Chapter 1 Introduction to Systems Analysis and Design Testbank

Multiple Choices

1. The process of understanding how an information system can support business needs, design the system, build it, and deliver it to users is the _____.

   a. analysis phase of the SDLC
   b. object oriented approach
   c. rule for creating a CASE tool
   d. systems development life cycle
   e. waterfall development methodology

   Ans: d

2. The person that identifies opportunities for improvements and designs an information system to implement them is called a(n) _____.

   a. computer programmer
   b. end-user
   c. systems analyst
   d. systems specialist
   e. technical writer

   Ans: c

3. The primary goal of the systems analyst is to _____.

   a. acquire a working tool
   b. create a wonderful system
   c. create value for the organization
   d. establish the phases of the SDLC
   e. identify opportunities for improvement

   Ans: c

4. Developing an information system is similar to building a house because you have to

   a. start with a basic idea of what is needed
   b. create simple drawings of what is needed and allow the customer to provide feedback
   c. develop a detailed set of blueprints
   d. actually build the project, often with some changes directed by the customer
   e. all of the above

   Ans: e

5. The four phases of the Systems Development Life Cycle are _____.

   a. analysis, gathering, modeling, and diagramming
   b. construction, installation, testing, and converting
   c. initiating, planning, controlling, and implementing
   d. planning, analysis, design, and implementation
   e. system request, feasibility, staffing, and construction

   Ans: d

6. Understanding why an information system should be built and determining how the project team will build it is part of the _____ phase of the SDLC.

   a. analysis
   b. system request
   c. gathering
   d. initiating
   e. planning

   Ans: e

7. The _____ is generated by the department or person that has an idea for a new information system.

   a. economic feasibility analysis
   b. requirements document
   c. project charter
   d. system request
   e. project plan

   Ans: d

8. The project sponsor is the _____.

   a. lead systems analyst on the project team
   b. person or department that requested the system
   c. lead computer programmer charged with writing the code for the system
   d. project team leader in charge of developing the system
   e. any of these choices may fill the role of the project sponsor

   Ans: b

9. Feasibility analysis examines several questions, including "_____?"

   a. Can it be built (technical feasibility)
   b. Do we have the right people to build it (organizational feasibility)
   c. If we build it, can our computers handle the load (operational feasibility)
   d. Can we get afford it (economic feasibility)
   e. all of these

   Ans: a

10. The project plan is the document that is used to _____.

    a. describe how the project team will go about developing the proposed system
    b. outline the tasks to be addressed in developing the proposed system and develop a time estimate for each task.
    c. outline the technical, economic, and organizational feasibility of the proposed system
    d. summarize the business need and explain how the proposed system supports that need and creates value
    e. all of these

    Ans: a

11. In which phase of the SDLC is the project plan developed?

    a. analysis
    b. design
    c. implementation
    d. planning
    e. reconstruction

    Ans: d

12. In which phase of the SDLC is the system proposal developed?

    a. analysis
    b. design
    c. implementation
    d. planning
    e. system delivery

    Ans: a

13. The analysis phase of the SDLC answers which questions?

    a. Who will create the system and when will it be used?
    b. Who will the system be for, what the system will do, when will it be used, and where will it be used?
    c. Why build the system, what the system will be, and how the system will work?
    d. Why build the system, who will the system be for, when will it be used, and how the system will work?
    e. Why build the system, who will the system be for, when will it be used, and where will it be used?

    Ans: b

14. Deciding how the hardware, software, and network infrastructure will operate occurs during the _____ phase of the SDLC.

    a. analysis
    b. design
    c. implementation
    d. planning
    e. strategy

    Ans: b

15. In which phase of the SDLC is the system specification developed?

    a. analysis
    b. design
    c. implementation
    d. planning
    e. system delivery

    Ans: b

16. Interfaces (e.g., menus, reports, forms) are specified during the _____ phase of the SDLC.

a. analysis
b. design
c. implementation
d. planning
e. system delivery

Ans: b

17. The phase of the SDLC when the system is actually built or purchased is the _____.

a. analysis
b. construction
c. design
d. implementation
e. planning

Ans: d

18. A development methodology that focuses on the processes as the core of the system is said to be _____.

a. vacation-oriented
b. structure-oriented
c. process-centered
d. object-oriented
e. data-centered

Ans: c

19. The principal disadvantages(s) with the waterfall development methodology is (are) _____.

a. a long time elapses between completion of the system proposal and the delivery of the system
b. if the team misses important requirements, expensive post-implementation programming may be needed
c. the design must be completely specified on paper before programming begins
d. all of these
e. none of these

Ans: d

20. _____ development is a structured design methodology that proceeds in a sequence from one phase to the next.

a. Parallel
b. Phased
c. Agile
d. Rapid Application
e. Waterfall

Ans: e

21. Any modern object-oriented approach to software development must be use case driven, _____, and iterative and incremental.

a. user-centric
b. architecture-centric
c. requirements-driven
d. model-driven
e. object-centric

Ans: b

22. Iterative and incremental development means that

a. the team is using a prototyping methodology
b. the system will be developed through versions
c. the system will be developed in phases
d. the system will undergo continuous testing and refinement
e. the team is using an agile methodology

Ans: d

23. In the Enhanced Unified Process, the inception phase involves several workflows including _____.

a. analysis
b. design
c. implementation
d. all of these
e. none of these

Ans: d

24. In the Enhanced Unified Process, the production phase involves several workflows including _____.

a. analysis
b. design
c. implementation
d. all of these
e. none of these

Ans: e

25. Overall, the consistent notation, integration among the diagramming techniques, and application of the diagrams across the entire development process makes _____ a powerful and flexible tool set for analysts and developers.

a. CASE
b. UML
c. DFDs
d. EPCs
e. Flow Charts

Ans: b

26. In SCRUM, teams organize themselves in a symbiotic manner and set their own goals for each _____.

    a. phase
    b. module
    c. week
    d. function
    e. sprint

    Ans: e

27. SCRUM belongs to the category of system development methodologies:

    a. agile development
    b. rapid application development
    c. structured design
    d. waterfall development
    e. rapid prototyping

    Ans: a

True/False

1. The primary objective of the systems analyst is to create a wonderful system.

   Ans: False

2. The planning phase is the fundamental process of understanding how an information system should be built and determining who on the project team will build it.

   Ans: False

3. During the analysis phase of the SDLC the systems analyst will decide how the hardware, software and network infrastructure, user interface, forms and reports will be used.

   Ans: False

4. The new information system is purchased or built during the implementation phase of the SDLC.

   Ans: True

5. The waterfall development methodology derives its name from the salmon that swim up the waterfall against the current.

   Ans: False

6. The infrastructure analyst is responsible for the design of the new business policies and processes.

   Ans: False

7. The role of the project manager includes managing the team members, developing the project plan, assigning resources and serving as the primary point of contact for people outside the project team.

   Ans: True

8. The role of the change management analyst includes ensuring that adequate documentation and support are available to the users.

   Ans: True

9. The business analyst is responsible for ensuring that the project is completed on time and within budget and that the system delivers all benefits that were intended by the project sponsor.

   Ans: False

10. The project manager develops ideas and suggestions for how to improve business processes, designs new business processes, and identifies the business value the new system will create.

    Ans: False

11. Determining who will use the system, what the system will do, and where and when it will be used is performed during the analysis phase of the SDLC.

    Ans: True

12. RAD (Rapid Application Development) adjusts the SDLC phases to get some of the system developed and into the hands of the users quickly.

    Ans: True

13. Agile development is considered a special case of RAD approach to developing systems.

    Ans: False

14. Phased development is considered a special case of RAD approach to developing systems.

Ans: True

15. Kim repeatedly performs the analysis, design, and implementation phases concurrently in a cycle until the system is completed. She then goes back and from scratch does a thorough design and implementation to complete the project. She is following a throwaway prototype methodology.

    Ans: True

16. Throwaway prototyping balances the benefits of well-thought-out analysis and design phases with the advantages of using prototypes to refine key issues before the system is built.

    Ans: True

17. The creation of a design prototype that is not a working information system, but represents a part of the system that needs additional refinement happens with the prototyping methodology.

    Ans: False

18. Parallel development relies on only one iteration of the analysis phase.

    Ans: True

19. A local retailer has hired Geneva and Sydney to develop his new information system. He is not sure what type of system he wants, but it must be completed in four months and he needs to know regularly that the project is on schedule. Geneva and Sydney should use the Waterfall Development methodology for constructing the system.

    Ans: False

20. The primary advantage of the Waterfall Development methodology is requirements are completely specified and held relatively constant prior to programming.

    Ans: True

21. *Extreme programming* is ideal for developing large mission-critical applications.

    Ans: False

22. An analyst with business skills that understands the business issues surrounding a system is commonly called a project manager.

    Ans: False

23. An analyst that focuses on the IS issues in a system, and who represents the interests of the IS department is called a systems analyst.

    Ans: True

24. The analyst that develops ideas and suggestions to improve the application of information technology is commonly called a systems analyst.

    Ans: True

25. An analyst that focuses on the technical issues of the organization (hardware, software, databases and networks) is commonly called a change management analyst.

    Ans: False

26. Scott has been assigned to focus on the users during the upcoming information systems installation. Scott will provide user training and documentation. His role is to serve as a change management analyst.

    Ans: True

27. Michelle has been assigned the task of completing the project in a timely manner and within budget. Her project team role is infrastructure analyst.

    Ans: False

28. Systems analysts Lori and Mark are employed by the local hospital. They have been assigned to develop a very complex patient monitoring system for the cardio-care unit using a new display technology. Throwaway prototyping is a very suitable methodology for this project.

    Ans: True

29. Agile development methodology aims at eliminating the modeling and documentation overhead in IS projects, while emphasizing simple, iterative application development.

    Ans: True

30. Extreme programming is founded on core principles such as communication, simplicity, feedback, and courage

    Ans: True

31. In extreme programming programmers pair up to write the code.

    Ans: True

32. Jim Smith is a project manager in the IS department of an insurance company and he just hired a group of four contractors to work on a project together with an in-house team of four full-time employees. He should use extreme programming as a methodology for the project.

    Ans: False

33. You are carrying out a project that involves information systems for the operation of controls in a passenger jet craft. This is an ideal project for you to follow a throwaway prototyping methodology.

    Ans: True

34. For complex systems, throwaway prototyping is not a suitable methodology, since it will lead to problems with maintaining the system.

    Ans: False

35. For complex systems, prototyping is not a suitable methodology, since it will lead to problems with maintaining the system.

    Ans: True

36. For urgent projects, it is a good idea to use a prototyping methodology.

    Ans: True

37. A project manager most likely would not have worked as a systems analyst in the past, since project management career track is independent of the system analyst's career track.

    Ans: False

38. Project team members focus on getting the project done, leaving change management to the business managers.

    Ans: False

39. The business analyst serves as the primary contact point with the project.

    Ans: False

40. The Unified Process is not use-case driven.

    Ans: False

41. Implementation is a phase in the Unified Process.

    Ans: False

42. Project management is a supporting workflow within the Unified Process.

    Ans: True

43. The Enhanced Unified Process goes beyond building the system and includes maintaining the system.

    Ans: True

44. The environment workflow in the Unified Process is designed to deal with the organizational and policy issues the project faces within the organizational environment.

    Ans: False

45. One of the criticisms of the Unified Process is that if fails to deal with the system after it has been delivered.

    Ans: True

46. Under the Unified Process, the Configuration and Change Management workflow includes risk management and scope management, among several other activities.

    Ans: False

47. Under the Unified Process, the Project Management workflow includes risk management and scope management, among several other activities.

    Ans: True

48. The business modeling workflow uncovers problems and identifies potential projects.

    Ans: True

49. In the Unified Process, the analysis phase follows requirements.

    Ans: False

50. In the Unifies Process, analysis is a workflow, not a phase.

    Ans: True

51. In the Enhanced Unified Process, the design and implementation workflows are the primary focus of the production phase.

    Ans: False

52. In the Enhanced Unified Process, the production phase focuses exclusively on supporting workflows.

    Ans: True

53. In the Unified Process, the implementation phase focuses on the deployment workflow.

    Ans: False

54. The vision document is a deliverable in the inception phase.

    Ans: True

55. The Unified Modeling Language is a collection of terms and diagrams designed to be used in data-oriented software projects.

    Ans: False

56. The Unified Modeling Language is a collection of terms and diagrams designed to be used in object-oriented software projects

    Ans: True

57. The Unified Modeling Language is a collection of terms and diagrams designed to be used in process-oriented software projects

    Ans: False

58. In the UML, the Deployment Diagram is a behavioral diagram that illustrates the dynamic interaction of the system with its environment.

    Ans: False

59. In the UML, the Activity Diagram illustrates all the interactions between the system and its environment.

    Ans: False

60. In the UML, the Use Case Diagram illustrates all the interactions between the system and its environment

    Ans: True

61. In the UML, the Class Diagram is an example of a structure diagram.

    Ans: True

62. In the UML, the Use Case Diagram is an example of structure diagram.

    Ans: False

63. Architecture Centric development requires functional (also known as external) diagrams in addition to structure and behavioral diagrams; however, the UML only has structure and behavioral diagrams.

    Ans: True

64. SCRUM is a type of agile development methodology.

    Ans: True

65. SCRUM has a designated team leader to lead the system development.

    Ans: False

66. It is questionable whether Scrum can scale up to develop very large, mission-critical systems.

    Ans: True

Short Answer

1. Indicate the four phases of the waterfall approach and mention its advantages and disadvantages.

Ans: Waterfall is a sequential process that has each of the four phases (planning, analysis, design, and implementation) completed following the previous one. The two advantages are that requirements are identified long before programming and changes are minimized. The two disadvantages are an extensive paper trail and the time that passes from initial proposal and system completion.

2. Briefly discuss the RAD methodology and mention its advantages and disadvantages.

Ans: The RAD methodologies attempt to address the weaknesses of the structured design methodologies by adjusting the phases of the SDLC to get parts of the system completed and in the hands of the users quickly. Analysis, design, and implementation are all speeded up. The advantages include the speed and quality of systems development, while the key disadvantage is the need to manage user expectations.

3. Explain the idea of prototyping and indicate when prototyping is appropriate.

Ans: Prototyping performs the analysis, design, and implementation phases of the SDLC concurrently and cyclically until the system is completed. This approach allows the analyst to quickly refine the user-requirements and to quickly get a system in the hands of the users (as long as it's not a large, complex application that many people need to use).

4. Explain the idea behind throw-away prototyping? When is it appropriate?

Ans: Throw-away prototyping is done at a different point in the SDLC than prototyping. It is done after a fairly thorough analysis phase has determined the user requirements, but when various technical issues may need to be solved or some of the user requirements may still be unclear. The design prototype is not a working system, just part of it. Thus, when the prototype is finished, there is not a complete system to deliver to the users. It may take longer to develop systems using throwaway prototyping. But it is suitable in projects where the requirements and/or technology issues are not well understood after the analysis phase. Projects that need to deliver reliable systems often use the throwaway prototyping technique.

5. Describes the roles of and activities performed by the business analyst and system analyst.

Ans: A BUSINESS ANALYST identifies the business value that a system will create, develops ideas and suggestions that improve the business process, and designs new processes and policies. Work experience of a business analyst is probably in the functional field or application, such as accounting, marketing or production management.

A SYSTEMS ANALYST develops ideas and suggests technology innovation to business processes, designs new business process and information systems, and ensures that IS standards are maintained. Work experience of a systems analyst is probably in analysis and design, programming, or some business area.

6. Describes the roles of and activities performed by the infrastructure and change management analysts.

Ans: An INFRASTRUCTURE ANALYST ensures the new system conforms to organizational standards and identifies infrastructure changes needed (to the network, database, hardware and software). Work experience of an infrastructure analyst is probably in networking, database administration, or various hardware or software systems.

A CHANGE MANAGEMENT ANALYST ensures that there is adequate documentation, user support, training, and change management strategies. Work experience of the change management analyst is probably in organizational behavior (any business field).

7. Explain the role of a project manager in an IS project.

Ans: The project manager is responsible for completing the project on-time and within budget. He/she is also responsible for ensuring that the completed system delivers all the benefits that were originally intended by the project sponsor. Project manager manages team members, develops work plan, assigns resources and is the primary point of contact for the project. He/she would have worked as a systems analyst for a significant amount of time prior to becoming the project manager.

8. Briefly summarize the purpose of the planning phase in SDLC. Explain why it exists and what it contributes to the completion of the system.

Ans: The purpose of the planning phase is to determine if the system request will provide value to the organization and to prepare a plan for completing the project. The Planning Phase exists so that the IS department and the project sponsors/users can develop an initial vision of the new system, establish its primary objectives, and perform a preliminary feasibility study that will evaluate the project's value to the organization and its estimated costs. With this information the organization's management can objectively assess whether the project has merit. The work done in this phase helps establish the project scope, define objectives and expectations, develop a plan for the project, and determine if the project warrants committing additional resources to its completion.

9. Briefly summarize the purpose of the analysis phase in SDLC. Explain why it exists and what it contributes to the completion of the system.

Ans: The purpose of the analysis phase is to determine the business needs of the new system and to develop a preliminary concept for the new system. The Analysis Phase exists in order to assure that the problems being experienced by the business unit are well understood and will be resolved through the features and functionality of the proposed system. The Analysis Phase serves to gather sufficient information to assure that the system will correct the actual problems of the organizational unit. System objectives will be clarified during this phase, and user and business requirements will be defined in detail.

10. Briefly summarize the purpose of the design phase in SDLC. Explain why it exists and what it contributes to the completion of the system.

Ans: The purpose of the design phase is to determine how technology will be used to fulfill the business needs defined in the Analysis phase. Design decision will be made regarding the technology infrastructure, user interface, file and database, and program components of the new system. These system elements must be designed prior to construction so that the system will meet user and business needs upon implementation.

11. Briefly summarize the purpose of the implementation phase in SDLC. Explain why it exists and what it contributes to the completion of the system.

Ans: The purpose of the implementation phase is to develop a production version of the system. The system components that were outlined in the design phase are created using the target technology, tested, and then introduced to the end users. This phase brings all the previous ideas into fruition as an actual working system is put into production in the organization.

12. Briefly describe the idea behind structured design approach to systems development.

Ans: Structured design represents a number of methodologies that adopt a formal, step-by-step approach for proceeding through the SDLC. These methodologies emphasize carefully determining user requirements on paper prior to actual construction of the system. Waterfall development model and parallel development model are examples of structured design.

13. Briefly describe the idea behind the RAD approach to systems development.

Ans: The RAD (Rapid Application Development) methodologies attempt to accelerate the process of developing systems, and also utilize a variety of new tools and techniques that help avoid the painstaking preparation of paper-based specifications. Most RAD methodologies recommend the usage of special tools such as CASE tools and special techniques such as joint application development (JAD) sessions. Such tools and techniques improve the speed and quality of systems development. However, managing user expectations of what is possible and what is not becomes difficult in RAD methodologies. Phased development, prototyping and throwaway prototyping are examples of RAD methodology.

14. Briefly summarize the role and contribution of the Business Analyst, Systems Analyst, Infrastructure Analyst, Change Management Analyst, and Project Manager on a systems development project team.

Ans: The Business Analyst role exists to assure that the interests of the end users and project sponsor are represented on the project team. The Systems Analyst role exists to assure that the available information technology is applied appropriately to the users/sponsors business needs. The Infrastructure Analyst role exists to deal with technical concerns about the new systems hardware, software, and networking components. The Change Management Analyst role exists to attend to the process of assimilating the new system in the organization. The Project Manager role exists to ensure timely completion of the project, fulfillment of user/sponsor requirements, and appropriate usage of project resources.

15. Briefly explain the idea behind extreme programming (XP).

Ans: In XP, developers not only accept change but embrace change. They provide quick feedback to the end-users on a continuous basis, and follow the KISS principle for system development. Developers make incremental changes as the system grows in functionality and size. Continuous testing, programming in pairs by developers and close interactions with end users are hallmarks of the XP approach. XP relies on refactoring, which is a disciplined way to keep the code simple.

16. Briefly compare and contrasts the roles and responsibilities of the project manager and the business analyst.

Ans: The project manager leads the project team; the business analyst is a team member. The project manager is responsible for overall project success; the business analyst is responsible for making sure the interests of the users and sponsor are met. The project manager's primary focus is on the project; the business analyst's primary focus is on the business. The project manager oversees technical and business people on the project team and does not necessarily have to be a technical wizard or an expert in the business, but it helps if he/she is proficient at both; the business analysts is the business expert on the team charged with making sure the technology delivers business value and does not have to be a technical wizard, but it helps if he/she is proficient with technology.

17. Briefly explain what the creators of the Unified Modeling Language (UML) mean by use-case driven, architecture centric, and iterative and incremental.

Ans: USE-CASE DRIVEN means that *use cases* are the primary tools for modeling the behavior of the system. A use case is a description of the interaction between the system and the user as the user seeks to accomplish a particular goal. Rather than decomposing processes into sub-processes, and sub-processes into sub-sub-processes, etc., etc., . . . , as is done in traditional structural analysis, use cases allow the analyst to focus on one process at a time without losing track of how all the use cases are interrelated.

ARCHITECTURE CENTRIC means that the development of the system is based on an initial understanding of the overall software architecture of the system from three perspectives or views.

- The *functional view* is a description of the system from the perspective of the user and focuses on what the system will do.
- The *static view* shows the classes of objects that make up the system, what they hold (attributes and methods), and their relationships.
- The *behavioral view* shows the messages sent between the objects and tracks their state changes.

ITERATIVE AND INCREMENTAL means that the development of the system undergoes continuous testing and refinement throughout the life of the project. It means you make some progress and before going forward, you go over everything you've done to make sure everything fits well and nothing is missing. The three architectural perspectives help. The analyst begins by working with the user to develop the functional view. He /she then uses this view to draft the static and behavioral views. In so doing he/she may discover discrepancies and missing requirements. He/she revisits the functional view. This continues until the three views are in sync.

18. Briefly describe the Unified Process (UP).

Ans: The UP is used for systems development and relies on a two-dimensional process of phases and workflows. The phases are inception, elaboration, construction, and transition. The phases measure how far along the project is. The workflows include business modeling, requirements, analysis, design, implementation, test, deployment, configuration and change management, project management, and environment. Each phase can be further broken down into iterations as needed. The key idea is that the traditional phases (planning, analysis, design, and implementation) are actually workflows, not phases. Along with other workflows, in the UP the traditional SDLC phases are activities carried out iteratively and incrementally throughout the project. Each iteration carries out a variety of workflows in parallel, emphasizing some workflows over others depending on how far along the project is.

19. Briefly describe the phases of the Unified Process.

Ans: The UP phases are inception, elaboration, construction, and transition.

In the INCEPTION PHASE the team sets out to build the business case for the system. It includes carrying out technical, economic, and organizational feasibility studies. In order to build the business case it may be necessary to deploy a tentative solution. The primary deliverables for the inception phase are the vision document and the decision of what environment to use to develop the system.

In the ELABORATION PHASE enough details are added to the vision document to finalize the business case, revise the risk assessment, and complete the project plan. The primary focus for this phase is on the analysis and design workflows.

In the CONSTRUCTION PHASE the system is built to the point where it is ready for beta and acceptance testing. In this phase the focus is primarily on programming. It is during this phase that missing requirements are uncovered, so the requirements workflow is still active. In addition, the configuration and change management workflow becomes increasingly important during this phase.

In the TRANSITION PHASE the goal is delivery of the actual executable information system including user manuals, maintenance plan, and upgrade plan. The focus in this phase is on the testing and deployment workflows.

20. Briefly explain why the Unified Process (UP) was modified.

Ans: The UP was modified to account for staffing issues, operational issues after deployment, and integration (or cross-project) issues. The Extended UP recognizes a phase after deployment. This is the Production Phase. In addition, two workflows were added. They are the operations and support workflow and the infrastructure management workflow. Lastly, some of the existing workflows were modified to account for emerging standards (OPEN and the OO Software Process).

21. Briefly describe the Unified Modeling Language (UML).

Ans: The objective of the UML was to provide a common vocabulary of terms and diagramming techniques rich enough to model any systems development project. Version 2.0 of the UML defines a set of fourteen diagramming techniques. The six structure diagrams are class, object, package, deployment, component, and composite structure diagrams. The eight behavior modeling diagrams are activity, sequence, communication, interaction overview, timing, behavior state machine, protocol state machine, and use-case diagrams. Overall, the consistent notation, integration among the diagramming techniques, and application of the diagrams across the entire development process makes the UML a powerful and flexible language for analysts and developers.

22. Briefly describe the SCRUM agile development methodology.

Ans: Scrum development focuses on a few key practices. First, teams are self-organized and self-directed. Unlike other approaches, Scrum teams do not have a designated team leader. Instead, teams organize themselves in a symbiotic manner and set their own goals for each sprint (iteration). Second, once a sprint has begun, Scrum teams do not consider any additional requirements. Any new requirements that are uncovered are placed on a backlog of requirements that still need to be addressed. Third, at the beginning of every workday, a Scrum meeting takes place. Fourth, at the end of each sprint, the team demonstrates the software to the client. Based on the results of the sprint, a new plan is begun for the next sprint. One of the major criticisms of Scrum, like all agile methodologies, is that it is questionable whether Scrum can scale up to develop very large, mission-critical systems. A typical Scrum team size is no more than seven members.

Chapter 2 Project Management
Testbank

Multiple Choices

1. The person who identifies the business value that can be gained from using information technology is called the _____.

   a. manager
   b. project sponsor
   c. staff member
   d. system analyst
   e. system request

   Ans: b

2. In order to approve a system request, the approval committee must know

   a. all of the details of the ultimate system to be developed.
   b. the high level functionality of the system.
   c. what the screens and reports will look like in the final system.
   d. who the end users of the system will be and exactly how they will use it in their jobs.
   e. all of these.

   Ans: b

3. _____ value can be quantified during the project initiation phase.

   a. Expected
   b. Tangible
   c. Intangible
   d. Real
   e. Salvage

   Ans: b

4. _____ is the process of examining the technical, economic, and organizational pros and cons of developing a new system.

   a. Committee approval
   b. Feasibility analysis
   c. Functionality determination
   d. Risk analysis
   e. System request

   Ans: b

5. Most system requests include all of the following except _____.

   a. business need
   b. business requirements
   c. project sponsor
   d. project manager
   e. business value

   Ans: d

6. The four elements commonly found on a system request are _____.

   a. economic, organizational, technical, and operational feasibility
   b. project sponsor, business need, business requirements, and business value
   c. risk analysis, familiarity, project size, and cost-benefit analysis
   d. training, software, installation, and equipment
   e. upgrades, licensing fees, repairs, and charges

   Ans: b

7. Suppose a proposed new financial reporting system for the AMF Biotech Corporation must be completed by the start of the next fiscal year in order to comply with new government regulations. This information should be included as part of the _____ section of the system request.

   a. business need
   b. business value
   c. business requirements
   d. special issues or constraints
   e. none of these

   Ans: d

8. Explaining "the business capabilities of the information system" is written in the _____ section of the system request.

   a. business need
   b. business value
   c. business requirements
   d. project need
   e. special issues

   Ans: c

9. Feasibility analysis may be defined as a(n)_____.

   a. assessment of ability of the ultimate users of the system to accept the system and incorporate it into the ongoing operations of the organization
   b. determination of the extent to which the system can be technically designed, developed, and installed
   c. guide to determining whether to proceed with a project
   d. identification of only the costs and benefits associated with the project
   e. none of these

   Ans: c

10. Which of the following factors could be included in a technical risk assessment?

    a. Cost of a new Web server
    b. Cost of hiring a Webmaster
    c. No previous experience with Java within the IS department
    d. Some fear of job loss among order entry department personnel
    e. all of these

    Ans: c

11. Which of the following factors would tend to increase the technical risk of a project?

    a. familiarity with the technology
    b. large project size
    c. creating an application that is familiar to the users and analysts
    d. small project size
    e. the number of other applications under development in the firm

    Ans: b

12. _____ feasibility is determined by identifying costs and benefits associated with the system.

    a. Economic
    b. Functional
    c. Organizational
    d. Intangible
    e. Technical

    Ans: a

13. Examples of development costs include all EXCEPT _____.

    a. consultant fees
    b. hardware expenses
    c. salaries for the project team
    d. software licensing fees
    e. none of these

    Ans: d

14. Operational costs that are examined during feasibility analysis include _____.

    a. data conversion cost
    b. development training
    c. user training
    d. equipment upgrades
    e. initial consultant fees

    Ans: d

15. The calculation that measures the amount of money an organization receives in return for the money it spends is called the _____.

    a. cash flow
    b. net present value
    c. total investment
    d. tangible costs
    e. return on investment

    Ans: e

16. The level of acceptance by the users of a system and the extent to which the new system will be incorporated into the operations of the organization are expressed in the _____ feasibility.

    a. economic
    b. familiarity
    c. functional
    d. organizational
    e. technical

    Ans: d

17. The project champion is a(n)_____.

a. high-level IS executive who is usually but not always the project sponsor who initiated the system request
b. mid-level IS manager who has the responsibility of controlling and directing the development process
c. high-level non-IS executive who is usually but not always the project sponsor who initiated the system request
d. senior member of the user group who participated in the RAD sessions
e. none of these

Ans: c

18. Peter is the vice president of accounting and finance. For the past year he has solely provided the resources necessary to get the just-in-time accounting system through the planning and analysis phases of the SDLC. Other managers have openly stated that the JIT system is not worth the investment. The SEC has just placed Peter under investigation for insider trading and the board has asked him to resign. This project is failing _____ feasibility analysis.

a. organizational
b. champion
c. functional
d. economic
e. technical

Ans: a

19. If end users feel fearful or threatened by a proposed new system, this factor should be included as a part of the _____.

a. economic feasibility assessment
b. organizational feasibility assessment
c. system proposal
d. system request
e. technical feasibility assessment

Ans: b

20. _____ is the process of planning and controlling the development of a system within a specified time frame at a minimum cost with the right functionality.

    a. Project management
    b. Semantic timeline
    c. Task identification
    d. Time estimation
    e. Work plan

    Ans: a

21. The most significant challenge to project managers is _____.

    a. lack of project management training
    b. no one really understands how to manage a complex systems development project
    c. the lack of tools that can assist in controlling project progress
    d. unrealistic schedule demands by project sponsors
    e. all of these

    Ans: d

22. A critical success factor for project management is to _____.

    a. create a work plan
    b. follow the three steps of project management
    c. identify most project tasks
    d. manage the hundreds of tasks
    e. start with a realistic assessment of the work

    Ans: e

23. The three steps of project management are _____.

    a. controlling the project, directing the project, and creating the work plan
    b. creating the work plan, staffing the project, and controlling and directing the project
    c. directing the project, creating the work plan, and naming the tasks
    d. naming the tasks, creating the work plan, and completing the deliverables
    e. setting the start date, estimating the time, and reading the actual time

    Ans: b

24. The _____ is a dynamic schedule that logs and monitors all of the tasks that need to be accomplished for the length of the project.

    a. margin of error
    b. project manager
    c. project objective
    d. timebox
    e. work plan

    Ans: e

25. Diane needs to create a work plan for an upcoming systems project. She must first _____.

    a. estimate the hours and request deliverables
    b. identify the tasks and estimate the time needed to complete them
    c. initiate the project and create the project management assessment
    d. make tradeoffs and set conservative numbers
    e. timebox the completion date

    Ans: b

26. To identify the tasks for a work plan the project manager can _____.

    a. control and direct the project
    b. estimate the size, staff the project, and remember technical skills
    c. establish a possible reporting structure
    d. list the four phases of the SDLC and the steps that occur in each
    e. set conservative numbers for the project software

    Ans: d

27. Project managers can develop task lists for a project with the help of _____.

    a. established methodologies
    b. system proposals
    c. system requests
    d. user application hardware
    e. user requirements

    Ans: a

28. The process of assigning values for the time and effort needed to perform a system project is called _____.

    a. analysis
    b. estimation
    c. identifying
    d. planning
    e. preparation

    Ans: b

29. Kathryn has little experience estimating the time it will take to complete a systems project. She has just completed the planning phase of the project. What method should she use to estimate the time required to build the system?

    a. adjusted project complexity
    b. function points
    c. industry standards
    d. Microsoft Project
    e. more complex approach

    Ans: c

30. Adding people to a project team in order to speed up total development time _____.

    a. is a standard task in timeboxing
    b. is a useful way to meet a tight deadline
    c. may actually increase total development time
    d. simplifies communication within the team
    e. none of these

    Ans: c

31. Traditional work breakdown structures tend to

a. focus on the design of the system as oppose to the needs of the current phase and iteration
b. force too many levels of detail early on for large project and they tend to allow too few level of detail for small projects
c. be too specific for the project and difficult to compare across projects
d. all of these
e. none of these

Ans: d

32. Unlike traditional work breakdown structures (WBS), *evolutionary* WBSs are

a. organized in a standard manner across all projects
b. created in an iterative and incremental manner
c. designed so one can compare the current project to past projects
d. all of these
e. none of these

Ans: d

33. Staffing plan that lists the roles and the proposed reporting structure that are required for the project. Typically, a project will have one _____, who oversees the overall progress of the development effort, with the core of the team comprising the various types of analysts.

a. team lead
b. functional lead
c. technical lead
d. project manager
e. business analyst

Ans: d

34. Demarco and Lister identify five characteristics of a jelled team. Which one is not the characteristics of a jelled team:

a. Jelled teams have a very low turnover during a project.
b. Jelled teams have a strong sense of identity.
c. The strong sense of identity tends to lead the team into feeling a sense of eliteness.
d. during the development process, jelled teams feel that the team owns the information system being developed and not any one individual member.
e. They always complete their work on time.

Ans: e

35. The central component of any CASE tool is the _____,

a. CASE repository
b. files
c. XML/HTML files
d. databases
e. object persistency

Ans.: a

36. Use-case points is a project effort estimation approach based on unique features of _____ and object orientation.

a. functions
b. classes
c. objects
d. projects
e. use cases

Ans: e

37. For use-case point estimation purposes, actors can be classified as simple, _____, or complex.

a. difficult
b. medium
c. average
d. common
e. feasible

Ans.: c

38. Use-case point–based estimation also has a set of factors that are used to adjust the use-case point value. Which one list in the following is Not one of the technical factors:

a. Whether the system is going to be a distributed system
b. The importance of customer service
c. The efficiency level of the end user using the system
d. The complexity of the internal processing of the system
e. The importance of code reuse

Ans.: b

True/False

1. Familiarity with the application and technology are major factors considered under economic feasibility.

   Ans: False

2. Cost benefit analysis identifies the financial costs and benefits associated with a systems project.

   Ans: True

3. To identify the costs and benefits related to the computer technology for a project the systems analyst should rely on the business users.

   Ans: False

4. Happy customers is a tangible cost that can be included in a cost-benefit analysis.

   Ans: False

5. A 20% increase in sales volume is a tangible benefit that can be included in a cost-benefit analysis.

   Ans: True

6. A limitation of a formal cost-benefits analysis is that it contains the costs and benefits for just one year.

   Ans: False

7. A high return on investment (ROI) results when benefits far outweigh the cost of a new project or information system.

   Ans: True

8. How well a system is accepted by the users and incorporated into the ongoing operations of the business is defined in the technical feasibility.

   Ans: False

9. Project size is an important consideration in technical feasibility. Larger projects create more risk, both because they are more complicated to manage and because there is a greater chance that some important system requirements will be overlooked or misunderstood.

   Ans: True

10. Economic feasibility includes an assessment of financial impact in four categories: (1) development costs, (2) operational costs, (3) tangible benefits, and (4) intangible costs and benefits.

    Ans: True

11. The return on investment (ROI) should be used as the sole indicator of a project's worth because it considers the end points of the investment, not the cash flow in between.

    Ans: False

12. User participation should be promoted throughout the development process to make sure that the final system will be accepted and used.

Ans: True

13. Economic feasibility is determined by identifying costs and benefits associated with the system, assigning values to them, and then calculating the cash flow and return on investment for the project.

    Ans: True

14. The champion is a high-level IS executive who initiates the system request and supports the project by providing time, resources, and political support within the organization by communicating the importance of the system to other organizational decision makers.

    Ans: False

15. Economic feasibility focuses on whether the system can be built by examining the risks associated with the users' and analysts' familiarity with the application, familiarity with the technology, and project size.

    Ans: False

16. It is not necessary to assign dollar values to intangible costs and benefits; it is almost impossible to come up with reasonable numbers for all of the costs and benefits that haven't happened yet.

    Ans: False

17. Project initiation begins when the project sponsor identifies business value that can be gained by using information technology.

    Ans: True

18. System requests often include the project team members including the project manager and the analysts.

    Ans: False

19. A feasibility analysis includes whether the project has been permitted by the CIO of the company.

    Ans: False

20. The feasibility analysis helps the approval committee determine whether or not to proceed with a project.

    Ans: True

21. Technical feasibility focuses on whether the system can be built by examining the risks associated with the application.

    Ans: True

22. Lauren, a systems analyst, is concerned that she and the end-users at her company do not have experience with a new scanner technology that will soon be implemented. This identified risk falls under economic feasibility.

    Ans: False

23. Nicole has identified development and operational costs for a soon-to-be built information system. Her findings will be listed under economic feasibility in the analysis report.

    Ans: True

24. Development costs that are examined during feasibility analysis include costs for software licenses and software upgrades.

    Ans: False

25. Natalie has been asked by her project manager to list the possible intangible benefits for a new system. Her list will include reduced expenses for the company.

    Ans: False

26. ROI calculations do not consider the present value of future money.

    Ans: True

27. Organizational feasibility can be evaluated by conducting a stakeholder analysis.

    Ans: True

28. Kelly Smith, the vice president of marketing, has provided resources and political support for the new production management information system. She has acted as the project manager for the project.

    Ans: False

29. The person or group that funds a project and enthusiastically promotes the project throughout the organization is the project champion.

    Ans: True

30. The organizational management of a business is involved in hands-on activities related to the project.

    Ans: False

31. During organizational feasibility analysis the system users are the stakeholders that are responsible for providing enough budget and promoting the project.

    Ans: False

32. System users are stakeholders who perform hands-on activities related to the project.

    Ans: True

33. Present value calculation takes inflation and time into account.

    Ans: True

34. The formula for net present value (NPV) is the ratio of (Total benefits – Total Costs) to Total Costs.

    Ans: False

35. Calculating the break-even point helps in understanding how long it will take before the system creates real value for the organization.

    Ans: True

36. Determining whether the new system will be compatible with the existing technology that already exists in the organization is part of the organizational feasibility study.

    Ans: False

37. Project management is the process of planning and controlling the development of a system within a specified time frame at a minimum cost with the right functionality.

    Ans: True

38. When planning a systems project, overly optimistic timetables are the cause of project completion delays.

    Ans: True

39. Creating a work plan requires three steps: identify the tasks that need to be accomplished, estimate the time that it will take to complete the tasks, and record the task completion time in a Gantt chart.

    Ans: False

40. When estimating project time schedules using industry standards for a systems project, the following values are acceptable: 15% for planning, 25% for analysis, 50% for design, and 10% for implementation.

    Ans: False

41. Using typical industry standards for estimating project time schedules, the estimated analysis phase would be 10 person-months for a systems project where the planning phase was completed in 7.5 person-months.

    Ans: True

42. To complete a 20 person-month project in 10 months, a team should have 4 full-time staff members assigned to the project.

    Ans: False

43. Project management is the second major component of the planning phase of the systems development life cycle (SDLC), and it includes three steps: creating the work plan, staffing the project, and controlling and directing the project.

    Ans: True

44. The work plan records and keeps track of all of the tasks that need to be accomplished over the life of the project, listing each task, along with important information about it, such as when it needs to be completed, the person assigned to do the work, and any deliverables that will result.

    Ans: True

45. It is not wise to identify tasks for a current project using existing methodology, because methodologies that have been used by an organization for other projects probably will not work for this project without extensive changes.

Ans: False

46. Adding staff to a project to shorten the project's length is usually a wise move, because adding staff normally translates into increased productivity.

    Ans: False

47. Timeboxing is a popular technique which sets a fixed deadline for a project and delivers the system by that deadline no matter what, even if functionality needs to be reduced.

    Ans: True

48. A key factor in staffing a project involves motivating people to meet the project's objectives, and the most effective way to do this is through the use of money and bonuses.

    Ans: False

49. Estimates from the planning stage will need to be refined as the project progresses, because it is virtually impossible to develop an exact assessment of the project's schedule before the analysis and design phases are conducted.

    Ans: True

50. Benefits to using computer-aided software engineering (CASE) include faster task completion and alteration, centralized development information, and illustration of information through diagrams.

    Ans: True

51. Scope creep is only a minor factor in projects running over schedule, and every effort should be made to incorporate any changes into the present system if they would truly be beneficial.

    Ans: False

52. Sergei, the project manager, is worried about completing the project on time. To increase the productivity of his 15-person team he should create subteams with no more than 10 people on a subteam.

    Ans: True

53. The project team has just determined that the deadline for completion will not be met. In order to deliver a high quality system on schedule, the team has requested that the features be prioritized and that a fixed deadline be imposed for the project. This technique is referred to as SDLC methodology.

    Ans: False

54. Timeboxing is a time-oriented approach to project development.

    Ans: True

55. Matching people's skills with the needs of the project, motivating employees, and minimizing personnel conflict are all part of the staffing process.

    Ans: True

56. The project charter describes the qualifications of the people who will work on a project and the reporting structure of the project team.

    Ans: False

57. The document that describes the project's objectives and rules is called the project charter.

    Ans: True

58. Lauren, a systems analyst, has excellent interpersonal skills. To take advantage of her skills, the functional lead of the project should assign her to program in Java and C++.

Ans: False

59. A functional lead manages a group of programmers and technical staff members.

Ans: False

60. A technical lead manages a group of analysts.

Ans: False

61. Christine does not have the skills that her project manager feels are necessary and no money has been budgeted for outside consultants. Mentoring is a good option to improve Christine's skills in this situation.

Ans: True

62. Daniel has just been assigned as the project manager. To motivate his team properly, Daniel's first step is to award bonuses to team members.

Ans: False

63. A highly effective motivational technique for technical staff is to provide recognition for each team member's accomplishments.

Ans: True

64. A good technique to help minimize conflict among team members is to hold team members accountable for their tasks.

Ans: True

65. According to leading experts in software development, the margin of error when estimating project costs is 100% and the margin of error in project scheduling time is 25%.

Ans: True

66. CASE tool is a popular graphic depiction of the work plan that lists project tasks along a y-axis, time along an x-axis, and uses shaded boxes to represent tasks.

Ans: False

67. PERT chart can be used to track the tasks of a project when task time estimates are fairly uncertain.

Ans: True

68. Integrated CASE tools are used to support tasks that happen throughout the SDLC.

Ans: True

69. Jim Smith, the project manager for a high-profile project, has permitted the users to add additional features to the systems project. The schedule and costs are now running over. This project suffers from poor standards.

Ans: False

70. The underlying cause of many missed project deadlines is scope creep.

Ans: True

71. The most common reason for schedule and cost overruns that surface after the project is underway is scope creep.

Ans: True

72. The traditional work breakdown structure approach is very useful when the requirements of the system are not well understood.

Ans: False

73. The evolutionary work breakdown structure approach is very useful when the requirements of the system are not well understood.

Ans: True

74. The traditional work breakdown structure makes it easy to compare the current project with past projects.

Ans: False

75. The evolutionary work breakdown structure makes it easy to compare the current project with past project

Ans: True

76. Use-case point–based estimation also has a set of factors that are used to adjust the use-case point value.

Ans: True

77. From a practical point of view, to estimate effort using use-case points, the use cases and the class diagrams must have been created.

Ans.: False

78. For use-case point estimation purposes, actors/use cases can be classified as simple, common, or complex.

Ans: False

79. The network diagram is a graphical way that lays out the project tasks in a flowchart to look at project workplan information.

Ans.: True

80. Network diagrams are the best way to communicate tasks dependencies because they lay out the tasks in the order in which they need to be completed.

Ans.: True

81. The critical path in a network diagram is the shortest path from the project inception to completion.

Ans: false

82. The science (or art) of project management is in making trade-offs among three important concepts: the functionality of the system, the time to complete the project, and the reliability of the project.

Ans.: False

83. The first step of timeboxing is set the date for system analysis.

Ans.: False

84. In a jelled team, team members enjoy doing their work.

Ans.: True.

85. Usually, a functional lead oversees the progress of a group of programmers and more technical staff members.

Ans.: False

86. Typically, a project will have one project manager, who oversees the overall progress of the development effort.

Ans.: True

87. Typically, a technical lead is usually assigned to manage a group of analysts.

Ans.: False

88. Essentially a daily scrum meeting is a very short, typically 15 minutes.

Ans.: True

89. Typically, the task of a daily scrum meeting is to find solutions for important development issues.

Ans.: False

Short Answer

1. Economic feasibility includes an assessment of financial impacts in four categories. What are these four financial categories and how are values assigned to each?

   Ans: The four financial categories of an economic feasibility are development costs, operational costs, tangible benefits, and intangible benefits and costs. Development costs are one-time-only costs that are incurred during the construction of the system, such as the salaries of the project team, and hardware and software expenses. Operational costs are the recurring variable costs that are required to operate the system for its lifetime. Tangible benefits are the revenues and cost savings that the system enables the organization to collect or avoid. Tangible benefits include items such as increased sales and reductions in staff. Intangible benefits and costs are difficult to put into hard numbers. Examples of intangibles include improved customer service and a decrease in goodwill.

   To assign values for these financial categories it is normally best to rely on the people who have the best understanding of them. Costs and benefits related to technology can be provided by the IS group or external consultants. Business users, such as sales managers or plant managers, can develop the numbers associated with the business. It is more difficult to apply values to intangible costs and benefits. Some organizations list intangible cost and benefits without values other attempt to provide projection based on estimates. An example of an intangible projection based on an estimate is that an increase in customer service may result in a 10% decrease in customer complaints. A 10% decline in phone calls will decrease the $200,000 cost of the customer service phone system to $180,000 per year.

2. Jane, the head nurse on the surgery recovery floor, is going to place a request for a system that will create a report from data already in the patient record system and print this report to printers located just outside each of 12 patient's rooms and the central nurses station. Jane feels that a graphical report that combines the patient record of pain and pain medication received is absolutely necessary for the doctors and nursing staff to make proper medical decisions concerning patient recovery. Nurses already record the date, time, and severity of pain each time the patient complains or notifies them of discomfort. The pharmacy nurse records the amount of pain medication administered to each patient immediately after administration. Jane feels that combining these two pieces of information will improve medical decision making and provide better care to the patient. In addition, this method will increase the accuracy of reporting and reduce cost. Assist Jane by completing a System Request.

   Ans:

   Project Name: Patient record of pain and pain medication received Report

   Project Sponsor: Jane, Head Nurse, Surgery Recovery

Business Need: Doctors and Nurses need to know at the bedside amount of pain a patient is having and a record of the amount of pain medication the patient has received.

Business Requirements: The patient record of pain and pain medication received report should present graphically the time, date and severity of pain for each occurrence based on the patient's notification and the amount of pain medication received from the pharmacy nurse.

Business Value:
Tangible: Reduced costs and increase accuracy.

Intangible: Combining these two pieces of information will improve medical decision-making and provide better care to the patient.

3. Jane, the head nurse on the surgery recovery floor, is going to place a request for a system that will create a report from data already in the patient record system. This report should be sent to new printers (cost per printer is approximately $2,000) located just outside each of 12 patient's rooms and the central nurse's station. Jane feels that a graphical report that combines the patient record of pain and pain medication received is absolutely necessary for the doctors and nursing staff to make proper medical decisions concerning patient recovery. Nurses already record the date, time, and severity of pain each time the patient complains or notifies them of discomfort. The pharmacy nurse records the amount of pain medication administered to each patient immediately after administration. Jane feels that combining these two pieces of information will improve medical decision making and provide better care to the patient. The IS manager has approved $50,000 for the development of the system and estimates that maintaining the system for the next five years will cost $2,000 per year. In addition, this method will increase the accuracy of reporting by 10% per year for three years and reduce pharmacy costs (cost of pain reducing drugs) by 15% in the first year of introduction. Current expenses credited to inaccurate data gathering are $100,000 per year. Pharmacy costs are currently $10 million.

   Identify the costs and benefits in the four financial categories assessed during a feasibility analysis.

   Ans: The intangible benefits for the new system are “improved medical decision making” and “better care to the patient.”

   The tangible benefits for the new system are increased accuracy of reporting by 10% per year for three years and reduced pharmacy costs by 15% in the first year of introduction.

   The new system’s development costs are the price of 12 printers at $2,000 each and $50,000 for the software development.

   The operational costs are estimated at $2,000 per year for next five years.

4. Revenue estimates for Cloud Selection's new Internet music business were computed using three different methods. What is the purpose and value of performing so many computations in determining these estimates?

   Ans: In this case, the new system under consideration was an entirely new line of business for the company - sales of product via the Internet. Because this is essentially a new business venture made possible by Internet technology, it was not a straightforward task to project expected revenues. None of the previous business models (such as the opening of a new store) really applied. Therefore, it was essential to use a variety of approaches to generate revenue estimates. A range of estimates could then be established; conservative projections would fall in the low end of the range, while optimistic estimates would fall in the high end of the range. There is far too much uncertainty in this situation to rely on one method of revenue estimation alone.

5. The feasibility study is performed during project initiation. How can this feasibility assessment be accurate so early in the project? Explain.

   Ans: The feasibility assessment performed during project initiation is admittedly going to be imprecise. There will be a great deal of uncertainty about many of the issues included in the first feasibility study. It is essential, however, for the project team to address all the issues required in the feasibility study even at an early stage in the project. That way, the team becomes more familiar with the nuances of the specific project, and is alert to new information that will have an impact on the project's feasibility. The feasibility assessment should be modified throughout the project to ensure that new information is incorporated into the analysis as it becomes available. It is certainly possible that a system that once appeared feasible becomes infeasible at a later time because of new information that is discovered.

6. Assigning values to costs and benefits involves making some difficult predictions of the future. How can the project team improve the accuracy of these estimates?

   Ans: There are several things that can improve the accuracy of cost and benefit estimates. Most importantly, the project team should contact those persons or groups who are most likely to have accurate information about the factor under study. For example, the organization's market researchers or a marketing research consulting firm should be contacted to provide sales projections rather than the project team developing its own. Another way to improve estimates is to keep detailed records about estimates made for previous projects. Those project estimates can be compared to 'what really happened,' and the estimating process can be improved by learning from previous successes and failures. A third way to improve estimates is to use a variety of approaches and assumptions in the estimating process. This can help the project team avoid the inadvertent omission of key factors in the analysis.

7. Compare and contrast the cash flow, return on investment, and net present value methods of assessing a project's economic feasibility.

   Ans: All three methods require that initial and annual costs and benefits be projected for the expected life of the system (usually considered 3-5 years). In the Cash Flow method, all costs and benefits are totaled over the system's life, and the net benefits are computed. The higher the net benefit figure, the more desirable the project. The Return on Investment method divides the total net benefits over the system's life by the total costs of the system. This ratio of net benefits to total costs indicates a rough return on investment figure, and the higher the ratio, the more positive the project. The Net Present Value method discounts the initial and annual costs and benefits to their present value equivalents using a required rate of return factor, then compares the present value of total benefits to the present value of total costs. If this figure is zero or more, the project is considered viable. Although all three methods are based on the same cash inflow and outflow projections, the Cash Flow and Return on Investment methods do not consider the timing of the cash flows or the time value of money. Therefore, the Net Present Value method is preferred from a financial standpoint.

8. Explain the role and interests of the project champion, organizational management, and end users regarding a new system project. How will each impact the organizational feasibility of the project?

   Ans: The project champion serves as a highly visible promoter of the system. The project champion plays an important role in generating excitement and interest in the system, and often smooths the way politically for the new system's introduction in the organization. There have been many instances of an otherwise viable systems development project being derailed due to the departure of the project champion from the organization. Organizational management has an interest in seeing that resources are used effectively in the project and that a successful system is produced. By showing support for the system, organizational management can help encourage the adoption of the new system upon implementation. Weak or inconsistent management support has contributed to the failure of many systems projects. End users are the recipients of the new system and will be most affected by it on a daily basis. If end users view the system as an improvement of their work life, they will support the new system. If end users are fearful or feel threatened by the new system, they will resist the new system. Two ways to gain end user support are to involve them in the development of the system, and to provide training and education that helps prepare them for the new work environment.

9. Why is it important for systems developers to consider the area of organizational politics when creating a new system?

   Ans: It is likely that a new information system will create a change in the power structure of a firm. The text quotes Machiavelli about the difficulties that will be encountered when a "new order of things" is created, and that is certainly what a large number of new systems do in organizations. A systems developer should be aware of the changes that the system will cause in the organization and plan accordingly.

10. Explain different sections of a system request.

    Ans: System request consists of the following sections: Project Sponsor, Business Need, Business Requirements, Business Value, Special Issues or Constraints. Project sponsor is the person who initiates the project and who serves as a contact on the business side. Business need articulates the reasons on why the system is needed, while business value summarizes the tangible and intangible benefits that the organization may receive from the proposed system. Business requirements summarize what the system functionality should be at a high level. Special issues list constraints such as specific deadlines or other issues that the approval committee must take into consideration.

11. Explain the three different aspects of a feasibility analysis.

    Ans: Feasibility analysis includes technical, economic and organizational feasibility. Technical feasibility answers the question "Can the organization build the system?" It considers issues such as organization's familiarity with technology, familiarity with the application, project size and compatibility. Economic feasibility answers the question "Should the organization build the system?" It considers issues such as development costs, annual operating and support costs for the system, annual benefits and intangible costs and benefits. Finally, organizational feasibility addresses the question "If the system is built, will it be used effectively in the organization?" Organizational feasibility is often conducted by an analysis of the stakeholders: users, organization management and the project champion.

12. Identify the seven steps involved in conducting the economic feasibility.

    Ans: (1) Identify costs and benefits (2) Assign values to costs and benefits (3) Determine cash flow (4) Determine net present value (5) Determine return on investment (6) Calculate break-even point (7) Graph break-even point

13. Explain the role of the project champion.

    Ans: The project champion is a high-level non-IS executive who is usually but not always the person who created the system request. The champion supports the project by providing time, resources, and political support within the organization. The champion effectively communicates the importance of the project to organizational decision makers. Often more than one project champion is desirable, to account for the possibility that the champion may leave his/her current job within the organization.

14. Explain four different dimensions that a technical feasibility analysis should consider.

    Ans: Technical feasibility is concerned with the question "Can we build it?" To answer this question, the following four dimensions should be evaluated: (1) familiarity with the application (2) familiarity with technology (3) project size, and (4) compatibility. *Familiarity with the application* is an important source of risk because, if the analysts are not familiar with the application, there is a high probability that the system requirements and opportunities for improvements may be misunderstood. In addition, construction of a new system is more risky than enhancing an existing system. *Familiarity with technology* --- or lack thereof --- in an organization can increase the risk of the project. If the technology required to complete the project was never used before in the organization, there is a high probability that it will lead to unexpected delays for the project. The larger the *project size*, the greater the chance that some important aspects of the system may have been missed or misunderstood. Larger projects also pose challenges in project management. Finally, the extent to which the new system will be *compatible* with the existing technology and infrastructure of the organization should be considered in technical feasibility analysis. If the new system does not integrate well with the existing technological environment and infrastructure, it increases the risk of the project.

15. Outline the three important components for staffing a project. Include topics such as matching peoples' skills with project needs, motivating team members, and minimizing conflict. Structure the essay into three or more paragraphs, one for each component.

    Ans: The three components of staffing are matching people's skills with project needs, motivating team members, and minimizing conflict.

    When matching people's skill to project needs, it is important to remember that people have technical skill and interpersonal skills. Both skill sets are important for a project's success. Technical skills are useful when working with tasks such as programming and server configuration. Interpersonal skills are critical when performing requirements gathering activities and when addressing organizational feasibility issues.

    Motivating team members is necessary for project success. Assuming that team members are paid a fair salary, motivation methods that are normally most successful are recognition, achievement, responsibility, advancement, and an opportunity to learn new things.

    Steps that minimize conflict among group members include clearly defining team roles, holding team members accountable, and creating a project charter that lists project norms and ground rules.

16. A project manager has three options to take when a schedule date has been missed. What are the basic assumptions the project manager can make? What changes to the schedule should the manager make for each assumption? What is the level of risk for each assumption?

    Ans: When a schedule date is missed in a project plan the project manager can make three possible assumptions. The first is to assume that the rest of the project is simpler than the part completed and that the lost time can be made up during the remainder of the project. No change should be made to the schedule. This is a high-risk assumption since a project rarely gets simpler.

    The second assumption is to assume that the remainder of the project is no simpler or more complex than the part completed. The lost time cannot be made up so the project completion date is extended the exact time difference between the originally planned and the missed schedule time. This has moderate risk.

    The third is to assume that the rest of the project is as complex as the part that was completed late and that all future schedule dates have been under estimated. An increase of the entire schedule by the percentage of time that the schedule is late is recommended. This action may require a reduction in the scope of the project, but it will have a lower risk.

17. Describe three classic planning mistakes. What would be a solution for each?

    Ans: Classic planning mistake 1: Wishful thinking leads to an overly optimistic schedule that causes analysis and design time to be cut short and puts pressure on the programmers to produce a system without meeting the systems requirements. The solution is to explicitly schedule slack time at the end of each phase to account for the variability of estimates.

    Classic planning mistake 2: Failing to monitor the schedule prevents the team members from knowing if the project is on schedule. The solution is to require team members to honestly report progress (good or bad) at regular intervals.

    Classic planning mistake 3: Failing to update the schedule because there is an assumption that the time can be made up later is a mistake. This is an early warning that the entire schedule may be overly optimistic. The solution is to immediately revise the schedule and inform the project sponsor of the new end date or reduce functionality in the project.

    Classic planning mistake 4: Adding people to a project running late only makes the project take longer to complete. The time required for the new member of the team to become “up to date” on the project and the new coordination activities involved slow the entire project down more. The solution is to revise the schedule, use timeboxing, and throw away bug filled code.

18. What can be done when the skills needed for a project are not found in the staff that is available for the project?

    Ans: Project managers cannot always dictate who will be assigned to his/her project team. Sometimes the staff with the needed skills are not available for assignment to a particular project. When the project manager is concerned about the lack of needed skills, it is essential to factor in the development of those skills into the project workplan. Obtaining the services of a vendor or consultant can help a project team initially. Staff can also be sent to training programs. Setting up a mentoring system can also help develop team members' skills by pairing them with other staff members who have the needed skills.

19. Discuss the options a project manager has if a phase of a project is completed (a) earlier than expected, and (b) later than expected.

    Ans: In the happy event that a project phase is completed earlier than expected, the project manager should move all the intermediate target dates up in the project schedule. However, the final completion date should not be adjusted; that slack time may be needed later in the project, and it is not a good idea to change your project sponsor's expectations about the completion date of the project. In the more common situation, a target date for an intermediate phase may be missed. Although it is tempting to think that this time may be made up later in the project, this is rarely the case. In fact, the underestimate of time for the phase that has just been missed may be true for the remainder of the project, implying that all time estimates need to be adjusted (increased). As a general rule, the project manager should determine if the work remaining on the project is simpler than the part of the project that was late. If it is simpler, the original time estimates are probably still appropriate. If the work remaining on the project is more complex than the part that was late, then the time estimates should be increased at least by the percentage of time that the late portion overran its deadline.

20. Explain the consequences of a project manager allowing the scope of a project to gradually increase. Why does 'scope creep' occur?

    Ans: If the project manager allows that scope of the project to increase without adjusting the project's cost and/or schedule, then there is little likelihood that the team can complete the project on time and under budget. This puts severe pressure on the project team, and heightens the risk of project failure. Scope creep is often subtle and usually does not occur for malicious reasons. Rather, the end users may become aware of some desirable features of the system that they honestly did not perceive at the project's outset. Technical staff may become convinced of certain technical features that were not initially identified. Management and project sponsors may perceive new roles for the system as the project progresses. Many project managers try to accommodate these changes, but the trick is to negotiate adjustments in time and/or budget before committing to the expanded requirements.

21. For what reason does a project team create a risk assessment? What value is a risk assessment to the team?

    Ans: It is desirable for a project team to have a clear understanding of the risks that are faced in a project. These risks can be defined and evaluated in a risk assessment, a document that details the risks associated with a project. Risks and their likelihood should be identified and their effect on the project should be assessed. The team can then identify ways to deal with the project risks. As the project progresses, some risks may be reduced and others may become apparent. The risk assessment document should be updated to reflect these changes, and should reflect the current project risk status.

22. Sunnyview Hospital needs to create a new patient-record system. Their current manual system is inadequate, and results in many errors in the records for the patients in their care. At this point in time, the users do not have a good idea of what they need the new system to do, but they need it done quickly. Create a risk assessment for this system.

Ans:

Risk:	Users do not know the requirements; thus, scope is likely to increase as the requirements become better known.
Likelihood of risk:	High probability of risk.
Potential impact on the project:	This risk likely will increase the time to complete the project by at least 50%.
Ways to address this risk:	Since the user requirements are unknown, a prototyping approach should be taken to help quickly determine what the users requirements are going to be for this system. User involvement is going to be critical for this system since they cannot articulate what they need the system to do up front.

23. Give the formula for the effort in person-months based on the number of lines of code.

Ans: effort (in person-months) = 1.4 X thousands of lines of code

24. Explain the concept of timeboxing.

Ans: Timeboxing sets a fixed deadline for the project and delivers the system by that deadline, even if it means reducing the original functionality. This technique makes sure that the project does not drag on for too long, and ensures that a system is delivered to the business relatively quickly. The following steps are used for timeboxing. First, set the date for system delivery. Second, prioritize functionality that needs to be included in the system. Third, build the core of the system with the essential functionality. Fourth, postpone the functionality that cannot be delivered by the deadline. Fifth, deliver the system with the core functionality. Then repeat steps three to five to add refinements and enhancements.

25. Give the formula for the schedule time in months, given the effort in person-months.

Ans: Schedule time (in months) = 3.0 X $(\text{person-months})^{1/3}$

26. Explain PERT analysis.

Ans: PERT stands for program Analysis and Review Technique. PERT technique can be used when the individual task time estimates are fairly uncertain. Instead of simply relying on one estimate for the duration of the project, PERT uses three estimates: optimistic, pessimistic, and most-likely. These estimates are then combined into a single weighted average using a formula:

$$PERT\ weighted\ average = \frac{Optimistic + (4 \times Most\ likely) + Pessimistic}{6}$$

27. What are different types of standards that a project may need to adhere to?

Ans: Some of the standards that a project needs to comply with are as follows. Documentation standards, coding standards, procedural standards, requirements and specification standards, and user-interface design standards.

28. Explain how daily scrum meeting is used for manage the scope of project.

Ans: Essentially a daily scrum meeting is a very short, typically 15 minute, meeting that keeps the development team up to date as to the current status of the evolving system. The content of the meeting typically only covers what has been accomplished since the previous meeting, what will be accomplished before the next meeting, and what obstacles could come up that could prevent progress from being made. Also, new requested features could be brought up. However, all proposed additional features are simply added to the product backlog that could be considered during the next iteration or timebox (sprint in Scrum's nomenclature).

29. Explain how daily product backlog is used for manage the scope of project.

Ans: The product backlog is essentially a prioritized list of the functional requirements that will be completed during the current iteration. In Scrum, only the client is allowed to modify the product backlog. In this manner, the development team always has a list of the current set of critical requirements. As long as the project is relatively small, this approach to scope management is very effective.

30. Explain why the evolutionary Work Breakdown Structure (WBS) is preferable for certain project over the traditional WBS.

    Ans: There are three reasons why the evolutionary WBS is sometime preferable. First, traditional WBS is tied to the structure of the system under development. This makes sense only when the requirements of the system are known. Using traditional WBS when the requirements are not fully understood, forces the analyst to make task assignment decisions before there is enough information. Second, the traditional WBS forces the analyst to specify too many levels of details for large projects and not enough levels of detail for small projects. Third and last, the traditional WBS is too specific to the project and does not make it easy for the analyst to compare the current project to past projects. Evolutionary WBS uses a standard format making comparisons between projects straight forward and easy. Evolutionary WBS is built iteratively and incrementally allowing the analyst to decide the level of detail that is most appropriate for the particular iteration. Evolutionary WBS is structured around the workflows of the UP development methodology and not around the structure of the system. Hence the analyst need not have to fully know the requirements of the system to begin the iterative process of drawing up the WBS. This is particularly useful when the requirements are not yet fully understood as often happens when the business domain is unfamiliar.

31. Briefly describe three types of standards for system development, and provide examples of each.

    Ans.: Coding standards define the content and structures that are to be used in programs. An example would be that all programs are to be written following structured programming guidelines.

    Procedural standards define processes that are to be followed by all team members. An example would be required attendance at a weekly team progress meeting, and required honest progress reporting at that meeting.

    User interface design standards create a common understanding of the appearance and functioning of the screens the end users see. An example would be to create a standard group of icons that are used consistently on all screens.

32. What is a use-case point? For what is it used?

    Ans.: Use-case points is a use cases based project effort estimation approach, which was originally developed based on unique features of use cases and object orientation. From a practical point of view, to estimate effort using use-case points, the use cases and the use-case diagram must have been created.

33. What process do we use to estimate systems development based on use cases?

Ans: Use case models have two primary constructs: actors and use cases. For use-case point estimation purposes, actors can be classified as simple, average, or complex. Simple actors are separate systems with which the current system must communicate through a well-defined application program interface (API). Average actors are separate systems that interact with the current system using standard communication protocols, such as TCP/IP, FTP, or HTTP, or an external database that can be accessed using standard SQL. Complex actors are typically end users communicating with the system. Once all of the actors have been categorized as being simple, average, or complex, the project manager will count the number of actors in each category and enter the values into the unadjusted actor weighting table contained in the use case point–estimation worksheet. The project manager will then compute the Unadjusted Actor Weight Total (UAW). This is computed by summing the individual results that were computed by multiplying the weighting factor by the number of actors of each type.

A use case represents a major business process that the system will perform that benefits the actor(s) in some manner. Depending on the number of unique transactions that the use case must address, like actors, a use case can be categorized as being simple, average, or complex. A use case is classified as a simple use case if it supports one to three transactions, as an average use case if it supports four to seven transactions, or as a complex use case if it supports more than seven transactions. Once all of the use cases have been successfully categorized, the project manager will enter the number of each type of use case into the unadjusted use case weighting table contained in the use-case point–estimation worksheet. By multiplying by the appropriate weights and summing the results, we get the value for the unadjusted use case weight total (UUCW). Next, the project manager computes the value of the unadjusted use-case points (UUCP) by simply summing the unadjusted actor weight total and the unadjusted use-case weight total.

Use-case point–based estimation also has a set of factors that are used to adjust the use-case point value.

34. What are the differences between a technical lead and a functional lead?

Technical Lead: The technical lead is typically a project team member who supervises the programmers and more technically oriented project staff.

Functional Lead: The functional lead is a team member who oversees the systems and business analysts on the team. Both positions report to the project manager, and are responsible for managing, controlling, and coordinating the work of their assigned team members

Chapter 3 Requirements Determination
Testbank

Multiple Choices

1. _____ is an example of functional requirements.

   a. The system should work with any web browser
   b. The system should load any web page within 3 seconds
   c. Customers should be able to see their orders after authentication
   d. The system should comply with the company's policy of buying all PCs and servers from Dell
   e. The system should be able to search all available inventory in order to determine whether a product can be made by a given date

   Ans: e

2. Understanding the as-is system, identifying improvements, and developing requirements for the to-be system are the steps of the _____ phase.

   a. analysis
   b. design
   c. implementation
   d. planning
   e. SDLC

   Ans: a

3. The most comprehensive and complete deliverable of the analysis phase is _____.

   a. project work plan
   b. system proposal
   c. behavioral models for the to-be system
   d. functional models for the to-be system
   e. structural models for the to-be system

   Ans: b

4. The most commonly used information-gathering technique is _____.

   a. interviewing
   b. joint application design (JAD) sessions
   c. document analysis
   d. observation
   e. questionnaires

   Ans: a

5. During an interview, the following question is asked; “How many times during a typical week does a customer complain about inadequate service following a sale?” This question is an example of a (n) _____ question.

   a. Opinion-generating
   b. Eye-opening
   c. open-ended
   d. closed-ended
   e. probing

   Ans: d

6. Sarah would like to give the interviewee more control over the interview and to gather rich information. She should ask _____ questions.

   a. closed-ended
   b. inappropriate
   c. open-ended
   d. opinion
   e. probing

   Ans: c

7. The information gathering technique that enables the analyst to collect facts and opinions from a wide range of geographically dispersed people quickly and with the least expense is the _____.

   a. document analysis
   b. interview
   c. JAD session
   d. observation
   e. questionnaire

   Ans: e

8. The examination of existing paperwork in order to better understand the As-Is system is an example of what information-gathering strategy?

   a. document analysis
   b. interviewing
   c. joint application design (JAD) sessions
   d. observation
   e. questionnaires

   Ans: a

9. What information-gathering strategy enables the analyst to see the reality of the situation rather than listen to others describe it?

   a. document analysis
   b. interviewing
   c. joint application design (JAD) sessions
   d. observation
   e. questionnaires

   Ans: d

10. The _____ brings together into a single comprehensive document the material created during planning and analysis

    a. project charter
    b. system proposal
    c. system request
    d. requirements document
    e. vision document

    Ans: b

11. Both story cards and task lists are considered to be "_____" approaches to documenting and gathering requirements.

    a. heavy weight
    b. lightweight
    c. formal
    d. dummy
    e. casual

    Ans.: b

12. The executive summary in system proposal is typically no more than _____ page(s) long.

    a. one
    b. two
    c. three
    d. four
    e. five

    Ans: a

13. From a quality perspective, _____ quality is related to the degree that the software meets the functional requirements.

    a. functional
    b. non-functional
    c. standard
    d. security
    e. reliability

    Ans: a

14. The _____ requirements are associated with the efficiency, maintainability, portability, reliability, reusability, testability, and usability quality dimensions.

    a. functional
    b. non-functional
    c. standard
    d. correctness
    e. performance

    Ans: b

15. When considering ISO9000 compliance, quality dimensions are further decomposed into _____ and _____.

    a. required and non-required
    b. essential and non-essential
    c. functional and non-functional
    d. internal and external
    e. reliable and non-reliable

    Ans: d

True/False

1. Benchmarking refers to studying how other organizations perform a business process so you can learn how your organization can do it better.

   Ans: True

2. The interview schedule lists all the people who will be interviewed, when, and for what purpose.

   Ans: True

3. Open-ended questions gather rich information because they are questions that permit the interviewee to elaborate on answer.

   Ans: True

4. It is easier to ask an interviewee what is used to perform a task than it is to show the interviewee a form and ask what information on the form is used.

   Ans: False

5. "How can you reduce the number of errors in the name and address field on the data entry screen?" is an example of a high level question.

   Ans: False

6. Following an interview the analyst should always prepare an interview report that describes the information gathered from the interview.

   Ans: True

7. The standard approach to select who should complete a questionnaire during information gathering is to sample only those departments that do not have direct contact with the As-Is system.

   Ans: False

8. To better understand the As-Is system the project team members can perform document analysis on existing forms, reports, and business process models.

   Ans: True

9. Observation is a powerful tool for gathering information about the As-Is system and may be necessary because managers often do not remember how they work and how they allocate their time.

   Ans: True

10. Document analysis and observation are commonly used for understanding the As-Is system because they are useful for obtaining facts.

Ans: True

11. Questionnaires are often used when there is only a small number of people from which information and opinions are needed, because it is difficult to get a large number of participants to return questionnaires on a timely basis.

    Ans: True

12. Questions on questionnaires should be open-ended to allow the respondent the freedom to express his/her opinion since the analyst will not be able to follow up with additional questions as could be done in a one-on-one interview.

    Ans: False

13. The top-down approach is an appropriate strategy for most interviews because it enables the interviewee to become accustomed to the topic before he or she needs to provide specifics and it enables the interviewer to understand the issues before moving to the details.

    Ans: True

14. When you begin an interview, the first goal is to establish control and let the interviewee know that you have a mastery of the subject.

    Ans: False

15. Root cause analysis attempts to find solutions for the business problems.

    Ans: False

16. Tracy has decided to ask the users and managers to identify problems with the current system and to recommend how to solve these problems in the future system. They have recommended small incremental changes. Tracy is identifying improvement opportunities through problem analysis.

    Ans: True

17. Jessica has asked the users to generate a list of problems with the current system and to prioritize the problems in order of importance. Jessica then generated all the possible causes for the problems, starting with the most important. Jessica is identifying improvement opportunities through root cause analysis.

    Ans: True

18. An analyst for an insurance company determined that the overall time required to process a property damage insurance claim is 21 business days. When the analyst decomposes the process into steps and aggregates the total time requirements for all steps, she discovers a total time of 12 hours. The analyst is employing the activity-based costing analysis technique.

    Ans: False

19. A systems analyst is participating in an exchange of services with another organization. First, the analyst visits the partner organization, studies and evaluates their systems, and recommends changes and improvements. Then, a team of analysts from the partner organization visits the analyst's organization and performs the same service. This process is an example of benchmarking.

    Ans: True

20. Amanda had the managers at her company develop a list of important and interesting technologies and how each technology could be applied to current business process. Amanda is identifying improvement opportunities through technology analysis.

    Ans: True

21. An analysis team consisting of users, managers, and analysts, are in the midst of a daylong meeting. They are working on systematically evaluating the consequences of removing every activity from the current business process. The team is performing activity-based costing.

    Ans: False

22. Activity-based costing is similar to duration analysis. While duration analysis attempts to find the time taken to complete business processes, activity-based costing finds the costs associated with each of the basic functional steps or processes.

    Ans: True

23. A systems analyst has prepared an interview agenda that begins with a number of specific, detailed questions, and then asks the interviewee to make general statements about the policies and procedure of the business process. The analyst is following a top-down interview structure.

    Ans: False

24. An interview style that seeks a broad and roughly defined set of information is commonly called the unstructured interview style.

    Ans: True

25. Kristin, a systems analyst, needs to know detailed information about the accounts receivable process, but she is not concerned with accounts payable or general ledger, or the integration of this information. Her analysis will assist her in designing a To-Be system for the accounts receivable department. The appropriate requirements-gathering technique to be used would be interviewing.

    Ans: True

26. The executive summary is an important component of the system proposal because it is used for convincing the busy executives of the merits of the project as briefly as possible.

    Ans: False

27. A requirement is a statement of what the system must do and how it will be implemented.

    Ans: False

28. Both story cards and task lists requirements documentation techniques are considered to be detail approaches to documenting and gathering requirements.

    Ans: False

29. A system proposal brings together into a single comprehensive document the material created during planning and analysis.

    Ans: True

30. The executive summary in system proposal provides all critical information in a very detail form.

    Ans: False

31. Virtually all of the quality models differentiate functional and non-functional requirements.

    Ans: True

Short Answer

1. What are the methods used to identify improvement opportunities during business process improvement? How do the methods used for each analysis strategy affect the outcome of the "identify improvement" process?

   Ans: The methods used to identify improvements during business process improvement are duration analysis, activity-based costing, and informal benchmarking. Duration analysis requires a detailed examination of the amount of time it takes to process inputs in the as-is system. First the process time is determined for the entire system. Then the time is determined for each sub-process in the system. The times for the basic sub-processes are then totaled and compared to the total time for the overall system process. When there are significant differences between the two, analysts, users and managers look for solutions such as parallelization and process integration.

   Activity-based costing is similar to duration analysis except it examines the cost of each major process or step in a business process instead of the time. The analyst identifies the costs associated with each basic function and focuses attention on improving the most expensive activities.

   During informal benchmarking the business processes of other organizations are studied to identify new and better ideas. The implementation of these new ideas may bring value to the organization.

   The outcome of duration analysis is normally a change in the as-is business process. The outcome of activity-based costing is normally a reduction in direct costs, but may also affect indirect costs. Informal benchmarking commonly affects customer-facing business processes such as web site appearances and customer satisfaction issues.

2. What are the three types of interview questions? Define and identify why an analyst would use each type of question. Include an example of each question type.

   Ans: The three types of interview questions are closed-ended, open-ended, and probing. Closed-ended questions are questions that require a specific answer. Analysts use closed-ended question when they are looking for specific, precise information. An example of a closed-ended question is “How many telephone orders are received per day?”

   Open-ended questions are questions that leave room for the interviewee to elaborate. Analysts use open-ended questions to gather rich information and to give the interviewee more control over the information that is revealed during the interview. An example of an open-ended question is “What do you think about the current system?”

   Probing questions follow up on what has just been discussed in order for the analyst to learn more and are often used when the interviewer is unclear about what the interviewee’s answer. Probing questions encourage the interviewee to expand or confirm information from a previous response and they are a signal that the interviewer is listening and is interested in the topic. An example of a probing question is “Why?”

3. Document analysis and observation are two requirement gathering techniques. Briefly describe each and compare and contrast the advantages and disadvantages.

   Ans: To understand the As-Is system, project teams often use document analysis. Hopefully, the project team that designed the As-Is system produced adequate data and process models, and all of the paper documents (forms, reports, policy manuals, etc.) necessary to provide an understanding of the system. A project team can learn much about the formal As-Is system from this type of analysis.

   Observation enables the analyst to see how the As-Is system actually operates, which may differ from the system outlined in the documentation. The analyst becomes an anthropologist as he or she observes the business functions, much the same way monkeys have been studied in Africa.

   The advantages of document analysis are (1) it provides a starting point for the analyst and (2) it indicates clearly that a new system is necessary if users have begun to create, make changes to, or leave blanks on documents, reports and forms. The disadvantage is that many systems are not well documented.

   The advantage of observation is that the analyst actually sees and can check the reality of the system, which may differ greatly from the documentation or the reports given during an interview. The disadvantages are that (1) observation is time intensive, (2) it disrupts workers, and (3) it may not be honest because people behave differently (more carefully) when observed.

4. Describe the most common way that the analyst organizes the interview process in terms of structured versus unstructured, and also in terms of open-ended, closed-ended, and probing questions.

   Ans: Although there is no hard and fast rule, it is usually best to begin the interviewing process with unstructured interviews that consist primarily of open-ended questions. At this point, the analyst will probably not know enough to ask very specific questions, and so should be seeking to gain a broad understanding of the situation. As more is learned, the analyst can use more probing questions to dig deeper. After the analyst has developed a good idea of the major issues, the interviews can become more structured, with more specific, closed-ended questions being effective in confirming facts and impressions.

5. During an interview, the analyst has been asking about the process used to identify and correct the number of poor-quality products produced on a manufacturing line. The analyst commented, "This process seems way too slow and complicated. I don't know how you people can function if this is the way things are done." Is this an appropriate comment for the interviewer to make? Why or why not?

   Ans: This is not an appropriate statement. There are two serious problems with this statement. First, it is an opinion statement. Analysts should be objective collectors of information. They are not there to provide commentary. Second, the remark is derogatory in nature. What if the person he is interviewing is the one who designed that process? The interviewee will be offended and may withdraw his/her support for the project. This attitude may spread to other users and may diminish the chance of a successful project outcome. The analyst needs to stay neutral whenever interacting with the project sponsors, users, and managers.

6. What is the primary goal of observation? What are three ways to make observation more effective? How reliable are the results of observation?

   Ans: The primary goal of observation is to enable the analyst to experience the reality of the As-Is system. The information gained this way can be much better at conveying the actual situation than verbal descriptions. To improve the effectiveness of observation, the analyst should be as unobtrusive as possible. S/he should not interfere with or disrupt the workers being observed. The analyst should also try to observe periods of normal work as well as periods of unusual activity, to get a sense of what the typical experience is and also the special cases that need to be anticipated. The results of observation need to interpreted carefully, because the normal human response to being observed is to do things 'by the book,' rather than using the informal procedures that may have evolved. The analyst needs to remember this and not take everything that is observed as actual fact. The best use of observation is to confirm or verify information gained through other techniques.

7. Briefly describe the information is typically included in a system proposal?

   Ans.: A system proposal brings together into a single comprehensive document the material created during planning and analysis. The system proposal typically includes an executive summary, the system request, the work plan, the feasibility analysis, the requirements definition, and the evolving models that describe the new system. The evolving models include functional models, structural models, and behavioral models. The executive summary provides all critical information in a very concise form. It can be thought of as a summary of the complete proposal.

8. Briefly describe the story cards and task lists requirements documentation techniques. What are some of the advantages of using story cards and task lists as a requirements gathering and documentation technique?

   Ans.: Both story cards and task lists are considered to be "lite weight" approaches to documenting and gathering requirements. A story card is typically an index card with a single requirement (functional or non-functional) written on it. Once the requirement is written down, it is discussed to determine the amount of effort it will take to implement it. During the discussion, a task list is created for the requirement (story). If the requirement is deemed to be too large, i.e., there are too many tasks on the task list, the requirement is split up into multiple story cards and the tasks are allocated across the new stories. In many shops, once a set of tasks have been identified with a story, the story and its tasks are taped on a wall together so that all members of the development team may see the requirements. The story can be prioritized by importance by placing a rating on the card. The story can also be evaluated as to the level of risk associated with it. The importance level and amount of risk associated with the story can be used to help choose which requirements to implement first.

   A set of advantages of using story cards and task lists to document requirements is that they are very low tech, high touch, easily updatable, and very portable.

9. Briefly explain the non-functional requirements and functional requirements in software quality.

   Ans: One area of information systems development that focused on differentiating functional and non---functional requirements is software quality. There have been many different models proposed to measure the quality of software. However, virtually all of them differentiate functional and non---functional requirements. From a quality perspective, functional quality is related to the degree that the software meets the functional requirements, i.e., how much of the actual problem is solved by the software solution provided. Whereas, the non---functional requirements are associated with the efficiency, maintainability, portability, reliability, reusability, testability, and usability quality dimensions. As stated above, the non---functional related dimensions are associated primarily with the actual detailed design and implementation of the system.

10. Briefly explain the external and internal quality dimensions in ISO9000.

Ans: When considering ISO 9000 compliance, quality dimensions are further decomposed into those that the user can see (external) and those that the user cannot see (internal). The external non---functional dimensions include efficiency, reliability, and usability where the internal non---functional dimensions include maintainability, portability, reusability, and testability. From a user perspective, the external dimensions are more important. If the system is simply too difficult to use, regardless how well the system "solves" the problem, the user will simply not use the system. In other words, from a user's perspective, for an information system to be successful, the system must not only meet the functional specification, but it must also meet the external non---functional specifications. From a developer perspective, the internal dimensions are also important. For example, given that successful systems tend to be long---lived and multi---platform, both the maintainability and portability dimensions can have strategic implications for the system being developed. Also, given the agile development approaches being used in industry today, the development of reusable and testable software is crucial.

Chapter 4 Business Process and Functional Modeling Testbank

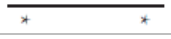
Multiple Choices

1. A(n) _____ is a formal way of representing how a business system interacts with its environment.

   a. use case
   b. physical model
   c. relationship
   d. system boundary
   e. trigger

   Ans: a

2. Which of the following diagramming symbols represents an actor in a use case diagram?

a.	
b.	
c.	
d.	
e.	

   Ans: a

3. Which of the following diagramming symbols represents a use case in a use case diagram?

a.	
b.	
c.	
d.	
e.	

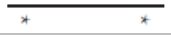
Ans: b

4. Which of the following diagramming symbols represents a subject boundary in a use case diagram?

a.	
b.	
c.	
d.	
e.	

Ans: c

5. Which of the following diagramming symbols represents a generalization relationship in a use case diagram?

a.	
b.	
c.	
d.	
e.	

Ans: d

6. A scenario is the same as a(n) _____.

a. use case
b. relationship
c. path through a use case
d. collection of use cases
e. role

Ans: c

7. Each use case describes _____ function(s) in which users interact with the system.

a. one
b. one or more
c. many
d. zero, one, or more
e. all

Ans: a

8. Jim has documented a use case that describes the functionality of a system as “To compute gross pay, multiply the hours worked that are recorded on the time card from the time clock by the hourly rate that is recorded in the employee master file from the MS SQL server database.” This is an example of a(n) _____ use case.

    a. overview
    b. detail
    c. essential
    d. real
    e. imaginary

    Ans: d

9. A(n) _____ use case is typically created early in the process of understanding the system requirements as a way of documenting basic information about the use case.

    a. overview
    b. detail
    c. essential
    d. real
    e. imaginary

    Ans: a

10. The importance level of a use case increases for all of the following characteristics of the use case except _____.

    a. the use case represents an important business process
    b. the use case supports revenue generation
    c. the technology is proven
    d. the functionality is complex
    e. the functionality is time-critical

    Ans: c

11. The _____ relationship in use cases allows use cases to support the concept of inheritance.

    a. association
    b. extend
    c. include
    d. generalization
    e. none of these

    Ans: d

12. The event that causes a use case to begin is called a(n) _____.

    a. action
    b. trigger
    c. hammer
    d. anvil
    e. stakeholder

    Ans: b

13. Which of the following relationships describe the communication between the use case and the actors?

    a. association relationship
    b. extend relationship
    c. include relationship
    d. generalization relationship
    e. none of these

    Ans: a

14. Which of the following relationships represent the extension of the functionality of the use case to cover optional behavior?

    a. association relationship
    b. extend relationship
    c. include relationship
    d. generalization relationship
    e. optional relationship

    Ans: b

15. Which of the relationship types in use cases enables functional decomposition?

    a. association relationship
    b. extend relationship
    c. include relationship
    d. generalization relationship
    e. decompose relationship

    Ans: c

16. Individual steps in a use case should be written in the form _____.

    a. Direct Object, Verb, Subject, Preposition, Indirect Object
    b. Direct Object, Subject, Verb, Preposition, Indirect Object
    c. Subject, Verb, Preposition, Indirect Object, Direct Object
    d. Subject, Verb, Indirect Object, Preposition, Direct Object
    e. Subject, Verb, Direct Object, Preposition, Indirect Object

    Ans: e

17. If a use case becomes too complex, it should be _____.

    a. rewritten to simplify it
    b. decomposed into a set of use cases
    c. written with a series of repeating steps to simplify it
    d. written from the perspective of an independent observe to simplify it
    e. dropped from the system, as it will be too complex to implement in the final system

    Ans: b

18. The correct sequence of the major steps in creating use case diagrams is _____.

a. identify the major use cases, expand the major use cases, confirm the major use cases, create the use-case diagram
b. identify the major use cases, expand the major use cases, create the use-case diagram, confirm the major use cases
c. create the use-case diagram, identify the major use cases, expand the major use cases, confirm the major use cases
d. create the use-case diagram, identify the major use cases, confirm the major use cases, expand the major use cases
e. identify the major use cases, confirm the major use cases, expand the major use cases, create the use-case diagram

Ans: a

19. When drawing the use-case diagram, an analyst should do the steps in this order: _____.

a. draw the use cases on the diagram, identify the system boundary, place the actors on the diagram, and draw the lines connecting the actors to the use cases
b. identify the system boundary, draw the use cases on the diagram, place the actors on the diagram, and draw the lines connecting the actors to the use cases
c. place the actors on the diagram, draw the use cases on the diagram, identify the system boundary, and draw the lines connecting the actors to the use cases
d. identify the system boundary, place the actors on the diagram, draw the use cases on the diagram, and draw the lines connecting the actors to the use cases
e. none of these gives the correct order of steps

Ans: b

20. Object nodes model these objects in an activity diagram. Object nodes are portrayed in an activity diagram as _____.

a. arcs
b. ovals
c. diamonds
d. rectangles
e. rounded rectangles

Ans: d

21. A fork node in an activity diagram is used to _____ behavior into a set of parallel or concurrent flows of activities (or actions).

    a. combine
    b. create
    c. initialize
    d. split
    e. represent

    Ans: d

22. The purpose of a walkthrough is to thoroughly test the fidelity of the functional models to the _____ and to ensure that the models are consistent.

    a. non-functional models
    b. use-case diagrams
    c. activity diagrams
    d. functional requirements
    e. use-case descriptions

    Ans: d

23. Activity diagrams, use-case descriptions, and use-case diagrams are three different representations for the _____.

    a. functional and non-functional model
    b. functional model
    c. non-functional model
    d. design model
    e. architectural model

    Ans: b

True/False

1. Use cases can be used to document both the current (As-Is) system and the future (To-Be) system.

   Ans: True

2. Use cases are the primary drivers for all of the UML diagramming techniques.

   Ans: True

3. An essential use case describes the specific set of steps to be followed.

   Ans: False

4. A use case that describes functionality that is complex and risky would be given a high importance level.

   Ans: True

5. The primary actor is the person or thing that starts the execution of a use case.

   Ans: True

6. The include relationship represents the optional inclusion of another use case.

   Ans: False

7. Inheritance is supported in use cases through the generalization relationship.

   Ans: True

8. An alternate or exceptional flow in a use case documents the decomposition of the normal flow of events.

   Ans: False

9. The SVDPI form of sentences in use cases aids in the identification of classes.

   Ans: True

10. A very complex use case should be broken down into a set of use cases.

    Ans: True

11. An actor is represented in a use case diagram by a stick figure of a man.

    Ans: True

12. An include relationship is modeled in a use case diagram by an arrow with the word <<include>> above it.

    Ans: True

13. An actor in a use case must be a person.

    Ans: False

14. An actor in a use case always represents a specific user.

    Ans: False

15. A formal way of representing how a business system interacts with its environment is termed a use case.

    Ans: True

16. Rectangles are used to represent association relationships in use case diagrams.

    Ans: False

17. Each use case can be associated with one or more role(s) that users have in the system.

    Ans: False

18. A use case that represents an important business process and involves the use of new technology would likely be given an importance level of medium.

    Ans: False

19. A use case that begins at the end of the month has a temporal trigger.

    Ans: True

20. The use case Take Order has a temporal trigger if it begins when a customer calls to place an order.

    Ans: False

21. As Felix is documenting an order entry system, he discovers that someone can call up to place an order that is not a customer. In this case, the Take Order use case will use the Create Customer use case to capture the customer information, and then the order will be taken. This is an example of the extend relationship between use cases.

    Ans: True

22. A use case should be written from the perspective of at least one of the actors associated with the use case.

    Ans: False

23. A solid line without arrows between an actor and a use case in a use case diagram represents a one-way flow of communication from the actor to the use case.

    Ans: False

24. Use cases are typically written to document the normal flow of events. Exceptions that occur in the normal flow need not be documented as part of the use case description.

    Ans: False

25. An asterisk on a relationship in a use case diagram represents multiplicity of the association.

    Ans: True

26. When drawing use case diagrams, higher level use cases are drawn below lower level use cases.

    Ans: False

27. The first step in creating use case diagrams is to identify the primary actors and their goals.

    Ans: False

28. Object nodes in an activity diagram are depicted using rectangles.

    Ans: True

29. Control flows in an activity diagram show the flow of objects into and out of activities.

    Ans: False

30. Control flows in an activity diagram are shown using solid-lines with arrows while object flows are shown using dashed lines with arrows.

    Ans: True

31. A decision node in an activity diagram is used to represent the actual test condition that is used to determine which of the paths exiting the node is to be traversed.

    Ans: True

32. Paths coming out of a decision node are always mutually-exclusive, while the paths coming out of a fork node are sometimes concurrent and sometimes mutually-exclusive.

    Ans: False

33. Join nodes in an activity diagram are used to bring concurrent or parallel flows together back into a single flow.

    Ans: True

34. A guard condition represents the value of the decision-test, based on which a particular path from the decision node will be traversed.

    Ans: True

35. Setting the scope of the activity being modeled is a task that can be accomplished after completing the activity diagram.

    Ans: False

36. Activity diagram is a representation for the non-functional model.

    Ans: False

37. Activity diagram, use-case diagram and use-case descriptions are three different representations for the non-functional model.

    Ans: True

38. Verification and validation through a walkthrough is to uncover and correct errors or faults in the evolving specification.

    Ans: False

39. The presenter role in a walkthrough team is more important than the role maintenance oracle.

    Ans: False

40. For a walkthrough to be successful, the members of the walkthrough team MUST be fully prepared.

    Ans: True

41. When comparing a use-case description to a use-case diagram for functional model verification and validation, there must be one and only one use-case description for each use case, and vice versa..

    Ans: True

42. A join node in an activity diagram is used to split behavior into a set of parallel or concurrent flows of activities (or actions).

    Ans: False

43. All object-oriented systems development approaches are use-case driven, architecture-centric, and iterative and incremental.

    Ans: True

Short Answer

1. Write a complete use case description for the interaction that a student would have with your college or university's class registration system.

   Ans: There is no single correct answer to this question, as it will depend on the particular details of your school's system. Also, it may vary based on the student's perspective on the system. For example, at most schools athletes go through a different registration process than the rest of the students.

   This use case description, though, should document the following to be correct:

   - Use case name
   - Primary actor
   - Use case type
   - Stakeholders and interests
   - Brief description
   - Trigger
   - Relationships
   - Normal flow of events
   - Alternate/exceptional flows (this should include closed classes or others where special permits may be needed, holds on registration because of uncleared financial situations, etc.)

2. How does a project team go about obtaining the information they need to create use case descriptions?

   Ans: The project team must work closely with the users as they develop the use cases. Often the project team will use interviews, JAD sessions, and observation to gain this information. In reality, the techniques are similar to those discussed in Chapter 4 of the text. The key will be keeping in mind that a use case is associated with a role that a person plays in the system, not with a specific person.

3. What are the four types of use cases? When are each used?

Ans: Use cases will vary based on the purpose of the use case and the level of detail they contain. Thus, there will be overview versus detail use cases, and essential versus real ones.

Overview use cases allow the analyst and the user to agree on a high-level overview of the requirements. This use case will only document information such as the name, ID number, primary actor, type, and a brief description.

Detail use cases will document all of the information for the use case. These will be developed after all of the overview use cases have been agreed to by the users and the analysts.

An essential use case describes only the minimum information necessary to understand the required functionality of the system.

A real use case goes beyond the essential use case and describes the specific set of steps required to understand the functionality of the system. Essential use cases are implementation independent whereas real use cases are detailed descriptions of how to use the system once it is implemented.

4. What are the five characteristics of a use case that impacts its importance level? Describe each, and indicate what conditions would result in a higher importance level.

Ans: The use case may represent an important business process, which results in a higher importance level. The use case may support the generation of revenue or cost reduction. If so, this would result in a higher importance level. If the technology needed to support the use case is new or risky, that will result in a higher importance level. If the functionality in the use case is complex, risky, and/or time-critical, then the importance level will be higher. If the use case could help increase the level of understanding of the evolving design of the system, and this increase in understanding comes with little relative effort, then the importance level will be higher.

5. Distinguish between the extend and include relationships in use case diagrams. When would you use each of these relationships?

   Ans: An *extend relationship* documents the extension of the functionality of the use case to incorporate optional behavior. For example, if the use case Register for Classes describes the registration process at your university, the use case Clear Financial Hold would only be executed for students who have financial holds on their registration, and the relationship between these two use cases would be an extend relationship. An *include relationship* represents the mandatory inclusion of another use case, which would happen if you had decomposed a particularly complex use case into several simpler ones. The text points out that this type of relationship allows for functional decomposition.

6. Distinguish between the association and generalization relationships in use case diagrams. When would you use each of these relationships?

   Ans: An *association relationship* documents the communication between the use case and the actors that use the use case. All actors involved in the use case will be documented with the association relationship. The *generalization relationship* allows use cases to support the concept of inheritance, since use cases can inherit the behaviors of other use cases. For example, Athlete Registration and New Student Registration can both have generalization relationships with Register for Classes, which would be used by the typical student.

7. Explain the difference between normal flows and subflows that would be documented in a use case.

   Ans: The *normal flow* of events describes the steps that are normally executed in a use case. The steps in a normal flow are listed in the order in which they are performed. In some cases it is recommended that the steps in a normal flow be decomposed to simplify the normal flow. Thus, *subflows* are used to help keep the normal flow of events as simple as possible. Subflows represent the decomposition of normal flow steps. At times, subflows could be replaced with a separate use case, if it makes sense.

8. Explain the usefulness of alternate flows and when they are used.

   Ans: *Alternate or exceptional flows* are those that can happen, but they are not the normal flow. They are documented separately to keep the normal flow of events as simple as possible. For example, in a student registration system, you may have alternate flows for students with financial or academic holds on registration, or those who have to deal with a closed class situation before they can complete their registration.

9. What is the SVDPI form for steps in a use case, and why is it important to use this format when writing use cases? Provide an example of a sentence written in this format.

Ans: SVDPI represents Subject-Verb-Direct Object and optionally Preposition-Indirect Object. This form of the sentence is useful for identifying classes and operations from the use case description. An example may be something like “The Student contacts the academic department to obtain a closed-class waiver.”

10. List and briefly describe the four major steps in writing effective use-case descriptions and use-case diagrams.

Ans: Identify the major use cases

In this step you find the boundary of the system, identify the primary actors, list the goals for those actors, identify and write the overviews for the major use cases, and review any current use cases.

Expand the major use cases

In this step choose one of the use cases to expand, fill in the details, write the normal flow for the events in that use case, decompose the flow into subflows if needed, list the possible alternate or exceptional flows, and describe how the actor or system should react when an alternate or exceptional flow occurs.

Confirm the major use cases

Review the set of use cases, and revise as needed, and then start at the top again.

Create the use-case diagram

Draw the system boundary, place the use cases on the diagram, place the actors on the diagram, and then draw the associations. Revise as needed.

11. What is an actor? What is their role in a system?

Ans: An actor is a role played by an individual while they are interacting with the system, or it may be another system that interacts with the current system. An actor is not a specific person. Actors can provide input to the system, receive output from the system, or both. A primary actor is an actor who triggers the use case.

12. Distinguish between logical models and physical models.

Ans: Logical models are models that describe the business domain's activities without suggesting how they are conducted. Logical models are also referred to as problem domain models. Examples of logical models include activity diagrams and use case diagrams. Logical models are constructed in the analysis phase while physical models are constructed in the design phase. In the design phase, logical models are refined into physical models, which provide information that is ultimately used to build the system. Logical models allow the analyst to focus on the business operations without getting distracted by the implementation details.

13. Describe the terms action, activity and object nodes that are found in an activity diagram.

Ans: Action is a simple non-decomposable piece of the overall behavior that is being modeled. On the other hand, an activity is used to represent a set of actions. An activity can further be decomposed into other activities or actions. Actions and activities can represent either computerized or manual behavior. They are depicted using rounded rectangles. Object nodes model objects in the activity diagram. They are represented using rectangles. Object nodes represent the flow of information from one activity to another activity.

14. Distinguish between control flows and object flows in an activity diagram.

Ans: Control flows model the paths of execution through a business process. Control flows can only be attached to actions or activities, and are depicted using a solid line with an arrowhead depicting the direction of flow. Object flows model the flow of objects through the business process. Since activities or actions modify or transform objects, object flows are necessary to show the actual objects that are used by and modified by these actions and activities. Object flows are depicted using dashed lines with arrows, and must have an activity at one end and an object at the other end.

15. What is a walkthrough?

Ans.: A walkthrough is essentially a peer review of a product. In the case of the functional models, a walkthrough is a review of the different models and diagrams created during functional modeling. This review typically is completed by a team of individuals that comes from the development team and the client. The purpose of a walkthrough is to thoroughly test the fidelity of the functional models to the functional requirements and to ensure that the models are consistent. That is, a walkthrough uncovers errors or faults in the evolving specification. However, a walkthrough does not correct errors—it simply identifies them. Error correction is to be accomplished by the team after the walkthrough is completed.

16. What are the different roles played during a walk-through?

Ans.: There are specified roles that different members of the walkthrough team can play. The first is the presenter role. This should be played by the individual who is primarily responsible for the specific representation being reviewed. This individual presents the representation to the walkthrough team. The second role is recorder, or scribe. The recorder should be a member of the analysis team. This individual carefully takes the minutes of the meeting by recording all significant events that occur during the walkthrough. In particular, all errors that are uncovered must be documented so that the analysis team can address them. The third role is to have someone who raises issues regarding maintenance of the representation. Due to the emphasis on reusability in object-oriented development, this role becomes particularly crucial.

Finally, someone must be responsible for calling, setting up, and running the walkthrough meetings.

17. Briefly describe the set of rules that are used to ensure the three representations (activity diagrams, use-case descriptions, and use-case diagrams) for the functional models are consistent among themselves.

Ans.: There are three different representations for the functional model: activity diagrams, use-case descriptions, and use-case diagrams. A set of rules have been developed to ensure that these three representations are consistent among themselves.

First, when comparing an activity diagram to a use-case description, there should be at least one event recorded in the normal flow of events, subflows, or alternate/exceptional flows of the use-case description for each activity or action that is included on an activity diagram, and each event should be associated with an activity or action.

Second, all objects portrayed as an object node in an activity diagram must be mentioned in an event in the normal flow of events, subflows, or alternate/exceptional flows of the use-case description.

Third, sequential order of the events in a use-case description should occur in the same sequential order of the activities contained in an activity diagram.

Fourth, when comparing a use-case description to a use-case diagram, there must be one and only one use-case description for each use case, and vice versa.

Fifth, all actors listed in a use case description must be portrayed on the use-case diagram. Furthermore, each one must have an association link that connects it to the use case and must be listed with the association relationships in the use-case description. In some organizations, we should also include the stakeholders listed in the use-case description as actors in the use-case diagram.

Sixth, all other relationships listed in a use-case description (include, extend, and generalization) must be portrayed on a use-case diagram.

Finally, there are many diagram-specific requirements that must be enforced. For example, in an activity diagram a decision node can be connected to activity or action nodes only with a control flow, and for every decision node there should be a matching merge node. Every type of node and flow has different restrictions.

18. Briefly describe the purposes of use case modeling in software development.

Ans: All object-oriented systems development approaches are use-case driven, architecture-centric, and iterative and incremental. A use case is a formal way of representing the way a business system interacts with its environment. Essentially, a use case is a high-level overview of the business processes in a business information system. From a practical perspective, use cases represent the entire basis for an object-oriented system. Use cases can document the current system (i.e., as-is system) or the new system being developed (i.e., to-be system). Given that object-oriented systems are use-case driven, use cases also form the foundation for testing and user-interface design. From an architecture-centric perspective, use case modeling supports the creation of an external or functional view of a business process in that it shows how the users view the process rather than the internal mechanisms by which the process and supporting systems operate.

Chapter 6 Structural Modeling
Testbank

Multiple Choices

1. Which of the following are used to create objects?

   a. concrete objects
   b. abstract objects
   c. concrete classes
   d. abstract classes
   e. concrete instances

   Ans: c

2. A(n) _____ of an analysis class represents a piece of information that is relevant to the description of the class.

   a. instance
   b. object
   c. attribute
   d. operation
   e. relationship

   Ans: c

3. Which of the following would most likely **not** be an example of an attribute?

   a. employee name
   b. customer address
   c. stock number
   d. ISBN number
   e. cancel appointment

   Ans: e

4. Which of the following types of attributes is **not** proper in an analysis class?

    a. integers
    b. strings
    c. doubles
    d. compound
    e. date

    Ans: d

5. A(n) _____ of an analysis class is where the behavior of the class is defined.

    a. operation
    b. attribute
    c. class
    d. object
    e. abstract class

    Ans: a

6. Service is another name for _____.

    a. attribute
    b. class
    c. abstract class
    d. operation
    e. object

    Ans: d

7. “A-kind-of” relationships represent _____ relationships.

    a. generalization
    b. association
    c. aggregation
    d. subsetting
    e. vague

    Ans: a

8. “A-part-of” or “has-parts” relationships represent _____ relationships.

    a. generalization
    b. association
    c. aggregation
    d. subsetting
    e. vague

    Ans: c

9. If a “student signs up for a class,” which type of relationship would you use to model the relationship between the two?

    a. generalization
    b. association
    c. aggregation
    d. subsetting
    e. vague

    Ans: b

10. CRC cards are used to document the responsibilities and collaborations of a(n) _____.

    a. class
    b. relationship
    c. object
    d. attribute
    e. operation

    Ans: a

11. A(n) _____ formalizes the interactions between a client and server object.

    a. relationship
    b. contract
    c. abstract object
    d. concrete object
    e. abstraction

    Ans: b

12. A collaboration consists of _____.

    a. two instances of a class talking with each other
    b. two instances of a class knowing the value of each other's attributes
    c. a set of classes that share common operations
    d. a set of classes that are all related to one another
    e. a set of classes involved in a use case

    Ans: e

13. A _____ object is an instance of a class that sends a request to an instance of another class for an operation to be executed.

    a. client
    b. server
    c. contract
    d. requester
    e. CRC

    Ans: a

14. A _____ object is the instance of a class that receives a request from another object.

    a. client
    b. server
    c. contract
    d. provider
    e. CRC

    Ans: b

15. A mechanism for developing CRC cards is for the user or analyst to role-play as if they are an instance of the class. This process is called _____.

    a. acting
    b. anthropomorphism
    c. interviewing
    d. anamorphous
    e. observation

    Ans: b

16. Which of the following is part of a CRC card?

    a. class name
    b. type
    c. description
    d. responsibilities
    e. all of these

    Ans: e

17. Which of the following would **not** be an appropriate class name?

    a. student
    b. patient
    c. John
    d. customer
    e. doctor

    Ans: c

18. A class diagram is a(n) _____ model.

    a. static
    b. dynamic
    c. evolving
    d. obsolete
    e. none of these

    Ans: a

19. A public attribute is shown in a class diagram with the symbol _____ before the name.

    a. –
    b. #
    c. *
    d. +
    e. /

    Ans: d

20. One way to identify objects for the class diagram is to scan the use case descriptions for _____.

    a. relationships
    b. object lists
    c. patterns
    d. nouns
    e. verbs

    Ans: d

21. Many different approaches have been suggested to aid the analyst in identifying a set of candidate objects for the structural model. The four most common approaches are textual analysis, brainstorming, common object lists, and _____.

    a. use cases
    b. business models
    c. patterns
    d. nouns
    e. verbs

    Ans: c

22. Text analysis is one of the four approaches to aid the analysis in identifying a set of candidate objects for the structural model. Textual analysis is an analysis of the text in the _____.

    a. business models
    b. use case descriptions
    c. class diagrams
    d. activity diagrams
    e. use case diagrams

    Ans: b

23. This chapter suggested three representations that could be used for structural modeling: CRC cards, class diagrams, and _____.

    a. object diagrams
    b. use case diagrams
    c. activity diagrams
    d. use case description
    e. business models

    Ans: a

24. One of rules for verifying the structural model is to check that the object type of the attributes listed on the back of the CRC card and with the attributes in the attribute list of the class on a class diagram implies _____from the class to the class of the object type.

    a. an inheritance
    b. an aggregation
    c. a dependence
    d. an association
    e. a communication

    Ans: d

True/False

1. A structural model is a formal way of representing the business activities in a business system.

   Ans: False

2. Abstract classes are used to create objects.

   Ans: False

3. Aggregation relationships can be useful for both aggregation and decomposition.

   Ans: True

4. Association relationships are used for the relationship between instances of two classes when the relationship is not specific enough to be considered a generalization or an aggregation relationship.

   Ans: True

5. CRC cards are used to capture all of the relevant information associated with a class.

   Ans: True

6. The responsibilities of a class can be divided into knowing and doing types.

   Ans: True

7. A contract formalizes the interactions between one client object and other client objects.

   Ans: False

8. Role-playing an instance of a class is a good way to develop CRC cards.

   Ans: True

9. A class diagram is a dynamic model that shows how the classes and relationships change over time.

   Ans: False

10. The symbol for a class in a class diagram contains the name of the class, a list of the attributes, and a list of operations.

    Ans: True

11. It is possible for the multiplicity of a relationship to be “zero or more.”

    Ans: True

12. Views are often used to provide the user a complete picture of the class diagram.

    Ans: False

13. Object diagram is just another name for class diagram; they both show the same information.

    Ans: False

14. A common object list is a list of objects that are common to business domains.

    Ans: True

15. Patterns can be reused in the development of object-oriented systems.

    Ans: True

16. Textual analysis is the review of corporate documents to identify potential objects, attributes, operations, and relationships.

    Ans: False

17. Patterns are useful for identifying classes, attributes, operations, and relationships in certain business domains.

    Ans: True

18. Part of the process of creating CRC cards is role-playing them, where individuals perform the operations for the class on the card.

    Ans: True

19. Books have been written that list useful patterns for a wide variety of business domains.

    Ans: True

20. The main building blocks of a class diagram are the relationships between entities

    Ans: False

21. In the symbol for a class, the name goes in the bottom compartment.

    Ans: False

22. A class symbol has the attributes listed in the top compartment.

    Ans: False

23. Operations of a class are listed in the bottom compartment of the class symbol.

    Ans: True

24. Age is an example of a derived attribute in a class since it can be computed from the date-of-birth attribute and the current date.

    Ans: True

25. A derived attribute that is stored is shown on a class diagram with the symbol # before the name.

    Ans: False

26. The symbol - before the name of an attribute on a class diagram represents a private attribute.

    Ans: True

27. The default visibility for an attribute in a class diagram is public.

    Ans: False

28. The default visibility of an operation in a class diagram is public.

    Ans: True

29. A constructor operation creates a new instance of a class?

    Ans: True

30. The update operation makes information about the state of an object available to other objects without altering the object.

    Ans: False

31. The query operation will change the value of one or more of an object's attributes.

    Ans: False

32. The multiplicity one-or-more on a relationship is signified by the notation 1..M.

    Ans: False

33. The multiplicity zero or more is signified by the notation 0..*.

    Ans: True

34. *..1 is a valid multiplicity on a relationship in a class diagram.

    Ans: False

35. When classes share a many-to-many relationship, it is common to create an association class that has its own attributes and methods.

    Ans: True

36. A diamond at the end of a relationship in a class diagram represents the many side of the relationship.

    Ans: False

37. A view is used to simplify a class diagram by subsetting the information available on the diagram for viewing.

    Ans: True

38. An object diagram may be created to make a class diagram easier to read by grouping classes together.

    Ans: False

39. In the textual analysis of a use case, the use case name suggests possible classes while the verbs suggest possible operations.

    Ans: False

40. In textual analysis of a use case, a doing verb implies an operation.

    Ans: True

41. A pattern is a group of collaborating classes that solve a recurring problem.

    Ans: True

42. Common object lists technique identifies candidate objects for a structural model by analyzing the text in the use-case descriptions.

    Ans: False

43. Common object lists technique identifies candidate objects for a structural model by analyzing a list of objects that are common to the business domain.

    Ans: True

44. The four most common approaches have been suggested to aid the analyst in identifying a set of candidate objects for the structural model are textual analysis, brainstorming, common object lists, and design patterns.

    Ans: False

45. Textual analysis to aid the analyst in identifying a set of candidate objects for the structural model is an analysis of the text in the business model.

    Ans: False

46. CRC cards, class diagrams, and object diagrams are three representations could be used for structural modeling.

    Ans: True

47. The set of rules used for verifying and validating the structural model is to check the consistency between CRC cards and class diagrams of the structural model.

    Ans: True

48. One of the rules used for verifying and validating the structural model is to check that every CRC card should be associated with a class on the class diagram, and vice-versa.

    Ans: True

49. One of the rules used for verifying and validating the structural model is to check that the object type of the attributes listed on the back of the CRC card and with the attributes in the attribute list of the class on a class diagram implies an aggregation from the class to the class of the object type.

    Ans: False

50. One of the rules used for verifying and validating the structural model is to check that the responsibilities listed on the front of the CRC card must be included as attributes in a class on a class diagram, and vice versa.

    Ans: False

Short Answer

1. Define what a structural model is. Why should a systems analyst create one? Why is the creation of a structural model iterative?

   Ans: A structural model is a formal way of representing the data that are used and created by a business system. It shows the people, places, or things about which information is captured and used by the system, and it shows the interrelations between them.

   Without creating a structural model, the analyst will likely not have a complete understanding of the data that are key to the application domain. In addition, the structural model helps assure that the analyst is talking the same language as the users.

   Development of a structural model is iterative because it evolves as the analyst gains understanding of the application domain. The structural model is high-level (conceptual) during the analysis phase, and becomes more concrete and detailed as the project moves through the SDLC.

2. Define the following terms: class, attribute, and operation. Give examples of each.

   Ans: A class is a template used to create specific instances or objects in the application domain. All of the objects of a given class will have the same structure and behavior, but will vary in the data in their attributes. For example, a class may be "student" and the instances of that class would be specific students – John, Jane, Sue – where the attribute first name obviously has a different value for each student.

   An attribute represents a piece of information that is relevant to the description of the class. They contain information the system should store for each class. For the student class mentioned above, possible attributes would include first name, last name, address, student ID number, gender, classification, etc.

   An operation is where the behavior to the class is defined. These are the actions to which the instances of the class can respond. Examples would include "drop student from class" and "alter student name."

3. An analyst has discovered two classes where one appears to be a superclass and the other a subclass. What type of relationship is used to model this association on a structural model? What is the notation that is used? Draw an example of how this would be illustrated on a class diagram.

   Ans: When there is a superclass and one or more subclasses, a generalization relationship is used to represent the "a-kind-of" relationship. The notation is a solid line from the subclass to the superclass and a hollow arrow pointing at the superclass. An example is shown below. Employee superclass has Data Entry Clerk as the subclass.

4. What is a CRC card and why should an analyst create them? What are the essential elements of a CRC card?

   A CRC card is a Class-Responsibility-Collaboration card that is used to document the responsibilities and collaborations of a class. They should have all the information needed for the analyst to draw the logical structural model for the system. Each card captures and describes the essential elements of a class. The front of the card as shown in the text contains: the class name, ID, type, description, list of associated use cases, responsibilities, and collaborators. The back of the CRC card contains: the attributes and relationships of the class.

5. What are the three parts of the notation for a class on a class diagram? Define each part.

   Ans: The class notation on the class diagram contains a name, which should be a noun, in the top compartment, the list of attributes in the middle compartment, and a list of operations in the bottom compartment. The attributes are characteristics of the class that will vary in value for each instance of the class (e.g., first name could be an attribute but it would have a different value for each instance of the class). The operations are actions or functions that the class can perform, such as "prepare back-order notice" or "drop student from class."

6. What is a relationship? What are the types of relationships that you may have on a class diagram? Define each of these.

   Ans: A relationship is the association between two classes on a class diagram. There are at least three types of relationships that occur on class diagrams: normal, generalization, and aggregation. A normal relationship is one that does not involve either generalization or aggregation. Thus, it is drawn between classes that are not subclass/superclass (generalization) or where one of the classes is a subset of another (aggregation).

   A generalization relationship is drawn between a superclass and a subclass, showing the inheritance of properties and operations from the superclass by the subclass. An example would be Employee as the superclass and Data Entry Clerk as the subclass. This type of relationship is described by the words "is a-kind-of."

   An aggregation relationship is used when a group of classes actually comprise another class. An example would be the class Students is actually comprised of the classes freshmen, sophomores, juniors, and seniors. These relationships are often described as "is a part of" or "is made up of."

7. Describe how views and packages help simplify class diagrams.

   Ans: Views are a subset of the class diagram that only shows the information desired by the user. For example, it may show only the classes and relationships that are relevant to a particular case, or only show the relationships of a particular type.

   Packages are used to group classes together that are related logically. This reduces the level of complexity and simplifies the diagram by reducing the number of elements on the diagram.

8. Describe the textual analysis method for identifying candidate objects for a structural model.

   Ans: Textual analysis involves analyzing the text of the use cases, using the text to provide clues about classes, instances of classes, attributes, operations, and relationships. The analyst starts by reviewing the use-case descriptions and use-case diagrams. The text in the descriptions is examined to identify potential objects, attributes, operations and relationships. Nouns in the use cases suggest possible classes, while verbs suggest possible operations. The simplicity of this technique is a major advantage.

9. Describe the common object list technique for identifying candidate objects for a structural model.

   Ans: Common object lists are simply a list of objects that are common to the business domain. This involves the analyst ignoring the use cases and looking instead for physical or tangible things in the business domain, incidents that occur, or roles that people play in the business domain. Each of these can help identify objects that were missed in the analysis of the use cases.

10. Describe the patterns method for identifying candidate objects for a structural model.

    Ans: Patterns is the third way to identify candidate objects for a structural model. This involves matching exiting patterns of classes to the target business domain to see if any of them can be reused. Books of patterns have been published for many of the common business domains, and they can be referenced by the analyst as a way of identifying possible objects. By simply reusing the existing patterns of classes, an analyst can define the system more quickly and more completely. Many common patterns have been published ranging from high-level business oriented patterns to low-level design patterns.

11. Describe how the concept of patterns in architecture relate to the development of object-oriented systems. In what way do patterns promote reuse?

    Christopher Alexander, an architect, contends that very sophisticated buildings can be constructed by stringing together commonly found patterns in existing buildings, rather than creating entirely new concepts and designs every time an architect desires to design a building. In the same way, patterns can be used in the development of object-oriented systems because many problems in the business domain involve the same type of objects and interactions as similar problems in other systems. Once the pattern has been developed, it can be reused in many other similar systems. One example the text provided was the example of a business transaction. Virtually all transactions would require a transaction class, a transaction line item class, an item class, a location class, and a participant class. Thus, once the analyst has determined that a transaction is involved, he has identified all of those classes that need to be considered in the development of this system.

12. List and briefly describe the seven steps for object identification and structural modeling.

    The seven steps are:

    1. Create CRC cards by performing textual analysis on the use cases
        - Create the normal flow of events, subflows, and alternate and exceptional flows following the SVDPI format
    2. Brainstorm additional candidate classes, attributes, operations, and relationships by using the common object list approach
        - This may result in revisions to the CRC cards as additional elements are discovered
    3. Role-play each use case using the CRC cards
        - Assign an individual to perform the operations for the class; if the "system" breaks down, you will likely discover additional objects, attributes, operations, or relationships
    4. Create the class diagram based on CRC cards
        - Transfer the information from the CRC cards to the class diagram, looking for ways in which to improve the model with generalization or aggregation relationships; keep the defaults of private attributes and public operations unless there is a reason to do differently
    5. Review the structural model for missing and/or unnecessary classes, attributes, operations, and relationships
    6. Incorporate useful patterns
        - This step requires the analyst to identify the underlying problem domain and to search for matching patterns that can be used to compare to what is already in the model
    7. Review the structural model
        - Do this step as part of a formal walk-through with a team of developers and users

13. Explain the concept of object diagrams. How do they differ from class diagrams?

    Ans: An object diagram is essentially an instantiation of all or part of the class diagram. Object diagrams are very useful when one is trying to uncover the details of a class. This is because it is easier to think in terms of concrete objects (instances) than in an abstract way using classes. By looking at the concrete objects (instances), an analyst may uncover more classes or methods or attributes that should belong to classes.

14. Describe different types of multiplicity that may be found on relationships in a class diagram.

    Ans: (1) Exactly one. An example of this type of multiplicity is that each Department has one and only one Manager. (2) Zero or More. An example is that an Employee may have zero or more Dependents. (3) One or More. An example is that a Manager is responsible for one or more Employees (4) Zero or One. An example is that an Employee has zero or one Spouse. (5) Specified Range. An example is that an employee can take between two to four vacations each year. (6) Multiple disjoint ranges. An employee may be a member of one to three or five committees.

15. Describe the four most common approaches have been suggested to aid the analyst in identifying a set of candidate objects for the structural model. These methods are textual analysis, brainstorming, common object lists, and patterns.

    Ans: Textual analysis is an analysis of the text in the use-case descriptions. The analyst starts by reviewing the use-case descriptions and the use-case diagrams. The text in the descriptions is examined to identify potential objects, attributes, operations, and relationships. The nouns in the use case suggest possible classes, whereas the verbs suggest possible operations.

    Brainstorming is a discovery technique that has been used successfully in identifying candidate classes. Essentially, in this context, brainstorming is a process of a set of individuals setting around a table and suggesting potential classes that could be useful for the problem under consideration. Typically, a brainstorming session is kicked off by a facilitator that asks the set of individuals to address a specific question or statement that “frames” the session.

    A common object list is simply a list of objects common to the business domain of the system. Several categories of objects have been found to help the analyst in the creation of the list, such as physical or tangible things, incidents, roles, and interactions.4 Analysts should first look for physical, or tangible, things in the business domain. These could include books, desks, chairs, and office equipment. Normally, these types of objects are the easiest to identify. Incidents are events that occur in the business domain, such as meetings, flights, performances, or accidents. Reviewing the use cases can readily identify the roles that the people play in the problem, such as doctor, nurse, patient, or receptionist. Typically, an interaction is a transaction that takes place in the business domain, such as a sales transaction. Other types of objects that can be identified include places, containers, organizations, business records, catalogs, and policies. In rare cases, processes themselves may need information stored about them. In these cases processes may need an object, in addition to a use case, to represent them. Finally, there are libraries of reusable objects that have been created for different business domains.

    A pattern is simply a useful group of collaborating classes that provide a solution to a commonly occurring problem. Because patterns provide a solution to commonly occurring problems, they are reusable.

16. Describe the set of rules for verifying and validating the structural model.

    Ans: Three representations could be used for structural modeling: CRC cards, class diagrams, and object diagrams. Because an object diagram is simply an instantiation of some part of a class diagram, we limit our discussion to CRC cards and class diagrams. We need a set of rules that will test the consistency within the structural models.

    First, every CRC card should be associated with a class on the class diagram, and vice-versa.

    Second, the responsibilities listed on the front of the CRC card must be included as operations in a class on a class diagram, and vice versa.

    Third, collaborators on the front of the CRC card imply some type of relationship on the back of the CRC card and some type of association that is connected to the associated class on the class diagram.

    Fourth, attributes listed on the back of the CRC card must be included as attributes in a class on a class diagram, and vice versa.

    Fifth, the object type of the attributes listed on the back of the CRC card and with the attributes in the attribute list of the class on a class diagram implies an association from the class to the class of the object type.

    Sixth, the relationships included on the back of the CRC card must be portrayed using the appropriate notation on the class diagram.

    Seventh, an association class should be created only if there is indeed some unique characteristic (attribute, operation, or relationship) about the intersection of the connecting classes.

    Finally, some specific representation rules must be enforced.

17. For what purpose is an association class used in a class diagram? Give an example of an association class that may be found in a class diagram that captures students and the courses they have taken.

    Ans: The association class is used to show a relationship where the relationship itself has attributes -- in other words which has information regarding the relationship itself that should be captured. Students enroll in courses. There is information about that enrollment itself -- when it occurs and the grade received, for example, that would be of interest to keep track of.

Chapter 6 Behavioral Modeling
Testbank

Multiple Choices

1. The external behavior of a system is described by _____.

   a. functional models
   b. structural models
   c. behavioral models
   d. interaction diagrams
   e. statechart diagrams

   Ans: a

2. An analyst depicts the static view of an information system with _____.

   a. use-case models
   b. structural models
   c. behavioral models
   d. interaction diagrams
   e. statechart diagrams

   Ans: b

3. The two types of interaction diagrams are _____ diagrams.

   a. use-case and sequence
   b. class and sequence
   c. sequence and communication
   d. object and communication
   e. statechart and object

   Ans: c

4. The modeling focus of the interaction diagram is at the _____ level while the modeling focus on the class diagram is at the _____ level.

   a. class, object
   b. interaction, class
   c. class, interaction
   d. object, class
   e. high, low

   Ans: d

5. A(n) _____ is an instantiation of a class.

   a. attribute
   b. behavior
   c. operation
   d. message
   e. object

   Ans: e

6. A(n) _____ describes information about an object.

   a. attribute
   b. behavior
   c. operation
   d. message
   e. instance

   Ans: a

7. _____ are information that is sent to objects to tell it to execute one of its behaviors.

   a. Attributes
   b. Operations
   c. Messages
   d. Instances
   e. use-cases

   Ans: c

8. Analysts use _____ to show the objects that participate in a use case and the messages that pass between the objects over time for one particular use case.

   a. structural models
   b. sequence diagrams
   c. collaboration diagram
   d. class diagrams
   e. behavioral state machines

   Ans: b

9. When arranging actors and objects on a sequence diagram, it is nice to list them _____.

   a. in alphabetical order down the side of the diagram
   b. in alphabetical order across the top of the diagram
   c. in order in which they participate in the sequence down the side of the diagram
   d. in order in which they participate in the sequence across the top of the diagram
   e. actors and objects are not both shown on a sequence diagram

   Ans: d

10. Which of the following objects would be most likely to be destroyed at some point in time in a sequence diagram?

    a. customer
    b. order
    c. order item
    d. invoice
    e. shopping cart

    Ans: e

11. A systems analyst draws a lifeline with an X at the end. This lifeline represents _____.

    a. a message that cannot be delivered
    b. an object that is destroyed at a point in time
    c. a message that is delivered at that point in time
    d. an object that is complete at that point in time
    e. an object that arrives at its final destination

    Ans: b

12. The focus in a sequence diagram is on _____

    a. How actors interact with objects to realize a given use case
    b. Messages sent by actors to other objects
    c. when an object is being created
    d. when messages are being destroyed
    e. time ordering of messages being passed between objects

    Ans: e

13. On a sequence diagram, an object name of Students:List would indicate that _____.

    a. Students is an instance of the List class that contains individual student objects
    b. List is an instance of the Students class
    c. List is a method of the Students class
    d. the Students and Lists objects are combined for that step in the sequence diagram
    e. a message is being passed from the Students class to the List class

    Ans: a

14. The order of messages on a sequence diagram goes from ____ to _____.

    a. right to left
    b. bottom to top
    c. left to right
    d. top to bottom
    e. left to right, top to bottom

    Ans: d

15. When an object sends a message to itself in a sequence diagram that is referred to as _____.

    a. recursive-messaging
    b. self-messaging
    c. self-delegation
    d. recursive-delegation
    e. none of these

    Ans: c

16. The first step in building a sequence diagram is to _____.

    a. set the context
    b. identify which objects will participate
    c. set the lifeline for each object
    d. add the focus of control to each object's lifeline
    e. validate the sequence diagram

    Ans: a

17. The acronym CRUD stands for _____.

    a. create, read, update, delete
    b. create, reference, underline, delete
    c. create, re-do, underline, delete
    d. collaborate, read, update, delete
    e. collaborate, reference, update, discard

    Ans: a

18. A behavioral state machine is a dynamic model that shows the different state through which a single _____ passes through its life in response to events, along with its responses and actions.

    a. object
    b. actor
    c. use case
    d. sequence diagram
    e. communication diagram

    Ans: a

19. A set of rules are used for performing the verification and validation walkthrough of behavioral model. One of the rules is: if there is a message on the sequence diagram, there must be _____on the communications diagram, and vice versa.

    a. a communication
    b. a message
    c. a behavior
    d. a dependence
    e. an association

    Ans: e

20. A set of rules are used for performing the verification and validation walkthrough of behavioral model. One of the rules is: all entries in a CRUDE matrix imply _____ being sent from an actor or object to another actor or object.

    a. a message
    b. a transition
    c. an association
    d. a guard condition
    e. a behavior

    Ans: a

21. A set of rules are used for performing the verification and validation walkthrough of behavioral model. One of the rules is: all _____ contained in a behavior state machine must be associated with a message being sent on a sequence and communication diagram, and it must be classified as a (C)reate, (U)pdate, or (D)elete message in a CRUDE matrix.

    a. messages
    b. behaviors
    c. transitions
    d. associations
    e. dependences

    Ans: c

True/False

1. Modeling the real world in behavioral models is relatively easy.

   Ans: False

2. As behavioral models are developed, it is likely that the use cases and structural models will have to be modified.

   Ans: True

3. Each object can both send and receive messages.

   Ans: True

4. A sequence diagram can only be drawn to represent a single scenario in a use case.

   Ans: False

5. Actors and objects are placed on a sequence diagram in no particular order.

   Ans: True

6. The destruction of temporary objects is shown on sequence diagrams with an X at the end of the lifeline.

   Ans: True

7. When an object sends a message to itself, it is called self-messaging.

   Ans: False

8. It is possible for an object to create another object, resulting in the message going directly to the object, not its lifeline.

   Ans: True

9. If you are interested in the time ordering of the messages in a system, you should use a communication diagram.

   Ans: False

10. Both the communication diagram and the sequence diagram can show return messages.

    Ans: False

11. A message with the information [a Student exists] will be sent only when this condition is true.

    Ans: True

12. The first step in drawing a communication diagram is to identify which objects and associations between the objects participate in the communication.

    Ans: False

13. In a CRUD matrix, C represents Create.

    Ans: True

14. When creating a CRUD matrix, you should use the letter U to represent Underline.

    Ans: False

15. CRUD matrices are created by creating a matrix that lists the classes across the top and down the side.

    Ans: True

16. Conditions on conditional messages in communication diagrams are placed in [ ] symbols.

Ans: True

17. Adding messages is the last step in building a communication diagram?

    Ans: False

18. If a class represents only temporary objects, then there should be a D in the column of the CRUD matrix.

    Ans: True

19. CRUD matrices are useful in the step “Set the Context” of building a collaboration diagram?

    Ans: False

20. Events are the triggers that cause an object to move from one state to another.

    Ans: True

21. A guard condition is a Boolean expression, which allows a transition to occur only if a condition is satisfied.

    Ans: True

22. The following symbol represents the destruction of a temporary object in a sequence diagram.

    Ans: True

23. An execution occurrence in a sequence diagram denotes when an object is sending or receiving messages.

    Ans: True

24. An execution occurrence in a sequence diagram is represented using thick dashed lines with arrows that are placed on top of the life lines.

    Ans: False

25. Return messages in a sequence diagram are often shown using dashed lines with arrows labeled with the return value.

    Ans: True

26. One of the guidelines for creating sequence diagram is: Place the initiator of the scenario on the right of diagram.

    Ans: False

27. The communication diagram is used for modeling process flow.

    Ans: False

28. Only create behavioral state machine for “complex” objects.

    Ans: True

29. Using detail and descriptive names for states when creating behavioral state machine.

    Ans: False

30. Every actor and object included on a sequence diagram must be included as an actor and an object on a communication diagram, and vice versa.

    Ans: True

31. If there is a message on the sequence diagram, there must be an association on the communications diagram, and vice versa.

    Ans: True

32. Some entries in a CRUDE matrix does not imply a message being sent from an actor or object to another actor or object.

    Ans: False

33. System analysts use behavioral models to depict the internal structural or static view of an information system.

    Ans: False

34. System analysts use structural models to depict the internal structural or static view of an information system.

    Ans: True

Short Answer

1. Describe sequence diagrams.

   Ans: Sequence diagrams are one of the types of interaction diagrams (the other being communication diagrams). These diagrams show the objects that participate in a use case and also the time-based ordering of the messages that pass between those objects over time for a single use case. A sequence diagram is a dynamic model that shows explicit sequence of messages between objects in a defined interaction. A sequence diagram can be a generic diagrams which shows all possible scenarios for a given use case or an instance sequence diagram which depicts a single scenario within the use case. Different components of a sequence diagram include actors, objects, lifelines, messages, execution occurrences, and frames.

2. Describe communication diagrams.

   Ans: Communication diagrams are also a type of interaction diagrams. These diagrams are essentially object diagrams that show message passing relationships instead of associations. These diagrams help you see the pattern of activity that occurs over a set of collaborating classes. Unlike sequence diagrams, they are unable to indicate time-ordering of messages. Primary components of a communication diagram include actors, objects, and messages.

3. What is a sequence diagram used for? Why would an analyst choose a sequence diagram over a communication diagram?

   Ans: A sequence diagram is an interaction diagram (as is the communication diagram) that looks at the time-based order of the messages among the objects in the use case. Sequence diagrams are constructed by placing the objects across the top of the diagram, and drawing the messages from lifeline to lifeline, from top to bottom to reflect the time-based order of the messages. Communication diagrams are essentially object diagrams that show message passing relationships instead of associations. These diagrams help you see the pattern of activity that occurs over a set of collaborating classes. Unlike sequence diagrams, they are unable to indicate time-ordering of messages. An analyst would choose to draw a sequence diagram if this time-based order is important to the analysis of the use case under study.

4. When drawing a sequence diagram, the analyst uses lifelines and a symbol to represent the execution occurrence. It is also possible for an object to be destroyed at some point in time. Explain these three concepts – what is a lifeline, what does the execution occurrence mean, and how it is possible that an object can be destroyed in a use case. Show the diagramming symbols used to represent each of these concepts.

   Ans: A lifeline extends vertically down from the object, representing literally its life in the system. Most objects have an unlimited life in the use case, so there is nothing that denotes an end to its life (obviously it ends at the end of the diagram). The lifeline is drawn as a dashed vertical line.

   An execution occurrence symbol is placed on the lifeline to represent when that particular object is sending or receiving messages. Thus, it shows when, in the life of the object, it is the focus of the use case. The focus of control is drawn as a long, narrow rectangle that is placed on top of the vertical lifeline.

   An object may be destroyed in a use case if it is a temporary object. For example, a web-based shopping cart will disappear once checkout occurs. If there is a temporary object, the lifeline is shortened, and an X is placed at the bottom of the lifeline to represent the end of the life.

5. List the steps that an analyst should go through to build a sequence diagram.

   Ans:

   1. Set the context – is it a system, a use case, a scenario of a use case, or an operation of a class
   2. Identify which objects will participate
   3. Set the lifeline for each object
   4. Lay out the messages from the top to the bottom of the diagram based on the order in which they are sent
   5. Add the execution occurrence to each object's lifeline
   6. Validate the sequence diagram

6. How does a communication diagram differ from a sequence diagram? Why would an analyst choose to draw a communication diagram?

   Ans: A communication diagram emphasizes the flow of messages through a set of objects, while the sequence diagram focuses on the time ordering of the messages that are being passed. If the focus of the analyst is on understanding how a set of collaborating objects interact with one another, then a communication diagram is more appropriate. If the time sequence of the message were of interest to the analyst, then he or she would create a sequence diagram.

7. Identify the steps that an analyst would follow in building a communication diagram.

   Ans:

   1. Set the context, which may be a system, a use case, a scenario of a use case, or an operation of a class
   2. Identify which objects (actors) and the associations between the objects that participate in the collaboration
   3. Lay out the communication diagram
   4. Add the messages
   5. Validate the communication diagram

8. What does the acronym CRUD stand for? Why would an analyst create a CRUD matrix during his analysis?

   Ans: CRUD stands for Create, Read or Reference, Update, and Delete. These are the four possible interactions between classes in a system. An analyst would create a CRUD matrix to help identify potential collaborations while building a communication diagram. (Step 2 of building a communication diagram). CRUD matrix clearly identifies how objects create, reference, modify and delete other objects.

9. When looking at a CRUD matrix, why would it be important to see "D" in a column for a temporary object, or to not see "D" or "U" in a column for objects in a data warehouse?

   Ans: D represents delete, and U represents update. A temporary object is supposed to disappear at some point in the life of the system; if there were no D in the CRUD matrix, then the analyst failed to accurately model that particular object.

   A data warehouse is supposed to maintain historical information, so one would not expect to see the data deleted (D), and in most cases, it should not be updated either (U), since the data warehouse should be reflecting the historical values, not updated ones. Hence, objects that represent a data warehouse should not have U or D underneath them in the CRUD matrix.

10. Think of an employee object. What are several of the possible states that that object may have over time? Which of these states would be the initial state? Which would be the final state?

    Ans:

    - New Employee (initial state)
    - Former Employee (final state)
    - Current Employee
    - Probationary Employee

11. Explain the term transition.

    Ans: A transition is a relationship that represents the movement of an object from one state to another. Some state transitions are conditional. Such conditional transitions are associated with a guard condition. A guard condition is a Boolean expression that includes attribute values, and it allows a state transition to occur only if the condition is true. An object moves from one state to another based on the outcome of an action that is triggered by an event.

12. Explain the terms event, action and activity.

    Ans: An event is something that takes place at a certain point in time and changes value(s) that describe an object. This in turn causes a change in the state of the object. Examples of events include a condition becoming true, a receipt of a call fro a method by an object, and the passage of a designated period of time. An action is an atomic, non-decomposable process that cannot be interrupted. Actions are often modeled as if they are completed in zero time, and they are associated with a transition. An activity is a non-atomic, decomposable process that can be interrupted. Activities take a long period of time to complete, they can be started or stopped by actions, and they are associated with states.

17. How are guard conditions shown on a behavioral state machine?

    Ans: A guard condition is a Boolean expression that includes attribute values, which allows a transition to occur only if the condition is true.
    The Boolean expression is placed in brackets and located along the relevant transition.

13. What kinds of events can lead to state transitions on a behavioral state machine?

    Ans: In the parlance of behavioral state machines, every event leads to a state transition. This is because events are defined as anything that changes a value which in turn describes the state of the behavioral state machine. In other words, transitions occur only as the result of an event. Specific types of events are as follows.

    1. Data value change: a change in one of the data values that collectively describe the state of the object. For example, a patient transitions from “new” to “existing” after the first visit.
    2. Boolean condition: a Boolean test that is applied at a certain point. For instance, after a patient transitions to “existing” we may ask the question “is the patient insured?” which would lead to state changes based on billing policies.
    3. Time lapse: after a certain amount of time in a given state, the object may spontaneously change to a different state. For instance, a patient that is in state “inactive” (perhaps because he/she has no future appointments), may be removed from the system after 5 years.

Chapter 7 Moving on to Design

Multiple Choices

1. To avoid the classic design mistake of "reducing the design time," the analyst should _____.

   a. increase the schedule to include learning time
   b. move proposed changes into future versions
   c. not switch or upgrade unless there is a compelling need for specific features
   d. not use a design tool that appears too good to be true
   e. use timeboxing

   Ans: e

2. To avoid the classic design mistake of "feature creep," the analyst should _____.

   a. not switch or upgrade unless there is a compelling need for specific features
   b. increase the schedule to include learning time
   c. move proposed changes into future versions
   d. not use a design tool that appears too good to be true
   e. use rapid application development techniques or timeboxing

   Ans: e

3. When an analyst discovers that a set of classes have a similar set of attributes and methods, it may make sense to _____ out the similarities into a separate class.

   a. refine
   b. abstract
   c. factor
   d. partition
   e. separate

   Ans: c

4. A(n) _____ is the equivalent to a subsystem.

   a. collaboration
   b. partition
   c. layer
   d. factor
   e. abstraction

   Ans: b

5. The _____ layer contains, among other things, the classes that represent the fundamental data types.

   a. problem domain
   b. system architecture
   c. human-computer interaction
   d. data management
   e. foundation

   Ans: e

6. The _____ layer addresses how the software will execute on specific computers and networks.

   a. foundation
   b. system architecture
   c. human-computer interaction
   d. data management
   e. problem domain

   Ans: e

7. The layer that keeps the user interface implementation separate from the application or problem domain classes is the _____ layer.

   a. foundation
   b. system architecture
   c. human-computer interaction
   d. data management
   e. problem domain

   Ans: c

8. The _____ layer addresses the issues involving the persistence of the objects contained in the system.

    a. foundation
    b. system architecture
    c. human-computer interaction
    d. data management
    e. problem domain

    Ans: d

9. Which of the following is not a fundamental way to approach the creation of a new information system?

    a. develop a custom application in-house
    b. rely on an external vendor to build the system
    c. purchase a software package and customize it
    d. rely on end-users to develop it themselves
    e. all of these are ways to create new information systems

    Ans: d

10. To avoid the classic design mistake of "silver bullet syndrome," the analyst should _____.

    a. increase the schedule to include learning time
    b. move proposed changes into future versions
    c. not switch or upgrade development tools unless there is a compelling need
    d. not use a design tool that appears too good to be true
    e. use rapid application development techniques or timeboxing

    Ans: d

11. There are three methods to create a new system. They are _____.

    a. buy a package, external vender, external service provider
    b. develop custom application in-house, external service provider, and external vender
    c. external service provider, rely on a developer, and external vender
    d. in-house custom application, buy a package, and external vender
    e. in-house custom application, external service provider, and external vender

    Ans: d

12. The following are all *classic design mistakes* EXCEPT _____.

    a. feature creep
    b. including design time
    c. reducing design time
    d. silver bullet syndrome
    e. switching tools in mid-project

    Ans: b

13. The following are all strengths of a *custom development design strategy* EXCEPT _____.

    a. builds technical skills
    b. greater creativity
    c. greater flexibility
    d. lower risk
    e. none of these

    Ans: d

14. The following are all strengths of a *packaged software design strategy* EXCEPT _____.

    a. it may be bought and installed in a short time
    b. many business needs are not unique
    c. the package is already tested and generally proven to work
    d. there is an exact match of functionality to requirements
    e. none of these

    Ans: d

15. An advantage of custom development is that the organization can _____.

    a. accept functionality that is not a perfect fit
    b. build technical skills and functional knowledge
    c. install in a short period of time
    d. remove all risk from the project
    e. save money on the purchase

    Ans: b

16. An advantage of purchasing packaged software is that the organization can _____.

    a. accept functionality that is not a perfect fit
    b. build technical skills and functional knowledge
    c. have developers climb the knowledge ladder
    d. make strategic changes during implementation
    e. save money on the purchase

    Ans: e

17. A disadvantage of purchasing packaged software is that the organization may _____.

    a. accept functionality that is not a perfect fit
    b. build technical skills and functional knowledge
    c. make strategic changes during implementation
    d. remove all risk from the project
    e. save money on the purchase

    Ans: a

18. The process of building new systems by combining packaged software, existing legacy systems, and new software written to integrate everything together is called _____.

    a. customization
    b. formal methodology
    c. outsourcing
    d. systems integration
    e. workaround

    Ans: d

19. Manipulating certain parameters to refine the way features work in a software package is called _____.

    a. a workaround
    b. adjustment
    c. customization
    d. feature adjustability
    e. parameterizing

    Ans: c

20. The decision on which design strategy to use depends on _____.

    a. how unique the business need is
    b. the expertise of the project manager
    c. the urgency of the project
    d. the amount of in-house experience
    e. all of these

    Ans: e

21. A(n) _____ matrix can be used to organize the pros and cons of the design alternatives so that the best solution will be chosen in the end.

    a. alternative
    b. cost-benefit
    c. feasibility
    d. design
    e. evaluation

    Ans: a

22. Which one in the following is a development strategy?

    a. Rational Unified development
    b. offshore development
    c. packaged software
    d. Agile development
    e. Rapid prototyping

    Ans: c

23. Which one in the following is NOT a factor for selecting a design strategy?

    a. Business need
    b. In-house experience
    c. Project skills
    d. Time frame
    e. Software quality

    Ans: e

24. Which one in the following is NOT a layer of a software architecture?

    a. Foundation
    b. Problem Domain
    c. Data management
    d. Data structure
    e. Human-computer Interface

    Ans: d

25. Which the following class should be designed in Foundation layer?

    a. Date
    b. DataInputStream
    c. Button
    d. Studnent
    e. URLConnection

    Ans: a

26. In order to aid project team to make a decision of an acquisition, they employ several approaches to gather additional information. The document that solicits a formal proposal from a potential vendor, developer, or service provider is called _____

    a. RFI
    b. RFQ
    c. RFP
    d. RFC
    e. RFD

    Ans: c

True/False

1. The purpose of the design phase is to create a blueprint for the new system.

Ans: True

2. The layer that would include the classes that would interact with middleware applications is the physical architecture layer.

   Ans: True

3. A package diagram is a class diagram that shows only packages and classes.

   Ans: False

4. There are three design strategies: 1) developing a custom application in-house, 2) hiring a consultant, and 3) relying on an external vendor, developer, or service provider to build the system.

   Ans: False

5. Custom development allows developers to be flexible and creative in the way they solve business problems.

   Ans: True

6. It is much less efficient to buy packaged software that has already been created, tested, and proven than to build a system from scratch.

   Ans: False

7. An object wrapper creates an application program interface (API) to a legacy system, enabling object-oriented systems to interact with it.

   Ans: True

8. Some benefits of outsourcing are that the service provider may be more experienced in the technology that would greatly benefit your organization and may have more experienced programmers.

   Ans: True

9. There are three primary types of outsourcing contracts: 1) time and arrangements, 2) variable-price, and 3) value added.

   Ans: False

10. Pirate Adventures, Inc., a company that owns and operates hotels in tropical locations, is interested in replacing the 15-year-old room reservation system in all of its hotels. Custom development would be the best design strategy.

    Ans: False

11. Max has been a project manager for 10 years and is considered one of the best in his department of well qualified IS professionals. The approval committee is considering the approval of a new unique Internet system that could possibly catapult the firm ahead of all of the competition. Buying a packaged system would be the best design strategy.

    Ans: False

12. It can be much more efficient to buy programs that have already been created, tested, and proven, and a packaged software system can be bought and installed in a relatively short period of time compared with a custom system.

    Ans: True

13. Many project teams believe that packaged software is the best way to create a system because they have complete control over the way the system looks and functions, and they can be flexible and creative in the way they solve business problems.

    Ans: False

14. Enterprise resource planning (ERP) applications are small single-function software packages that are inexpensive and easy to install and have only minor problems and fast, easily recognizable benefits.

    Ans: False

15. The three primary types of contracts that can be drawn to control the outsourcing deal are (1) a time and arrangements contract, (2) a fixed-price contract, and (3) a value-added contract.

    Ans: True

16. Custom development of software is usually the best strategy for common business needs, particularly when the business need is not unique and does not have special requirements.

    Ans: False

17. Custom applications require excellent project management and a proven methodology, and the project team should choose to develop a custom application only if it is certain that the underlying coordination and control mechanisms will be in place.

    Ans: True

18. If in-house experience exists for all the functional and technical needs of the new system, it will be easier to outsource the building of the system, because the company employees with those skills will be able to quickly learn the new system with very little training.

    Ans: False

19. Object-oriented systems can send messages to a legacy system through the use of a package wrapper.

    Ans: False

20. The design strategy that would be most logical to a firm with a very limited amount of in-house IS expertise is allow end-users to create the system.

    Ans: False

21. A company adopting an enterprise resource planning (ERP) application, has adopted the strategy of outsourcing.

    Ans: False

22. A workaround is a custom-built add-on program that interfaces with the packaged application to handle special needs.

    Ans: True

23. When using the packaged software design strategy, substantial time can be saved because the project team no longer has to spend time defining the requirements of the new system.

    Ans: False

24. Time and arrangements types of outsourcing contracts would be preferred when the client and the outsourcer have difficulty specifying the work required to complete the project.

    Ans: True

25. A disadvantage of outsourcing the application development process is that the organization may lose control over confidential information.

    Ans: True

26. As many as 70% of companies with IT budgets over $5 million are currently outsourcing development of systems.

    Ans: False

27. An advantage of outsourcing the application development process is that the organization may acquire technical skills and functional knowledge from the vendor.

    Ans: True

28. Outsourcing eliminates all risks from the project.

    Ans: False

29. A value added contract provides for flexibility, but may result in a larger than expected bill.

    Ans: False

30. A fixed price contract provides for a stable customer price, but requirements will be well defined by the outsourcer at the beginning of the contract period.

    Ans: True

31. A value added contract that is gaining in popularity provides for the outsourcer to gain a percentage of the completed systems benefits.

    Ans: True

32. When the *business need* is unique and the process is critical to the business, the most appropriate *development strategy* is packaged software.

    Ans: False

33. Packaged software is preferred when the business need is common and time is a constraining factor?

    Ans: True

34. When the *project skills* are not strategic but they do exist in-house and the *time frame* is short, the most appropriate *development strategy* is packaged software.

    Ans: True

35. When selecting a design strategy an organization should consider project management experience, project skills, functional skill development, time frame, costs, and flexibility.

    Ans: False

36. Seng would like the opportunity to increase the experience level of her IS staff by having them analyze and design a new web-based distribution system. The skills learned from this project may help with future strategic applications. Since the time period for the project is very flexible and this is a somewhat unique business need, Michelle has decided to use packaged software for this project.

    Ans: False

37. Alex would like to complete this development project quickly so that the IS department may move onto more strategic needs. He has assigned Joan to coordinate the project because she worked recently with a local vendor and has an established relationship. Michael has decided to use package software for this project.

    Ans: True

38. When the timeframe for implementation is short, it is best to consider custom development.

    Ans: False

39. An alternative matrix combines several feasibility analyses into one table so that the pros and cons of alternatives can be easily compared.

    Ans: True

40. A request for information is used to solicit proposals from vendors.

    Ans: True

41. Design models refine analysis models by adding details from the solution domain.

    Ans: True

42. In the design phase we address the functional requirements.

    Ans: False

43. Every sequence diagram must be associated to a use case in the use-case diagram.

    Ans: True

44. The attributes that change in a behavioral state machine must appear in the object attribute list.

    Ans: True

45. Class like Date (dealing with date and time) should be considered in the layer Foundation.

    Ans: True

46. Class such as URLConnection (dealing with URL connections) should be handled in the layer Data Management.

    Ans: False

47. MVC is an example of layered design of software architecture.

    Ans: True

48. The physical architecture layer addresses how the software will execute on specific computers and networks.

    Ans: True

49. The outsourcing is the best design strategy for every project.

    Ans: False

50. In-house experience is not a factor to be considered for selecting a design strategy since a company is always able to hire experienced developers.

    Ans: False

51. Package diagrams cannot be verified or validated since they are too general.

    Ans: False

52. RFP, RFI and RFQ all could be used by project teams to collect information for making acquisition decision.

    Ans: True

Short Answer

1. Describe the custom development design strategy. Discuss its advantages and disadvantages.

   Ans: During custom development the project team actually builds the new system from scratch. Advantages to custom development include control over the way the system looks and functions, flexibility and creativity in the way the business problem is solved; and the ability to build technical and functional knowledge within the company. Disadvantages to custom development include factors such as the use of an already over committed IS staff, a fully trained and experienced staff must already be in place before attempting custom development, and the risks (testing and recreating the wheel) associated with building a system from the ground up.

2. Describe the package system design strategy. Discuss its advantages and disadvantages.

   Ans: Packaged software is the purchase of software for a non-unique business need. Advantages for buying packaged software include efficiency (the programs are already created, tested, and proven), quick installation, and the expertise and experience from the vendor who created the software. Disadvantages of packaged software include the functionality of the system is inflexible and may not be a perfect fit, and the new software package may not integrate with existing legacy software.

3. Describe the outsourcing design strategy. Discuss its advantages and disadvantages.

   Ans: Outsourcing is when an external vendor, developer, or service provider is hired to create the system. This type of development strategy has increased in popularity recently. Advantages of outsourcing include factors such as the outsourcer may have more experience, technology, and resources. Outsourcing is often seen as adding value to the organization instead of reducing costs. A disadvantage to outsourcing is that the outsourcer gains the knowledge of building the new system and the customer does not.

4. Explain how the “business need” factor influences the selection of a design strategy for a project.

   Ans: There are five characteristics of any design strategy. They are business need, in-house experience, project skills, project management, and the time frame.

   Out of these five factors, if the business is quite common, there may be technical solutions in the market place that already meet this common business need. A common need means that the solution probably already exists in the marketplace and can be purchased in package software. A unique business need means a solution will need to be created from scratch by custom development. Non-core business needs can be outsourced.

5. Explain how the “in-house experience” factor influences the selection of a design strategy for a project.

   Ans: The availability of in-house experience for all functional and technical needs is important. A packaged system is an alternative for organizations that do not have in-house technical experience. Outsourcing is a way to bring outside functional or technical experience into the organization that is missing in-house, but outsourcing does not build experience for the in-house staff.

6. Explain how the factor “project skills” influences the selection of a design strategy for a project.

   Ans: Improving technical and functional project skills of in-house employees may be a strategic process within an organization. Custom development is good if an organization wishes to build in-house skills. Purchasing packaged software or outsourcing may be done if building skills is not strategic.

7. Explain how the “project management” factor influences the selection of a design strategy for a project.

   Ans: Managing a custom developed system requires excellent in-house project management skills. Packaged software requires a project manager who can coordinate a vendor’s efforts. Outsourcing requires a highly skilled project manager at the level of the organization that matches the scope of the outsourcing deal.

8. Explain how the “time frame” factor influences the selection of a design strategy for a project.

   Ans: The time frame for a project is an important characteristic. Custom development requires a very flexible time frame. It normally takes longer than expected. A packaged system can be implemented in a shorter time frame. Outsourcing may be completed in a flexible or short period depending on the size and scope.

9. Kiki, the marketing manager, and Joan, the director of information systems, have just returned from a conference on state-of-the art technology for marketing management. Each day after viewing vendor presentations and listening to other marketing managers discuss "what they don't have and what they really need," Kiki and Joan would brain storm ideas and record them in Joan's laptop. On the flight home, Joan, a successful project manager, and Kiki, an experienced marketing professional, recognize that they have the foundation for a one-of-a-kind marketing management system that would improve the decisions the marketing staff must make. This new system could possibly change the way their primary products are marketed. In the process, this new system could save the company millions of dollars and possibly make millions more. Joan has an expert IS staff that is just completing a production management system. They are always interested in learning new technology and often request additional training. No new projects have been approved by the steering committee. What would you recommend Kiki and Joan do? Include in your discussion the design strategy selection process and the important characteristics that apply to the strategy selected.

   Ans: I would recommend that Kiki and Joan make a formal request for a new marketing management system to the steering committee.

   The new system should be custom developed because all of the following selection characteristics point towards that decision. The business need is unique and has been identified by marketing managers as a big money saver and maker.

   Joan is identified as a successful project manager with an expert IS staff, so the in-house technical experience probably exist. Kiki is identified as an experienced marketing professional, so the in-house functional experience probably exists.

   The IS staff have a history of building new in-house skills on prior projects and from continued professional training.

   Joan is identified as a successful project manager that probably employees a proven methodology.

   The time frame appears to be flexible since not projects are currently in the pipeline for development and the current project is about to be completed.

10. Mariana, the IS manager, has just received a note from the accounting department stating that they wish a new purchasing system could be placed on the priority list. The chief accounting officer (CAO) has just learned that three of their competitors have new purchasing systems. Since purchasing has not been considered a key business function in the past, the CAO is concerned that his department lacks the functional expertise to implement a new purchasing system. She feels that purchasing is becoming a strategic necessity for the company and a new system should be in place by this time next year. The CAO has managed the automation of numerous accounting functions, such as the purchase of a combined general ledger with accounts receivable and accounts payable, the custom development of a just-in-time inventory control system, and the management of a financial projections and stock funds project that was contracted to an outside vendor. What would you recommend Mariana do? Include in your discussion the design strategy selection process and the important characteristics that apply to the strategy selected.

    Ans: Mariana should place a new purchasing system on the priority list if the funds are available to outsource the project. The reasons for outsourcing are quite clear. The business need is not unique, common to the business, or critical to the company. The accounting department lacks functional experience in the purchasing process (no mention is made of technical experience). The CAO has a vast amount of project management experience with many different types of oversight expertise, one of which was managing a project that was contracted to an outside vendor. The purchasing process is becoming more of a strategic concern of the organization and the decision to include this project on the priority list should be a strategic one. Finally, the time frame is about a year, which is short but flexible. All of the strategic characteristics point toward outsourcing as the type of development strategy.

11. Outsourcing can be a risky strategy to use when developing new information systems. Discuss ways to improve the likelihood of a successful outsourcing agreement.

    Ans: First, select the outsourcer carefully. Find an outsourcer with whom you can establish a partnership arrangement; both sides should benefit from the contract. Second, be very clear on the requirements you have before signing the contract. Don't outsource what you don't understand. Third, assign someone to manage the outsourcing relationship. Don't assume it will maintain itself. Keep the line of communication open between you and your outsourcer. Finally, develop a contract that emphasizes flexible requirements, long-term relationships, and short-term contracts.

12. What is the purpose of an alternatives matrix? What is the typical content? How will this tool be used by a project team in the context of design strategy selection?

    Ans: An alternatives matrix organizes the pros and cons of the design alternatives so that the best solution will be chosen in the end. On one side of the matrix, technical, budget, and organizational feasibility is listed, along with the pros and cons of each alternative plus any other pertinent information. The various system candidates are listed along the top of the matrix. In each cell of the grid, detailed information on each alternative is inserted. The alternatives matrix provides a concise representation of the relevant issues on each option in an easily compared format. The team may just use it to facilitate discussion. Or, the team may assign weights to each of the factors, and then score each alternative on each factor, enabling them to compute a weighted average score for each alternative. This quantification may help the team identify the alternative that provides the best overall 'package' of feasibility.

13. Briefly describe the five different software layers.

    Ans: The foundation layer contains classes that are necessary for any object-oriented application to exist, such as fundamental data types, data structures, and abstractions.

    The system architecture layer addresses how the software will execute on specific computers and networks. This layer includes classes that deal with communications between the software and the operating system and the network. This also includes classes that would interact with middleware applications.

    The human-computer interaction layer contains the classes associated with the implementation of the user interface. This deals with issues like the navigation through the system, help system, and the types of input and output elements to be included.

    The data management layer addresses the issues involving the persistence of the objects contained in the system. The types of classes that appear in this layer deal with how objects can be stored and retrieved.

    The problem domain layer is the layer that the majority of this course focuses on – the actual business problem that the system is designed to address.

14. Describe the five-step process for creating package diagrams.

    Ans: First, set the context for the package diagram. Second, cluster the classes together into partitions based on the relationships that the classes share. Third, place the clustered classes together in a partition and model the partitions as packages. Fourth, identify the dependency relationships among the packages. Fifth, place the dependency relationships on the evolved package diagram.

15. What is an "object wrapper" and how can one be used to help integrate systems?

    Ans: An object wrapper is an object that wraps around a legacy system, enabling an object-oriented system to send messages to the legacy system. Object wrappers create an application program interface (API) to the legacy system. This allows a firm to retain their investment in their legacy systems while integrating them with their object-oriented systems.

16. Give some example classes that can appear on each of the layer of software architecture.

    Ans: Answers will vary. Some suggestions are below:

Layers	**Sample Classes**
Foundation	Date, Enumeration (They include classes that represent fundamental data types, classes that represent fundamental data structures, sometimes referred to as container classes, and classes that represent useful abstractions, sometimes referred to as utility classes.)
Problem Domain	Employee, Customer (Domain classes, further detail the classes so that it will be possible to implement them in an effective and efficient manner.
Data Access and Management	DataInputStream, FileInputStream (The types of classes that appear in this layer deal with how objects can be stored and retrieved.)
Human–Computer Interaction	Button, Panel (Typical classes found on this layer include classes that can be used to represent buttons, windows, text fields, scroll bars, check boxes, drop-down lists, and many other classes that represent user interface elements.)
Physical Architecture	ServerSocket, URLConnection (classes that deal with communication between the software and the computer's operating system and the network).

17. What is the purpose of the different layers?

Ans: To successfully evolve the analysis model of the system into a design model of the system, we must add the system environment information. One useful way to do this, without overloading the developer, is to use layers.

Chapter 9 Class and Method Design
Test Bank

Multiple choices

1. Detailed design is important for two reasons. First, preexisting classes and components need to be understood, organized, and pieced together, and second, _____.

   a. it is common for the project team to write some code and produce original classes that support the application logic of the system
   b. it is tempting to jump in without planning
   c. modular design is outdated
   d. the SDLC continues to be used instead of a more reliable method of analysis for systems
   e. top-down modular approaches are an acceptable method of analysis that must be performed during the planning phase

   Ans: a

2. In an object-oriented system, changes can take place at the following level of abstraction.

   a. variable
   b. method
   c. class/object
   d. cluster (examples: partition, package)
   e. all of these

   Ans: e

3. _____ has emerged as the standard for the design of object-oriented systems.

   a. Java
   b. C++
   c. VisualBasic
   d. UML
   e. Microsoft .NET

   Ans: d

4. In terms of levels of abstraction, which of the following is at the lowest level relative to the rest?

   a. system
   b. partition/package
   c. library
   d. class/object
   e. method

   Ans: e

5. _____ means having the ability to send the same message to different objects, which can be interpreted differently by different objects.

   a. encapsulation
   b. polymorphism
   c. inheritance
   d. coupling
   e. cohesion

   Ans: b

6. _____ suggests that only the information required to use an object should be available outside the object.

   a. Encapsulation
   b. Information hiding
   c. Polymorphism
   d. Inheritance
   e. Cohesion

   Ans: b

7. _____ refers to the level of interdependency or interrelationship among the modules in a system.

   a. coupling
   b. cohesion
   c. connascence
   d. multiple inheritance
   e. single inheritance

   Ans: a

8. A class/object should only represent one thing, and a method should only solve a single task. This principle is often referred to as _____.

   a. coupling
   b. cohesion
   c. connascence
   d. multiple inheritance
   e. none of these

   Ans: b

9. What are the two types of coupling in object-oriented systems?

   a. interaction, data
   b. data, inheritance
   c. data, stamp
   d. interaction, inheritance
   e. data, common

   Ans: d

10. Which of the following types of interaction coupling is "best?"

    a. stamp
    b. data
    c. content or pathological
    d. common or global
    e. control

    Ans: b

11. Object-oriented systems have three general types of cohesion: _____, _____, and _____.

    a. method, class, inheritance
    b. method, generalization/specialization, inheritance
    c. generalization/specialization, class, object
    d. method, class, generalization/specialization
    e. functional, sequential, procedural

    Ans: d

12. *Fan-out* refers to _____.

    a. the number of attributes a class has
    b. the number of messages sent by a method
    c. the number of times a message is sent by a method
    d. the number of times an attribute is passed from a class
    e. none of these

    Ans: b

13. Which of the following Structured English statements is an advanced form of an IF statement?

    a. Action statement
    b. For statement
    c. While statement
    d. Case statement
    e. Do statement

    Ans: d

14. Constraints can be written in either a natural language, a semiformal language, or a formal language such as _____.

    a. UML
    b. Structured English
    c. Use case diagrams
    d. English
    e. UML's Object Constraints Language

    Ans: e

15. There are three different types of constraints typically captured in object-oriented design: preconditions, postconditions, and _____.

    a. regular conditions
    b. guard conditions
    c. exception handling
    d. invariants
    e. contracts

    Ans: d

16. Essentially, all OCL expressions are simply a declarative statement that evaluates to either being true or false. If the expression evaluates to true, then the constraint has been _____.

    a. satisfied
    b. executed
    c. always true
    d. served as an invariant
    e. skipped

    Ans: a

17. Like other problem domain models, the _____, contracts, and method specifications in class and method design need to be verified and validated.

    a. constraints
    b. classes
    c. behaviors
    d. associations
    e. polymorphisms

    Ans: a

18. The constraints and contracts in class and method design models were derived from the _____ requirements and the problem domain representations.

a. business
b. regularly
c. non-functional
d. functional
e. reliability

Ans: d

True/False

1. Many project teams are too quick to jump into writing code for classes without first designing them.

   Ans: True

2. Polymorphism is the mechanism that combines the processes and data into a single object.

   Ans: False

3. Subclasses inherit the appropriate attributes and methods from the superclass above them.

   Ans: True

4. Because of potential problems, developers must be aware of the effects of modifications in a superclass and in each of the subclasses that will inherit the modification.

   Ans: True

5. It is impossible for a subclass to inherit from more than one superclass.

Ans: False

6. C++ forces programmers to write code with good levels of interaction coupling.

   Ans: False

7. High levels of inheritance coupling in a system are always good and desirable.

   Ans: False

8. You should maximize connascence within an encapsulation boundary and minimize connascence between the encapsulation boundaries.

   Ans: True

9. Fan-out refers to the number of attributes passed by one object to another.

   Ans: False

10. A derived attribute results from storing the value of a computation.

    Ans: True

11. Contracts document the message passing that takes place between objects.

    Ans: True

12. Method specifications can be somewhat vague, as the programmers will have a good idea of what the analyst needs done in the system.

    Ans: False

13. Clicking a mouse can be an event.

    Ans: True

14. A Case statement is an advanced form of an If statement.

    Ans: True

15. A For statement simply performs some action.

    Ans: False

16. When a calling method passes a variable to the called method, the two exhibit content or pathological coupling.

    Ans: False

17. The *signature* of a method is completely specified by the name of the method and the parameters that must be passed to the method.

    Ans: False

18. A self-contained, encapsulated piece of software that can be plugged into a system is often referred to as a design pattern.

    Ans: False

19. Method signatures, in conjunction with frameworks, class libraries and design patterns, offer excellent opportunities for reuse.

    Ans: False

20. Using an attribute to store the value of a computation is the use of a derived attribute.

    Ans: True

21. Moving the attributes to a calling class when it is the only class that needs those attributes is not a method of optimizing the design of a system?

    Ans: False

22. A post-condition is a constraint that must be met for a method to execute.

    Ans: False

23. A pre-condition is a constraint that must be met after the method executes.

    Ans: False

24. Invariants model constraints that must always be true for all instances of a class.

    Ans: True

25. Contracts contain a detailed algorithmic description of how the method is to work.

    Ans: False

26. A listing of the items that trigger the functionality in the program is known as events.

    Ans: True

27. Written documents that include explicit instructions on how to write the code to implement the method are called method specifications.

    Ans: True

28. A Case statement in Structured English specifies some action to be performed.

    Ans: False

29. An *If* statement in Structured English controls actions that are performed under different conditions.

    Ans: True

30. A Case statement in Structured English has several mutually exclusive branches.

    Ans: True

31. Constraints can only be written in either a semiformal language or a formal language.

    Ans: False

32. There are only two different types of constraints typically captured in object-oriented design: preconditions and postconditions.

    Ans: False

33. Invariants are a type of constraints captured in object-oriented design

    Ans: True

34. Essentially, all OCL expressions are simply a declarative statement that evaluates to either being true or false.

    Ans: True

35. Since a manager has a higher position than an employee, it is a good idea to design class Manager as a superclass, and the class Employee inherits class Manager.

    Ans: False

36. One of inheritance abuses in Object-oriented design is the inheritance was used to implement an association relationship.

    Ans: True

37. In order to verifying and validating class and method design, all constraints, contracts, and method specifications must be tested.

    Ans: True

38. UML's Object Constraint Language is a formal language.

    Ans: True

Short Answer

1. What is *coupling*? Is this desirable or undesirable in a system? Why?

   Ans: Coupling refers to the level of interdependency or interrelationship among the modules (classes, objects, and methods) in a system. The higher the interdependency is, the more likely changes in part of a design can cause changes to be required in other parts of the design. Thus, you want to minimize coupling in a system, if possible. There are two types of coupling in an object-oriented system: inheritance coupling and interaction coupling.

2. What is interaction coupling? How can interaction coupling be minimized?

   Ans: The two types of coupling in OO systems are interaction coupling and inheritance coupling. Interaction coupling deals with the coupling among methods and objects through message passing. To minimize this form of coupling, Lieberherr and Holland proposed the Law of Demeter. This law minimizes the number of objects that can receive messages from a given object. Interaction coupling is difficult to totally eliminate, but the best coupling is "no direct coupling" where the methods do not relate to one another at all. The worst form of this coupling is "content or pathological" coupling where a method of one object refers to the inside (hidden) parts of another object; this type of coupling violates the principle of encapsulation and information hiding.

3. What is inheritance coupling? How can inheritance coupling be minimized?

   Ans: Inheritance coupling deals with how tightly coupled the classes are in an inheritance hierarchy. The issues of inheritance conflicts, redefinition capabilities, and dynamic binding all make a high level of inheritance coupling undesirable. To avoid these problems, the guidelines presented in the text state that you should ensure that inheritance is used only to support generalization/specialization (a-kind-of) semantics, and avoid all other uses.

4. Describe the concept of inheritance. How does this impact the development of object-oriented systems?

   Ans: Inheritance is a form of reuse. Classes can reuse attributes and methods that were defined in other classes. Thus, a class can be defined, and the attributes and methods can automatically flow to a subclass (e.g., person may be the class, and employee and student could both be subclasses). The subclass would then have the same attributes and methods as the superclass, and may have additional attributes and/or methods that are unique to the subclass. There are two types of inheritance: single inheritance and multiple inheritance. Single inheritance allows a subclass to have only one parent class. With multiple inheritance, a subclass may inherit from more than one superclass. Single inheritance causes inheritance conflicts, as per which a subclass may have the same name as an attribute/method of a superclass. Multiple inheritance may cause even more inheritance conflicts, which arise from conflicts between two or more superclasses that a subclass inherits.

5. What is *connascence*? Is this desirable or undesirable in a system? Why?

   Ans: Connascence generalizes the ideas of cohesion and coupling, and combines them with the arguments for encapsulation. This means that two modules (classes or methods) are so intertwined that if you make a change in one, it is likely that a change will be required in the other. This is very similar to coupling and as such should be minimized. However, when you combine coupling with the encapsulation levels, it's not quite that simple. In this case, you want to 1) minimize overall connascence by eliminating any unnecessary connascence throughout the system, 2) minimize connascence across any encapsulation boundaries, such as method boundaries and class boundaries, and 3) maximize connascence within any encapsulation boundary.

6. What are the four opportunities for reuse identified in the text?

   Ans: The four opportunities for reuse are patterns, frameworks, class libraries, and components. A pattern was defined in Chapter 7 as "a useful group of collaborating classes that provide a solution to a commonly occurring problem." A framework is a set of implemented classes that can be used as a basis for implementing an application. For example, frameworks are available for CORBA and DCOM that enable you to base the implementation of part of the system architecture layer. A class library gives you a set of implemented classes that were designed for reuse. A component is a self-contained, encapsulated piece of software that can be plugged into a system to provide a specific set of required functionalities.

7. What are the five optimizations that should be done to create a more efficient design?

   Ans: First, review the access paths between objects. If the path is long and the message is sent frequently, a redundant path should be considered.

   Second, each attribute for each class should be reviewed. Which method uses the attributes and which objects use the methods should be determined. If the only methods that use an attribute are read and update methods and only instances of a single class send messages to read and update the attribute, the attribute may belong with the calling class instead of the called class. Moving the attribute will speed up the system.

   Third, review the direct and indirect fan-out of each method. If the fan-out of a method is high relative to that of other methods in the system, the method should be optimized.

   Fourth, look at the execution order of the statements in often-used methods. Sometimes rearranging some of the statements can make it more efficient.

   Finally, avoid re-computation by creating derived attributes.

8. What are the three types of constraints typically captured in object-oriented design?

   Ans: The three are pre-conditions, post-conditions, and invariants.

   Pre-conditions are constraints that must be met for a method to execute. A post-condition is a constraint that must be met after the method executes or the effect of the method execution must be undone. Invariants model constraints that must always be true for all instances of a class.

9. Use Structured English to write the logic for the process “register for a class” at your college or university. Focus on a single class, but consider the possible exceptions that may occur when you try to register for that class.

   Ans: The answers will vary for this problem depending on the particular registration process (and possible exceptions) that exists at your institution. However, they certainly should consider what would happen if the class is closed, if they don’t have the necessary pre-requisite for the course, if there is a hold on their registration, etc.

10. Why is it necessary for an analyst to detail the specifications for the individual classes and methods? What techniques are useful for doing this documentation?

    Ans: The analyst must provide explicit instructions on how to write the code to implement each method so that the programmers who write the code will know what to do. The specifications need to be very clear and easy to understand or the programmers will have to try to decipher vague or incomplete instructions. A method specification form can be used to document these specifications. The analyst will have to determine the triggers or events that start the particular method, the arguments received and returned, messages sent, and the specifications for the algorithm(s) used in the method.

11. What is the Object Constraint Language? Give an OCL example.

    Ans: The Object Constraint Language (OCL) is a complete language designed to specify constraints. Essentially, all OCL expressions are simply a declarative statement that evaluates to either being true or false. If the expression evaluates to true, then the constraint has been satisfied. For example, if a customer had to have a less than a one hundred dollar balance owed to be allowed to place another credit order, the OCL expression would be: *balance owed <=100.00.*

12. What are the different ways to optimize an object system?

Ans:

1. Review the access paths between objects.
2. Review the attributes of each class.
3. Review the direct and indirect fan-out of each method.
4. Look at execution order of the statements in often-used methods.
5. Avoid re-computation by creating derived attributes.

13. Briefly discuss the procedure for verifying and validating class and method design.

    Ans: First, perform a walkthrough of all of the evolved problem domain representations. That is, all functional models must be consistent, all structural models must be consistent, all behavioral models must be consistent, and the functional, structural, and behavioral models must be balanced. Second, all constraints, contracts, and method specifications must be tested. The best way to do this is to role-play the system using the different scenarios of the use cases. In this case, we must enforce the invariants on the evolved CRC cards, the pre- and post-conditions on the contract forms, and the design of each method specified with the method specification forms and algorithm specifications.

Chapter 09 Data Management Layer Design
Testbank

Multiple Choices

1. Data may be stored in the following formats _____.

   a. databases
   b. entities
   c. entities and files
   d. files
   e. files and databases

   Ans: e

2. A(n) _____ is less expensive and easier for novice users to use, but it does not have the features that are necessary to support mission-critical or large scale systems.

   a. database
   b. database management system
   c. end-user database administrative system
   d. end-user database management system
   e. enterprise database management system

   Ans: d

3. A(n) _____ can support large volumes of data and support applications that run an entire company.

   a. database
   b. database management system
   c. end-user database administrative system
   d. end-user database management system
   e. enterprise database management system

   Ans: e

4. A(n) _____ is basically an electronic list of information that is stored on a disk.

   a. sequential access file
   b. unordered sequential access file
   c. ordered sequential access file
   d. random access file
   e. transaction file

   Ans: b

5. SQL operates on _____.

   a. rows of data at a time
   b. columns of data at a time
   c. tables of data at a time
   d. the entire database
   e. any of the above

   Ans: c

6. Which of the following is NOT a characteristic of current object-relational databases?

   a. storage of objects in the relational table structure
   b. good support for typical data management operations
   c. SQL support
   d. support for inheritance
   e. all of these are characteristics of object-relational databases

   Ans: d

7. In an object-oriented database, an *extent* is the equivalent to a(n) _____ in a relational database.

   a. attribute
   b. row
   c. table
   d. relationship
   e. unique identifier

   Ans: c

8. The type of database that is most capable of supporting complex data types is _____.

    a. sequential files
    b. relational DBMS
    c. object-oriented DBMS
    d. object-relational DBMS
    e. random access files

    Ans: c

9. The process of ensuring that values linking tables together through the primary and foreign keys are valid and correctly synchronized is _____.

    a. hierarchical integrity
    b. primary integrity
    c. table integrity
    d. referential unity
    e. referential integrity

    Ans: e

10. A relational database may be optimized for _____.

    a. data type and storage efficiency
    b. relational type
    c. speed of access
    d. storage efficiency
    e. storage efficiency and speed of access

    Ans: e

11. A simple rule to follow when creating problem domain classes and data access and manipulation classes is that there should be _____.

    a. One data access and manipulation class for each concrete problem domain class
    b. Two data access and manipulation classes for each concrete problem domain class
    c. N data access and manipulation classes for each concrete problem domain class, where N is the number of methods in the problem domain class
    d. N data access and manipulation classes for each concrete problem domain class, where N is the number of subclasses of the problem domain class
    e. none of these

    Ans: a

12. Which one in the following list is an example of NOSQL data store?

    a. Oracle
    b. SQL Server
    c. Access
    d. OODBMS
    e. Google's Big Table

    Ans: e

13. Most NoSQL data stores were created to address problems associated with storing large amounts of distributed data in _____.

    a. SQL Server
    b. ORDBMSs
    c. OODBMSs
    d. RDDBMSs
    e. MySQL

    Ans: d

14. _____ is primarily designed for supporting the decision making systems.

    a. Rational DBMS
    b. Object Relational DBMS
    c. Object-Oriented DBMS
    d. Microsoft SQL Server
    e. NoSQL

    Ans: e

15. Key-value data stores essentially provide a distributed index (primary key) to where a(n) _____ is stored.

    a. BLOB (binary, large object)
    b. field
    c. entity
    d. attribute

    Ans: a

True/False

1. A master file holds information temporarily so that it can be used to update other master files.

   Ans: False

2. Most object-oriented programming languages support sequential and random access files.

   Ans: True

3. Finding a specific object in a sequential access file is relatively easy to do.

   Ans: False

4. An object-relational database is used primarily to support multimedia applications.

   Ans: False

5. It is likely easier today to find expertise in OODBMS than in RDBMS.

   Ans: False

6. Mapping between the problem domain objects and an OODBMS is a straightforward one-to-one mapping.

   Ans: True

7. Mapping from the problem domain to the data management objects in an RDBMS format is a straightforward one-to-one mapping.

   Ans: False

8. In terms of storage space, the most efficient tables in a relational database have redundant data and many null values.

   Ans: False

9. Update anomalies occur when some instances of redundantly stored data are overlooked when an update occurs.

   Ans: True

10. A file contains an electronic list of information that is formatted for a particular transaction, and the information is changed and manipulated by programs that are written for those purposes.

    Ans: True

11. Look-up files store core information that is important to the business and to the application, and are usually kept for long periods of time with new records appended to the end of the file.

    Ans: False

12. The most efficient tables in a relational database in terms of storage space have no redundant data and very few null values because the presence of these suggest that space is being wasted, and more data to store means higher data storage hardware costs.

    Ans: True

13. Optimization is a process whereby a series of rules are applied to a logical data model to determine how well-formed it is; these rules help analysts identify entities that are not represented correctly.

    Ans: False

14. Sequential access files are very efficient for operations such as report writing.

    Ans: True

15. When looking for a specific object of interest, on average 25% of a sequential access file will have to be searched in order to find that object.

    Ans: False

16. A transaction file is primarily used to update a master file.

    Ans: True

17. Joanne, a systems analyst trained at this university, has been asked to lead a team that will recommend a new data storage system for her company. After careful analysis of the five divisions that comprise the entire $35 million company, Joanne's team should recommend an end-user database management system.

    Ans: False

18. A master file stores core information that is important to the business, is normally kept for long periods of time, and is regularly updated.

    Ans: True

19. A file that stores core information important to the business is an audit file.

    Ans: False

20. A file that stores static values used for reference and validation is a look-up file.

    Ans: True

21. A file that stores information on who, when, and how data was altered is an audit file.

    Ans: True

22. An image file stores past transactions that may no longer be needed, is usually stored off-line, and can be accessed on an as-needed basis.

    Ans: False

23. An audit file contains information about how data changes over time; it records before and after images of data as it is altered so that it can be validated later.

    Ans: True

24. SQL, the standard language for accessing data in tables in relational databases, stands for Standard Query Language.

    Ans: False

25. Up until recently, an object-oriented database is mainly used to support multimedia applications or complex systems involving graphics, video and sound.

    Ans: True

26. Nicole and her team of skillful systems analysts have been hired to create a database system for an educational software package that supports the study of medicine and the human body. A sample application will include a narrative exploration and graphical "tour" of the heart. As part of Nicole's team, the type of database that you would you recommend is a relational database.

    Ans: False

27. The leader in the database market and a system that can handle diverse data needs is the relational DBMS.

    Ans: True

28. It is difficult to find professionals with the necessary skill set for RDBMS.

    Ans: False

29. Lauren and her team have been hired to create a transaction system for Mike's Motorcycles. Mike's is a medium size shop with 10 employees that sells motorcycle parts and does repair on motorcycles, lawn mowers, and other small engine systems (boats, dune buggies, tractors, etc.) As part of Lauren's team, you need to recommend relational database management system.

    Ans: True

30. The object persistence format that supports simple data types only is OODBMS.

    Ans: False

31. The accountants at the Sears store in a local city have noticed that the appliance department is regularly short when items sold are compared to sales. The accountants feel that something is wrong and these systems must be checked for accuracy. The audit file system will reveal if appliances may have been stolen.

    Ans: True

32. The two primary dimensions to optimize a relational database are storage efficiency and future needs.

    Ans: False

33. The data stores that are described as NoSQL typically support SQL.

    Ans: False

34. The applicability of NOSQL data stores is limited and they are NOT applicable to traditional business transaction processing systems.

    Ans: True

35. Key-value data stores is a type of NOSQL data stores, and they essentially provide a distributed index (primary key) to where a BLOB (binary, large object) is stored

    Ans: True

36. There are many different types of NoSQL data stores including key-value stores, document stores, column-oriented stores, object databases, and RDBMSs.

    Ans: False

37. The Object Relational DBMS has all advantages from both the Relational DBMS and the Object-Oriented DBMS.

    Ans: False

38. The Relational DBMS only supports simple data types, but the Object Relational DBMS supports both simple and complex data types.

    Ans: True

Short Answer

1. Explain the object persistence format type known as files.

   Ans: There are four main types of object-persistence formats: files (sequential and random access), relational database management systems, object-relational database management systems, and object-oriented database management systems. Files are good for transaction processing systems but have poor future prospects. The major weakness of files is redundant data. This weakness is a significant limitation. Though files can be designed for fast performance and are good for short-term storage, their usage is very limited for new data storage. An unordered sequential file is an electronic list of information that is stored on a disk. Ordered sequential files store information in a specific order (for example, by customer id). Random access files allow only random or direct file operations to be performed, and are optimized for such operations.

2. Explain the object persistence format type known as Relational databases.

   Ans: Relational database management systems (RDBMS) currently lead the database market because they are able to handle diverse data needs. RDBMS are good for transaction processing systems and decision making. RDBMS have good future prospects. A relational database is based on collections of tables with each table having a primary key, a field whose value is unique for every row in the table. Most RDBMS support referential integrity, which forces the tables linked by the primary key-foreign key relationships to be correctly synchronized. SQL (Structured Query Language) is the standard language for accessing data in RDBMS. IBM DB2, Oracle, Microsoft SQL Server are all examples of RDBMS systems.

3. Explain the object persistence format type known as Object-relational databases.

   Ans: Object-relational database management systems are relational databases that have extensions that provide limited support for object-orientation. The extensions typically include some support for the storage of objects in the relational table structure. This is typically done through the use of a user-defined type. Currently, IBM Db2, Oracle, and Informix all have some level of support for storing objects. Many of the ORDBMS still do not support several object-oriented features including inheritance.

4. Explain the object persistence format type known as Object Oriented Databases.

   Ans: Object-oriented database management systems (OODBMS) are able to handle complex data but the technology behind OODBMS is still maturing and skilled OO professions are hard to find. These systems can be used for transaction processing but they have an uncertain future. With an OODBMS, collections of objects are associated with an extent. An extent is a set of instances associated with a specific class (similar to a table in an RDBMS). Each instance has a unique Object ID. OODBMS maintains referential integrity by tracking the object relations using the Object ID. OODBMS support some form of inheritance; one problem with supporting inheritance is that it tends to be language dependent. OODBMS also support the idea of repeating groups and multivalues attributes.

5. Information systems consultants, Drew and Becky, have just visited the site of a potential customer. Video-Audio-Images Extra, Inc., is an old established organization that was one of the first companies to videotape weddings, high school musicals, and church presentations. Today they have transformed into a multinational company that performs audio and video recording and mixing, digital re-mastering, and computer graphics for feature films, MTV videos, commercials and video games. During the interview Becky learned that the company has a legacy database system that should soon be replaced. The new system should be able to handle only accounting, purchasing, human resources, and inventory control for the company. What object persistence format would you recommend to Becky and Drew? Support your answer.

   Ans: I would recommend a relational database management system to Becky and Drew. Though Video-Audio-Images Extra, Inc. is a company that does high-tech computer applications, it is currently looking for a system that will run the business end of the organization. Relational database management systems are currently the industry leader in transaction processing systems, which include accounting, purchasing, human resources and inventory control.

6. Explain the difference in the way Structured Query Language processes data compared to traditional programs.

   Ans: The key difference is that traditional programs operate on files, and the files must be processed record by record. Structured Query Language operates of complete tables as opposed to the individual records in the tables. When a query deals with data from more than one table, the tables are joined to create a new, larger table, which is then operated on by the SQL commands.

7. What is the role of the following file types: master, look-up, transaction, audit, and history?

   Ans: The master file stores core information for the business, such as customer information or order information. They are usually kept for long periods of time with new records appended to the end. Look-up files contain static values, such as valid zip codes, against which user input can be validated. A transaction file holds information temporarily until it is used to update a master file. An audit file records before and after images of data as it is altered so that an audit can be performed if the integrity of the data is questioned. A history file is used to store information that is no longer actively used. This file archives the old records, typically off-line, so they can be accessed if needed but so they will not slow down the system.

8. What is the concept of referential integrity? Why is it important in databases?

   Ans: Referential integrity is the idea of ensuring that values linking the tables together through the use of primary and foreign keys are valid and correctly synchronized. This makes sure that data are not entered in one table (e.g., the order table) without corresponding data in the related table (e.g., customer).

9. Describe the differences between an ORDBMS and an OODBMS, and list the advantages of using an OODBMS over an OODBMS.

   Ans: The OODBMS leaves the relational model aside. It does implement something called an extent which functions much like a table. While the system generates a unique identifier for each object, it is still good to have an attribute with a unique value for each instance. The OODBMS provide some language dependent form of inheritance and some complex data forms such as repeating groups and multi-valued attributes.

   Being based on established technology, the systems tend to be more mature and have a broader range of personnel with appropriate skill sets.

10. Describe the differences between Relational DB and NoSQL Data Store.

    Ans: The major strengths of Relational DB are they are leaders in the database market, and they Can handle diverse data needs, and NoSQL can handle complex data. The data types support in Relational DB is simple, but NoSQL supports simple and complex data types. Relational DB is mainly for handling transaction processing and decision making, but NoSQL is optimized for decision making, which emphasizes performance than consistency.

11. When implementing the object persistence in an ORDBMS, what types of issues must you address?

    Ans: The mapping between problem domain layer and the data management layer is not straightforward with the ORDBMS. First, the mapping will vary with the specific language and tools used. There is a need to map the problem domain classes to both data management classes and tables in the data management layer. There are nine rules that should be followed for implementing this mapping that mostly focus on dealing with complex data forms such as repeating groups of attributes.

12. Why should the object persistent classes be dependent on the associated problem domain classes instead of the other way around?

    Ans: It is recommended that the data management functionality specifics, such as retrieval and updating of data from the object storage, be included only in classes contained in the Data Management layer. This will ensure that the Data Management classes are dependent on the Problem Domain classes and not the other way around. Furthermore, this allows the design of Problem Domain classes to be independent of any specific object persistence environment, thus increasing their portability and their potential for reuse. This one also implies additional processing. However, the increased portability and potential for reuse realized should more than compensate for the additional processing required.

Chapter 10: Human-Computer Interaction Layer Design Testbank

Multiple Choices

1. The fundamental part of the user interface that permits the system to capture information is the _____ mechanism.

   a. description
   b. input
   c. interface
   d. navigation
   e. output

   Ans: b

2. The fundamental part of the user interface that provides information from the system to the user is the _____ mechanism.

   a. input
   b. interface
   c. layout
   d. navigation
   e. output

   Ans: e

3. Novice users prefer _____ while expert users prefer _____.

   a. ease of use, ease of learning
   b. ease of use, good layout
   c. consistency, ease of learning
   d. ease of learning, ease of use
   e. ease of learning, consistency

   Ans: d

4. _____ assures the interface will act as the users expect, while _____ assures it will look pleasing.

   a. Layout, aesthetics
   b. Aesthetics, consistency
   c. Consistency, aesthetics
   d. Consistency, layout
   e. Aesthetics, layout

   Ans: c

5. The user interface design principle that places an emphasis on the intuitive flow of the interface (i.e. left to right and top to bottom) to minimize the user's movements is _____.

   a. aesthetics
   b. consistency
   c. content awareness
   d. layout
   e. user experience

   Ans: d

6. The user interface design principle that places an emphasis on the user's ability to always know where he/she is in the system and what information is being displayed is _____.

   a. aesthetics
   b. consistency
   c. content awareness
   d. layout
   e. user experience

   Ans: c

7. Juan is designing a user interface for the data-entry clerks in the marketing department. In an interview with the department manager, Juan has learned that the department has frequent turnover and that there is very little money for training. What two interface design principles would you recommend Juan emphasize in his design?

   a. aesthetics and consistency
   b. aesthetics and layout
   c. content awareness and aesthetics
   d. content awareness and minimal user effort
   e. user experience and consistency

   Ans: e

8. In user interface design, use scenarios will _____.

   a. describe all possible paths through the system
   b. describe the most frequent paths taken through the use cases
   c. provide the designer with detailed descriptions of the interface design elements
   d. repeat the content of the system's data models
   e. repeat the content of the system's process models

   Ans: b

9. A(n) _____ shows how all the screens, forms and reports are related, and how the user moves from one to another.

   a. data flow diagram
   b. interface standard design
   c. window navigation diagram
   d. storyboard
   e. use scenario

   Ans: c

10. The *interface standard* that specifies the pictures that will appear on command buttons as well as in reports and forms to highlight important information is(are) the _____.

    a. interface metaphor
    b. interface objects
    c. interface actions
    d. interface icons
    e. interface templates

    Ans: d

11. Which of the following interface evaluation techniques involves a highly structured assessment of the users' interaction with the system?

    a. heuristic evaluation
    b. interactive evaluation
    c. metaphor prototyping
    d. usability testing
    e. walk-through evaluation

    Ans: d

12. Which of the following ways of enabling users to communicate with the system is most commonly used?

    a. Command languages
    b. Direct manipulation
    c. Menus
    d. Natural languages
    e. all of these are about the same

    Ans: d

13. Moving files by dragging and dropping is an example of _____ navigation controls.

    a. command language
    b. direct manipulation
    c. menu
    d. natural language
    e. UNIX

    Ans: b

14. If *real-time information* is required by the information system, then the appropriate *input processing mechanism* is _____.

    a. back room processing
    b. batch processing
    c. off-line processing
    d. on-line processing
    e. real-time processing

    Ans: d

15. Which of the following is the most important principle of input design?

    a. capture input electronically as close to the source as possible
    b. minimize keystrokes
    c. never use on-line processing
    d. use batch processing when appropriate
    e. use on-line processing when appropriate

    Ans: a

16. Laura sorts the information on all of her reports into alphabetical order, which makes it very hard to notice the X, Y, or Z. By sorting the information in this way Laura has introduced _____ into the manager's decision process.

    a. bias
    b. information availability
    c. information overload
    d. real-time reporting
    e. report usage

    Ans: a

17. As an addition to a regular report, a(n) _____ report may help the user understand the change in comparison values over time or show proportions that are relative to the whole.

    a. detailed
    b. graph
    c. media
    d. summary
    e. turnaround

Ans: b

18. A(n) _____ check is a type of input validation that determines if several fields have been entered before the form can be processed.

    a. check digit
    b. completeness
    c. consistency
    d. format
    e. range

    Ans: b

19. A(n) _____ check ensures that the numeric data entered is within the correct minimum or maximum values.

    a. check digit
    b. completeness
    c. consistency
    d. format
    e. range

    Ans: e

20. A(n) _____ check ensures that combinations of data are valid, for example, does the zip code of an address correspond to the correct state name.

    a. completeness
    b. consistency
    c. database
    d. format
    e. range

    Ans: b

21. The _____ design principle requires that a report not provide all the available information, only the information that is needed.

    a. understand report usage
    b. minimize bias
    c. manage information load
    d. real-time reporting
    e. none of these

Ans: c

22. Krug's three design principles are also important to design the user interfaces of mobile computing systems, especially the first one: _____.

    a. give the mobile context
    b. remove all "fluff" from the site
    c. try to linearize the content of the application
    d. using the unique features from the device
    e. "Don't make me think"!

    Ans: d

23. Steve Krug provides us with a set of guiding principles for web usability. Find one of the principles in the following list

    a. The user should never have to think about how to navigate the user interface.
    b. Using more clicking instead of typing.
    c. Using more texts in the interface
    d. Using more voice recognition feature as possible.
    e. Be consistent to other similar applications

    Ans: a

24. One of the guidelines for designing user interfaces for social media website is to make sure you understand the difference between push and pull approaches. The push-based approach is _____.

    a. you have to click buttons to get information
    b. the server sends information to users periodically
    c. the user has to come to the social media website to find information
    d. the user setup an agent program to get information from the website
    e. the server collects information for the user and store in the server and the user can access it at any time.

    Ans: b

25. A few rule you should follow to design multilingual user interfaces. Which one in the following list is NOT one of the rules?

    a. Keep the writing short and simple.
    b. Avoid humor, jargon, slang, clichés, puns, analogies, and metaphors.
    c. Use good grammar.
    d. Use large fonts.

    Ans: d

True/False

1. The user interface includes three parts; the input mechanism, the output mechanism, and the reporting mechanism.

   Ans: False

2. The use of screen and frame titles, well-defined areas on reports and forms, and good field labels apply to the interface design principle of content awareness.

   Ans: True

3. All forms and reports need a minimal amount of white space that is intentionally left blank.

   Ans: True

4. Novice and expert users are both usually most concerned with “ease of use” of a new system.

   Ans: False

5. Using the word “client” repeatedly, instead of interchanging it with the word “customer” is an example of the interface design principle for minimal user effort.

   Ans: False

6. Most user interface designers follow the minimal user effort principle by permitting users to go from the main menu of the system to the information or action need in no more than five mouse clicks or five keystrokes.

   Ans: False

7. The first step in the user interface design process is “interface design prototyping.”

   Ans: False

8. A use scenario is an outline of the steps that the users perform to accomplish some part of their work.

   Ans: True

9. An interface metaphor is a concept from the real world that is used as a model to help the user understand the system and enable the user to predict what features the interface might provide.

   Ans: True

10. The three fundamental parts of the system interface are the navigation mechanism, the input mechanism, and the output mechanism, all of which are closely intertwined.

    Ans: True

11. All parts of the interface, whether navigation, input, or output, should provide as much content awareness as possible, but it is particularly important for forms or reports that are used quickly or irregularly.

    Ans: True

12. Guidelines for aesthetics require that as much information as possible be squeezed onto a page or a screen with a minimum of white space; this will make the form or report pleasing to the eye and extremely functional.

    Ans: False

13. Interfaces should be designed primarily for the inexperienced users who are usually most concerned with ease of use; experienced users will be able to quickly pass over the simpler aspects of the new system.

    Ans: False

14. Probably the single most important factor in making a system simple to use is consistency because it enables users to predict what will happen; once they can interact with one part of the system, they will know how to interact with the rest.

    Ans: True

15. The final step in the user interface design process, interface evaluation, usually does not yield any improvements, because by that stage of the design process, all of the “bugs” will normally have been removed from the system.

    Ans: False

16. The interface standards, the basic design elements that are common across the individual screens, forms, and reports within the system, must be identical for different parts of the system, hence the name “standards.”

    Ans: False

17. Analysts must assume that users have read the manual, have attended the training classes, and have external help nearby.

    Ans: False

18. The grammar order of the navigation controls may be random (object-action or action-object) throughout an application.

    Ans: False

19. The advantage of direct manipulation is that it permits the user to enter extensive data by keystroke and allows the user to size objects within three keystrokes.

    Ans: False

20. A menu bar is often a second-level menu that pops up, floats over the screen, and disappears after one use.

    Ans: False

21. A tool bar is a list of commands at the top of the screen that are always present on the interface and may drop down immediately below another menu and disappear after one use.

    Ans: False

22. The ideal computer system permits users to enter invalid data into the system. This data is later inexpensively identified and someone is notified to resolve the information problem.

    Ans: False

23. A drop-down box displays selected items in a one-line box that opens to reveal a list of choices. Common applications include a list of the 50 states and the selection of a printer from a list of 12 available.

    Ans: True

24. Analysts often set out to introduce bias into the design of a report by sorting the information alphabetically or chronologically.

    Ans: False

25. A significant drawback of a printed report is the inability of the information to be further manipulated (i.e., sorted).

    Ans: True

26. The goal of the navigation system is to make the system as simple as possible to use; a good navigation component is one the user never really notices because it functions the way the user expects.

    Ans: True

27. The goal of the input mechanism is to present information to users so they can accurately understand it with the least effort, usually by understanding how reports will be used and designing them to minimize information overload and bias.

    Ans: False

28. The goal of the output mechanism is to simply and easily capture accurate information for the system, typically by using on-line or batch processing, capturing data at the source, and minimizing keystrokes.

    Ans: False

29. In order for managers to receive all the information needed to support the task for which it was designed, the report should provide all the information available on the subject and allow the managers to select that which they wish to use.

    Ans: False

30. Input design means designing the screens used to enter the information, as well as any forms on which users write or type information (e.g., time cards, expense claims).

    Ans: True

31. Messages are the way in which the system responds to a user and informs him or her of the status of the interaction; they should be clear, concise, complete, grammatically correct, free of unfamiliar jargon, and avoid confusing negatives.

    Ans: True

32. With batch processing (sometimes called transaction processing), each input item is entered into the system individually, usually at the same time as the event or transaction prompting the input.

    Ans: False

33. Messages should require the user to acknowledge them, rather than being displayed for a few seconds and then disappearing, with the exception of delay in processing messages, which should disappear once the delay has passed.

    Ans: True

34. Research suggests that in an ideal world, any one menu should contain no more than eight items, and it should take no more than two mouse clicks or keystrokes from any menu to perform an action (three from the main menu starting a system).

    Ans: True

35. Use scenarios are developed and used during the evaluation of the interface as a check on what could go wrong.

    Ans: False

36. Ease of use and ease of learning are important interrelated aspects of the user experience design principle.

    Ans: True

37. Content awareness is the user interface design principle that recognizes that if the user is experienced and well aware of the content on the screens, then the design of the screen can be simplified to take advantage of that awareness.

    Ans: False

38. Content awareness is the user interface design principle that requires that the screen design make it clear to the user what content is being displayed.

    Ans: True

39. One of the rules for designing multilingual user interface is to use humor language in the interface.

    Ans: False

40. One of the rules for designing multilingual user interface is to keep the writing short and straightforward.

    Ans: True

41. Pull-based approach can be used together with push-based approach for designing social media websites.

    Ans: True

42. You should only consider whether customers could find materials in your social media website but not search engines.

    Ans: False

43. One of the principles for common sense based user interface design is “Don’t make me think!”

    Ans: True

44. One of the challenges of designing user interface for mobile computing applications is that the device may be used everywhere.

    Ans: True

45. When designing user interface for mobile computing applications, you should not reuse patterns that have been used for mobile devices.

    Ans: False

46. Game players normally are motivated by cash reward, so they play game again and again.

    Ans: False

47. People play games again and again because playing games is fun.

    Ans: True

48. Gamification deals with applying gaming mechanics to non-gaming situations.

    Ans: True

49. *Gamification* deals with applying gaming mechanics to gaming business..

    Ans: False

Short Answer

1. What are the six User Interface Design Principles? Identify each principle and provide a description for each.

   Ans: The six User Interface Design Principles are layout, content awareness, aesthetics, user experience, consistency, and minimal user effort. Layout refers to a series of areas on the screen that are used consistently for different purposes. For example, the top is for commands and navigation, the middle is for input and output, and the bottom is for status information. For content awareness, the users should be aware of where they are in the system and what information is being displayed. The principle for aesthetics proposes that the interface should be functional and inviting to use. There should be careful use of white space, colors, and fonts. User experience refers to the ease of use and ease of learning. There are often tradeoffs between these two concepts. Novice users or infrequent users will prefer ease of learning, whereas frequent users will prefer ease of use. Consistency in interface design enables user to predict what will happen before they perform a function. It is one of the most important elements in ease of learning, ease of use, and aesthetics. The interface should require minimal user effort. Most designers plan on having no more than three mouse clicks from the starting menu until users perform work.

2. Quarters, Inc. is a company that sells maps of the U.S.A. that have pre-fitted holes corresponding to the recently release quarters with state emblems on the back. The maps are display cases and collectors guides for families or individuals participating in the program. Six months ago the marketing manager requested a new system that would allow retailers of the maps to order them in packs of fifty over the Internet. Three retailers are local and have volunteered to participate in a half-day evaluation of the new system. The new web-based system is almost complete. As the IS testing manager you have been assigned the task of testing the new system. Describe the four methods for interface evaluation and make a recommendation on the appropriate method or methods that would best fit the system described.

   Ans: The four common approaches to interface evaluation are heuristic evaluation, walk-through evaluation, interactive evaluation, and formal usability testing. Heuristic evaluation examines the interface by comparing it to a set of rules or principles for interface design. Three or more members of the team evaluate each screen using a checklist that was developed at the beginning of the project. After each screen has been evaluated the team meets, shares evaluations, and identifies specific improvements. For a walk-through evaluation, the project team has a meeting with the users and performs a walk-through of the interface prototype. The project team shows the storyboard or actually demonstrates the prototype and explains how the interface is to be used. Users identify improvements. During an interactive evaluation the users work with the prototype in a one-person session with a member of the project team. The team member records the difficult cases, when the user makes mistakes, or when misinterpretations are made.

Formal usability testing is commonly done with commercial software products and products developed by large organizations that will be widely used throughout the organization. A scientific process is performed that may include lab equipment, video cameras, and special software that records every keystroke and mouse operation.

I would recommend heuristic evaluation and/or walk-through evaluation. All systems should be evaluated heuristically against a checklist prior to being evaluated by customers or users. In this specific example three local retailers have volunteered to test the system for half a day. To best use their volunteer time a walk-through evaluation suits well. The team would show the retailers the prototype and explain how the interface will be used. The retailer would identify improvements to each interface.

3. Describe the typical layout areas for a standard screen, a Web screen, and a report screen.

   Ans: For a typical screen, three areas are defined. First, there is a box along the top that contains the navigation commands. Second, there is a box along the bottom that is the status area, displaying information about what the user is doing. Third, the remainder large central area of the screen is used for the primary content of the screen: displaying a report or displaying an input form, for example. A Web screen will be similar, but often provides many more navigation areas than a standard screen. There will usually be a navigation area at the top, which is used to give commands to the browser for the overall system. There is often another navigation area along the left side of the screen, containing a navigation mechanism to more between sections of the page. There may also be navigation controls at the top of the page itself and at the bottom of the page itself. In Web pages, it is essential to always let the user know where they are and how to move, so there is a lot of emphasis on navigation features. Report screens will also make use of smaller, specialized areas on the screen. Each report area may show a different type of information and is somewhat self-contained.

4. Describe the five steps of the user interface design process. Why is this process iterative?

   Ans: The first step is to review the sequence diagrams and use cases to identify use scenarios. These scenarios describe users' commonly employed patterns of action, enabling designers to focus on creating an interface that performs these actions quickly and smoothly. Second, the designers create the window navigation diagram that defines the basic structure of the interface. Third, interface standards are developed for the basic interface design elements. Fourth, the interface design elements are prototyped. Finally, the interface is evaluated by the end users. This process will be iterative in that user feedback usually suggests improvements for the interface, which results in a repeated cycle through these steps until the users are satisfied.

5. Analysts must assume that users have not read the manual, have not attended training, and do not have external help readily available. To confront these realities, navigation controls must be designed with three basic principles. Identify and define these three principles. Provide an example for each.

   Ans: The three basic design principles for navigation controls are prevent mistakes, simplify recovery from mistakes, and use consistent grammar order. Mistakes can be reduced by labeling commands and actions appropriately and by limiting choices. Too many choices can confuse the user, particularly when they are similar and hard to describe in the short space on a screen. Two examples to prevent mistakes would be to never display a command that cannot be used and to consider using a second level of menu. To simplify the recovery from mistakes the system should make it as easy as possible to correct errors. The Window menu has an undo command built in. This feature is often too complicated to write into application software. The use of consistent grammar order can easily be implemented by making each command an "action-object order." This is the most common method and most users are familiar with the format. For example, save a file has an action-object order (save is an action, file is the object).

6. Michelle and Tom have been assigned the task of creating the menu system for a new software package. They have been given the following information about the system and the prospective users of the system. There are to be only two types of menus used. The users of the new system are very familiar with Windows applications, but are considered "novices." The primary menu items should be just one word that leads to other menus. The second-level can be multiple words that perform actions. Due to limited development time image maps and toolbars should be excluded from the selection process. What types of menus would you recommend Michelle and Tom? Define each and support yourAnswer.

   Ans: There are six types of menus: menu bars, drop-down menus, pop-up menus, tab menus, toolbars, and image maps. The question does not permit the use of image maps or toolbars. Pop-up menus would not be suitable because they are not appropriate for novice users. Tab menus only permit one row of tabs (or commands) and at this point we are not sure how many we will need. The recommended menu types should be menu bar for the primary menu and drop-down menu for the secondary menu. Menu bars are a list of commands at the top of the screen that are always on the screen and act as the main menu for the system. Menu items on menu bars are always one word that lead to secondary menus. Drop-down menus drop down immediately below another menu and disappear after use. They are second-level menus that often drop from a menu bar. Drop-down menus can be multiple words that perform actions.

7. Why is it important to capture data at the source and how is this process best done?

   Ans: Capturing data at the source is perhaps the most important input design principle. The earlier in the process data is entered into electronic format the less opportunity there is for errors to enter the system. Entering data onto a paper form that is then entered into an electronic format is an expensive duplication of work. Doing the data entry process twice, once on paper and a second into electronic format, is expensive and the duplicate process creates two opportunities for error. Capturing data at the source is called source data automation. Bar code readers, optical character readers, magnetic stripe readers, and smart cards are the most common forms of source data automation. An online form, such as an application or a customer order, is also a method of capturing data at the source. The customer entering the data via a form is less expensive and more error free than a customer service representative performing the data entry.

8. The Dean of Admissions at State University would like to have an online application process for all prospective students. The online application will have the following field: first, middle, and last name; street, city, state, and zip address; phone; date of birth; and social security number. What types of input validation would you perform on each field? Support your answer.

   Ans: There are six types of input validation: completeness check, format check, range check, check digit check, consistency checks, and database checks. All of the fields would be checked for completeness. All information would be required before the form could be processed. The numeric fields of zip code, phone, date of birth, and social security number would be checked for format. Each is all numeric with a pre-defined format. For example, date of birth is defined as month, day, and year. The numeric fields should also be validated for range to guaranty that only numbers between the correct values are used. For example, a home phone number does not normally have the area codes of 800 or 900, and date of birth cannot have a day above 31 or a month above 12. Consistency check can be performed for two or more fields that are related. For example, a zip code within a state should match the state's available zip codes and a phone number area code should match a state's available area codes. Database checks would not be performed on new applicants that are not currently in State University's database.

9. Discuss three design principles that can improve the usability of menus.

   Ans: First, design the menus to be broad and shallow rather than narrow and deep. A broad and shallow structure places more choices in front of the user initially and makes it easier for them to find the desired command. Second, try to organize the menus to achieve the ideal of no more than eight items per menu, and not more than two mouse clicks or keystrokes from any menu to the desired action. Third, construct the menus so that similar categories of items are put together so that the user can intuitively guess what each menu contains. One strategy that helps is to group menu items by interface objects rather than by actions. This way, all actions pertaining to each object are contained in the same menu.

10. Distinguish between batch processing and on-line processing. What are the pros and cons of each input method? Under what circumstances is it best to use each?

    Ans: With batch processing, transaction data is accumulated over some natural period (such as a day) and processed as a group. With this method, the organization's files do not reflect the transactions until the batch has been accumulated and processed. With on-line processing, a transaction is processed as it occurs, and the organization's files reflect the transaction immediately. With this method, the organization's files are always up-to-date. Batch processing is generally simpler to implement and has lower communications costs; however, on-line processing is required in situations where files must have real-time content.

11. Discuss three ways a system designer can improve the usability of the system's reports?

    Ans: First, know how the report will be used. Clarify what the user looks for, the order in which the information is desired, and the categories that can be used to organize the information appropriately. Second, provide all necessary and sufficient information to the user, but do not provide more than the user needs. Also, if the user wants the same information presented different ways for different decision making purposes, then create different reports for each purpose. Do not try to make a comprehensive, multi-purpose report. It will probably be unusable. Third, look for possible bias in the way the report content is presented. Bias can be subtle and unintended, but present just the same.

12. Discuss the problem of bias with regard to graphical outputs.

    Ans: Bias is especially problematic in graphical output because the size effect of changes or trends can be manipulated through the choice of the scale used. To help avoid this, always start graph axes scales at zero

13. With regards to social media, what is the difference between "push" and "pull" approaches to interacting with customers?

    Ans: If the user must come to you to find out something, then you are using a pull-based approach. On the other hand, if you put the information out to the user, then you are using a push-based approach. When it comes to social media, you really need to use a combination of the approaches. For example, in Facebook if someone posts on your wall or sends you a request, Facebook will send you an email message to try an entice you back to the Facebook site. The act of posting to your site was a pull-based action, while the email message sent to you is a push-based action. In a nutshell, you want to focus on more of a push-based approach. You want your content to get to your customers in as an effective manner as possible. You don't want them to have to come looking for you. Encourage them to opt-in for update notifications to come to them in a form that they prefer. Some may prefer email notifications, while others may prefer you post to their Facebook or Twitter accounts. Also, be sure to include links to your social media sites on your home page. But, be sure not to overwhelm the customer. Not every customer wants to know every tidbit regarding the firm. Only give the customer what the customer wants. Remember, Krug's first principle: Don't Make Me Think! A corollary to this principle for social media would be: Don't Make Me Work! So, make it easy for the customer to find only what they want (or maybe what we want them to want).

14. What is occlusion? Why is it an issue when developing multi-dimensional information visualizations? What are augmented reality systems? What are Virtual reality systems?

    Ans: Occlusion is when viewing data in 3D, some of the visualization may be covered up, hidden, by other parts of the visualization. It blocks information in the back. Augmented and virtual reality using immersive technologies, is among the latest and exciting application areas being utilized to solve business problems. Where virtual reality (VR) technologies completely immerse the user into an artificial simulated digital environment, augmented reality (AR) technologies are used to augment or enhance the view of the real world. There are both opportunities and challenges with deploying both of these technologies.

15. What are some of the multilingual issues that you may face when developing for a global audience?

    Ans: Global applications often have multilingual requirements, which means that they have to support users who speak different languages and write using non-English letters (e.g., those with accents, Cyrillic, Japanese). One of the most challenging aspects in designing global systems is getting a good translation of the original language messages into a new language. Words often have similar meanings but can convey subtly different meanings when they are translated, so it is important to use translators skilled in translating technical words.

16. When developing a virtual reality system, what are some of the issues that need to be addresses?

    Ans: Obviously, designing effective and efficient VR applications is very difficult39. Again, the overall design process is similar to the general user interface design process described earlier. However, given the potential for VR to support business decision-making by combining gaming and information visualization technologies into a single seamless distributed environment and that the investment in specialized hardware and software is dropping, VR could provide large payoffs.

17. What is a cognitive map?

    Ans: A cognitive map consists of not only spatial relationships, but also of auditory, sensory and emotional impressions. In games, a map is typically provided to help with change "*is*" to "*are*" understanding where one is in the virtual space and from where one has come. Like the immersion issue, way-finding also raises issues related to individual psychological and cognitive differences.

18. What are the six suggestions to address the mobile computing challenges?

    Ans: Based on these challenges, Tidwell provides a set of suggestions that you should follow in designing a user interface for these devices. First, given the mobile context, you really need to focus on what the user needs and not what the user may want. In other words, you really should go back to business process and functional modeling (Chapter 4). In this case, only focus on the tasks that the user will need to perform when they are in the mobile context. This is a good example of a non-functional requirement (mobile computing) impacting the possible functional requirements.

    Second, if you are porting an application or web site to a mobile device, remove all “fluff” from the site. By that we mean, strip the site down to its bare essentials. If for some reason, the user needs access to the full site, be sure to provide a link to it in an obvious location. Alternatively, you could provide a complete mobile version of the application or web site to the user. Obviously, the design of the user interface will be different, but the functionality should be the same.

    Third, whenever possible, take advantage of the unique capabilities built into these devices. Some of the devices will have GPS built-in. Depending on your application, knowing where the user is could change the results. In other cases, devices such as the iPad, have an accelerometer that allows the app to “know” the orientation of the device. Many of devices have speech recognition capabilities, cameras that can be used for scanning, touch screens that allow sophisticated gestures to be used, and haptic feedback, such as bumps and vibrations. All of these capabilities could prove useful in developing different mobile applications.

Fourth, when considering a phone, you tend to have a limited width from which to work. Consequently, you should try to linearize the content of the application (see Figure 10-25). By that we mean, take advantage of vertical scrolling and try to minimize, if not eliminate, horizontal scrolling. It is simply more natural for users to scroll up and down instead of left to right on these devices.

Fifth, optimize your mobile application for the user. This will include minimizing the number of times the device must interact with a server to download or upload information with a server. Not everyone will have access to 3G, alone true 4G, networks. In many cases, uploading and downloading is still very slow. Optimization also includes the user's interaction with the device. Instead of using a lot of typing, scrolling, and taps on a touch screen, consider using the speech recognition capability. It's a lot easier to speak slowly to a smartphone than it is to have to type a lot into a virtual or physical keyboard.

Finally, Tidwell provides a set of reusable patterns that have been customized for mobile devices. These include things such as a vertical stack, filmstrip, and bottom navigation to name a few.

Chapter 12: Physical Architecture Layer Design
Testbank

Multiple Choices

1. The *computing architecture* in which the server performs practically all of the work is known as _____.

   a. client connection based architecture
   b. client-based architecture
   c. client-server architecture
   d. server-based architecture
   e. middleware architecture

   Ans: d

2. Which of the following is NOT one of the four basic functions of a computer application?

   a. application logic
   b. data access logic
   c. data storage
   d. networking logic
   e. presentation logic

   Ans: d

3. A *server* can be a(n) _____.

   a. mainframe
   b. mainframe, minicomputer, or microcomputer
   c. microcomputer
   d. minicomputer
   e. low-end personal computer

   Ans: b

4. The application function that allows data to be stored and retrieved is called _____.

   a. application logic
   b. data access logic
   c. data storage
   d. presentation logic
   e. network logic

   Ans: c

5. A server in the client-server architecture performs which of the following application functions?

   a. application logic and data storage
   b. application logic and presentation logic
   c. data access logic and presentation logic
   d. data access logic and data storage
   e. data storage logic and presentation logic

   Ans: d

6. What is one primary problem with server-based computing architectures?

   a. As more users place heavier demands on the server, it is expensive to increase server capacity.
   b. Client terminals are no longer made by hardware vendors.
   c. It is difficult to maintain security in the server-based environment.
   d. Servers are no longer made by hardware vendors.
   e. Servers cannot be manufactured quickly by vendors.

   Ans: a

7. *Scalability* refers to the _____.

   a. easy increase or decrease of the storage and processing capabilities of the computer
   b. fact that there is no central point of failure in the system
   c. deployment of middleware in the system
   d. support of many different types of clients and servers
   e. ease of decreasing the cost of the infrastructure during economic downturn

   Ans: a

8. In an *n-tiered architecture*, the _____ is spread across two or more different sets of servers.

   a. presentation logic
   b. application logic
   c. data access logic
   d. data storage
   e. any of the above can be spread across two or more sets of servers

   Ans: b

9. The six architecture characteristics that assist in selecting the proper architecture are cost of infrastructure, cost of development, ease of development, _____, _____, and _____.

   a. control and security, scalability, cost of programming
   b. interface capabilities, control and security, cost of programming
   c. interface capabilities, control and security, scalability
   d. interface capabilities, control, and security
   e. interface capabilities, scalability, cost of programming

   Ans: c

10. Ethan is considering the replacement of the existing network for his organization. He has projected organizational growth at 50% per year for the next five years. With this growth, many new employees will surely be hired and trained. He has received a large amount of money from a small business grant for the initial development. The architecture Ethan should select is _____.

    a. server-based
    b. client-based
    c. client-server
    d. network-based
    e. client-network server

    Ans: c

11. A network model will depict _____.

    a. clients
    b. network equipment
    c. external networks
    d. servers
    e. all of these

    Ans: e

12. Elements of a deployment diagram include _____.

    a. Nodes, artifacts, and locations of middleware components
    b. Client PCs, servers, and locations of application logic modules
    c. Servers, external networks, and data access logic
    d. Primarily servers
    e. Nodes, artifacts, and communication paths

    Ans: e

13. In the public key private key encryption algorithm, normally the public key is used to _____, while the private key is used to _____.

    a. Encrypt data, decrypt data
    b. Store data, restore data
    c. Access data, access information
    d. Password-protect data, retrieve password
    e. Encrypt login id, encrypt password

    Ans: a

14. The public key infrastructure (PKI) is _____.

    a. hardware
    b. software
    c. organizations
    d. policies
    e. all of these

    Ans: e

15. Recent studies have shown that almost ___ percent of organizations suffer a virus infection each year.

    a. 90
    b. 80
    c. 70
    d. 60
    e. 50

    Ans: a

16. Systems designed to handle multiple languages on the fly are ____ multilingual systems.

    a. ad-hoc
    b. concurrent
    c. versatile
    d. discrete
    e. global

    Ans: b

17. Many countries have ____ norms for expressing information such as dates that are unique to the country. Knowledge of these norms is important when developing global information systems.

    a. cultural
    b. specialized
    c. variable
    d. idiosyncratic
    e. unstated

    Ans: e

18. The cloud can contain the firm's IT infrastructure, IT platform, and software. _____ refers to the cloud providing the computing hardware to the firm as a remote service.

    a. Infrastructure as a service (IaaS)
    b. Platform as a service (PasS)
    c. Software as a service (SaaS)
    d. Utility as a service (UaaS)
    e. Computing as a service (CaaS)

    Ans: a

19. Fundamentally, cloud computing is an umbrella technology that encompasses the ideas of _____, service-oriented architectures, and grid computing.

    a. distributed computing
    b. e-business
    c. Remote Method Invocation (RMI)
    d. virtualization
    e. networking

    Ans: d

20. Which one in the following is one of the set of obstacles that cloud computing must overcome before it becomes the primary approach to provision the physical architecture layer.

    a. the cost of the cloud
    b. the level of availability of the cloud
    c. the security in the cloud
    d. the safety of the cloud
    e. the usability of the cloud

    Ans: c

21. Essentially, _____computing is the idea that computing takes place everywhere and in everything.

    a. Internet
    b. cloud
    c. ubiquitous
    d. Internet of Things (IoT)
    e. business

    Ans: c

22. The _____is the idea that, in addition to things having some form of computing capacity built into them, everyday things become connected via the Internet.

    a. cloud computing
    b. big data
    c. machine learning
    d. Internet of Things (IoT)
    e. e-business

    Ans: d

True False

1. In the server-based architecture, all data stored on one computer.

   Ans: True

2. An advantage of server-based architecture is that they never become overloaded and are always able to process user demands in a timely way.

   Ans: False

3. With the client-based architecture the clients are personal computers on a local area network and the server computer is a server on the same network.

   Ans: True

4. Client-server architectures strive to balance the processing between the client and the server by having both perform some of the application functions.

   Ans: True

5. A two-tiered architecture uses only three sets of computers, clients, database servers, and application servers.

   Ans: False

6. Senior management has established the priority for the new system as “the highest security and control at any cost.” The systems analyst should recommend a client-based computing architecture.

   Ans: False

7. Senior management has established the priority for the new system as “user friendly, and quickly and inexpensively expandable to all part of the organization.” The systems analyst should recommend a client-server based computing architecture.

   Ans: True

8. The hardware and software specification is a document that describes what hardware and software are needed to support the application.

   Ans: True

9. Server-based computing requires a high degree of coordination among many components, and the chances of security holes or control problems are much greater than with client-server computing.

   Ans: False

10. The purpose of the network model is to convey the complexity of the system, to show how the system's components will fit together, and to help the project team develop the hardware and software specification.

    Ans: True

11. A node in a deployment diagram typically indicates a server, a client or a separate network. A node never represents an individual network device since that is a very low level of abstraction for a deployment diagram.

    Ans: False

12. In a deployment diagram, typically a node is labeled with a stereotype, with the stereotype representing the type of node (e.g., web server, database server, mobile device).

    Ans: True

13. A concurrent multilingual system is one that contains separate parts that are written in each language and must be reinstalled before a specific language can be used.

    Ans: False

14. Most systems are not built to use the existing infrastructure in the organization, so the current infrastructure rarely restricts the choice of architecture.

    Ans: False

15. The client-server architecture was originally developed to control and secure data, and it is much easier to administer because all data are stored in a single location.

    Ans: False

16. Companies seldom build networks to connect distant locations by buying land and laying cable or sending up their own satellites; they usually lease services provided by large telecommunications firms, such as AT&T, Sprint, and Verizon.

    Ans: True

17. In a deployment diagram, an artifact is a piece of the information system that is to be deployed onto the physical architecture.

    Ans: True

18. The function that provides the processing required to query a database and other logic related to the data management layer is called presentation logic.

    Ans: False

19. The function that provides the logic related to the problem domain layer is called application logic.

    Ans: True

20. The function that provides the processing logic required by the human computer interaction layer is called presentation logic.

    Ans: True

21. In a deployment diagram, a communication path represents a communication link between the nodes of the physical architecture, and communication paths may be stereotyped.

    Ans: True

22. Minicomputer typically costs hundreds of thousands of dollars while a mainframe costs millions of dollars.

    Ans: True

23. Access control requirements state who can access data and what type of CRUD data access is permitted to each individual who has access to data.

    Ans: True

24. A server in the server-based architecture performs application logic, data access logic, data storage, and presentation logic.

    Ans: True

25. The major problem with a server-based architecture is that all data on the server must travel to the client for processing.

    Ans: False

26. Assume that your network has a server and three clients, this network is an example of a four-tiered architecture.

    Ans: False

27. Scalability is an important attribute in today's systems. Client-server architectures tend to be more scalable compared to the server-based architectures.

    Ans: True

28. In order to prepare computer systems for global communication, discrete multilingual systems contain separate parts that are written in multiple languages and must have each language reinstalled before it can be used.

    Ans: True

29. Legacy databases and systems are one of seven factors in the hardware and software specification document

    Ans: True

30. Cost of ownership is an estimate of the purchase price of the system used to determine whether or not to lease from an outsource vendor.

    Ans: False

31. Virtualization is another term for cloud computing.

    Ans: False

32. Basically, a web service in cloud computing is the software that supports an entire business process such as salesforce.com.

    Ans: False

33. With Platform as a Service (PaaS), the cloud vendor not only provides hardware support to a customer, but also provides the customer with either package-based solutions, different services that can be combined to create a solution, or the development tools necessary to create custom solutions in the PaaS vendor's cloud.

    Ans: True

34. Security concerns are one of the set of obstacles for adopting the cloud.

    Ans: True

35. Cost of cloud is one of the set of obstacles for adopting the cloud.

    Ans: False

36. The paperless office idea is becoming a reality thanks for widely using of tablet devices.

    Ans: True

37. Ubiquitous computing is the idea that computing takes place everywhere and in everything.

    Ans: True

38. Currently, there is only one major approach to support ubiquitous computing: specialized computing devices.

    Ans: False

39. Enhanced objects are a type of magic objects.

    Ans: True

40. Enchanted objects should be in the background simply providing its message for you to receive at your leisure; not “in your face.”

    Ans: True

Short Answer

1. Describe the fundamental types of computing architectures. Identify the four general functions of an application system and apply each to the corresponding computing architecture.

   Ans: The three fundamental types of computing architectures are server-based, client-based, and client-server based. In the server-based architecture the server performs virtually all of the work. In the client-based architecture the client is responsible for most of the application functions. In the client-server based architecture the work is shared between the two.

   The four general functions of an application system are data storage, data access, application logic, and presentation logic. Data storage is the function that is represented in the entity relationship diagram. Data storage is the actual data that is stored. Data access is the process that is required to retrieve the data that is stored. Data access includes the query language. Application logic is the process that is documented in the data flow diagram. Presentation logic includes the acceptance of the user's commands through the user interface and all information that is presented to the user via reports, screens, etc.

   In a server-based architecture the server provides the presentation logic, the application logic, the data access logic, and the data storage. The client does not provide anything.

   In a client-based architecture the client provides the presentation logic, the application logic, and the data access logic. The server provides the data storage.

   In a client-server based architecture the client provides the presentation logic. The server provides the data storage logic and the data access. The application logic may be split between both the client and the server.

2. Identify the characteristics used when selecting a computing architecture. Provide a description of characteristic.

   Ans: There are six characteristics used when selecting a computing architecture. They are the cost of the infrastructure, the cost of development, the ease of development, the interface capabilities, the control and security, and the scalability.

   The cost of the infrastructure is the major force toward the implementation of client-server computing. Client-server based architectures cost less than server-based and tend to cost less than client-based.

   The cost of developing systems is also important. Developing software for client-server computers is complex and expensive. It is thought to be 4 or 5 times more expensive than server-based. Client-based computing is less expensive than server-based because of the graphical user interface.

Ease of development has come a long way since the development of graphical user interfaces. Client-based and client-server based systems are much easier to develop than server-based. But, client-server based system do have a complexity built in when multiple layers of hardware are used.

Typically server-based applications contain character-based interfaces which are not as simple to use as graphical user interfaces (GUI). New GUI and web development tools assist in the development of improved client-based and client-server based systems.

Server-based systems are the most secure for multi-user environments. Client-server systems are still maturing in terms of security. Client systems are secure for individual users.

Scalability is the ability to increase or decrease the capacity of the computing infrastructure in response to changing capacity needs. The most scalable architecture is client-server. By contrast, server-based architectures rely on mainframe hardware that needs to be scaled up in large expensive increments. Client-based architectures have ceilings, above which the application cannot grow.

3. Scott and Tim need to implement a very secure system for the Johnson Space Flight Center. The Center has an endless hardware budget, so infrastructure costs are not a consideration. The Center has a well-trained IS staff that is available for the project. Only six people will be interacting with the new system and they are engineers with years of computer experience. Scott and Tim do not see changes to the system in the near future. Using the six characteristics of a computing architecture, make an architecture selection recommendation to Scott and Tim.

   Ans: I would recommend a server-based architecture. Security is the primary characteristic emphasized and a server-based architecture is the most secure. Other characteristics that provide support for the server-based architecture are that the infrastructure cost is not important (the high cost of server-base can be absorbed into the other budgets), the six people that will use the system are computer literate (the low-level interface capabilities are not important), the system is not projected to grow (scalability is not important).

4. Sara and Julian need to implement a system for the Johnson Space Flight Center. It is projected that the Center will grow 60% or more over the next two years. These drastic increases at the Center will be reflected in huge increases in personnel, the relocation of offices, and many software upgrades. All of the software to be used in this system is considered “non-secure”. The software will be purchased, thus reducing the cost of development. Using the six characteristics of a computing architecture, make an architecture selection recommendation to Sara and Julian.

   Ans: The growth of the Johnson Space Flight Center is the primary characteristic of the new system. I would recommend the most scalable system, client-server based, to Sara and Julian. The other important factors are the interface capabilities, since the number of people to use the system will also increase dramatically, and the “non-secure” nature of the application. Client-server based architecture fits perfectly with these to variables.

5. Explain how the four fundamental computer application functions are handled in client-server computing architectures. Discuss what is meant by fat client and thin client configurations.

   Ans: In client-server architecture, the clients and servers share the application functions. Generally, the client provides the presentation logic and the servers provide the data storage and data access logic. The application logic itself may reside on the client, the server, or be shared between the two. A fat client configuration is one in which the client contains the bulk of the application logic. By contrast, a thin client configuration is one in which the server contains the bulk of the application logic.

6. Explain the distinction between two-tiered, three-tiered, and n-tiered client-server architectures. What is the chief advantage of a multi-tiered architecture as compared to a two-tiered architecture? What are the limitations?

   Ans: These terms refer to the way that the application logic is partitioned between the client and the server. In the simple, two-tiered architecture, the client is responsible for all application logic and presentation logic, while the server is responsible for data storage and data access logic. Just two sets of computers are needed: the clients and the servers. In the three-tiered architecture, three sets of computers are used. Client computers are responsible for the presentation logic. Application servers are responsible for the application logic. Separate database servers are responsible for data access logic and data storage. In the n-tiered client-server architecture, more than three sets of computers are used: clients for presentation logic, database servers for data storage and data access logic, and two or more application servers. The application logic is partitioned among these two or more application servers.

   The primary advantage of multi-tiered client-server architecture is the fact that the processing load can be balanced among the application servers; it is more scalable. The disadvantages of the n-tiered architecture arise from increased network traffic required in this environment. Since more communication occurs between the servers, more network traffic will be generated, requiring a higher-capacity network. The second problem is that it is more difficult to develop software in the multi-tiered architecture, since more devices have to communicate in order to complete a user transaction.

7. Discuss the factors that might encourage an organization to adopt a server-based architecture as opposed to a client-server-based architecture.

   Ans: Although client-server-based architecture receives a great deal of attention today, there are two factors that could encourage organizations to use the server-based architecture. The most significant would be the need for security and control in the application. It is much easier to maintain control and security in a server-based environment. Server-based architectures were originally developed to provide control and secure data, and they excel in this. The other factor could be the lack of knowledge and experience in the organization regarding how to successfully implement a system with the complexity of client-server architecture.

8. Describe deployment diagrams. Discuss different components of a deployment diagram.

   Ans: Deployment diagrams are used to represent the relationships between the hardware components used in the physical infrastructure of an information system. They can also be used to represent the software components and how they are deployed over the physical infrastructure. In this case, a deployment diagram represents the environment for the execution of the software. The elements of a deployment diagram include nodes, artifacts and communication paths. A node represents any piece of hardware that needs to be included in the model of the physical architecture layer design. Nodes typically include client computers, servers, separate networks, or individual network devices. An artifact represents a piece of information system that is to be deployed onto the physical architecture. Often, an artifact represents a software component, a subsystem, an entire database or a layer (data management, HCI or problem domain). A communication path represents a communication link between the nodes of the physical architecture.

9. Describe network models. Discuss different components of a network model.

   Ans: The network model is a diagram that shows major components of the information system, such as the servers and networks, and their geographic locations. There is no standard way to create network diagrams. Often analysts use their own symbols and diagramming tools to create them, though UML's deployment diagram is recommended to depict network models. The purpose of a network model is two-fold: to convey the complexity of the system and two show how the system's software components fit together. This diagram also helps the project team develop the hardware and software specifications for the information system. The components of the network model are the various clients (e.g. PCs, kiosks), servers (e.g. database, network), network equipment (e.g. routers, satellite links), and external systems or networks (e.g. Internet service providers) that support the application. Locations are the geographic sites related to these components.

10. Name the three different types of clouds. How do they differ from each other?

    Ans: There are three different classifications of clouds: private, public, and hybrid. Private clouds are available only to employees of the firm, public clouds are available to the general public, and hybrid clouds combine the private and public cloud ideas together to form a single cloud. In some senses, all e-commerce sites could run in a hybrid cloud environment where the customer sales transaction portion of the system would need to be public while all other aspects would be private.

11. What are the issues related to security in the cloud?

    Ans: A major obstacle to cloud adoption is the perceived level of security available in the cloud. Not only does a firm have to worry about security from the outside, when you consider multi-tenancy, the firm must seriously consider potential attacks from within their cloud from other cloud users. Furthermore, from a service availability perspective, a denial-of-service attack against another tenant within the cloud can cause performance degradation of the firm's systems. Finally, a firm must consider protecting themselves from the cloud vendor itself. It turns out, the cloud vendor is responsible only for physical security and firewalls. All application-level security tends to be the responsibility of the cloud customer. Obviously, security in the cloud is a very complex endeavor. Given the confidentiality and auditability requirements of Sarbanes-Oxley (SOX) and the Health and Human Services Health Insurance Portability and Accountability Act (HIPAA), security in the cloud becomes a major concern for a firm to move any of its confidential data, including email, to the cloud. In many ways, when using a cloud a firm is simply taking a "leap of faith" that the cloud is secure.

12. What is meant by a service-oriented architecture?

    Ans: Web services basically support connections between different services to form service-oriented architectures. Basically, a service is a piece of software that supports some aspect of a business process. A service can be an implementation of part of a business process, it can be an implementation of an entire business process (for example, salesforce.com), or it can be object persistence support for the data management layer. These services can be either internal or external to the firm. Services can be combined to support business processes. If you recall, we suggest modeling business process with use cases, use case diagrams, and activity diagrams. A service-oriented architecture allows business processes to be supported by "plugging and playing" services together in a static and/or dynamic manner. Furthermore, some of the pluggable and playable services can be purchased out right or they can be billed to the firm based on their use; a sort of pay as you go model.

13. What is meant by ubiquitous computing? How about the Internet of Things?

    Ans: Essentially, ubiquitous computing is the idea that computing takes place everywhere and in everything. With ubiquitous computing, computing becomes so engrained into everyday things, computing effectively disappears into the background. In other words, computing becomes so deeply rooted into everyday things that the things themselves seem to become magical. The Internet of Things (IoT) is the idea that, in addition to things having some form of computing capacity built into them, everyday things become connected via the Internet.

14. What is an enchanted object?

Ans: An enchanted object is an everyday object that has a very specialized processor embedded in it that augments the object such that the object seems to be magical. For example, an umbrella that, since there is a good chance of rain, lets you know that you should take it with you today, or a wallet that lets you know that you are reaching your monthly budget limits or that your account just received a deposit.

Chapter 12: Construction
Testbank

Multiple Choices

1. When information systems projects fail, the primary reason has traditionally been _____.

   a. improperly trained programmers
   b. inadequate planning
   c. poor analysis, design, installation, or project management
   d. poor programming
   e. shortened testing periods

   Ans: c

2. _____ is the development of all parts of the new system including the software, documentation, and new operating procedures.

   a. Construction
   b. Design
   c. Documentation
   d. Management
   e. Testing

   Ans: a

3. The cost of fixing one major bug after the system is installed can easily exceed the _____.

   a. annual salary of a programmer
   b. cost of one week's work as a programmer
   c. cost of two weeks' work as a programmer
   d. entire cost of the programming project
   e. value of the entire systems team

   Ans: a

4. When assigning programmers to a programming team, the best size of the team is _____.

   a. five
   b. six
   c. the largest number of people possible
   d. the smallest number of people possible
   e. twenty-two

   Ans: d

5. Regular meetings of a systems project team _____.

   a. encourage communication
   b. is not a simple approach
   c. reduce communication
   d. reduce discussion
   e. should not be held unless necessary

   Ans: a

6. When programmers or project teams set up three areas on different disk drives in which the programmers can work, these areas are for _____.

   a. development, goal setting, and testing
   b. development, testing, and contracting
   c. development, testing, and production
   d. testing, filing, and printing
   e. testing, printing, and program logging

   Ans: c

7. A classic mistake made during the implementation phase is to _____.

   a. create a risk assessment
   b. maintain control over the code
   c. plan for the use of state-of-the-art technology
   d. spend too much time in testing
   e. use low cost personnel

   Ans: e

8. Which of the following statements is true about testing object-oriented systems?

   a. testing can be minimized since we are reusing parts of systems that have been tested before
   b. testing should be designed to prove there are no errors in the system
   c. testing is more important than it was in systems developed before object-oriented development
   d. encapsulation makes testing easier
   e. most testing techniques have been developed to support object-oriented development

   Ans: c

9. _____ allow hiding everything in a system behind a visible interface, making testing difficult.

   a. Encapsulation and information hiding
   b. Polymorphism and dynamic binding
   c. Inheritance
   d. Reuse
   e. Object-oriented development processes

   Ans: a

10. _____ makes it impossible to know which implementation is going to be executed until the system actually does it.

    a. Information hiding
    b. Dynamic binding
    c. Inheritance
    d. Reuse
    e. Encapsulation

    Ans: b

11. The number of errors found will be highest in the _____ stage of testing.

    a. unit test
    b. integration test
    c. system test
    d. acceptance test (alpha)
    e. acceptance test (beta)

    Ans: b

12. A(n) _____ defines a series of tests that will be conducted to identify errors in programming.

    a. object test
    b. test script
    c. stud test
    d. test case
    e. test plan

    Ans: e

13. Mary has written a message into her program to notify her when a particular class has been reached within the program. This message is commonly called a(n) _____.

    a. change item
    b. error message
    c. navigator
    d. stub
    e. unit

    Ans: d

14. _____ is the type of test performed to assess whether a set of classes that must work together do so without an error.

    a. Acceptance testing
    b. Beta testing
    c. Integration testing
    d. System testing
    e. Unit testing

    Ans: c

15. Which approach to system testing checks to see if the new system can handle high volumes of transactions?

    a. requirements testing
    b. usability testing
    c. security testing
    d. performance testing
    e. documentation testing

    Ans: d

16. _____ is the test that is performed to ensure that all classes work together without error and meet the business requirements for usability, security, and performance.

    a. Acceptance testing
    b. Beta testing
    c. Integration testing
    d. System testing
    e. Unit testing

    Ans: d

17. _____ documentation is designed to help programmers and systems analysts understand the application software and maintain it after the system is installed.

    a. Acceptance
    b. Integration
    c. Navigation
    d. System
    e. User

    Ans: d

18. The type of documentation designed to be used when the user needs to learn how to perform a specific function is known as _____.

    a. procedural cohesion
    b. procedures manuals
    c. reference documents
    d. sequential cohesion
    e. tutorials

    Ans: c

19. A(n) _____ is a navigation control for on-line documentation that provides access into topics using important keyword.

    a. agent search
    b. index
    c. table of contents
    d. text search
    e. web-like links

    Ans: b

20. Topics in the text documentation should be written from the viewpoint of _____.

    a. the programmers
    b. the users
    c. the sponsor
    d. what the system can do
    e. the objects

    Ans: b

21. In developing documentation use _____.

    a. the active voice
    b. e-prime style
    c. consistent terms
    d. parallel grammatical structures
    e. all of these

    Ans: e

22. In developing documentation use _____.

    a. formal language
    b. simple language
    c. technical language
    d. all of these
    e. none of these

    Ans: b

23. Hall identified several cultural differences, and cultural issues add a new wrinkle in the management of developing a successful information system. From an information systems development perspective, _____ could influence the ability of a team member to see (or not see) potential creative solutions that are out of the box or affect a team member's ability (or inability) to understand the entire problem under consideration.

    a. time
    b. context
    c. color
    d. language
    e. geography

    Ans: b

24. Hofstede identified 5 dimensions on cultural differences. Which one in the following list is NOT the dimension Hofstede identified?

    a. individualism and collectivism
    b. time
    c. power distance
    d. religion
    e. masculinity versus femininity

    Ans: d

25. From an information systems development perspective, the common language today tends to be _____, Java, SQL, C++, Objective-C, and Visual Basic.

    a. English
    b. Formal language like Finite State Machines
    c. technical language
    d. UML
    e. Graphical language

    Ans: d

26. Security testing involves three primary areas: _____, authorization, and virus control.

    a. encoding/decoding
    b. monitoring
    c. authentication
    d. validation
    e. verification

    Ans: c

27. Which one in the following is NOT in the state of the system testing?

    a. Requirements Testing
    b. Usability Testing
    c. Security Testing
    d. Performance Testing
    e. System Interface Testing

    Ans: e

28. In addition to testing the functional requirements across all layers, testing must also address all nonfunctional requirements. Which of the following is not one of those nonfunctional requirements?

    a. Operational
    b. Budgetary
    c. Performance
    d. Security
    e. Political requirements

Ans: b

True/False

1. Programming can be the greatest single component of any information systems development project in terms of time and cost.

Ans: True

2. Implementation is the development of all parts of the system, including the software development, documentation creation, and new operating procedures generation.

   Ans: False

3. The programming process of a new systems project is considered completed prior to testing.

   Ans: False

4. The larger the number of programmers assigned to a programming team, the shorter the time will be for programming to be completed.

   Ans: False

5. A test plan is often a short document (1 to 2 pages) that has one to two sentences about each test to be performed during the testing part of the implementation phase.

   Ans: False

6. Integration tests focus on one unit, program, or class that performs a specific function.

   Ans: False

7. System tests are conducted by the systems analysts to ensure that all classes work together without error.

   Ans: True

8. Three common types of documentation are reference documents, help systems, and procedure manuals.

   Ans: False

9. Three recommended guidelines for writing documentation are to use an active voice, use consistent terms, and use parallel grammatical structures.

   Ans: True

10. Documentation should be written in long paragraphs so that users get large amounts of detail quickly.

    Ans: False

11. If you use state-of-the-art technology, you can significantly decrease the project's time and cost estimates because the newer technologies are much faster and more efficient than older ones.

    Ans: False

12. If cost is a critical issue, you should assign the best, most expensive personnel to the implementation phase; never assign entry-level personnel in an attempt to save costs.

    Ans: True

13. The number one reason for project failure during implementation is testing in which the programmers and analysts test the system without formal test plans.

    Ans: True

14. On large projects, programmers must coordinate changes to the program source code, and the best way to avoid mistakes is to use a source code library, which requires programmers to check out programs and prohibits others from working on them at the same time.

    Ans: True

15. The four approaches to unit testing are user interface testing, use scenario testing, data flow testing, and system interface testing; most projects use all four approaches.

    Ans: False

16. Acceptance testing is done in two stages: alpha testing, where users test the system using made-up data, and beta testing, where users begin to use the system with real data but are carefully monitored for errors.

    Ans: True

17. System documentation is intended to help programmers and systems analysts understand the application software and enable them to build it or maintain it after the system is installed.

    Ans: True

18. Paper-based user documentation is simpler to use because it is more familiar to users, is easier to flip through to gain a general understanding of its organization and topics, and can be used far away from the computer itself.

    Ans: True

29. One of the most common causes for schedule problems is scope creep

    Ans: True

30. If cost is a critical issue, a reasonable solution is to assign lower cost programmers to the project.

    Ans: False

31. A classic mistake made during the implementation phase is to coordinate changes to the source code, since that increases the development time.

    Ans: False

32. Unit test is the type of test performed to ensure that a class is performing the function as it is defined in the program specifications.

    Ans: True

33. Interaction testing is one type of integration testing. In interaction testing, the entire system starts as a set of stubs, and each class is added in turn and tested.

    Ans: True

34. Beta testing is part of performance testing.

    Ans: False

35. System documentation consists of user's manuals, training manuals, and on-line help systems.

    Ans: False

36. Performance testing (examining the ability of the system to perform under high loads) is an example of integration testing

    Ans: False

37. Time required to develop and test user documentation should be built into the project plan.

    Ans: True

38. Unit testing includes two kinds of tests: white box testing and black box testing.

    Ans: True

39. A reference document is designed so the user can learn how to perform a specific computer application function.

    Ans: True

40. A reference document describes how to perform a business task that typically requires several computer functions or steps.

    Ans: False

41. A tutorial will teach people how to use a major component of the system by providing a step-by-step or sequence of entries.

    Ans: True

42. The type of documentation designed to describe how to perform business tasks is known as procedures manuals.

    Ans: True

43. The general structure used in most on-line documentation for documents, procedures manuals, or tutorials is called documentation items.

    Ans: False

44. The type of navigation control for topics that organizes the information into a logical form (as though the users were to read the material from start to finish) is known as table of contents.

    Ans: True

45. An index is a navigation control for on-line documentation that provides the ability to search through the topics with user generated text.

    Ans: False

46. The guideline for crafting documentation that creates a more readable text by putting the subject at the start of the sentence, the verb in the middle, and the object at the end of the sentence is “use the active voice”.

    Ans: True

47. The guideline for crafting documentation that when followed permits the user to quickly scan text to find the information needed is “use e-prime style”.

    Ans: False

48. Changing the headings from “Calling the Help Desk”, “How to Dial the Phone,” and “Provide Important Details” to “Calling the Help Desk”, “Dialing the Phone”, and “Providing Important Details” is an example of implementing the “use parallel grammatical structures” guideline for crafting documentation.

    Ans: True

49. The change from “*Select the text you want to copy. Pressing the copy button will copy the marked text to the new location*.” to “*Select the text you want to copy. Pressing the copy button will copy the selected text to the new location*.” is an application of the guideline “use consistent terms″ for crafting documentation?

    Ans: True

50. Omitting all forms of the verb “to be” from documentation to create a more active writing style follows the documentation guideline “use active voice.”

    Ans: False

51. Terms for the index and search engine can come from technical terms the analyst used in creating the system.

    Ans: False

52. When writing documentation, all commands contain two parts, an index and an action.

    Ans: False

53. The number of errors found will be lowest in the unit testing stage of testing.

    Ans: False

54. The goal of acceptance testing is to confirm that the system is complete, meets the business needs that prompted the system to be developed, and is acceptable to the users.

    Ans: True

55. System interface testing is performed at the system testing state.

    Ans: False

56. White-Box testing is used when complexity of the system under testing is high.

    Ans: True

57. One has to execute the system under test to know which implementation to be used when dynamic biding is implemented in the system.

    Ans: True

58. Testing Object-oriented system is same as difficult as testing non-object-oriented systems.

    Ans: False

59. Given the context dimension identified by Hall on cultural difference, the level of detail in direction could be varied between cultures.

    Ans: True

60. In *polychromic* time cultures, deadlines are critical. This is probably why *timeboxing* has been relatively successful as a method to control projects.

    Ans: False

61. Understanding cultural issues is extremely important to successfully manage international/multicultural development teams..

    Ans: True

62. Performance testing typically falls into two categories: stress tests and speed tests.

Ans: False

63. Performance testing typically falls into two categories: stress tests and volume tests.

Ans: True

64. The purpose of volume tests is to push the implementation so that it may break when there is a large amount of data required to answer a user request.

Ans: True

65. Comparing managing programmers in a feminine culture than in a masculine culture, it is more important to ensure that the workplace is a supportive, non-competitive, and nurturing environment in a feminine culture.

Ans: True

66. In addition to testing the functional requirements across all layers, testing must also address all nonfunctional requirements.

Ans: True

67. In testing, the “happy path” are those activities and abilities that keep the users satisfied.

Ans: False

68. Testing should be limited to the functional requirements.

Ans: False

69. Testing should end once a system is deployed.

Ans: False

70. Testing is of limited usefulness when it comes to security threats because those threats vary so widely.

    Ans: False

Short Answer

1. During the construction phase of the SDLC the project manager must coordinate the programming activities performed by the programmers. Identify three coordination activities and provide the advantages of each.

   Ans: Three coordination activities that are performed by the project manager are hold regular weekly meetings, create and follow standards, and put mechanism in place to keep the programming effort well organized.

   Regular weekly meetings provide an opportunity for the project team to discuss any changes or issues to the system that have arisen during the past week. Regular meetings encourage widespread communication and discussion of issues before they become problems.

   The creation of standards, ranging from simple rules to the completion of formal forms, assists the project team in the completion of the project. Historically, projects have been completed faster when a team completed standards for task coordination.

   Mechanisms can be put in place to keep programmers well-organized. Three areas can be established for programmer to work: a development area, a testing area, and a production area. A program is written in the development area. When it is completed it is sent to the testing area. If the program passes testing, it is placed in production. If a program does not pass testing it is sent back to development. This three work area process helps manage the "change control" process.

2. What are the two types of acceptance tests and when are they used? What is the difference between the two types of tests?

   Ans: The two types of acceptance tests are alpha testing and beta testing. Alpha testing is for normal acceptance testing and is conducted by the users to ensure that they accept the system. Beta testing is performed for very important systems using real data. Alpha testing often repeats previous tests but it is conducted by the users themselves. During Beta testing the users, using real data, closely monitor the system for errors or useful improvements.

3. Identify three types of user documentation. Contrast when each form of documentation should be used.

   Ans: There are three types of user documentation: reference documents or help systems, procedure manuals, and tutorials.

   Reference documents or help systems are designed to be used when the user needs to learn how to perform a specific function, such as updating a field or adding a new record. Since users may have already attempted to perform the function prior to reading the reference documentation, it must be particularly clear and brief.

   Procedure manuals describe how to perform a business task such as printing a monthly report or taking a customer order. Each item in the procedure manual typically guides the user through a task that requires several functions. Procedure manual entries are normally much longer than reference document entries.

   Tutorials teach people how to use major components of the system, such as the operating system or the accounts receivable system. Tutorial entries are much longer than procedure manual entries. Tutorials are typically designed to be read in sequence whereas reference documents and procedure manuals are designed to be read individually.

4. Explain the distinction between unit testing and integration testing.

   Ans: Unit testing focuses on one unit of the system, a class, to verify that the unit performs as defined in the program specification. Integration testing focuses on a set of classes that must work together. This testing looks at the flow of control between classes and on the data that is exchanged.

5. Sara has been assigned by the project manager to serve as the testing manager for the soon-to-be-completed systems project. The project manager has made it clear that this systems project is normal in every way and they are to design a plan that would be similar to the last. They have written a normal testing plan that is very similar to the testing plan followed on the last three projects. What are the four stages of tests Sara should include in their testing plan and what is the ideal type of test to be performed for each stage.

   Ans: The four stages of tests are unit testing, integration testing, system testing, and acceptance testing. The project manager has stressed a "normal" testing procedure. There is a normal test that should be performed for each stage of testing.

   During unit testing the normal type of test is black-box testing. During this test the tester focuses on whether the unit meets the requirements stated in the program specifications.

   The normal test for integration testing is user-interface testing. This test is done by moving through each and every menu item in the interface by either a top-down or bottom-up order. Each interface function is tested.

   Requirements testing is the normal test for system testing. This test ensures that changes made as a result of integration testing did not create new errors. During requirements testing the users often pretend to be uninformed users and perform improper actions to ensure the system is immune to invalid actions.

   The final testing stage is acceptance testing. Alpha testing is performed by having the users repeat previous tests performed by systems analysts to ensure they accept the system.

6. Explain the purpose of integration testing. Explain each of the four approaches that are commonly used in integration testing.

   Ans: Integration testing assesses whether or not a set of classes that must work together do so without error. The four approaches are: user interface testing, use-case testing, interaction testing, and system interface testing.

   In user interface testing, each interface function is tested by testing each and every menu item in the interface either a top-down or a bottom-up manner.

   In use-case testing, each use case is tested by moving through each use case to ensure they work correctly. This testing is usually combined with user interface testing because it does not test all of the interfaces.

   Interaction testing tests each process in a step-by-step fashion. The entire system begins as a set of stubs. Each class is added in turn and the results of the class compared to the correct result from the test data; when a class passes, the next class is added and the test rerun. This is done for each package. Once each package has passed all tests, then the process repeats integrating the packages.

   System interface testing tests the exchange of data with other systems. Because data transfers between systems area often automated and not monitored directly by the users it is critical to design tests to ensure they are being done correctly.

7. Discuss the tests performed during system testing.

   Ans: There are five different tests conducted during system testing: requirements testing, usability testing, security testing, performance testing, and documentation testing. Requirements testing tests to whether original business requirements are met in the new system. Usability testing tests how convenient the system is to use. Security testing is concerned with disaster recovery and blocking unauthorized access to the system. Performance testing examines the ability of the system to perform under high data loads. Finally, documentation testing assures the accuracy of the documentation for the system.

8. Discuss the reasons why on-line documentation is expected to be the dominant form of documentation for the future.

   Ans: There are several strengths of on-line documentation compared to paper-based documentation. The search capability should enable users to find relevant information faster on-line compared to searching through paper. Second, it is possible to strengthen user understanding by presenting the same information in multiple formats. Third, by being part of the computer, the user can interact with the documentation in many new ways (e.g., the 'show-me' guidance in many systems). Fourth, the cost of distributing on-line documentation is much lower than paper documentation.

9. Explain the five general types of navigation controls for user documentation topics.

   Ans: The documentation developers can choose from five general types of documentation navigation controls. Tables of contents organize the topics logically, but assume that the user will read the documentation through from start to finish. An index provides access to the topics by listing the important terms and keywords alphabetically. Text search permits the user to search through the topics for any text. Intelligent agents can be used to help in the search process. Finally, hyperlinks that connect topics logically permit the user to navigate among topics as needed.

10. Why is testing so important in object-oriented systems when we are using patterns, frameworks, class libraries, and components that have all be tested before?

    Ans: Because of encapsulation (and information hiding), polymorphism (and dynamic binding), inheritance, and reuse, testing is much more difficult and critical. The volume of products from the OO development process also increases the importance of testing in OO development.

11. What techniques are used by project managers during the construction phase for managing the project schedule?

    Ans: Project managers need to revise the time estimates as the construction step proceeds. If a program modules takes longer than expected, the expected completion date should be revised to take this into account. Scope creep may occur if requirements are added to the project after the design phase is complete. Any proposed change to the requirements during the construction phase must undergo a cost-benefit analysis before approval. Another common cause is the unnoticed day-by-day slippage in the schedule. A project manager must watch these minor slippages carefully and update the schedule accordingly. Project managers also need to revise and update risk assessment of the project as the construction phase progresses.

12. Discuss four classic implementation mistakes, and how project teams can avoid these mistakes.

    Ans: The first classic mistake is research-oriented development, by which the project team attempts to use the latest new technology, which is not well understood and/or documented. To avoid this mistake, the project manager needs to significantly increase the project time and cost estimates when state-of-the-art technology that is used. A second mistake is to use low-cost personnel. If cost is a critical issue, assign the best, most expensive personnel to a project. Assigning entry-level persons to handle complex tasks is expected to cost the project in other ways. The third classic mistake is not having a source code control. Source code developed in a large programming team needs to be controlled so that programmers accidentally do not undo each other's work. Using source control where each programmer checks out the modules he/she needs to work on, and checks them back in when they complete changes is required in moderate to large programming teams. The fourth classic mistake is inadequate testing. Ad hoc testing is the number one reason for project failures during the implementation phase. To avoid this, the project manager should allocate sufficient time in the project plan for formal testing.

13. Explain the distinction between black box testing and white box testing.

    Ans: Black-box and white-box testing are different types unit testing. In black-box testing the tester treats the class as a black-box and focuses on whether the class meets the requirements stated in the specifications. In white-box testing, the tester looks inside the class and reviews the code and tests major elements of the class. White-box testing is useful for uncovering errors or incorrect assumptions that are not immediately obvious to someone who is doing black-box testing. Black-box testing is done for normal unit testing, while white-box testing is used when the complexity of the class is high.

14. Explain the distinction between user documentation and system documentation.

    Ans: System documentation is intended to help programmers and systems analysts understand the application software and enable to them to extend it or maintain it after the system is installed. System documentation is largely a byproduct of the systems analysis and design process and is created as the project unfolds. In most object-oriented development environments, it is possible to automate the creation of detailed documentation for classes and methods. User documentation, such as the user's manuals, training manuals, and online help systems, is designed to help the user operate the system. Three fundamental types of user documentation are reference documents, procedure manuals and tutorials. Reference documents (or help systems) are useful when the user needs to learn how to perform a specific function. Procedure manuals describe how to perform business tasks. Tutorials teach users on how to use major components of the system.

15. Explain four sources for identifying navigation terms.

    Ans: As you prepare documentation topics, you also begin to identify terms that will be used to help user find topics. Table of contents is often the most straightforward, because it is developed from the logical structure of the documentation topics. However, navigation terms for the index and search engines can come from four distinct sources. The first source is the set of the commands in the user interface (e.g. open file, modify customer, and print all open orders). It is important to develop the index for both the action and the object parts of the command. The second source is the set of major concepts in the system. These are often found in the use cases and classes. A third source is the set of business tasks a user performs, such as making an appointment or entering a customer order. A fourth source is the set of synonyms for the navigation terms identified by the previous three sources. For example, users may think of "exit" as "quit" and "delete" as "erase". Synonyms help the users in searching by making the documentation more useful to them.

16. When offshoring development, how could differences in Hall's context dimension of culture affect the contribution of a team member to the successful development of an information system? What about Hall's time or speed of messages dimensions?

    Ans: From an information systems development perspective, *context* could influence the ability of a team member to see (or not see) potential creative solutions that are out of the box or affect a team member's ability (or inability) to understand the entire problem under consideration. Furthermore, given this dimension, the level of detail in direction could be varied between cultures. When managing programmers in a multicultural setting, Hall's *time* dimension must also be considered. In *monochromic time* cultures, deadlines are critical. This is probably why *timeboxing* has been relatively successful as a method to control projects (see Chapter 2). However, in a *polychromic time* culture, a *deadline* is nothing more than a suggestion. Obviously, when managing programmers, understanding how the culture considers time is very important to have both a successful product delivery and a successful development process. Hall's *speed of messages* and context dimensions could also affect the manner in which this could be addressed. Depending on the culture, too much detail could be insulting, but attempting to put this issue in to a contextual frame that is culturally sensitive is difficult.

17. What are Hofstede's five dimensions of cultural differences? How could differences in them influence the effectiveness of an information systems development team?

    Ans: Hofstede's *individualism* and *collectivism* dimension partially explains the results regarding plagiarism and cheating described above. Given the importance that intellectual property plays in IT, this potentially could be a real problem when offshoring development to a collectivist culture.

    Hofstede's other previously mentioned dimensions are *power distance*, *uncertainty avoidance*, and *masculinity versus femininity*. Managing programmers in a culture with a high power distance value will be different than with a culture with a low power distance. For example, in the US, programmers see themselves as equals to their managers. In fact, in some firms, the president of the firm will be "coding" solutions alongside of a brand new hire. This somewhat explains the growing popularity of Agile methods (see Chapter 1). In comparison, the president of the firm would never stoop down to perform the same tasks as a new hire. It would be insulting to the president and embarrassing to the new hire. With regards to uncertainty avoidance, the choice of systems development approach could be affected. In a culture that prefers everything to be neat and ordered, a system development methodology that is very rule-driven would be beneficial. Furthermore, development team member professional certification and team/firm ISO or CMMI certifications would lend credibility to the team, whereas, in a culture that willingly takes on risk, certifications may not increase the perceived standing of the development team. When managing programmers in a masculine culture, it is critical to provide recognition to the top-performing members of the development team and also to recognize the top-performing teams. On the other hand, when considering a feminine culture, it is more important to ensure that the workplace is a supportive, non-competitive, and nurturing environment.

    Finally, Hofstede identified a fifth dimension, *long-* versus *short-term orientation*, which deals with how the culture views the past and the future. In a long-term focused culture, team development and a deep relationship with a client is very important, while in a culture that emphasizes the short-term, delivering a high-quality product on time is all that really matters.

Chapter 13 Installation and Operations
Testbank

Multiple Choices

1. The three-stage process for managing organizational change that was developed by Lewin is _____.

   a. As-Is system, transition, and To-Be system
   b. hold, shuffle, and fold
   c. SDLC, RAD, and BPR
   d. support, maintain, and assess
   e. unfreeze, move, and refreeze

   Ans: e

2. Post-implementation activities include _____.

   a. project assessment
   b. system maintenance
   c. system support
   d. system support and system maintenance
   e. system support, system maintenance, and project assessment

   Ans: e

3. Which of the following is the most costly aspect of the installation process?

   a. change management
   b. conversion
   c. maintenance
   d. training
   e. analysis

   Ans: c

4. A migration plan contains two major elements. They are _____.

   a. challenging and motivation
   b. change and assessment
   c. conversion and testing
   d. supportive and maintenance
   e. technical and organizational

   Ans: e

5. Install hardware, install software, and convert data are the three steps found in the _____.

   a. change management process
   b. conversion plan
   c. direct conversion activity
   d. file and database conversion
   e. purchase or rent process

   Ans: b

6. The conversion style that recommends operating the new system alongside the old system for a trial period is known as _____.

   a. direct
   b. parallel
   c. phased
   d. pilot
   e. simultaneous

   Ans: b

7. Cold turkey, big bang, and abrupt cut-over are alternative names for _____ conversion.

   a. direct
   b. parallel
   c. phased
   d. pilot
   e. simultaneous

   Ans: a

8. When an organization has one or more locations or units within a location converted first, this is called _____ conversion.

    a. direct
    b. parallel
    c. phased
    d. pilot
    e. simultaneous

    Ans: d

9. The conversion strategy that will require the least amount of time is _____.

    a. direct conversion of the entire system at all locations simultaneously
    b. direct conversion of the system by modules throughout locations in phases
    c. parallel conversion of the entire system at all locations simultaneously
    d. parallel conversion of the system by modules at all locations simultaneous
    e. All are about the same in terms of time

    Ans: a

10. The installation of SAP to replace all of your legacy systems is an example of what type of conversion?

    a. modular
    b. phased
    c. pilot
    d. simultaneous
    e. whole system

    Ans: e

11. Phil and Maryanne would like to provide conversion advice to the TRI-COL company when it converts the manufacturing and chemical mixing computer system. TRI-COL produces a very dangerous chemical (limit the risk) used to defoliate the rainforest. What conversion location and style should they recommend?

    a. direct and parallel
    b. modular and pilot
    c. parallel and modular
    d. phased and pilot
    e. pilot and parallel

    Ans: e

12. Tim and Sara need to provide conversion advice to the IAM-POOR company when it converts the concrete manufacturing and mixing computer system. IAM-POOR is looking for a low cost conversion strategy. What conversion modules and style should they recommend?

    a. modular and phased
    b. pilot and direct
    c. pilot and parallel
    d. whole system and direct
    e. whole system and parallel

    Ans: d

13. The Deliver-Fast Internet system must be implemented quickly if this new company is to survive. Which conversion style and modules would you recommend?

    a. direct and modular
    b. direct and whole system
    c. parallel and whole system
    d. simultaneous and direct
    e. simultaneous and whole system

    Ans: b

14. The person charged with actually planning and implementing the change necessary to support the implementation of a new system is known as a _____.

    a. change agent
    b. potential adopter
    c. project manager
    d. project sponsor
    e. systems analyst

    Ans: a

15. Which of the following is included as a basic step in a change management plan?

    a. convert data
    b. install hardware
    c. install software
    d. motivate adoption
    e. write plan

    Ans: d

16. The most important factor associated with successful change is a(n) _____.

    a. clear plan for change
    b. compelling personal reason to change
    c. committed business sponsor
    d. demonstrated support by top management
    e. management directive

    Ans: b

17. During a change management process the potential adopters that would readily accept a new system are normally _____%.

    a. 5-10
    b. 20-30
    c. 40-50
    d. 50-60
    e. 60-70

    Ans: b

18. Training for a business system should focus on _____.

    a. all the capabilities of the new system
    b. complex computerized modules and code
    c. helping the users to accomplish their jobs
    d. how to use the system
    e. not using the system

    Ans: c

19. The process of refining the system to make sure that it continues to meet business and organizational needs is called _____.

    a. change management
    b. project assessment
    c. system maintenance
    d. system review
    e. system support

    Ans: c

20. A system review is typically conducted _____.

    a. right after the system is implemented
    b. just before the system is implemented
    c. during the project initiation phase
    d. several months after the system is installed
    e. during the project team review

    Ans: d

21. If you decide to upgrade, allow yourself at least _____ to test the upgrade on a separate system before you install it.

    a. a day
    b. a week
    c. two weeks
    d. a month
    e. two months

    Ans: d

22. Project team review is usually conducted _____.

    a. right after the system is implemented
    b. just before the system is implemented
    c. during the project initiation phase
    d. several months after the system is installed
    e. during the project team review

    Ans: a

23. Post-implementation activities attempt to _____ the organization after the successful transition to the new system.

    a. streamline
    b. refreeze
    c. down size
    d. right size
    e. improve

    Ans: b

24. If there are many users to train, many organizations turn to _____.

    a. online support (OLS)
    b. frequently asked questions (FAQ)
    c. on-demand training (ODT)
    d. classroom training
    e. computer-based training (CBT)

    Ans: e

25. When training users from a collectivistic culture it makes sense to use _____.

    a. online support (OLS)
    b. frequently asked questions (FAQ)
    c. on-demand training (ODT)
    d. group-based training
    e. computer-based training (CBT)

    Ans: d

26. One of the earliest models for managing organizational change was developed by Kurt Lewin. Lewin argued that change is a three-step process: unfreeze, _____, refreeze.

    a. migrate
    b. change
    c. develop
    d. move
    e. program

    Ans: d

27. There are three important factors to consider in selecting a conversion strategy: risk, cost, and _____.

    a. the time required
    b. system features
    c. infrastructure
    d. planning
    e. performance

    Ans: a

28. The conversion style is the way in which users are switched between the old and new systems. There are two fundamentally different approaches to the style of conversion: direct conversion and _____.

    a. indirect conversion
    b. parallel conversion
    c. phased conversion
    d. pilot conversion
    e. simultaneous conversion

    Ans: b

29. There are three key roles in any major organizational change, the sponsor of the change, the change agent, and _____.

    a. potential adopters
    b. customers
    c. users
    d. project mangers
    e. vendors

    Ans: a

True/False

1. Project assessment is not usually performed, yet it can be an important component of organizational learning.

   Ans: True

2. Moving users from the as-is business processes and computer programs to the to-be business processes and programs is called conversion.

   Ans: True

3. Direct conversion is the conversion style where both systems (as-is and to-be) are used simultaneously.

   Ans: False

4. When one or more locations or units within a organization are selected to be converted first as part of a pilot test, this is called phased conversion.

   Ans: False

5. Whole system conversion is the conversion location where the separate and distinct modules of the entire system are installed at one time in three or more phases.

   Ans: False

6. Systems analysts examine four important factors when selecting a conversion strategy: risk, cost, communication, and time required.

   Ans: False

7. APS Systems would like to convert to the new system quickly. The ideal conversion strategy for APS Systems would be a conversion style of parallel and a modular conversion.

   Ans: False

8. APS Systems would like to convert to the new system with very little risk. The ideal conversion strategy for APS Systems would be a conversion style of parallel, piloted, and a modular conversion.

   Ans: True

9. Change management is the process of helping people to adopt and adapt to the to-be system and its accompanying work processes without undue stress.

   Ans: True

10. The sponsor, the change agent, and the potential adopters are the actors found in the change management process.

    Ans: True

11. Online support, the most common form of on-demand training, includes the documentation and help screens built into the system, as well as separate Web sites that provide answers to frequently asked questions.

    Ans: True

12. Most beginning systems analysts and programmers work first on new development projects; usually only after they have gained some experience are they assigned to maintenance projects.

    Ans: False

13. It is critical in change management to understand that the real costs and benefits are far more important than the perceived costs and benefits, because people act on what is true, not on what they believe to be true.

    Ans: False

14. The three major steps to the conversion plan before commencement of operations are to install hardware, install software, and convert data; usually these steps must be done sequentially at any one location.

    Ans: True

15. Direct conversion, where the new system is turned on and the old system is immediately turned off, is the simplest and most straightforward method, but it is also the most risky because any problems with the new system may seriously disrupt the organization.

    Ans: True

16. The main problem with the parallel conversion method, where the new system is operated side by side with the old system, is the added expense of operating two systems that perform the same function.

    Ans: True

17. With phased conversion, one or more locations or units/work groups within a location is selected to be converted first as part of a pilot test, and if the system passes the pilot test, then the system is installed at the remaining locations.

    Ans: False

18. A whole-system conversion, in which the entire system is installed at one time, is the least common because it is complex and the hardest to understand.

    Ans: False

19. Parallel conversion is less risky than direct conversion because it has a greater chance of detecting bugs that have gone undiscovered in testing; pilot conversion is less risky than either phased or simultaneous conversion because if bugs do occur, they occur in only pilot test locations.

    Ans: True

20. The three key roles in any major organizational change are the sponsor of the change, the change agent, and the potential adopter or target of the change.

    Ans: True

30. The post-implementation activities performed during the refreeze process are system support, project assessment, and change management.

    Ans: False

31. The technical process during which the new system replaces the old system is called installation.

    Ans: False

32. Institutionalization refers to using the new system as the normal, accepted, and routine way of performing the business processes.

    Ans: Tue

33. Revisions to the management policies and factors that motivate the adoption of the new system are part of the conversion plan.

    Ans: False

34. When a system is installed sequentially at different locations and there may be a deliberate delay between the first and second installation, the organization is using a phased conversion process.

    Ans: True

35. The conversion location in which one or more locations are selected to test the conversion to the new system prior to full implementation is known as pilot conversion.

    Ans: True

36. The conversion approach that converts all locations at the same time is simultaneous conversion.

    Ans: True

37. The simultaneous direct conversion to SAP to replace all of your legacy systems would result in high risk while requiring an enormous amount of time.

    Ans: False

38. When all of the modules of a system are installed at one time, an organization is using whole system conversion.

    Ans: True

39. When an organization chooses to convert the separate and distinct modules of a system one module at a time, the organization is using pilot conversion approach.

    Ans: False

40. Simultaneous conversion has a higher cost than pilot and phased conversion because more staff are required to support all of the locations.

    Ans: True

41. The project manager is the person who wants the change that a new system brings in an organization.

    Ans: False

42. The potential adopter is the person for whom the new system is designed and built.

    Ans: True

43. Management has several tools for structuring organization work processes. Establishing standard operating procedures (SOPs) involves establishing behavioral norms and how processes are actually performed.

    Ans: True

44. Presentations outlining the costs and benefits of the new system do not motivate potential adopters to use the new system, and should not be used as a motivating factor.

    Ans: False

45. The highest proportion of potential adopters of a significant organization change will be reluctant adopters.

    Ans: True

46. The most commonly used approach to delivering training for a new system is computer-based training.

    Ans: False

47. The training delivery method that is most appropriate for a new Executive Information System would be one-on-one training.

    Ans: True

48. When selecting a training method the analyst should consider the cost to develop the training program, the cost to deliver the training program, the reach, and the impact.

    Ans: True

49. Helping the users to use the system after installation is called system maintenance.

    Ans: False

50. People assigned to a help desk have very broad computer skills and are able to respond to a wide range of problems.

    Ans: True

51. The most common source of a change request is from the operations group that identifies bugs in the system.

    Ans: True

52. Enhancements suggested by users to make the system easier to use are given higher priority than bug fixes.

    Ans: False

53. The project team review focuses on the way in which the project team carried out the project activities.

    Ans: True

54. System review attempts to understand whether the implementation of the system resulted in the costs and benefits identified during project initiation.

    Ans: True

55. New programmers and systems analysts are typically assigned to work on complex new development projects.

    Ans: False

56. The three key post implementation activities are system support, system maintenance, and project assessment.

    Ans: True

57. The operations group takes care of system maintenance.

    Ans: False

58. The operations group takes care of system support.

    Ans: True

59. Institutionalization refers to establishing formal post implementation deliverables for all projects.

    Ans: False

60. Training should focus on everything the new system can do.

    Ans: False

61. Rather than attempting to teach the users all the features of the system, training should instead focus on the much smaller set of activities that users perform on a regular basis and ensure that users are truly expert in those.

    Ans: True

62. Of the potential adopters 40% to 60% are reluctant.

    Ans: True

63. There are two basic strategies to motivating adoption: informational and political. Both strategies are often used simultaneously.

    Ans: False

64. The change agent is a set of software tools and policies that help the organization transition to the newly installed system.

    Ans: False

65. Low uncertainty cultures need extra attention when asked to adopt a new system.

    Ans: False

66. End users from high power distance cultures may have difficulties expressing what they want for fear of offending their bosses.

    Ans: True

67. It makes sense to use computer-based training (CBT) in collectivistic cultures because CBT allows the users to go at their pace.

    Ans: False

68. One of the earliest models for managing organizational change was developed by Kurt Lewin. Lewin argued that change is a three-step process: unfreeze, change, and refreeze.

    Ans: False

69. There are two fundamentally different approaches to the style of conversion: direct conversion and indirect conversion.

    Ans: False

70. With Turkey conversion, the new system instantly replaces the old one.

    Ans: True

71. Whole-system conversion is a better conversion strategy than modular conversion since the later one may introduce more bugs to the system during conversion.

    Ans: False

72. There are three important factors to consider in selecting a conversion strategy: risk, cost, and performance.

    Ans: False

73. There are three key roles in any major organizational change. The three keys are sponsor of the change, the change agents, and the potential adopters.

    Ans: True

74. In general, for any change that has true organizational benefits, about 50 percent of potential adopters will be ready adopters, and another 50 percent are resistant adopters.

    Ans: False

75. The training should cover all the capabilities of the new system so users understand what each module does.

    Ans: False

76. There are two basic strategies to motivating adoption of a new system: informational and economical.

    Ans: False

77. The goal of change management is to actively support and encourage the ready adopters and help them win over the reluctant adopters.

    Ans: True

Short Answer

1. Explain different styles of conversion.

   Ans: The conversion style is the way in which users are switched between the old and the new systems. The two different approaches for conversion style are direct conversion and parallel conversion. Direct conversion, or cold turkey, is when the new system instantly replaces the old system. The new system is turned on and the old system is immediately turned off. Direct conversion is used for upgrades of commercial software such as Microsoft Word. Direct conversion is the simplest and most straightforward. However, it is also the most risky, because problems with the new system (if they were not detected during testing) may seriously disrupt the organization's business. Parallel conversion is when both systems are used simultaneously for a period of time, often one to two months. This approach is more likely to catch any major bugs in the new system and prevent the organization from suffering major problems. If problems are discovered with the new system, the new system is turned off and fixed and then the conversion process starts again. Parallel conversion has the disadvantage of having the added expense of operating two systems that perform the same function.

2. Explain the "Conversion Location" dimension and its impact on the conversion process.

   Ans: The conversion location refers to what parts of the organization are converted at what points in time. The three different approaches for conversion location are pilot conversion, phased conversion, and simultaneous conversion. Pilot conversion is when one (or more) location is selected to be converted first so that lessons can be learned for later conversions. Pilot conversion has the advantage of providing an additional level of testing before the system is widely deployed in the organization. Phased conversion is when the system is installed sequentially at different locations. Sometimes the delay between different installations is deliberate in order to detect problems with the system before too much of the organization is affected. This approach requires a smaller number of people to do the conversion compared to the simultaneous conversion approach. During simultaneous conversion all locations are converted at the same time. Often, simultaneous conversion is used with direct conversion approach. It eliminates the problem of different organizational units using different systems and processes.

3. Explain the “Conversion Modules” dimension and its impact on the conversion process.

   Ans: The time in which modules are converted refers to whole system conversion or modular conversion. Whole system conversion is when the entire system is installed at one time. Whole system conversion is most common. It is also simple and easier to understand. However, if the system is complex (e.g. an enterprise resource planning software such as SAP or PeopleSoft), the whole system may prove too difficult for users to learn in one step. When the modules in the system are separate and distinct, a system may be converted one module at a time. This is a modular conversion. Modula conversion requires special care in developing the system, and this usually adds to the cost. Each module must be written to work with both the old and the new systems or object wrappers must be used to encapsulate the old system from the new. Modular conversion is easier if the modules are loosely associated. This type of conversion reduces the amount of training to begin using the new system, but takes longer to complete.

4. Identify and define the three important factors to consider in the selection of a conversion strategy?

   Ans: The three important factors to consider in the selection of a conversion strategy are risk, cost, and time. Risk involves the discovery of bugs that were not found during unit, system, integration, and acceptance testing. The conversion process is the last place to find bugs before the new system goes live. Different conversion strategies have different costs. Costs can include salaries, travel expenses, operation expenses, communication costs and hardware lease fees. Each conversion strategy requires a different mix of direct costs. Each conversion strategy requires a different time line for completion. Some, such as parallel conversion, require two systems to be operated simultaneously for one month. Others, such as direct conversion, are immediate.

5. Mark has been asked to develop a conversion strategy for a soon-to-be-completed systems project. Only three marketing managers will sporadically use the new system, a small marketing advisory system. The conversion must be completed in less than a week. The organization has not fully budgeted the IS departments requested conversion costs. Identify the three characteristics for a conversion strategy and make a recommendation to Mark for a conversion style.

   Ans: The three characteristics for a conversion strategy are risk, cost, and time. In this problem Mark is developing the conversion strategy for a small system with minimal risk. The cost must be low since it has not been fully budgeted. The one-week time to complete the conversion is short. The recommended conversion style should be a direct conversion because a direct conversion has a high risk, low cost, and short time frame. The high risk is balanced against a very small risk system.

6. Mark has been asked to develop a conversion strategy for a soon-to-be-completed systems project. Only three marketing managers will sporadically use the new system, a small marketing advisory system. The conversion must be completed in less than a week. The organization has not fully budgeted the IS departments requested conversion costs. Identify the three characteristics for a conversion strategy and make a recommendation to Mark on the conversion modules process to be used.

   Ans: The three characteristics for a conversion strategy are risk, cost, and time. In this problem Mark is developing the conversion strategy for a small system with minimal risk. The cost must be low since it has not been fully budgeted. The one-week time to complete the conversion is short. The recommended conversion module process should be whole-system conversion. The major factors are the short time frame and the cost to convert to the new system. Modular conversion has a high cost and a long conversion time. The high risk is offset by the low risk of the system.

7. Describe Lewin's model of organizational change, and how it is relevant to the process of implementing new information systems.

   Ans: The first stage is to unfreeze existing habits and norms. This is usually accomplished to some extent as the users are aware of and participate in the process of developing the new system. They will recognize that change will occur and will be ready to break out of their established patterns of behavior. The second step is to move, which focuses on understanding the reasons for the change and adapting to it. The third step is to refreeze the new system as the habitual way of performing the work processes. On-going support, maintenance, and improvements help to solidify the position of the system in the organization.

8. Enumerate a few common sources of change requests.

   Ans: The most common source of changes requests is problem reports from the operations group that identify bugs in the system. The second most common source is enhancement to the system from users. These enhancements are suggested by the users to make the system easier to use or identify additional functionality. A third source of change requests is other system development projects, which might cause the system to be integrated or work together with another system. A fourth source of change requests arises when the underlying software or networks change. For example, new versions of windows may require the system to be changed to adapt to the new version. The fifth source of change requests arises when the senior management changes the organization’s business strategy significantly.

9. If a project team wants to employ a conversion strategy that minimizes risk, what will its choices be? What circumstances might dictate the use of the lowest risk conversion strategy?

   Ans: To minimize risk as much as possible, the team should use a parallel conversion style so that the old system remains available in case of bugs in the new system. The teams should convert a single location as a pilot test to enable more testing and assessment of the new system. Finally, if feasible, the system should be converted by modules rather than as a whole to limit the scope of the conversion.

10. Discuss the cost-benefit analysis that accompanies the decision of accepting or rejecting an opportunity to change.

    Ans: When faced with an opportunity to change, people will assess the costs of the change and the benefits of the change, and will be motivated to change if the benefits exceed the costs. Since these costs and benefits are not always clearly known, the likelihood or certainty of the benefits actually occurring and of the costs being as projected will also be assessed. If these expected benefits still exceed the expected costs, then change is more likely to occur.

11. When determining the content of training, the team should cover everything the system can do and focus on all of its capabilities. Do you agree? Why or why not?

    Ans: Training will be much more effective to the users if it focuses on helping the users accomplish their jobs, not on how to use the system. The training must help the users understand how the computer fits into the bigger picture of their jobs. Also, the training should focus on what the user needs to do, not what the system can do. There often are features of a system that the users will not need to use. The training should emphasize thorough coverage of the tasks that the users perform on a regular basis.

12. What is project assessment? What are the goals of project assessment?

    Ans: The goal of project assessment is to understand what was successful about the system and the project activities (and therefore should be continued in the next system or project) and what needs to be improved. This is an important component in organizational learning as it helps both the organization and the people understand how to improve their work. Project assessment consists of two primary parts: project team review and system review. Project assessment is not routines in most organization. It is the least commonly performed activity of SDLC but it is perhaps the one with the most long-term value to the IS department. It is an important component of organizational learning because it helps people and organizations understand how to improve the quality of their work.

13. Explain the project team review part of project assessment. What is the goal of project team review?

    Ans: Project team review focuses on the way in which the project team carried out its activities in the development of the system. The focus of this review should be on improving performance, not penalties for mistakes made. It is hoped that by identifying mistakes everyone can learn from those mistakes and avoid them when faced with a similar situation in the future. In the same manner, good performance should be identified so that team members can understand why their actions worked well and how to repeat them in future projects. Each team member prepares a short document analyzing his or her performance. Project manager then meets with the team members to identify areas of excellence and areas that need improvement. Project manager then prepares a summary document, which identifies what actions should be taken on future projects to improve performance (here care should be taken not to identify team members who made mistakes). This summary document is then widely circulated among all project managers and regular staff members so that everyone can learn from this project.

14. Explain the system review part of project assessment.

    Ans: The focus of the system review is to understand the extent to which the proposed costs and benefits from the new system that were identified during project initiation were actually recognized from the implemented system. This review is often undertaken several months after the system is installed so the system can be properly assessed. The objective of system review is to compare the anticipated business value (that was estimated during project initiation) with the actual realized business value from the system. This comparison will help the future projects in understanding true costs and benefits. System review also has important behavioral implications. Since people understand that the costs and benefits will be reevaluated after the system is implemented, people will be more conservative with their estimates of costs and benefits during the project initiation phase.

15. Distinguish between level 1 system support and level 2 system support.

    Ans: Most organizations provide a help desk. Users are able to talk with a help desk person who can answer questions about the problems that the users are facing. Help desk supports all systems, not just one specific system, so it receives calls about a wide variety of software and hardware. The help desk is operated by level 1 support staff who have very broad computer skills and are able to respond to a wide range of requests. The goal of most help desks is to have the level 1 support staff resolve 80 percent of the requests they receive on the first call. If the issue cannot be resolve by level 1 support, a problem report is prepared and passed to a level 2 support staff member. Level 2 support staff members are people who know the system well and can provide expert advice. Level 2 support staff works with users to resolve the problem. Most problems are successfully resolved by the level 2 support staff. However, some of these problems might turn out to be bugs which in turn are passed to the system maintenance personnel.

16. Explain the role of the change agent.

    Ans: The change agent is the person or persons in charge with planning and implementing the change. This is usually someone outside the business unit and with no direct authority over the end users. The idea is bring in someone the end users trust implicitly and who can motivate them through the difficult transition points of adopting the new system. The change agent therefore plays an important mediation role even though he/she may not be using the system and has no vested interests in its success.

17. How is a problem report different from a change request?

    Ans: A problem report documents a problem that has been encountered with the system that cannot be immediately resolved. The problem report will usually be passed to an application specialist, who will attempt to clear up the problem. If he/she cannot resolve the problem, then it is likely that a system bug has been encountered. At this point, the problem report becomes a change request, which is used to inform the system maintenance group that an un-resolvable problem has been discovered that probably requires a system fix.

18. Some experts argue that change management is more important than any other part of system development. Do you agree or not? Explain.

    Ans: Those who agree will point out that without appropriate change management, there is significant risk of employees not using or inappropriately using an expensive new tool (and thus not gaining the benefit from the development). Those who disagree will point out that great change management will not overcome horrible technical difficulties, such as a weak architecture or incompatible platforms. Though change management is important, it cannot be judged more important than the other constraining factors.

19. Explain the three basic approaches to training.

    Ans:
    1. Classroom training: This is the traditional approach to training in which a number of people are trained simultaneously with one instructor. Classroom training is moderately effective. Its costs are moderate, and it is fairly effective, especially since it is the method that many people are most familiar with.
    2. One-on-one training: This puts one trainer with one student at a time. One-on-one training is very effective, but is expensive to deliver and reaches only a few people
    3. Computer-based training: This uses a CD or Web-based training program delivered to students as needed. Computer-based training is very costly to develop, but is inexpensive to disseminate after development. It can reach a large number of people, but its effectiveness can be limited.

Chapter 1 Introduction to Systems Analysis and Design Testbank

Multiple Choices

1. Users typically do not think in terms of data or processes; instead, they see their business as a collection of logical units that contain both – so communicating in terms of _____ improves the interaction between a user and an analyst or developer.

   a. objects
   b. business rules
   c. business units
   d. attributes and methods
   e. workflow units

   Ans: a

2. Which following is one of the basic characters of object-oriented systems?

   a. Process
   b. Data
   c. Module
   d. Inheritance
   e. Garbage collection

   Ans: d

3. Polymorphism is made possible through _____.
   a. static binding
   b. dynamic binding
   c. initialization
   d. messaging
   e. information hiding

   Ans: b

True/False

1. Dynamic binding is one of the basic characters of object-oriented systems.

   Ans: True

2. An object is same as its class since both have attributes and behaviors.

   Ans: False

3. In object-oriented systems, the encapsulation means the system simply combines processes and data into classes.

   Ans: True

4. Abstract classes can produce instances.

   Ans: False

5. Polymorphism means that the same message can be interpreted differently by different classes of objects.

   Ans: True

6. Dynamic binding is a technique that delays typing the object until run-time.

   Ans: True

Short Answer

1. Briefly discuss the encapsulation and information hiding in object-oriented systems.

   Ans: In object-oriented systems, combining encapsulation with the information-hiding principle suggests that the information-hiding principle be applied to objects instead of merely applying it to functions or processes. As such, objects are treated like black boxes. The fact that we can use an object by calling methods is the key to reusability because it shields the internal workings of the object from changes in the outside system, and it keeps the system from being affected when changes are made to an object.

2. Briefly discuss the difference between dynamic and static binding.

   Ans: Dynamic binding is a technique that delays typing the object until run-time. As such, the specific method that is actually called is not chosen by the object-oriented system until the system is running. This is in contrast to static binding. In a statically bound system, the type of object is determined at compile time. Therefore, the developer has to choose which method should be called instead of allowing the system to do it.

3. Briefly discuss the difference between abstract classes and concrete classes.

   Ans: Most classes throughout a hierarchy will lead to instances; any class that has instances is called a concrete class. For example, if Mary Wilson and Jim Maloney were instances of the Patient class, Patient would be considered a concrete class. Some classes do not produce instances because they are used merely as templates for other more specific classes (especially those classes located high up in a hierarchy). The classes are referred to as abstract classes. Person is an example of an abstract class. Instead of creating objects from Person, we create instances representing the more specific classes of Specialist and Patient, both types of Person.

Appendix 9-1 Optimizing RDBMS-Based Object Storage Testbank

Multiple Choices

1. A(n) _____ occurs when data are stored redundantly in a database and only some of the instances are updated when a change is needed.

    a. error
    b. update anomaly
    c. data integrity concern
    d. storage efficiency
    e. none of these

Ans: b

2. A data model that does not contain repeating fields and that the data models leads to tables containing fields that are dependent on a whole primary key is in _____ normal form.

    a. balanced
    b. first
    c. primary
    d. second
    e. third

    Ans: d

3. If the data model does not have any *repeating fields* it is in _____.

    a. base normal form
    b. first normal form
    c. non-normal form
    d. second normal form
    e. third normal form

    Ans: b

4. If the logical data model contains fields that depend on another non-primary key field, then it is in violation of the rules of _____.

   a. base normal form
   b. first normal form
   c. non-normal form
   d. second normal form
   e. third normal form

   Ans: e

5. In order to reduce the number of joins that must be performed in a query and to increase the speed of data access, the data analyst will _____ the physical model.

   a. cluster
   b. denormalize
   c. index
   d. normalize
   e. optimize

   Ans: b

6. To improve the access speed of a database, similar records in a table are stored together in primary key order. This optimizing access speed process is called _____.

   a. denormalization
   b. indexing
   c. interfile clustering
   d. intrafile clustering
   e. volumetrics

   Ans: d

7. _____ is the process of estimating the amount of data that the hardware will need to support, so that the server hardware specifications are sufficient for the project's needs.

   a. Indexing
   b. Interfile clustering
   c. Intrafile clustering
   d. Raw data calculating
   e. Volumetrics

   Ans: e

8. The size of a database is determined by the _____.

   a. amount of raw data in the tables
   b. amount of raw data in the tables and overhead requirements for the DBMS
   c. number of instances in the tables
   d. overhead requirements for the DBMS
   e. overhead requirements for the DBMS and number of instances in the tables

   Ans: b

9. A mini-table that contains values from one or more columns in a table and the location of the values within the table is called a(n) _____.

   a. index
   b. interfile cluster
   c. intrafile cluster
   d. raw data calculation
   e. volumetric

   Ans: a

10. A simple rule to follow when creating problem domain classes and data access and manipulation classes is that there should be _____.

    a. One data access and manipulation class for each concrete problem domain class
    b. Two data access and manipulation classes for each concrete problem domain class
    c. N data access and manipulation classes for each concrete problem domain class, where N is the number of methods in the problem domain class
    d. N data access and manipulation classes for each concrete problem domain class, where N is the number of subclasses of the problem domain class
    e. none of these

    Ans: a

True/False

1. Normalization is a process that applies a series of rules to a logical data model to determine how well the model is formed.

   Ans: True

2. Denormalization of a data model reduces the number of joins that must be performed in a query, which increases the speed of data access.

   Ans: True

3. There are several techniques that the project team can use to try to speed up access to the data: denormalization, clustering, and indexing.

   Ans: True

4. Null values in a database are easy to interpret.

   Ans: False

5. Clustering similar records together is one way of reducing access time.

   Ans: True

6. Information in a file's records that specifies the location of related records is called a marker.

   Ans: False

7. The normalization process is performed primarily to increase the database's storage efficiency.

   Ans: True

8. The most efficient tables in a relational database in terms of storage space have redundant data and few null values.

   Ans: False

9. When the analyst is evaluating a data model to ensure that all fields in a record depend fully on the entire primary key, the analyst is making sure that the data model conforms to the second normal form.

   Ans: True

10. A method for improving data access that involves physically arranging the records on the storage medium is called clustering.

    Ans: True

11. The process of adding redundancy back into a physical data model is known as denormalization.

    Ans: True

12. Denormalization is performed before the object storage is optimized.

    Ans: False

Short Answer

1. Explain the term denormalization.

   Ans: There are a few techniques that a project team can use to increase the data access speed: denormalization, clustering, indexing. Denormalization is when the project team decides to add redundancy back into the design that is depicted in the physical data model. This will reduce the number of joins that must be performed in a query, which speeds up the data access speed. Denomalization should be applied sparingly but it is ideal in situations in which information is queried frequently yet updated rarely. There are three scenarios where denormalization can be applied. First, denormalization can be applied in the case of lookup tables, which contain descriptions of values. Second, one-to-one relationships are good candidates for denormalization. Third, at times it is efficient to include a parent entity's attributes in a child entity (e.g. Customer and Order entities).

2. Explain the term clustering.

   Ans: Clustering records together physically so that like records are stored together, reduces the number of times that a storage medium must be accessed during a transaction. By reducing the number of times the medium is accessed the data access speed is increased. There are two types of clustering: intra-file clustering and inter-file clustering. With intra-file clustering, like records in the same table are stored together in some way, such as in order by primary key. Inter-file clustering combines records from more than one table that are typically retrieved together.

3. Explain the term Indexing.

   Ans: An index is a mini-table that contains values from one or more columns in a table and the location of the values within the table. Instead of paging through the entire database, the access method can go directly to the necessary data. An index is the primary method to improve access performance. Performance of the index is often improved by placing the index in main (primary) memory. When the database has its index(es) in memory, it can locate records fair quickly, as opposed when the indexes are stored in a secondary memory. Indexes cause storage overhead, since the indexes themselves need be stored. In addition, they may lead to slower database performance, since indexes may need be reorganized as new data is inserted or existing data is modified or deleted.

4. Explain the term Volumetrics.

   Ans: Volumetrics involves estimating the size of the database so that you can make sure you have the hardware necessary to support it. Insufficient hardware can prove to be a bottleneck on database performance. The size of the database is based on the amount of raw data in the tables and the overhead requirements of the DBMS. Raw data refers to all of the data stored in the tables of the database. Overhead is computed as a percentage of each record. Overhead includes the amount of storage needed for administrative actions and indexes. CASE tools provide the volumetrics information automatically from the data models and other information you may have developed using the CASE tool.

5. Summarize the first three steps of the normalization process.

   Ans: The first step of normalization involves looking for and removing any fields that repeat within a table to capture multiple values. Every table should have the same number of columns. The repeating field or groups of fields should be removed into a separate table. The second step of normalization involves determining that all fields in the table are fully dependent upon the entire primary key. Especially in cases where a table has a concatenated primary key, it is important that the entire key must be used to determine the value of the table fields. If the value of a table field depends on just part of the primary key, it belongs in a separate table. The third step in normalization checks to see that no fields in the table depend on any other non-key fields. In addition, in this step, any fields that can be calculated or derived from other data are removed.

6. Discuss the three situations in which denormalization will reduce joins and improve data access performance.

   Ans: One situation is in the case of look-up tables, which are used to provide descriptive information. It may be preferable to include the descriptive information in the main table along with its respective code to eliminate the need to join the look-up table every time a query is performed. A second situation involves 1:1 relationships. Although these entities should be logically separated, as a practical matter, they may always be accessed together. By combining them in the same table, the need to join the separate tables every time the information is required is eliminated. A third situation involves combining a parent entity's attributes in its child entity. If queries involving the child entity continuously require information from the parent entity, the most frequently needed parent entity attributes can be added to the child entity's attributes.

7. Why would an analyst both normalize and denormalize the design of the data management layer?

   Ans: Normalization is performed to assure that storage space is optimally used in a relational database. No redundant data and very few null values should be present. This also decreases the possibility of update anomalies. However, by separating the data into multiple independent tables to achieve third normal form, we introduce operating inefficiencies. Those multiple tables must be joined in order to do queries, and if those queries are performed on a routine basis, those joins will slow down the entire system. Thus, after the data model is normalized, the analysts may very carefully and deliberately denormalize the model for the sake of operating efficiency. They should do this, however, with full knowledge that they are re-introducing the possibility of update anomalies in the data.