

===== CHAPTER-11=====

**1. Which of the following is true?**

- A) A state is never transitory, it always lasts for an interval of time.
- B) A state is a condition during the life of an object or an interaction during which it satisfies some condition.
- C) An object always has more than one potential state.

**2. The transition from one state to another is triggered by an event. One type of event is a change event. Which of the following statements is true?**

- A) A change event occurs when a condition becomes true.
- B) A change event occurs when a condition changes.
- C) A change event occurs when an attribute value changes in an object.

**3. Which of the following statements is true about statecharts in general?**

- A) A statechart must have a final state.
- B) A statechart must have at least one initial state.
- C) A statechart must have one initial and one final state.

**4. A guard condition may be associated with a transition. Which of the following statements best applies to guard conditions?**

- A) A guard condition may only involve attributes of the object that owns the statechart.
- B) A guard condition may involve attributes and links of the object that owns the statechart.
- C) A guard condition may only involve parameters from the triggering event.

**5. On the following figure which symbol represents the final state in the statechart?**



- A) 1
- B) 2
- C) 3

**6. Which of the following statements is true about actions and activities?**

- A) An activity may be tied to a transition.
- B) An action may only be tied to transitions.
- C) Both actions and activities may be tied to a state.

**7. When an internal transition occurs within a state which of the following is true?**

- A) The entry and exit actions, if present, are triggered.

- B) The entry and exit actions are not triggered.
- C) The entry and exit actions if present and the action tied to the internal transition are all triggered.

**8. A statechart may have states that include substates. Which of following is true?**

- A) An object may occupy more multiple concurrent substates simultaneously.
- B) An object may occupy only two concurrent substates simultaneously.
- C) An object may only occupy one substate at a time.

**9. When an object exits a composite state which of the following is true.**

- A) Each of the submachines in the composite state must enter their final state.
- B) At least one of the submachines in the composite state must enter its final state.
- C) Whatever combination of substates the composite is in, all those substates are exited.

**10. The behavioural approach to constructing statecharts involves which of the following?**

- A) All interaction sequence diagrams should be analysed first.
- B) All interaction sequence diagrams involving classes that have heavy messaging should be analysed.
- C) One interaction sequence diagram for each class must be analysed.

**11. The lifecycle approach to constructing statecharts is so called for which of the following reasons.**

- A) The statecharts are constructed throughout the development lifecycle.
- B) Collaboration diagrams rather than sequence diagrams are used to analyse behaviour.
- C) It attempts to identify the lifecycle of a class from use cases and other requirements documents.

**12. When a statechart is checked for consistency with other models of the system which of the following is true?**

- A) Every operation in a class must appear as an event on a statechart.
- B) Every action should correspond to the execution of an operation on the appropriate class.
- C) Every event must appear on a sequence diagram.

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**13. Which of the following is the best description of a design model?**

- A) It shows what the system will do.
- B) It shows how the system will work.**
- C) It shows why the system is required.

**14. Which of the following is an example of design?**

- A) There will be a class called Client in the Agate system.
- B) The Client class has an attribute called companyName.
- C) The maximum length of the companyName attribute when printed will be 40 characters.**

**15. Which statement is true?**

- A) Iterative processes such as the Unified Process give phases different names from activities to confuse students.
- B) Iterative processes such as the Unified Process give phases different names from activities because they share the same namespace and must be unique.
- C) Iterative processes such as the Unified Process give phases different names from activities to allow the same activities to take place in different phases.**

**16. Which of the following is not a reason for separating the analysis stage from the design stage?**

- A) Analysts and designers may be people with different skills and knowledge.
- B) It is not possible to begin design until all the analysis has been completed.**
- C) Clients will want clear decision points at which they can agree that the project should progress to the next stage and incur further costs.

**17. Which of the following is claimed as an advantage of iterative development processes?**

- A) Risk mitigation—by identifying technical problems early on.**
- B) Logical design—by producing a design that is not tied to the physical implementation.
- C) Diagram separation—by making it possible to use different kinds of diagrams in analysis from those used in design.

**18. Which of the following is a description of logical design?**

- A) Design of aspects of the system without having to consider how they will physically be implemented.**

- B) Design of the logic used in operations, based on decision trees, decision tables or Object Constraint Language.
- C) Design of the logic gates used in the implementation of the processor chips used in the system.

**19. Which statement is an example of logical design?**

- A) Communication between the Agate system and the company accounts system will be by passing messages.**
- B) There will be a message sent to the accounts system called NewInvoice, which will be formatted in XML, and each invoice will have a six-digit invoice number allocated by the accounts system.
- C) Communication between the Agate system and the company accounts system will use the OpenJMS Java message server with persistent storage of messages provided by the MySQL database.

**20. Which combination of cohesion and coupling is desirable in a design?**

- A) High cohesion and low coupling.
- B) High cohesion and high coupling.
- C) Low cohesion and high coupling.

**20. What is system design?**

- A) Designing the architecture of the system and setting standards, for example for user interface design.**
- B) Designing the inputs and outputs of the system, processes and data storage.
- C) Designing classes that will implement the system in an object-oriented language.

**21. Which of the following is not part of detailed design?**

- A) Screen and window layouts in the form of user interface classes.
- B) Allocation of sub-systems to processors.**
- C) Allocation of responsibilities to classes.

**22. Which of the following is a list of characteristics of good analysis?**

- A) Completeness, consistency, correct scope and correct content.**
- B) Consistency, security, reliability and completeness.
- C) Consistency, efficiency, effectiveness and correct scope.

**23. Which of the following is a list of characteristics of good design?**

- A) Consistency, efficiency, effectiveness and correct scope.
- B) Efficiency, reliability, security and flexibility.**
- C) Efficiency, redundancy, functionality and usability.

**24. What is meant by an economical design?**

- A) The design itself was produced at a low cost.
- B) The fixed costs and running costs of the system will be low.**
- C) The system will use inexpensive disks.

**25. What is meant by a secure design?**

- A) The design is held in encrypted format in a CASE tool repository.
- B) The models are backed up nightly and the back-up stored off-site.
- C) The design includes measures to protect the system from deliberate or inadvertent damage.**

**26. Which of the following is not a characteristic of a maintainable design?**

- A) The developed program code and the design model are kept in sync.
- B) The design and program code are well documented.
- C) The code is designed to require maintenance work equivalent to 60% of all staff time.**

**27. Which of the following might provide a measure of the usability of a system?**

- A) The number of errors made by programmers.
- B) The number of errors made by users.**
- C) The number of bugs found by system testers.

**28. What is meant by reusability in design?**

- A) Design of classes that can be reused in other systems.**
- B) Reuse of legacy systems.
- C) Buying rather than building software.

**29. What is meant by design trade-offs?**

- A) A way of resolving conflicts between requirements and design constraints.**
- B) A way of achieving measurable objectives in design.
- C) A way of producing reusable code.

**30. What is meant by the term 'measurable objectives'?**

- A) Aims of the system that are vague and difficult to assess.
- B) Objectives that can be quantified and have a specific numeric target.**

C) Strategic aims of the organisation that is getting a new system.

**31. Which of the following is not a measurable objective?**

- A) To reduce errors made by users by 50%.
- B) To cut response times by an average of 5 seconds.
- C) To process more invoices.**

**32. Which of the following is a measurable objective?**

- A) To despatch all orders received before 11.00 am on the same day.**
- B) To despatch orders more quickly.
- C) To improve customer satisfaction.

#### ===== CHAPTER-13=====

**33. Which of the following is considered to be a major element of system design?**

- A) Class diagrams are mapped onto tables in a relational database management system.
- B) Data management classes are identified.
- C) Standards for code development and human computer interaction are determined.**

**34. Which of the following is consistent with Buschmann's definition of a software architecture (Buschmann et al., 1996)?**

- A) The software architecture only determines the software sub-systems.
- B) Software architecture describes the relationships between the components of the system.**
- C) Software architecture determines the look and feel of an application.

**35. The sub-division of an information system into sub-systems brings which of the following benefits?**

- A) The constructed system will be smaller and hence easier to maintain.
- B) It improves the performance of the system.
- C) It makes the system easier to maintain.**

**36. Which of the following statements is true about a client-server architecture?**

- A) The client interface must be specified first.
- B) The server only provides the functionality required by the client.
- C) The client requests services from the server.**

**37. Which of the following is true about a closed layered architecture?**

- A) Dependencies between the layers are minimized.**
- B) The architecture is less open to change.

- C) A layer may only communicate with any of the layers beneath it.

**38. Which of the following is true about an open layered architecture?**

- A) System performance may be reduced.  
B) It is more open to change.  
C) It is less easy to maintain.

**39. When constructing a layered architecture which of following is not a specific consideration?**

- A) Maintaining the interfaces for each layer.  
B) Maintaining a consistent level of granularity for sub-systems.  
C) The further sub-division of complex layers.

**40. In the Model–View–Controller architecture which of the following best describes the role of the Model?**

- A) It informs each view when model data has changed.  
B) It ensures that the view updates its presentation of data.  
C) It accepts user input in the form of events, and triggers the execution of operations.

**41. The advantages of the Model–View–Controller architecture include which of the following?**

- A) It is best suited to process control applications.  
B) It places complex functionality in the controller components.  
C) It supports diverse styles of view and controller.

**42. Which of the following is a property of a broker architecture?**

- A) It improves performance while providing a client component with services.  
B) It hides the server components from the client components.  
C) It acts a server component.

**43. A scheduler provides which of the following facilities?**

- A) It is useful for allocating computer-processing resources when time constraints are not tight.  
B) It determines which parts of the system execute in a pre-determined sequence.  
C) It can be used to ensure that each thread of control operates within the constraints on its response time.

**43. The allocation of a system to multiple processors involves which of the following?**

- A) Concurrency requirements for each sub-system should be identified.  
B) Each processor must use local data only.

- C) Each processor must be able to operate independently.

===== CHAPTER-14=====

**44. When objects are being designed in detail the signature of each operation has to be specified. Which of the following statements is consistent with the term operation signature?**

- A) Each operation in a class has the same signature.  
B) The operation name and the number of parameters are part of the operation signature.  
C) A class may not have two operations with the same name.

**45. Which of the following best describes when primary operations should be shown on class diagrams?**

- A) All primary operations are shown on class diagrams in design.  
B) Primary operations are shown in class diagrams only if they modify attribute values.  
C) Primary operations are shown on design class diagrams if they are part of the public interface of the class.

**46. Encapsulation is best enforced by which of the following decisions regarding object visibility?**

- A) All attributes and operations are private.  
B) All attributes are private and all operations are public.  
C) All attributes are private and public operations are kept to a minimum.

**47. When is a UML interface used?**

- A) It describes boundary classes.  
B) It describes an interface that a class may offer to another class.  
C) It describes the human-computer interface.

**48. Good coupling is best characterised by which of the following?**

- A) Keeping the number of message types between objects to a minimum.  
B) Ensuring that sub-classes are not strongly linked to their superclass.  
C) Ensuring that operations in the same class are linked.

**49. Which of the following is a beneficial consequence of good cohesion in a class?**

- A) The attributes in the class will only be accessed by the operations of that class.  
B) The class will exhibit high levels of encapsulation.  
C) The operations in the class will be easier to maintain.

**50. The Liskov Substitution Principle is best described by which of the following?**

- A) A derived object may be treated as if it is the base object.
- B) A derived object should be replaced by its base object.
- C) Derived objects should be used instead of base objects.

**51. Which of the following statements best describes what is involved in the task of designing associations?**

- A) It is concerned with how links between objects should be implemented.
- B) Its main focus is determining the multiplicity of the associations.
- C) It is concerned with specifying operations that may use the links between objects.

**52. How many collection classes could sensibly be used to implement a two-way many-to-many association?**

- A) Two or more.
- B) Two.
- C) One.

**53. If there is a dependency constraint between two or more attributes which of the following statements applies?**

- A) The value of none of the attributes should be changed.
- B) If the value of one of the attributes is changed then all the others must be updated by one or more synchronizing operations.
- C) Any change to the value of any of the attributes may require the other dependent attributes to be updated by one or more synchronizing operations.

**54. Which of the following statements best describe the application of referential integrity during object design?**

- A) An object may only refer to another object if they share a link.
- B) When an object is deleted all objects to which it refers must be deleted.
- C) Referential integrity only applies for one-to-one associations.

#### ===== CHAPTER-15=====

**55. Which of the following statements best describes the relationship between patterns and frameworks?**

- A) A framework may involve many patterns.
- B) A framework is more abstract than a pattern.
- C) A pattern may incorporate one or more frameworks.

**56. Several key principles underlie the use of patterns. Which of the following is not a key principle involved in the use of patterns?**

- A) Abstraction.
- B) Separation of concerns.
- C) Conformance testing.

**57. A pattern is normally described in the format of a pattern template. Which of the following statements best describes the forces of a pattern?**

- A) The forces embody the constraints that must be addressed by the solution.
- B) The forces describe why it is important to find a solution to the problem
- C) The forces are the constraints that solution is unable to resolve.

**58. Which of the following is not one of the categories defined for the GOF patterns?**

- A) Creational.
- B) Static.
- C) Behavioural.

**59. Which of the following best describes an advantage of the Singleton pattern?**

- A) The pattern can be used to ensure that no more than a fixed number of instances of the Singleton class are created.
- B) Using the pattern always makes a system easier to maintain.
- C) When the pattern is used global data can be accessed more quickly.

**60. Which of the following statements is true about the Composite pattern?**

- A) The pattern must be used in conjunction with the Singleton pattern.
- B) The pattern makes it easier to add new leaf subclasses.
- C) The pattern makes it easier to add new operations to each of the leaf subclasses.

**61. Which of the following best describes when to use the State pattern?**

- A) The pattern may be used when a class has many states.
- B) The pattern may be used when a class has many operations.
- C) The pattern may be used when an object appears to change class at run-time.

**62. Which of the following is not an advantage of the State pattern?**

- A) State behaviour is localized.
- B) The Singleton pattern may be used with the State pattern.
- C) State transitions are made explicit.

**63. Which of the following is not an issue that should be considered before using a pattern?**

- A) If a simpler solution exists it should be used in preference to the pattern.
- B) It is preferable to use patterns by themselves.
- C) It is important that the context of the problem is consistent with the context of the pattern.

**64. Which of the following statements is most appropriate when using a pattern during information systems development?**

- A) The pattern must be used without any changes to its overall structure.
- B) The pattern should be implemented with names that are meaningful in the context of the application.
- C) The names of the classes in the pattern should be given the general names from the pattern so that their roles are unambiguous.