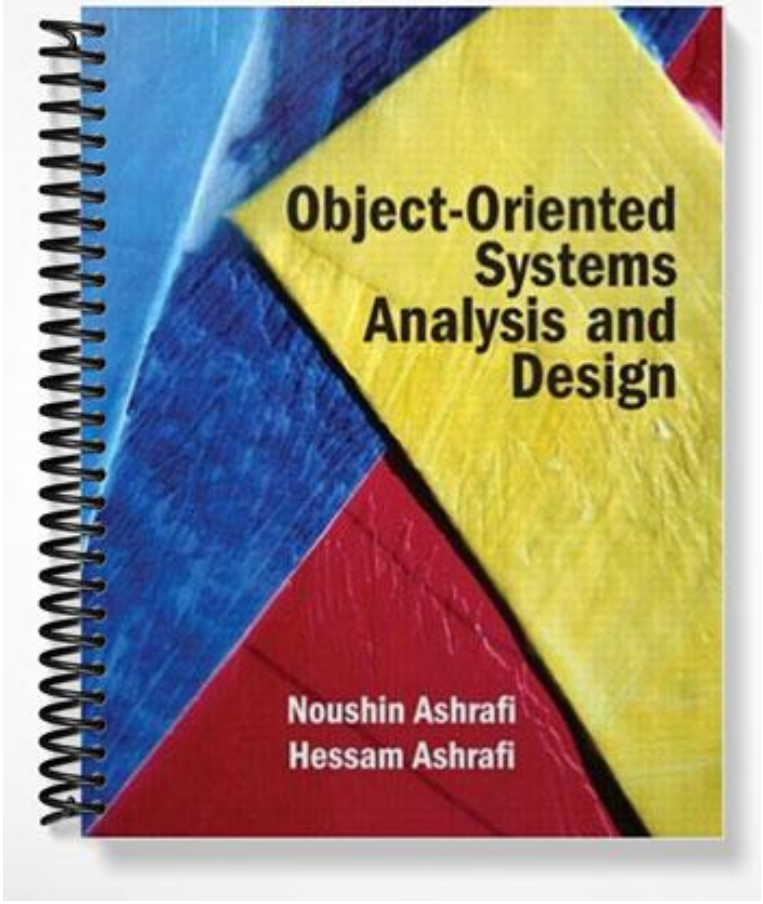
TEST BANK


Object-Oriented
Systems
Analysis and
Design
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Object-Oriented Systems Analysis and Design **(Ashrafi)**
Chapter 2 The Concept of Object Orientation

1) When using an object-oriented approach to software development we create models using _____, their relationships, and their interactions.
A) programs
B) system analysts
C) objects
D) project mangers
Answer: C
Diff: 2 Page Ref: 30

2) Object-oriented analysis and design, coupled with _____, is used as the most effective technique to build software and information systems.
A) object-oriented technology
B) implementation
C) requirement
D) maintenance
Answer: A
Diff: 3 Page Ref: 31

3) An object is _____.
A) something that is perceived as an entity and referred to by name
B) something perceptible by one or more of the senses
C) something intelligible or perceptible by the mind
D) all of the above
Answer: D
Diff: 3 Page Ref: 31

4) An object is a thing and can be _____.
A) animate or inanimate
B) human or non-human
C) tangible or non-tangible
D) any of the above
Answer: D
Diff: 3 Page Ref: 31

5) The identity of an object is identified by its _____.
A) name
B) presence
C) value
D) none of the above
Answer: A
Diff: 2 Page Ref: 31

6) Attributes of an object constitute what an object _____, while operations describe what it _____.
A) does, is
B) is, does
C) has, predicts
D) suggests, presents
Answer: B
Diff: 1 Page Ref: 31

7) Features, properties, or characteristics of an object are represented by its _____.
A) values
B) identity
C) attributes
D) name
Answer: C
Diff: 2 Page Ref: 32

8) Attributes are usually paired with _____.
A) values
B) features
C) identity
D) name
Answer: A
Diff: 2 Page Ref: 32

9) Consider the two phrases describing a telephone: has a microphone and can connect to the telephone network. These two phrases are _____ and _____, respectively.
A) attribute, operation
B) operation, attribute
C) state, attribute
D) state, operation
Answer: A
Diff: 2 Page Ref: 32

10) An object is the *subject* of a sentence with an *active* voice, and the **_____ expresses** an operation.
A) action
B) subject
C) verb
D) voice
Answer: C
Diff: 4 Page Ref: 33

11) A "student becomes a graduate" describes the _____ of object "student."
A) state
B) attribute
C) name
D) identity
Answer: A
Diff: 3 Page Ref: 33

12) _____ is the condition of an object at a certain stage in its lifetime.
A) Attribute
B) Identity
C) Operation
D) State
Answer: D
Diff: 2 Page Ref: 33

13) An infant boy grows to be a 80-year-old man. The new state of the object is _____.
A) a grandfather
B) an old and rich man
C) an old and wise man
D) all or any of the above
Answer: D
Diff: 2 Page Ref: 33

14) Class is a set of objects that share the same _____.
A) name
B) state
C) attributes and operations
D) all of the above
Answer: D
Diff: 2 Page Ref: 33

15) "The employee name is Richard Smith and he checks the inventory periodically." In this sentence, "Richard Smith" is the _____ of attribute "name"
A) class
B) object
C) value
D) operation
Answer: C
Diff: 1 Page Ref: 34

16) In object-oriented technique, the opposite of generalization is _____.
A) degeneralization
B) abstraction
C) specialization
D) none of the above
Answer: C
Diff: 1 Page Ref: 34

17) An instance is the concrete manifestation of a _____.
A) class
B) object
C) state
D) attribute
Answer: A
Diff: 3 Page Ref: 35

18) An object can be an instance of numerous classes that have _____ relationships to each other.
A) parallel
B) hierarchical
C) both A & B
D) none of the above
Answer: C
Diff: 4 Page Ref: 35

19) A superclass results from _____ a set of classes.
A) generalizing
B) class hierarchy of
C) specializing
D) all of the above
Answer: A
Diff: 1 Page Ref: 35

20) A subclass results from _____ a superclass.
A) generalization
B) class hierarchy of
C) specializing
D) all of the above
Answer: C
Diff: 3 Page Ref: 35

21) The relationship among superclasses and subclasses is called _____.
A) generalization
B) class hierarchy
C) specializing
D) none of the above
Answer: B
Diff: 2 Page Ref: 35

22) Information systems are composed of _____.
A) virtual objects
B) real objects
C) any object
D) computer objects
Answer: A
Diff: 2 Page Ref: 36

23) A class is a(n)_____ for a virtual object.
A) abstraction
B) template
C) collection
D) both A & B
Answer: D
Diff: 2 Page Ref: 36

24) Which of the following is NOT a type of class for virtual objects?
A) computer class
B) business class
C) utility classes
D) control class
Answer: A
Diff: 2 Page Ref: 36

25) When you use an ATM, encapsulation ensures that _____.
A) you are not burdened with the complexity of how the machine works
B) only operations that you are allowed are performed
C) the way the machine operates is not changed
D) all of the above
Answer: D
Diff: 3 Page Ref: 36

26) The phrase "object as black box" refers to _____.
A) encapsulation
B) information hiding
C) generalization
D) both A & B
Answer: D
Diff: 2 Page Ref: 37

27) Together, encapsulation and information hiding turn an object into a black box dividing the space in which the object lives into _____ and _____.
A) indoor, outdoor
B) private, public
C) upside, downside
D) general, specific
Answer: B
Diff: 3 Page Ref: 38

28) Objects interact through _____ when offering services or operation to the public.
A) interfaces
B) business classes
C) public services
D) public operations
Answer: A
Diff: 3 Page Ref: 38

29) A system development team is an example of a(n) _____ relationship
A) composition
B) generalization
C) aggregation
D) public class
Answer: C
Diff: 2 Page Ref: 40

30) Human body is an example of a(n) _____ relationship.
A) composition
B) generalization
C) aggregation
D) public class
Answer: A
Diff: 3 Page Ref: 40

31) "Art" is an example of a(n) _____.
A) abstract object
B) concrete object
C) real object
D) virtual object
Answer: A
Diff: 4 Page Ref: 41

32) _____ literally means "many shapes."
A) Polymath
B) Polynomial
C) Polymorphism
D) Polypheric
Answer: C
Diff: 3 Page Ref: 43

33) In procedural languages, the basic building blocks of a program are _____.
A) procedures
B) objects
C) functions
D) A or C
Answer: D
Diff: 2 Page Ref: 45

34) Object-oriented analysis relies on the _____ of information systems.
A) logical modeling
B) physical modeling
C) abstract modeling
D) concrete modeling
Answer: A
Diff: 3 Page Ref: 46

35) Design develops the results of analysis into a(n) _____ model for building the system.
A) conceptual
B) abstract
C) concrete
D) physical
Answer: C
Diff: 2 Page Ref: 47

36) Analysis of a system helps us discover the concepts of the real world and build a(n) _____ of the product.
A) conceptual model
B) abstract model
C) physical model
D) concrete model
Answer: A
Diff: 3 Page Ref: 48

37) UML is a modeling language for _____ analysis and design
A) object-oriented system
B) unified modeling system
C) real world system
D) World Wide Web system
Answer: A
Diff: 2 Page Ref: 48

38) From UML perspective, _____ view reflects the conceptual view of the system.
A) developer
B) owner
C) analyst
D) designer
Answer: B
Diff: 2 Page Ref: 48

39) From UML perspective, _____ view reflects the logical view of the system.
A) developer
B) owner
C) architect
D) client
Answer: C
Diff: 2 Page Ref: 48

40) From UML perspective, _____ view reflects the physical view of the system.
A) builder
B) owner
C) client
D) architect
Answer: A
Diff: 2 Page Ref: 48

41) A Symphony is an instance of Classical Music that descends from Music which, in turn, is a child of Art..
Answer: TRUE
Diff: 2 Page Ref: 41

42) Object-oriented technology is a response to an ever-increasing demand for simple information systems.
Answer: FALSE
Diff: 2 Page Ref: 31

43) To understand object-oriented technology, methodology, and modeling, we don't need to understand objects.
Answer: FALSE
Diff: 2 Page Ref: 31

44) State is the condition of an object at a certain stage in its lifetime.
Answer: TRUE
Diff: 2 Page Ref: 33

45) The same object cannot be described by several states simultaneously.
Answer: FALSE
Diff: 3 Page Ref: 33

46) A class is a result of classification.
Answer: TRUE
Diff: 1 Page Ref: 33

47) Abstraction makes the distinction between entities.
Answer: TRUE
Diff: 3 Page Ref: 34

48) To say that somebody is "in a class of his own" really means that a person is so unique that he cannot be generalized into a class.
Answer: TRUE
Diff: 2 Page Ref: 34

49) An object cannot be an instance of numerous classes.
Answer: FALSE
Diff: 3 Page Ref: 35

50) The most generalized class is "thing**.**"
Answer: TRUE
Diff: 2 Page Ref: 35

51) Virtual objects embody the same concepts as real objects, but are created *from* concepts instead of giving rise *to* them.
Answer: TRUE
Diff: 2 Page Ref: 36

52) In object-oriented vocabulary, utility classes are usually called entity classes.
Answer: FALSE
Diff: 2 Page Ref: 36

53) Attributes and operations of virtual objects are defined by their classes.
Answer: TRUE
Diff: 2 Page Ref: 37

54) The concept of information hiding is closely related to encapsulation.
Answer: TRUE
Diff: 2 Page Ref: 37

55) An object provides services through its interface.
Answer: TRUE
Diff: 2 Page Ref: 39

56) The term "interface" must be reinforced by the qualifier "private."
Answer: FALSE
Diff: 2 Page Ref: 39

57) An object cannot consist of more objects.
Answer: FALSE
Diff: 2 Page Ref: 40

58) The relationship of one object to its component objects is called aggregation.
Answer: TRUE
Diff: 2 Page Ref: 40

59) "Literature" is an abstract class because we have found it to be too general to satisfactorily represent a specific literary work.
Answer: TRUE
Diff: 2 Page Ref: 41

60) Polymorphism is closely related to inheritance.
Answer: TRUE
Diff: 3 Page Ref: 44

61) Smalltalk is one of the earlier object-oriented languages.
Answer: TRUE
Diff: 2 Page Ref: 45

62) Smalltalk was created by the Learning Research group at IBM**.**
Answer: FALSE
Diff: 2 Page Ref: 45

63) Complex products, regardless of the field to which they belong, do not need modeling.
Answer: FALSE
Diff: 2 Page Ref: 47

64) UML is a programming language.
Answer: FALSE
Diff: 2 Page Ref: 47

65) UML models are not compatible with object-oriented languages.
Answer: FALSE
Diff: 2 Page Ref: 47

66) UML offers a set of graphical elements that are combined to form diagrams. Each diagram is a visual presentation of the system.
Answer: TRUE
Diff: 2 Page Ref: 48

67) UML supports the three major activities of system development: analysis, design, and implementation.
Answer: TRUE
Diff: 2 Page Ref: 48

68) Dynamic modeling represents how the components of the system interact with the outside world and with each other to satisfy the structural requirements of the system.
Answer: FALSE
Diff: 4 Page Ref: 48

69) Structural modeling represents the components of the system and their interrelationships.
Answer: TRUE
Diff: 2 Page Ref: 48

70) Behavioral modeling represents the interaction of the system with the inside world.
Answer: FALSE
Diff: 2 Page Ref: 48

71) Grady Booch introduced "use case" modeling concept.
Answer: FALSE
Diff: 2 Page Ref: 49

72) An abstract class cannot be instantiated.
Answer: TRUE
Diff: 2 Page Ref: 52

73) Aggregation is a strict form of composition when the life of the part is tied to the life of the whole.
Answer: FALSE
Diff: 2 Page Ref: 52

74) A business class reflects a class of objects in the real world.
Answer: TRUE
Diff: 2 Page Ref: 52

75) "Instance" is used instead of the term "object" when the purpose is to emphasize the relationship between the object and the class.
Answer: TRUE
Diff: 3 Page Ref: 52

76) Virtual objects are created from real life instances.
Answer: FALSE
Diff: 2 Page Ref: 52

77) Real objects and virtual objects embody different concepts.
Answer: FALSE
Diff: 2 Page Ref: 51

78) Describe object-oriented information systems.
Answer: An object-oriented information system consists of objects, and an object-oriented approach to software development models objects, their relationships, and their interactions.
Diff: 3 Page Ref: 30

79) Define the characteristics of a real object.
Answer: An object is something that is perceived as an entity and referred to by name; something perceptible by one or more of the senses; something intelligible or perceptible by the mind.
Diff: 3 Page Ref: 31

80) Elaborate on the following: "An identity of an object is unique and unchanging."
Answer: The object's identity remains solid and inviolable, regardless of errors or deliberate attempts by one entity to fake the identity of another one. An object may change superficially or profoundly, but our perception of its unique identity does not change. During a person's lifetime, neither the person's character nor the molecules that constitute his or her body remain the same; our firm belief, however, that the person's identity has not changed remains unshaken.
Diff: 2 Page Ref: 31

81) What is the difference between attribute and operation of an object?
Answer: Attributes are what an object is. Attributes are usually paired with values that qualify or quantify the attribute. Operations are what the object does or can do.
Diff: 2 Page Ref: 32

82) Describe the state of an object and explain its relation to attribute and object identity.
Answer: An object has a set of attributes and these attributes accept a range of values. The combination of these attributes and their associated values constitute the state of an object: an infant boy grows to be a 80-year-old man; a sapling becomes a tree; a student becomes a graduate. While the identity of the object remains the same, its state might change.
Diff: 2 Page Ref: 33

83) Describe classification.
Answer: The simplest way to describe a class is to say that it results from classification, which is the result of two simultaneous mental activities: abstraction and generalization. Abstraction is identifying those characteristics of an entity that distinguish it from other *kinds* of entities. When classifying objects, we select those attributes and operations which we consider to be significant or relevant to the concept. To generalize is to conclude that the characteristics of a particular entity apply to a broader range of entities. If we cannot apply what we have abstracted to more objects than one, we would not have a class. If there were only one telephone in the entire world, it would be not only useless, but also unclassifiable: a class must apply to a set of objects that share a set of selected attributes and/or operations.
Diff: 3 Page Ref: 34

84) Describe hierarchy, superclass, and subclass and provide an example.
Answer: A superclass results from *generalizing* a set of classes. A subclass results from *specializing* a superclass. The relationship among superclasses and subclasses is called class hierarchy. A Passenger Car is a subclass of Automobile; both Truck and Bicycle are specializations of the Vehicle class.
Diff: 2 Page Ref: 34

85) Define the differences between business and utility classes.
Answer: "Business" classes are those that have a counterpart in the real world. Utility classes are those that lack a *direct* counterpart in the real world and are used to create objects that manage the responsibilities of the information system: to interact with the outside world, to make communication among business objects possible, and to save information when required.
Diff: 2 Page Ref: 35

86) Give an example of encapsulation in the real world.
Answer: Driving a car needs a minimum amount of skill and attention, but you may serenely ignore how the engine works and how the wheels of the car respond to the signal of the steering wheel to turn left or right. In other words, encapsulation makes complexity manageable and safe. Without it, we would be overwhelmed with so many details that we cannot hope to control.
Diff: 4 Page Ref: 37

87) What is the difference between aggregation and composition?
Answer: The relationship of one object to its component objects is called *aggregation*. A strong form of aggregation in which the life of components rely on the life of the whole is called *composition*.
Diff: 2 Page Ref: 40

88) Define the differences between abstract and concrete classes.
Answer: In the hierarchy of superclasses and subclasses, some classes can be instantiated into actual (real *or* virtual) objects, while others cannot. Those that can be instantiated are called **c**oncrete classes; those that cannot be are abstract classes.
Diff: 3 Page Ref: 41

89) Apply the concept of polymorphism to "Person/ Work" or another object/operation of your choice.
Answer: "Person" is a superclass with a "Work" responsibility. Person can have numerous subclasses, including Doctor, Mechanic, and Cook. Instances of all subclasses must work, but the work that they actually *do* is very different from each other: when objects belonging to Person subclasses are told to work, the Doctor treats patients, while the Mechanic fixes cars and the Cook prepares food. In other words, the same message, "Work", is implemented differently depending on the nature of the object, *not* the nature of the message.
Diff: 2 Page Ref: 41

90) Explain the difference between multiple and simple inheritance and provide one example for each.
Answer: Inheritance is the mechanism by which a subclass incorporates the behavior of a superclass. Whether the object is real or virtual, inheritance is a mechanism, not an idea or an abstraction. In nature, living objects have one or two parents. A child that inherits some characteristics of each parent embodies the concept of multiple inheritance whereas Classical Music that descends from Music, which in turn is a child of Art, shows an example of single inheritance. Man-made objects, including virtual ones, can have many parents. Portable devices such as cell phones and personal digital assistants are the modern rivals to Swiss army knives in the race to implement multiple inheritance.
Diff: 3 Page Ref: 43

91) What is object-oriented modeling? How does it differ from Unified Modeling Language (UML)?
Answer: Object-oriented analysis and design uses an object-oriented approach to building conceptual and logical models of the system. UML is a modeling language for object-oriented system analysis, design, and deployment. UML is not a product, nor is it a process or a methodology. UML is a language for object-oriented modeling. To be exact, UML is a "meta-modeling" language. What this means is that UML "models the models," those object-oriented concepts such as classes, objects, and their interactions that are the actual models of the system□in the same way that words and sentences are "meta-models" that describe our concepts of the world.
Diff: 6 Page Ref: 46

92) What does modeling mean and how does it help the development of object-oriented information systems?
Answer: Without modeling, system analysis and design is distorted into a multi-layered guessing game. A system analyst tries to understand what the client wants, interprets the requirements to the best of his abilities, and communicates his interpretations to the programmer. The programmer, in turn, uses his judgment to understand the analyst and build the actual system. The result is like the "telephone game" that children play: the first child starts by whispering a phrase or a sentence to the second child who, in turn, transmits the message to the third. By the time that the last child in line receives the sentence and utters it loudly, the message has been distorted beyond recognition.
Diff: 3 Page Ref: 46

93) What is the difference between object-oriented languages and UML?
Answer: UML's notation□its system of figures and symbols□is designed to represent object-oriented concepts. Unlike OO language, UML is not a programming language and is not a product that you have to buy.
Diff: 2 Page Ref: 47

94) Where is the place of UML in the process of software development?
Answer: Throughout the development process, from requirement gathering to deployment, UML models and notations are used to facilitate software development. UML supports multiple views of same system, with varying degrees of detail or generalization as needed.
Diff: 2 Page Ref: 47

95) Describe owner's, architect's, and builder's views and tell how they differ.
Answer: Owner's View reflects what the owner (or business) wants, or the conceptual view of the system.
Architect's View reflects how the architect conceives the solution, or the logical view of the system.
Builder's View illustrates the blueprints for building the product, or the physical view of the system.
The difference is the movement from conceptual to logical to physical, where the physical model is derived from logical, which in turn is based upon the conceptual view.
Diff: 2 Page Ref: 48

96) What is the difference between encapsulation and information hiding?
Answer: The concept of information hiding is closely related to encapsulation. Together, encapsulation and information hiding turn an object into a black box. Information hiding not only conceals the complexity of the inner workings of an objects, but also protects them from careless, malicious, or unauthorized interference. Encapsulation packages data and processes into one unit and information hiding conceals them.
Diff: 3 Page Ref: 48

97) What is the difference between real objects and virtual objects? Give an example for each.
Answer: A real object is a "thing," but more specifically it is something that is perceived as an entity and referred to by name. A virtual object is an entity in a virtual system similar to objects in the real world. Virtual objects are created from classes that act as templates. All characteristics of real objects apply to virtual objects, but since by definition virtual objects are not real, certain concepts have to be discussed from a slightly different viewpoint. When a hospital treats a patient, it attends to a real object, even though the attributes and the behavior of the real patient are abstracted and generalized into the class. But when the hospital wants to track the patient's medical history, it is no longer concerned with a real object, but with a virtual object that has only those attributes that the hospital considers relevant to an instance of the patient class. When you enroll in a college, you become a student by virtue of the fact that the college agrees to abstract certain attributes from you (the real object), place them in a template, and instantiate a virtual student object. To open an account, a bank must use a customer template and one or more account templates. We do not abstract or generalize virtual objects into classes, but create them from templates or classes that are already abstract and general.
Diff: 2 Page Ref: 52

98) Give three specialized subclasses for the Student class.
Answer: Out-of-state students, Residents, and Recipients of Financial Aids
Diff: 1 Page Ref: 52

99) Give a superclass for three classes: car, airplane, tank.
Answer: Vehicle = means of transportation
Diff: 1 Page Ref: 52

100) How do business classes differ from utility classes? Provide one example for each.
Answer: Business classes are those that have a counterpart in the real world: tree, student, contract, office, poet, shirt, patient, etc. The discovery of business classes and their relationships is the main task of *analysis*. Utility classes are those that lack a *direct* counterpart in the real world and are used to create objects that manage the responsibilities of the information system: to interact with the outside world, to make communication among business objects possible, and to save information when required. Command buttons, menus, and dropdown lists are a few such classes. Discovery and definition of utility classes and their relationships is the task of *design*.
Diff: 3 Page Ref: 52