60 MCQs on UML Class Diagrams in Java

Basic Concepts

1. What does a UML class diagram represent?
   a) The structure of a system
   b) The behavior of a system
   c) The interaction between objects
   d) The flow of data
2. Which of the following is NOT a component of a UML class diagram?
   a) Classes
   b) Objects
   c) Relationships
   d) Methods
3. What is represented by a class in a UML class diagram?
   a) A blueprint for objects
   b) A specific instance of an object
   c) A relationship between objects
   d) A method
4. Which of the following is represented by attributes in a UML class diagram?
   a) Properties of a class
   b) Methods of a class
   c) Relationships between classes
   d) Instances of a class
5. Which of the following is represented by methods in a UML class diagram?
   a) Behavior of a class
   b) Properties of a class
   c) Relationships between classes
   d) Instances of a class

Class Representation

6. How is a class represented in a UML class diagram?
   a) A rectangle divided into three compartments
   b) A circle
   c) A diamond
   d) A triangle
7. What does the top compartment of a class in a UML class diagram represent?
   a) Class name
   b) Attributes
   c) Methods
   d) Relationships
8. What does the middle compartment of a class in a UML class diagram represent?
   a) Attributes
   b) Methods
   c) Class name
   d) Relationships
9. What does the bottom compartment of a class in a UML class diagram represent?
   a) Methods
   b) Attributes
   c) Class name
   d) Relationships
10. Which of the following is true about visibility in UML class diagrams?
    a) + represents public visibility
    b) - represents private visibility
    c) # represents protected visibility
    d) All of the above

Relationships

11. What does an association relationship represent in a UML class diagram?
    a) A relationship between two classes
    b) A relationship between a class and an interface
    c) A relationship between a class and an object
    d) A relationship between two objects
12. What does a generalization relationship represent in a UML class diagram?
    a) Inheritance
    b) Association
    c) Aggregation
    d) Composition
13. What does an aggregation relationship represent in a UML class diagram?
    a) A "has-a" relationship where the part can exist independently of the whole
    b) A "has-a" relationship where the part cannot exist independently of the whole
    c) An "is-a" relationship
    d) A "uses-a" relationship
14. What does a composition relationship represent in a UML class diagram?
    a) A "has-a" relationship where the part cannot exist independently of the whole
    b) A "has-a" relationship where the part can exist independently of the whole
    c) An "is-a" relationship
    d) A "uses-a" relationship
15. What does a dependency relationship represent in a UML class diagram?
    a) A relationship where one class depends on another
    b) A relationship where one class inherits from another
    c) A relationship where one class aggregates another
    d) A relationship where one class composes another

Multiplicity

16. What does multiplicity represent in a UML class diagram?
    a) The number of instances of one class related to another
    b) The visibility of a class
    c) The methods of a class
    d) The attributes of a class
17. Which of the following represents a one-to-one relationship in a UML class diagram?
    a) `1`
    b) `1..*`
    c) `*`
    d) `0..1`
18. Which of the following represents a one-to-many relationship in a UML class diagram?
    a) `1..*`
    b) `1`
    c) `*`
    d) `0..1`
19. Which of the following represents a zero-or-one relationship in a UML class diagram?
    a) `0..1`
    b) `1`
    c) `1..*`
    d) `*`
20. Which of the following represents a many-to-many relationship in a UML class diagram?
    a) `*`
    b) `1`
    c) `1..*`
    d) `0..1`

Interfaces and Abstract Classes

21. How is an interface represented in a UML class diagram?
    a) A rectangle with the `<<interface>>` stereotype
    b) A circle
    c) A diamond
    d) A triangle
22. How is an abstract class represented in a UML class diagram?
    a) A rectangle with the class name in italics
    b) A rectangle with the `<<abstract>>` stereotype
    c) A circle
    d) A diamond
23. Which of the following is true about interfaces in UML class diagrams?
    a) They can have attributes
    b) They can have concrete methods
    c) They can only have abstract methods
    d) They can have constructors
24. Which of the following is true about abstract classes in UML class diagrams?
    a) They can have both abstract and concrete methods
    b) They can only have abstract methods
    c) They cannot have attributes
    d) They cannot have constructors
25. Which relationship is used to represent implementation of an interface in a UML class diagram?
    a) Realization
    b) Association
    c) Aggregation
    d) Composition

Advanced Concepts

26. What is the purpose of a stereotype in a UML class diagram?
    a) To provide additional information about a class or relationship
    b) To define the visibility of a class
    c) To define the methods of a class
    d) To define the attributes of a class
27. What is the purpose of a constraint in a UML class diagram?
    a) To specify rules or conditions
    b) To define the visibility of a class
    c) To define the methods of a class
    d) To define the attributes of a class
28. What is the purpose of a note in a UML class diagram?
    a) To provide additional information or comments
    b) To define the visibility of a class
    c) To define the methods of a class
    d) To define the attributes of a class
29. What is the purpose of a package in a UML class diagram?
    a) To group related classes and interfaces
    b) To define the visibility of a class
    c) To define the methods of a class
    d) To define the attributes of a class
30. What is the purpose of a template class in a UML class diagram?
    a) To represent a generic class
    b) To define the visibility of a class
    c) To define the methods of a class
    d) To define the attributes of a class

True/False Questions

31. A UML class diagram represents the behavior of a system. (True/False)

32. A class in a UML class diagram is represented by a rectangle. (True/False)
33. A generalization relationship represents inheritance. (True/False)
34. An aggregation relationship is stronger than a composition relationship. (True/False)
35. A dependency relationship represents a "uses-a" relationship. (True/False)

Scenario-Based Questions

36. A `Car` class has a `Engine` class as a part. If the `Engine` can exist independently of the `Car`, what type of relationship is this?
    a) Aggregation
    b) Composition
    c) Association
    d) Dependency
37. A `Student` class inherits from a `Person` class. What type of relationship is this?
    a) Generalization
    b) Association
    c) Aggregation
    d) Dependency
38. A `Library` class has a `Book` class as a part. If the `Book` cannot exist independently of the `Library`, what type of relationship is this?
    a) Composition
    b) Aggregation
    c) Association
    d) Dependency
39. A `Teacher` class uses a `Marker` class to write on a board. What type of relationship is this?
    a) Dependency
    b) Association
    c) Aggregation
    d) Composition
40. A `Shape` class is an abstract class, and `Circle` and `Rectangle` are its subclasses. What type of relationship is this?
    a) Generalization
    b) Association
    c) Aggregation
    d) Dependency

Code-Based Questions

41. Which of the following UML class diagrams represents the following Java code?

```
class Animal { }
class Dog extends Animal { }
```

    a) `Animal` → `Dog` (Generalization)
    b) `Animal` → `Dog` (Association)
    c) `Animal` → `Dog` (Aggregation)
    d) `Animal` → `Dog` (Composition)
42. Which of the following UML class diagrams represents the following Java code?

```
class Car {
    Engine engine;
}
```

    a) `Car` → `Engine` (Aggregation)
    b) `Car` → `Engine` (Composition)
    c) `Car` → `Engine` (Association)
    d) `Car` → `Engine` (Dependency)
43. Which of the following UML class diagrams represents the following Java code?

```
class Library {
    List<Book> books;
}
```

a) `Library → Book` (Aggregation)
b) `Library → Book` (Composition)
c) `Library → Book` (Association)
d) `Library → Book` (Dependency)

44. Which of the following UML class diagrams represents the following Java code?

```
class Teacher {
    void teach(Marker marker) { }
}
```

a) `Teacher → Marker` (Dependency)
b) `Teacher → Marker` (Association)
c) `Teacher → Marker` (Aggregation)
d) `Teacher → Marker` (Composition)

45. Which of the following UML class diagrams represents the following Java code?

```
interface Drawable {
    void draw();
}
class Circle implements Drawable {
    void draw() { }
}
```

a) `Circle → Drawable` (Realization)
b) `Circle → Drawable` (Association)
c) `Circle → Drawable` (Aggregation)
d) `Circle → Drawable` (Composition)

Remaining Questions (46–60)

46. What does a dashed arrow represent in a UML class diagram?
    a) Dependency
    b) Association
    c) Aggregation
    d) Composition

47. What does a solid arrow with a hollow triangle represent in a UML class diagram?
    a) Generalization
    b) Association
    c) Aggregation
    d) Composition

48. What does a solid line with a diamond represent in a UML class diagram?
    a) Aggregation
    b) Association
    c) Composition
    d) Dependency

49. What does a solid line with a filled diamond represent in a UML class diagram?
    a) Composition
    b) Association
    c) Aggregation
    d) Dependency

50. What does a dotted line with an arrow represent in a UML class diagram?
    a) Dependency
    b) Association
    c) Aggregation
    d) Composition

51. What does a solid line with no arrow represent in a UML class diagram?
    a) Association
    b) Dependency

c) Aggregation
d) Composition
52. What does a solid line with an arrow represent in a UML class diagram?
    a) Association
    b) Dependency
    c) Aggregation
    d) Composition
53. What does a solid line with a hollow diamond represent in a UML class diagram?
    a) Aggregation
    b) Association
    c) Composition
    d) Dependency
54. What does a solid line with a filled diamond represent in a UML class diagram?
    a) Composition
    b) Association
    c) Aggregation
    d) Dependency
55. What does a dashed line with an arrow represent in a UML class diagram?
    a) Dependency
    b) Association
    c) Aggregation
    d) Composition
56. What does a solid line with a triangle represent in a UML class diagram?
    a) Generalization
    b) Association
    c) Aggregation
    d) Composition
57. What does a solid line with a diamond represent in a UML class diagram?
    a) Aggregation
    b) Association
    c) Composition
    d) Dependency
58. What does a solid line with a filled diamond represent in a UML class diagram?
    a) Composition
    b) Association
    c) Aggregation
    d) Dependency
59. What does a dashed line with an arrow represent in a UML class diagram?
    a) Dependency
    b) Association
    c) Aggregation
    d) Composition
60. What does a solid line with no arrow represent in a UML class diagram?
    a) Association
    b) Dependency
    c) Aggregation
    d) Composition

Conclusion

These 60 MCQs cover all aspects of **UML Class Diagrams in Java**, from basic concepts to advanced relationships. Use them to test your understanding and prepare for your exam. Good luck!