**Java – Inheritance,Abstract Classes & Interfaces – MCQ’s**

Q1. What is an abstract class in Java?

A) A class that cannot be instantiated directly.

B) A class that contains only abstract methods.

C) A class that can be used as a blueprint for other classes.

D) All of the above.

Q2. What happens if a concrete subclass does not implement all the abstract methods of its abstract superclass?

A) The compiler throws an error.

B) The abstract methods are automatically implemented by the JVM.

C) The concrete subclass cannot be instantiated.

D) The concrete subclass must be marked as abstract.

Q3. What is an interface in Java?

A) A class that cannot be instantiated directly.

B) A blueprint for objects that defines a set of methods that a class must implement.

C) A class that contains only concrete methods.

D) A class that cannot have any methods.

Q4. Which of the following statements about interfaces is true?

A) Interfaces can have instance variables.

B) Classes can implement multiple interfaces using the 'extends' keyword.

C) Interfaces can have constructors.

D) Interface methods are public and abstract by default.

Q5. Which of the following is a valid way to use an interface in Java?

A) Instantiate the interface using the 'new' keyword.

B) Create a concrete subclass that extends the interface.

C) Implement the interface in a concrete class and provide implementations for all its methods.

D) Call interface methods directly from the interface.

Q6. Can a class implement multiple interfaces in Java?

A) No, a class can only implement one interface.

B) Yes, but only if the interfaces have no methods.

C) Yes, a class can implement multiple interfaces separated by commas.

D) Yes, but the interfaces must be declared as final.

Q7. Which of the following access modifiers restricts access the most in Java?

- A) public

- B) protected

- C) private

- D) default (no modifier)

Q8. In Java, which access modifier grants access to a member to all classes regardless of their location?

- A) public

- B) protected

- C) private

- D) default (no modifier)

Q9. Which of the following statements is true about protected access modifier in Java?

- A) Protected members can only be accessed by subclasses in the same package.

- B) Protected members can be accessed by any class in the same package and subclasses in any package..

- C) Protected members can only be accessed within the same class.

- D) Protected members cannot be accessed outside their class.

Q10. What will be the output of the following code snippet?

package com.example;

public class MyClass {

protected int num = 10;

public static void main(String[] args) {

MyClass obj = new MyClass();

System.out.println(obj.num);

}

}

a) 0

b) 10

c) Compilation Error

d) Runtime Error

Q11. What happens when you try to access a private member from a subclass in a different package?

a) Compilation Error

b) Runtime Error

c) Access is allowed

d) Access is allowed only if the subclass is in the same package

Q12. What is the output of the following code snippet?

package com.example;

public class MyClass {

public int x = 5;

protected int y = 10;

private int z = 15;

}

public class SubClass extends MyClass {

public static void main(String[] args) {

SubClass obj = new SubClass();

System.out.println(obj.x + ", " + obj.y + ", " + obj.z);

}

}

a) 5, 10, 15

b) 5, 10, Compilation Error

c) Compilation Error

d) Runtime Error

Q13: Consider the following code snippet:

public interface MyInterface {

void display();

}

public class MyClass implements MyInterface {

public void display() {

System.out.println("Inside MyClass display method");

}

public static void main(String[] args) {

MyInterface obj = new MyClass();

obj.display();

}

}

What will be the output?

a) Inside MyClass display method

b) Compilation Error

c) Runtime Error

d) No output

**Java – Inheritance,Abstract Classes & Interfaces – Programs**

Q1: O/p of following program,?

class Base {

public void show() {

System.out.println("Base::show() called");

}

}

class Derived extends Base {

public void show() {

System.out.println("Derived::show() called");

}

}

public class Main {

public static void main(String[] args) {

Base b = new Derived();

b.show();

}

}

A. Base::show() called

B. Derived::show() called

Q2: O/p of following program?

class Base {

final public void show() {

System.out.println("Base::show() called");

}

}

class Derived extends Base {

public void show() {

System.out.println("Derived::show() called");

}

}

class Main {

public static void main(String[] args) {

Base b = new Derived();

b.show();

}

}

A. Base::show() called

B. Derived::show() called

C. Compile Error

D. Runtime Error

Q3: O/p of following?

class Base {

public static void show() {

System.out.println("Base::show() called");

}

}

class Derived extends Base {

public static void show() {

System.out.println("Derived::show() called");

}

}

class Main {

public static void main(String[] args) {

Base b = new Derived();

b.show();

}

}

A. Base::show() called

B. Derived::show() called

C. Compile Error

D. Runtime Error

Q4: What is the problem with following code?

class X

{

//Class X Members

}

class Y

{

//Class Y Members

}

class Z extends X, Y

{

//Class Z Members

}

Q5: O/p of following program?

class X

{

{

System.out.println(1);

}

}

class Y extends X

{

{

System.out.println(2);

}

}

class Z extends Y

{

{

System.out.println(3);

}

}

public class Main

{

public static void main(String[] args)

{

Z c = new Z();

}

}

Q6: O/p of following:

class X

{

static

{

System.out.println("THIRD");

}

}

class Y extends X

{

static

{

System.out.println("SECOND");

}

}

class Z extends Y

{

static

{

System.out.println("FIRST");

}

}

public class Main

{

public static void main(String[] args)

{

Z c = new Z();

}}

Q7: O/P of following program?

class X

{

public X()

{

System.out.println("Class X Zonstructor");

}

}

class Y extends X

{

public Y()

{

System.out.println("Class Y Zonstructor");

}

}

class Z extends Y

{

public Z()

{

System.out.println("Class Z Zonstructor");

}

}

public class Main

{

public static void main(String[] args)

{

Z z = new Z();

}

}

Q8: What is the issue in this program?

abstract class AbstractClass

{

abstract void abstractMethod()

{

System.out.println("First Method");

}

}

Q9: What is the issue here?

abstract class A

{

abstract int add(int a, int b);

}

class B extends A

{

}

Q10: O/p of following program?

abstract class X

{

public X()

{

System.out.println("ONE");

}

abstract void abstractMethod();

}

class Y extends X

{

public Y()

{

System.out.println("TWO");

}

@Override

void abstractMethod()

{

System.out.println("THREE");

}

}

public class Main

{

public static void main(String[] args)

{

X x = new Y();

x.abstractMethod();

}

}

**Java – Inheritance,Abstract Classes & Interfaces - Theory**

Q1: What is inheritance in Java?

Answer:

Inheritance, is one of three object oriented concepts, which helps to separate out common data and behavior (or member variables and methods) from multiple related classes. Inheritance greatly helps in simplifying the code, enhancing its the re-usability and maintainability.

Q2: What are static variables?

Answer:

The static keyword is used to create variables that will exist independently of any instances created for the class. Only one copy of the static variable exists regardless of the number of instances of the class.

Static variables are also known as class variables. Local variables cannot be declared static.

Q3: What are static methods?

Answer:

The static keyword is used to create methods that will exist independently of any instances created for the class.

Static methods do not use any instance variables of any object of the class they are defined in. Static methods take all the data from parameters and compute something from those parameters, with no reference to variables.

Q4: What are final variables?

Answer: A final variable can be explicitly initialized only once. A reference variable declared final can never be reassigned to refer to an different object.

However, the data within the object can be changed. So, the state of the object can be changed but not the reference.

With variables, the final modifier often is used with static to make the constant a class variable.

Q5: What are final methods?

Answer:

A final method cannot be overridden by any subclasses. As mentioned previously, the final modifier prevents a method from being modified in a subclass.

The main intention of making a method final would be that the content of the method should not be changed by any outsider.

Q6: What are final classes?

Answer:

The main purpose of using a class being declared as final is to prevent the class from being subclassed. If a class is marked as final then no class can inherit any feature from the final class.

Q7: What are Abstract Classes in Java? Can you give an example?

Answer:

An abstract class can never be instantiated. If a class is declared as abstract then the sole purpose is for the class to be extended.

Eg:

abstract class Caravan {

private double price;

private String model;

private String year;

public abstract void goFast(); // an abstract method

public abstract void changeColor();

}

Q8: What are Abstract methods?

Answer:

An abstract method is a method declared without any implementation. The methods body (implementation) is provided by the subclass. Abstract methods can never be final or strict.

Any class that extends an abstract class must implement all the abstract methods of the super class, unless the subclass is also an abstract class.

The abstract method ends with a semicolon. Example: public abstract sample();

Q9: A class contains one abstract method, should the class be marked as abstract?

Answer:

Yes. If a class contains one or more abstract methods, then the class must be declared abstract whereas an abstract class does not need to contain abstract methods.

Q10: What is method overriding?

Answer:

Method overriding is a powerful concept supported by Java, which helps in changing the behavior of the method implemented in the super-class.

Q11: What are Interfaces in Java and how to declare them?

Answer:

Interfaces is a powerful concept of Java which helps in achieving multiple inheritance to certain extent.

Interface is similar to a abstract class except that all the methods in it are abstract. We can not include the method body for any of the methods in interface i.e. we can not define concrete methods in interface.

Eg:

interface interface-name

{

return-type method-name-1(parameters);

return-type method-name-2(parameters);

}

Q12: How do we use interface in an concrete class ? Give an example.

Answer:

We need to use the keyword implements.

Eg: If IBowler is an interface in this way:  
interface IBowler{

void bowl();

}

Then a class need to implement the interface in this manner:

class Bowler implements IBowler{

void bowl(){

System.out.println(“In bowl method”);

}

}

**Java – Classes and Objects**

Q1: What is a Class and Object in Java?

Answer:

A class is a user-defined blueprint or prototype from which objects are created. It represents the set of properties or methods that are common to all objects of one type. Using classes, you can create multiple objects with the same behavior instead of writing their code multiple times.

An object is a basic unit of Object-Oriented Programming that represents real-life entities. A typical Java program creates many objects for the same class.

Q2: What are the pillars of OOPs?

Answer: Abstraction,Encapsulation,Inheritance,Polymorphism

Q3: What is Abstraction in Java? Can you give an example?

Answer:

Data Abstraction is the property by virtue of which only the essential details are displayed to the user. The trivial or non-essential units are not displayed to the user.

Eg: A person driving a car knows that pressing the accelerators will increase the car speed or applying brakes will stop the car, but he/she does not know how on pressing the accelerator, the speed is actually increasing. He/She does not know about the inner mechanism of the car or the implementation of the accelerators, brakes etc. in the car. This is what abstraction is.

Q4: What is Encapsulation in Java? Can you give an example?

Answer: It is defined as the wrapping up of data under a single unit. It is the mechanism that binds together the code and the data it manipulates.

Eg: If combinations of medicine are variables and methods then the capsule will act as a class and the whole process is called Encapsulation

Q5: What is Inheritance in Java? Can you give an example?

Answer:

Inheritance is an important pillar of OOP (Object Oriented Programming). It is the mechanism in Java by which one class is allowed to inherit the features (fields and methods) of another class.

Real-life example – Parent-child. A child inherits certain features from parents.

Q6: How to create an object in Java?

Answer: By using the new keyword. Eg: Box mybox = new Box();

Q7: What is a Constructor in Java?

Answer: A constructor initializes an object immediately upon creation. It has the same name as the class in which it resides and is syntactically similar to a method.

Q8: What is a parameterized constructor in Java?

Answer: Constructor that takes certain parameters to assign the attributes of a class is called a parameterized constructor

Q9: What is “this” keyword in Java?

Answer: Sometimes a method will need to refer to the object that invoked it. b. To allow this, Java defines the this keyword. this can be used inside any method to refer to the current object.

Q10: How do we create a method in Java?

Answer: This is the general form of a method:

type name(parameter-list) { // body of method

}

Q11: What is overloading in Java? Can you give an example?

Answer:

When we have more than one method with same name, but different parameters, then Java decides which one to call at run time.

Eg:

int add(int num1,int num2);

double add(double num1, double num2);

Here both methods have same name add, but have different parameters

Q12: What is call by value and call by reference in Java?

Answer:

Call By Value: In Java, when you pass a primitive type to a method, it is passed by value. Thus, what occurs to the parameter that receives the argument has no effect outside the method.

Call By Reference: When you create a variable of a class type, you are only creating a reference to an object. Thus, when you pass this reference to a method, the parameter that receives it will refer to the same object as that referred to by the argument. If any attribute of the reference is changed,we see the change in the object attributes as well.

Q13: How many constructors are there in below class?

class Test{

int i;

int j;

Test(){

}

Test(int i, int j){

}

void m1(){

}

Test(int i){

}

}

Answer : 3

Q14: O/p of following program?

class T {

int t = 20;

}

class A {

public static void main(String args[]) {

T t1 = new T();

System.out.println(t1.t);

}

}

Answer: 20

Q15: O/p of following program

class T {

int t = 20;

T() {

t = 40;

}

}

class A {

public static void main(String args[]) {

T t1 = new T();

System.out.println(t1.t);

}

}

Answer: 40

Q16:

**Java – Arrays**

Q1: What are Arrays in Java?

Answer: An array is, essentially, a list of like-typed variables. To create an array, you first must create an array variable of the desired type. The general form of a one-dimensional array declaration is

type var-name[ ];

Q2: What is ArrayIndexOutOfBoundsException wrt to Arrays?

Answer: It occurs when a program attempts to access an invalid index in an array i.e. an index that is less than 0, or equal to or greater than the length of the array

Q3: Which index do array elements start from?

Answer: 0

Q4: Output of following

class A{

public static void main(String[] args){

int[] rollNumber = { 23, 17, 20, 29, 30 };

for (int temp : rollNumber)

System.out.print(temp+" ");

}

} }

Answer: Error – We are missing a bracket { at the for loop.

Q5: What is the length of the following array:

byte[] data = { 12, 34, 9, 0, -62, 88 };

Answer: 6

Q6: O/p of following program:  
class A{

public static void main(String[] args){

int i[] = new int[10];

System.out.println(i[10]);

} }

Answer: Exception. We are trying to access index 10, the array will have a max index of 9 since its length is 10.

Q7: Given, int [] nums = {2, 3, 5, 8, 9, 11};

How would you access the fourth element in nums?

Answer: nums[3] – This will give the fourth element.

Q8: O/p of following program:

class A{

public static void main(String[] args){

int [] arr1= {1, 2, 3};

int [] arr2 = {1, 2, 4};

if(arr1[0] == arr2[0])

System.out.println("Same");

else

System.out.println("Not same");

} }

Answer: Same

Q9: Which is correct declaration of a 2d array?

int intArray1[][]; // A

int[][] intArray2; // B

Answer: Both are correct.

Q10: O/p of following program?

class A{

public static void main(String[] args){

int i[] = new int[10];

i[0]= 8;

System.out.println(i[0]+i.length);

} }

Answer: 18

**Java – Operators**

Q1: Give examples of Arithmetic operators

Answer: Some arithmetic operators are +, -, ++, -- etc

Q2:What is output of following program  
class A{

public static void main(String[] args){

int a = 10;

int b=20;

System.out.println(a++);

System.out.println(b++);

System.out.println(a);

System.out.println(b);

} }

Answer:

10

20

11

21

Q3: What is the output of following program?

class A{

public static void main(String[] args){

int a = 10;

int b=20;

a += 7;

b -= 3;

System.out.println(a);

System.out.println(b);

} }

Answer:

17

17

Q4: What is the output of following program?

class A{

public static void main(String[] args){

int a = 10;

int b=20;

System.out.println(a&b);

System.out.println(a|b);

} }

Answer:

0

30

Q5: What is the output of following program?

class A{

public static void main(String[] args){

int a = 10;

int b=20;

System.out.println(a>>1);

System.out.println(b<<2);

}}

Answer:

5

80

Q6: O/p of below program?

class A{

public static void main(String[] args){

int a = 10;

int b=20;

int c = a < b ? a > 8 ? 9 : 4 : 5;

System.out.println(c);

}}

Answer:

9

Q7: O/p of this- System.out.println(6 + 4 \* 5 + 2);

Answer: 28

Q8: O/p of this - System.out.println( (8 + 1)\* 4 + 5 \* 3);

Answer: 51

Q9: Write the if statement to print if a number is even or odd. (Use if else)

Answer:

If(number%2==0){

System.out.println(“Even”);

}

else{

System.out.println(“Odd”);

}

Q10: Program to find factorial of a number

Answer: Discussed in class in details

**Commands in Git**

Q1: What are branches in Git?

Answer : A branch is a version of the repository that diverges from the main working project. A git project can have more than one branch.

Q2 : What is the master branch in Git?

Answer : The master branch is the default branch in Git. It is instantiated when first commit made on the project. A repository can have only one master branch. Some companies may also use the name main for this starting branch.

Q3 : How to create a branch?

Answer : Use command git branch <branch\_name>

Eg: To create a dev branch we can create using, git branch dev

Q4 : How to see all branches of a repository ?

Answer: Use command: git branch

Q5 : How to move to a particular branch?

Answer : Use command: git checkout <branch\_name>

Eg: To move to dev branch, the command is git checkout dev

Q6: How to create and checkout a branch at the same time?

Answer: Use command: git checkout -b <branch\_name>

Q7: How to merge a branch to the other branch?

Answer : Use command: git merge dev

If you are on master branch, this will merge the dev branch changes to the master branch

Q8: What is the use of the .gitignore file?

Answer: If there are any files in the project that we do not want to track and do not want them to show up in the git status command, we can add such files to the .gitignore file.

Q9: How to see what changes we have made to a file with what is currently present in the file?

Answer: Use command git diff <file\_name>

Q10: What is GitHub?

Answer: GitHub, Inc. is an Internet hosting service for software development and version control using Git.

Q11 : What does git remote command do?

Answer: It helps to create,view and delete connections to other repositories

Q12 : What does git push command do?

Answer : It updates remote refs along with associated objects.

Eg: Once you make changes to your branch on local and want to push it to git hub, you could use this command: git push -u origin master

**Git – Questions and Answers**

Q1 : What is GIT ?

Answer: Git is a distributed version control system that tracks changes in any set of computer files, usually used for coordinating work among programmers collaboratively developing source code during software development.

Q2 : Why is GIT used?

Answer: GIT is used for Synchronous development, to increase team speed and productivity. It is also used across many industries and has become an industry standard.

Q3 : What does git init command do?

Answer: It is used to initialize a new or an empty repository to a Git repository.

Q4 : How do add a file to the staging area?

Answer: Use git add <file\_name> to add a file to a staging area.

Q5 : What does git commit command do?

Answer: It records the file(s) permanently in the version history.

Q6 : Which command is used to see the commit history?

Answer : The git log command is used to see the commit history

Q7 : What does the git status command do?

Answer: It displays the state of the working directory and the staging area.

Q8: How to add all files to the staging area?

Answer : Use the command **git add .**

Q9: How to go back to a previous commit?

Answer: Use the command git checkout <commit\_id>

**Java – Basic Questions**

Q1: What is Java?

Answer: Java is a high-level, class-based, object-oriented ,platform independent programming language

Q2: Can you give a few buzz words of Java?

Answer : Fe buzz words of Java are – Simple, Secure, Portable, Object-Oriented, Robust etc.

Q3: From which method does Java program processing start?

Answer: It starts from the main method.

Q4: How to compile a program in Java?

Answer: Use the command javac <file\_name>.java

Q5: When we compile a java program which file is generated?

Answer: When we compile a program, a .class file is generated.

Q6: How to run a Java Program?

Answer: Use command java <name\_of\_the\_class>

Q7: Can you write a simple program to print Hello World using Java?

Answer: public class MyFirstJavaProgram {

public static void main(String []args) {

System.out.println("Hello World"); // prints Hello World

}

}

Q8: What happens at compile time?

Answer: At compile time, the Java file is compiled by Java Compiler and converts the Java code into bytecode.

Q9: What is JVM?

Answer: JVM (Java Virtual Machine) is an abstract machine that enables your computer to run a Java program.

When you run the Java program, Java compiler first compiles your Java code to bytecode. Then, the JVM translates bytecode into native machine code

Q10: Why is Java platform independent?

Answer: It's because when you write Java code, it's ultimately written for JVM but not your physical machine (computer). Since JVM executes the Java bytecode which is platform-independent, Java is platform-independent.

Q11: What is JRE?

Answer: JRE (Java Runtime Environment) is a software package that provides Java class libraries, Java Virtual Machine (JVM), and other components that are required to run Java applications.

Q12: What is JDK?

Answer: JDK (Java Development Kit) is a software development kit required to develop applications in Java. When you download JDK, JRE is also downloaded with it.

In addition to JRE, JDK also contains a number of development tools (compilers, JavaDoc, Java Debugger, etc).

Q13: What are the primitive types in Java?

Answer: We have 8 primitive types in Java, they are:   
byte, short, int, long, char, float, double, and boolean.

Q14: List a few Java keywords

Answer: There are many Java keywords, some of them are for,if,else,continue,break etc.