1. Explain Java Main Method public static void main (String[] args)

The starting point of any Java Program is the main() method. It is one of the important methods of Java. Technically, the main method is the starting point where the Java program starts its execution. JVM always look for this method signature to start running an application.

2. What is Java?

Java is a programming language and computing platform first released by Sun Microsystems in 1995. There are lots of applications and websites that will not work unless you have Java installed, and more are created every day. Java is fast, secure, and reliable. From laptops to datacenters, game consoles to scientific supercomputers, cell phones to the Internet, Java is everywhere!

Java program which prints Hello World!

```
public class MyClass {
  public static void main(String args[]) {
    System.out.println("Hello World!");
  }
}
```

3. Mention some features of Java?

Some of the features which play an important role in the popularity of java are as follows:

- Simple: Java is easy to learn. Even though Java is based on C++ , it was developed by eliminating poor programming practices of C++.
- Object-Oriented: Java is an object-oriented programming language. Everything in Java is an Object.

- **Portable:** Java run time environment uses a bytecode verification process to make sure that code loaded over the network doesn't violate Java security constraints.
- **Platform independent:** Java is platform-independent. Java is a write once, run anywhere language. Without any modifications, we can use a program on different platforms.
- **Secured:** Java is well known for its security. It delivers virus-free systems.
- **High Performance:** Java enables high performance with the use of JIT (Just-In-Time) compilers
- **Multithreaded:** Java Multithreaded features allows us to write programs that can perform many tasks simultaneously. The multithreading concept of Java shares a common memory area. It doesn't occupy memory for each thread.

4. Is Java 100% Object Oriented Language?

Java is not a pure Object Oriented Language because it supports primitive data type such as byte, boolean, char, double, float, int, long, short. These primitive data types are not object oriented. This is the reason why Java is not 100% object-oriented language.

5. What is the difference between Object-oriented programming language and Object-based programming language?

There is a difference between Object Oriented Languages and Object Based languages.

Object Oriented Languages:

- Some of the Object Oriented Languages are Java, C#, VB. Net, Smalltalk etc.,
- These languages support all the concepts of OOPs.
- These languages don't have the inbuilt objects.

Object Based Languages:

- Some of the Object Based Languages are JavaScript, VBScript etc.,
- These languages support all the concepts of OOPs like inheritance and polymorphism.
- These languages have the inbuilt objects, say JavaScript has window object.

6. What is the difference between Declaration and Definition in Java?

Declaration: If you just declare a class or method/function or variable without mentioning anything about what that class or method/function or variable looks like is called a declaration in Java.

Definition: If you define how a class or method/function or variable is implemented then it is called definition in Java.

When we create an interface or abstract class, we simply declare a method/function but not define it.

For a clear understanding, check the below image

7. What is JRE, and why is it required?

JRE stands for "Java Runtime Environment". It comprises of the JVM (Java Virtual Machine), Java platform classes, and supporting libraries.
Using JRE, we can only execute already developed applications. We cannot develop new applications or modify existing applications.
As the name suggests, JRE only provides Runtime Environment.

8. What is JDK, and why is it required?

JDK stands for Java Development Kit. It is a superset of JRE (Java Runtime Environment). Using JDK, we can develop, compile and execute (run) new applications and also we can modify existing applications. We need to install JDK in developers machine where we want to develop new applications or modify existing applications.
JDK includes JRE and development tools (environment to develop, debug and monitor Java programs).

9. What is JVM, and why is it required?

JVM stands for Java Virtual Machine. JVM drives the java code. Using JVM, we can run java byte code by converting them into current OS machine language. It makes Java to become a portable language (write once, run anywhere)

10. What is an Object in Java?

An object is an instance of a class. Objects have state (variables) and behavior (methods).

Example: A dog is an object of Animal class. The dog has its states such as color, name, breed, and behaviors such as barking, eating, wagging her tail.

```
public class MyClass{    //Class name (MyClass) declaration
    public static void main(String[] args){
        MyClass obj = new MyClass(); //Object Creation
    }
}
```

11. What is a Class in Java?

A class can be defined as a collection of objects. It is the blueprint or template that describes the state and behavior of an object.

```
public class MyClass{    //Class name (MyClass) declaration
int a = 9;   // Variable declaration
int b = 99;
    public void myMethod(){ //Method (myMethod) declaration
        int sum=a+b;
    }
}
```

12. What is Constructor in Java?

Constructor in Java is used in the creation of an Object that is an instance of a Class. The constructor name should be the same as the class name. It looks like a method but it’s not a method. It won’t return any value. We have seen that methods may return a value. If there is no constructor in a class, then the compiler automatically creates a default constructor.

13. What is Local Variable and Instance Variable?

Local Variable:

A local variable is a variable that we declare inside a Method. A method will often store its temporary state in local variables.

It can be accessible only inside a block, function, or constructor.

```
public void website() {
String websiteName;
double websiteLoadTime;
int webisteAge;
}
```

String websiteName, double websiteLoadTime, int websiteAge are Local variables in above example.

Instance Variable (Non-static):

An instance variable is a variable that is declared inside a Class but outside a Method. We don't declare this variable as Static because these variables are non-static variables.

It can be accessible by all the methods in the class.

```
class website() {
public String websiteName;
public double websiteLoadTime;
public int webisteAge;
}
```

websiteName, websiteLoadTime, websiteAge are Instance variables in above example.

14. What are the OOPs concepts?

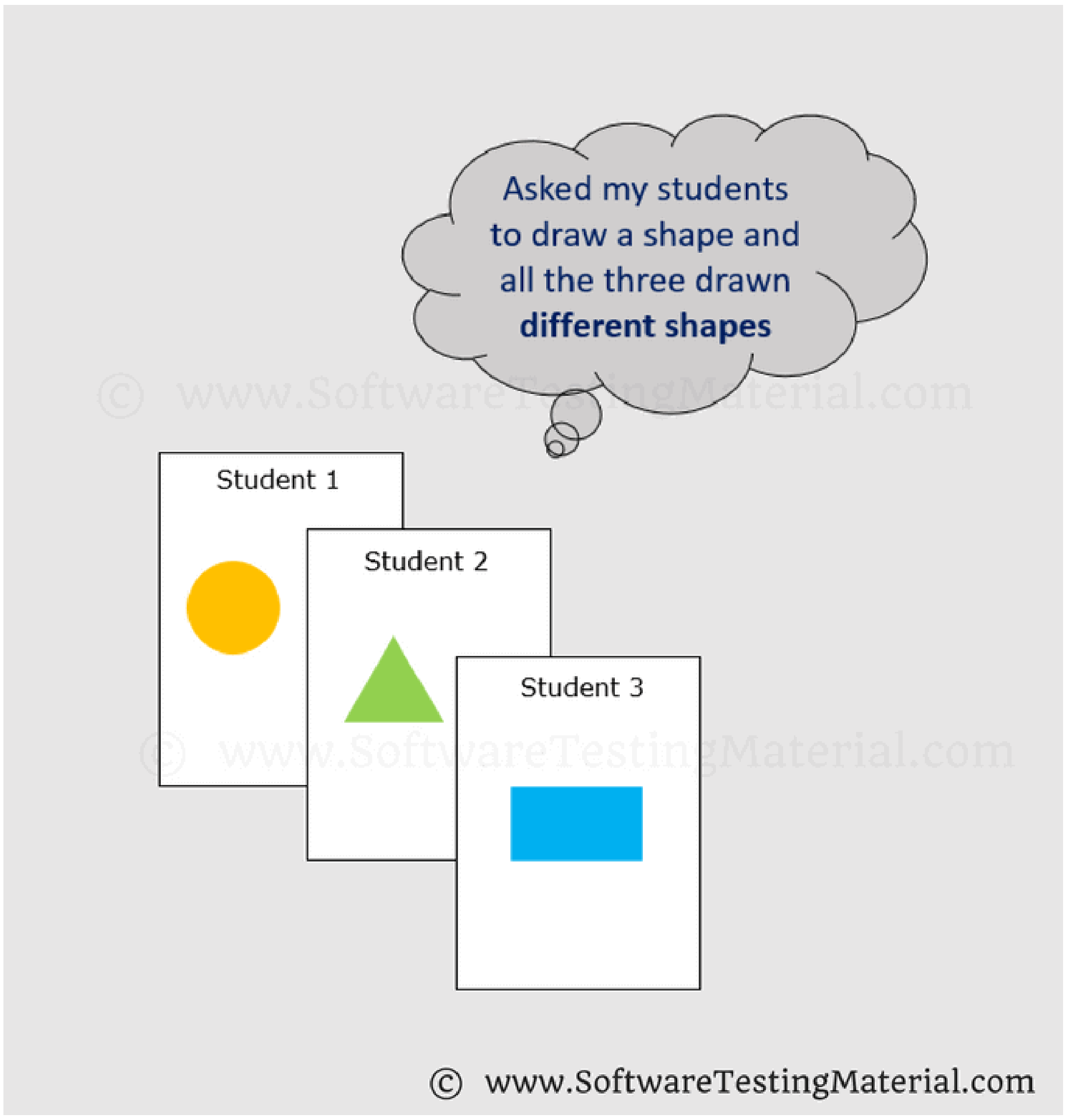
OOPS Stands for Object-Oriented Programming System. It includes Abstraction, Encapsulation, Inheritance, Polymorphism, Interface, etc.,

15. What is Inheritance in Java?

Inheritance is a process where one class inherits the properties (methods & fields) of another class.

16. What is Polymorphism?

Polymorphism allows us to perform a task in multiple ways. Let’s break the word Polymorphism and see it, ‘Poly’ means ‘Many’ and ‘Morphos’ means ‘Shapes’.


Asked my students to draw a shape and all the three drawn **different shapes**
Student 1
Student 2
Student 3
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Assume we have four students and we asked them to draw a shape. All the four may draw different shapes like Circle, Triangle, and Rectangle.

17. What are the types of Polymorphism?

There are two types of Polymorphism in Java

1. Compile time polymorphism (Static binding) – Method overloading
2. Runtime polymorphism (Dynamic binding) – Method overriding

We can perform polymorphism by ‘Method Overloading’ and ‘Method Overriding’

18. What is Method Overloading?

A class having multiple methods with the same name but different parameters are called Method Overloading

There are three ways to overload a method.

- Parameters with different data types
- Parameters with a different sequence of data types
- Different number of parameters

19. What is Method Overriding?

Declaring a method in child class that is already present in the parent class is called Method Overriding.

In simple words, overriding means to override the functionality of an existing method.

In this case, if we call the method with the child class object, then the child class method is called. To call the parent class method we have to use **super** keyword.

20. What is Abstraction in Java?

Abstraction is the methodology of hiding the implementation of internal details and showing the functionality to the users.

I don't know how my phone works internally but I know **how to make calls**
STM
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Example: Mobile Phone.

A layman who is using a mobile phone doesn't know how it works internally but he can make phone calls.

21. What is Abstract Class in Java?

We can easily identify whether a class is an abstract class or not. A class that contains abstract keyword in its declaration then it is an Abstract Class.

Syntax:

```
1 abstract class <class-name>{}
```

Points to remember:

- Abstract classes may or may not include abstract methods
- If a class is declared abstract then it cannot be instantiated.
- If a class has abstract method then we have to declare the class as abstract class

- When an abstract class is subclassed, the subclass usually provides implementations for all of the abstract methods in its parent class. However, if it does not, then the subclass must also be declared abstract.

22. What is Abstract Method?

An abstract method is a method that is declared without an implementation (without braces, and followed by a semicolon), like this:

```
abstract void myMethod();
```

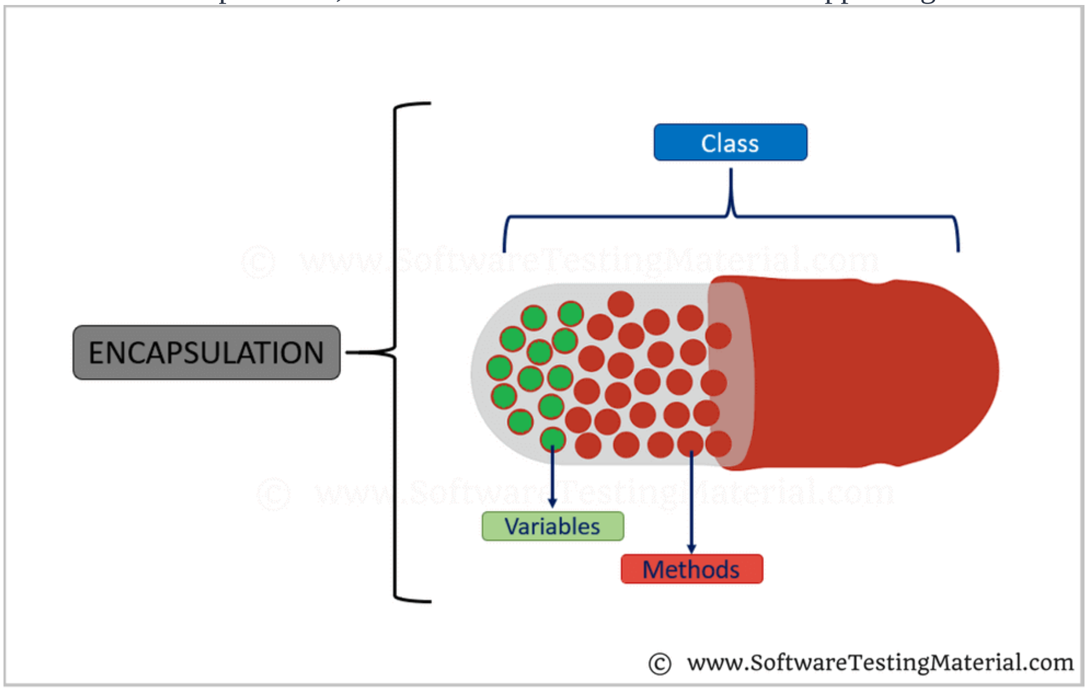
In order to use an abstract method, you need to override that method in sub class.

23. What is Interface in Java?

An interface in Java looks similar to a class but both the interface and class are two different concepts. An interface can have methods and variables just like the class but the methods declared in interface are by default abstract. We can achieve 100% abstraction and multiple inheritance in Java with Interface.

24. What is Encapsulation in Java?

Encapsulation is a mechanism of binding code and data together in a single unit. Let's take an example of Capsule. Different powdered or liquid medicines are encapsulated inside a capsule. Likewise in encapsulation, all the methods and variables are wrapped together in a single class



25. What is String in Java?

String in Java is an object that represents sequence of characters. An array of characters works same as Java string. String in Java is an immutable (cannot grow) object that means it is constant and cannot be changed once it is created.

For example:

char[] c={'S','T','M'};

26. Why are strings immutable in Java?

In Java, String is immutable to make sure that the string value doesn't change. String literals are usually shared between multiple clients. If the value of the string changes (from "STM" to "stm"), it will affect all reference variables and cause severe discrepancies. Hence, strings are immutable in Java. Making string immutable enhances security, caching, synchronization, and performance of the application.

27. What is the difference between equals() method and double equal operator (==) in Java?

equals() method

- This method is defined in the Object class in Java.
- It is used for checking the equality of contents between two objects defined by business logic.
- public boolean equals(Object o) is the method provided by the Object class.

double equal operator (==)

- It is a binary operator in Java.
- It is used for comparing addresses (or references), i.e checks if both the objects are pointing to the same memory location.
- Default implementation uses double equal operator == to compare two objects.

28. How to convert Integer to String in Java?

```
package softwareTestingMaterial;

public class STM {

public static void main(String[] args) {
int x = 123;
            int y = 456;
            String s1 = Integer.toString(x);
            String s2 = Integer.toString(y);
System.out.println(""String s1 = "" + s1);
System.out.println(""String s2 = "" + s2);
}
}
```

29. How to convert String to Integer in Java?

```
package softwareTestingMaterial;

public class STM {

public static void main(String[] args) {
String str = ""100"";
            // Integer.parseInt()
            System.out.println( Integer.parseInt( str ));
}
}
```

30. How to convert Char to Integer in Java?

```
package softwareTestingMaterial;

public class STM {

public static void main(String[] args) {
            // Initializing a character(ch)
char c = '9';
            // Converting the character to an interger value
            int number = Integer.parseInt(String.valueOf(c));
            System.out.println(number);
}
}
```

31. Difference between Array and ArrayList?

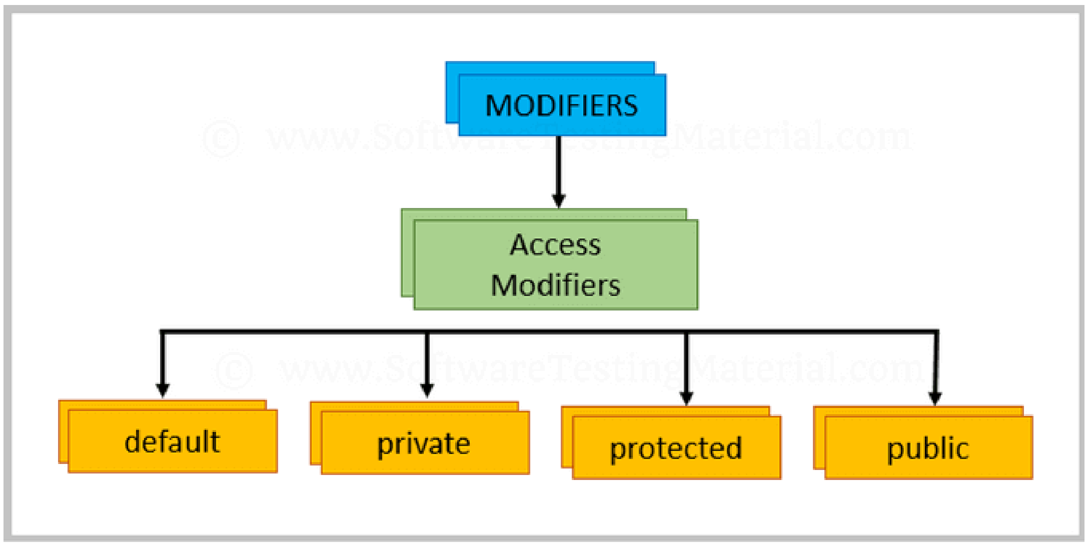
Array	ArrayList
Array is static	ArrayList is dynamic
Size of the array should be given at the time of array declaration. We cannot change the size of array after creating it	Size of the array may not be required. It changest the size dynamically. Capacity of ArrayList increases automatically whenever we add elements to an ArrayList
Array can contain both primitive data types as well as objects	ArrayList cannot contain primitive data types. It contains only objects
Arrays are multidimensional	ArrayList is always single dimension

32. Difference between ArrayList and HashSet in Java?

ArrayList	HashSet
ArrayList implements List interface	HashSet implements Set interface
ArrayList allows duplicates	HashSet doesn't allow duplicates
ArrayList is an ordered collection and maintains insertion order of elements	HashSet is an unordered collection and doesn't maintain insertion order
ArrayList is backed by an Array	HashSet is backed by an HashMap instance
ArrayList is an index based	HashSet is object based
In ArrayList, we can retrive object by calling get() method or remove object by calling remove() method	In HashSet, we can't achieve get() method

33. What are the different access modifiers available in Java?

Access modifiers are subdivided into four types such as Default, Public, Private, Protected



default: The scope of default access modifier is limited to the package only. If we do not mention any access modifier, then it acts like a default access modifier.

private: The scope of private access modifier is only within the classes.

Note: Class or Interface cannot be declared as private

protected: The scope of protected access modifier is within a package and also outside the package through inheritance only.

Note: Class cannot be declared as protected

public: The scope of public access modifier is everywhere. It has no restrictions. Data members, methods and classes that declared public can be accessed from anywhere.

34. Difference between static binding and dynamic binding?

1. Static binding is also known as early binding whereas dynamic binding is also known as late binding.
2. Determining the type of an object at compile time is Static binding whereas determining the type of an object at run time is dynamic binding
3. Java uses static binding for overloaded methods and dynamic binding for overridden methods.

35. Difference between Abstract Class and Interface?

ABSTRACT CLASS	INTERFACE
To declare Abstract class we have to use abstract keyword	To declare Interface we have to use interface keyword
In an Abstract class keyword abstract is mandatory to declare a method as an abstract	In an Interface keyword abstract is optional to declare a method as an abstract. Compiler treats all the methods as abstract by default
An abstract class contains both abstract methods and concrete methods(method with body)	An interface can have only abstract methods
An abstract class provides partial abstraction	An interface provides fully abstraction
An abstract class can have public and protected abstract methods	An interface can have only public abstract methods
An abstract class can have static, final or static final variables with any access modifiers	An interface can have only public static final variables
An abstract class can extend one class or one abstract class	An interface can extend any number of interfaces
Abstract class doesn't support multiple inheritance	Interface supports multiple inheritance

36. What is Multiple Inheritance?

If a class implements multiple interfaces, or an interface extends multiple interfaces then it is known as multiple inheritance.

37. What are the differences between throw and throws in Java?

throw keyword

- The throw keyword is used to explicitly throw an exception in the program inside a function or inside a block of code.
- The checked exceptions cannot be propagated with throw only.
- The throw keyword is followed by an instance.
- The throw keyword is used within the method.
- You cannot throw multiple exceptions.

throws keyword

- The throws keyword is used in the method signature to declare an exception which might get thrown by the function while executing the code.
- The checked exception can be propagated with throws
- The throws keyword is followed by class.
- The throws keyword is used with the method signature.

- You can declare multiple exceptions, e.g., public void method()throws IOException, SQLException.