1. Basic Introduction of Java

1.1 Interview Questions:

1) **What is Java?**
Java is an object oriented, platform independent, case sensitive, strongly typed checking, highly secured, robust, high level, open source programming language that was released by Sun Microsystem in the year of 1995.

2) **What are the Features of Java?**
The most important features of java language are.

- **Simple:**
  It is easy to learn and easy to use because all the complex concepts like pointers, multiple inheritances, operator overloading, explicit memory allocation removed from java.
- **Object Oriented:**
  Organizing or representing our data in the form of object is called object oriented.
- **Portable:**
  Java is portable because it facilitates us to carry the java byte code to any platform.
- **Platform Independent:**
  Compiler converts source code to byte code and later JVM executes the byte code generated by the compiler. This byte code we can run in any platform.
- **Secured:**
  Java is secure because
  - ✓ No explicit pointer
  - ✓ Java programs run inside a virtual machine sandbox.
  - ✓ Classloader
  - ✓ Byte code verifier
  - ✓ Security Manager.
- **Robust:**
  Java language is robust it means reliable.
  The main features of java that make it robust are garbage collection, exception handling and memory allocation.
- **Architecture neutral:**
  Java is architecture neutral because there is no implementation dependent feature. For example, the size of primitive types is fixed.
- **Interpreted**:
  Java programming language uses both a compiler and interpreter. Java programs are compiled to generate byte code file then JVM interprets the byte code during the execution.
- **High Performance:**
  Java is faster than other traditional interpreted programming languages because java byte code is close to native code.

- **Multithreaded:**
  A Java support multithreading It is a java feature allows concurrent execution of two or more parts of a program for maximum utilization of CPU.
- **Distributed:**
  Java allows us to create distributed applications.
- **Dynamic:**
  Java is a dynamic language because it supports dynamic loading of classes and it supports native methods.

3) Difference between C++ and JAVA?

C++	JAVA
It was developed by Bjarne Stroustrup.	It was developed by James Gosling.
It is a partial object oriented programming.	It is purely object oriented programming.
It is platform dependent.	It is platform independent.
It supports multiple inheritance.	It does not support multiple inheritance.
It supports pointers.	It does not support pointers.
It supports goto statement.	It does not support goto statement.
It supports operator overloading.	It does not support operator overloading.
Memory allocation and deallocation will take care by a programmer.	Memory allocation and deallocation will take care by a JVM.
It supports three access specifiers i.e public, private and protected	It supports four access modifiers i.e default, public, private and protected.
It supports three loops i.e do while loop, while loop and for loop.	It supports four loops i.e do while loop, while loop, for loop and for each loop.
It supports preprocessor directory (#).	It does not support preprocessor directory (#).
We can save C++ program by using .CPP extension.	We can save java program by using .JAVA extension.

4) What is Debugging?

Bugs are also known as Errors.
The process of removing/eliminating the bugs from the application is called debugging.

5) Difference between PYTHON and JAVA?

PYTHON	JAVA
It was developed by Guido Van Rossum.	It was developed by James Gosling.
It is a product of Microsoft.	It is product of Oracle Corporation.
It is a scripting language.	It is object oriented programming language.
It is an interpreted language.	It is a compiled language.
It is a dynamically typed language.	It is a statically typed language.
It is easy then java.	It is easy.
Performance is low.	Performance is high.

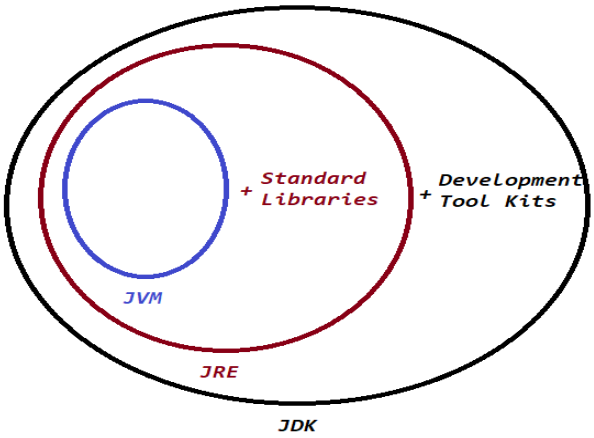
It contains PVM (Python Virtual Machine).	It contains JVM (Java Virtual Machine).
It supports less set of frameworks.	It supports large set of frameworks.

6) Difference between JDK, JRE and JVM?

JDK (Java Development Kit)
It is installable software used for developing java applications. It includes Java Runtime Environment (JRE), an interpreter/loader (Java), a compiler (javac), an achiever (jar), a Document generator (javadoc), and other tools needed for java development.

JRE (Java Runtime Environment)
It provides very good environment to run java applications only.

JVM (Java Virtual Machine)
It is an interpreter which is used to execute our program line by line procedure.



7) Types of modules in java?
We have three types of modules in java.

1. **J2SE/JSE (Java Standard Edition)**
   It is used to develop standalone applications, desktop applications and two-tier applications.

2. **J2EE/JEE (Java Enterprises Edition)**
   It is used to develop enterprise applications, web applications, distributed applications, N-tier applications and etc.

3. **J2ME/JME (Java Micro Edition)**
   It is used to develop mobile applications.

8) What is Operating System?
Operating System is a collection of software's.
It acts like a mediator/interface between software components and hardware components.

9) What is Token? Instruction? Program? Application? And software?

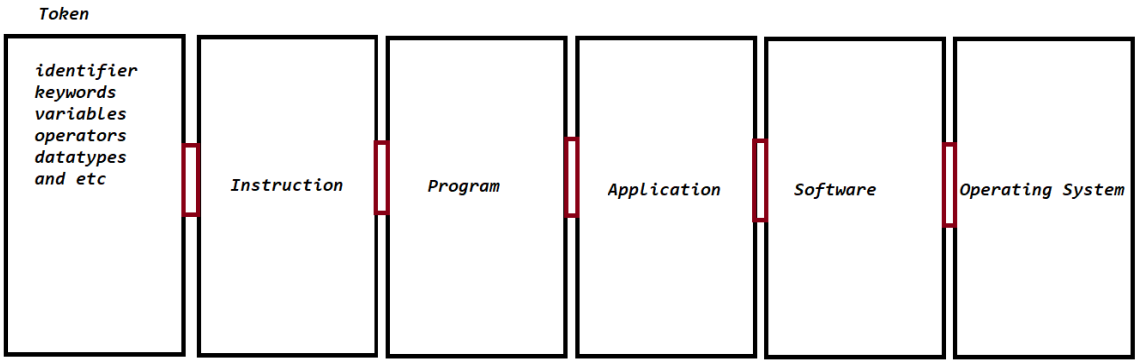
Token is a small unit of a program which consists of identifiers, keywords, variables, data types, operators and etc.

Set of tokens is called instruction.

Set of instructions is called program.

Set of programs is called application.

Set of applications is called software.



10) What is identifier?

A name in java program is called identifier.
It may be variable name, method name, class name and label name.
Ex:

```
class Test
{
        public static void main(String[] args)
        {
                int x=10;
        }
}
```

Here Test, main, String, args and x are identifiers.

11) Explain main method in java?

JVM always look for main method with following signature.
Ex:

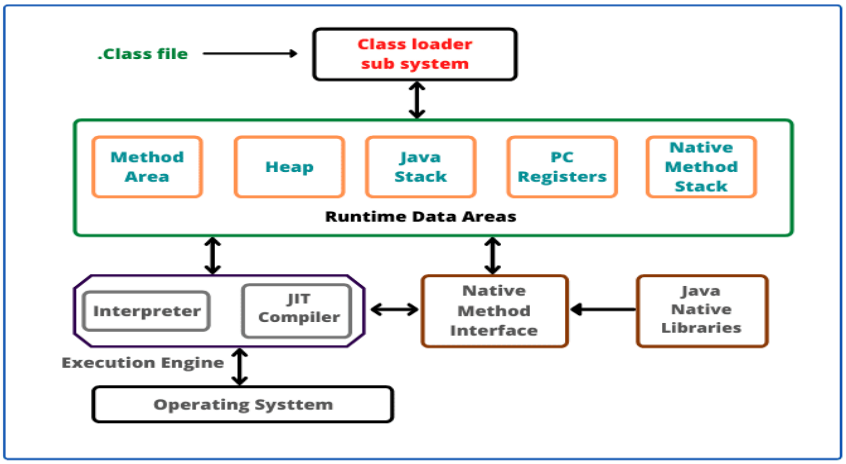
```
public static void main(String[] args)
```

public: JVM wants to call this method from anywhere.
static: JVM wants to call this method without using object reference.
void: main() method won't return anything to JVM.

main: It is an identifier

String[] args: It is command line argument.

12) Explain internal architecture of JVM?



Java application contains java code instructions. Once if we compile java code instruction converts to byte code instructions in .class file.

JVM calls one module called classloader or sub system to load all the byte code instructions from .class files. The work of classloader is to check, these byte code instructions are proper or not. If they are not proper it will refuse the execution. If they are proper it will allocate the memory. In java we have five types of memories.

1. **Method Area:**
   It stores per-class structures such as the runtime constant pool, field and method data, the code for methods.

2. **Heap:**
   Objection creation will store in heap.

3. **Java Stack:**
   Java Stack stores frames. It holds local variables and partial results, and plays a part in method invocation and return.

4. **PC Register:**
   PC (program counter) register contains the address of the Java virtual machine instruction currently being executed.

5. **Native Method Stack:**
   It contains all the native methods used by the application.

Execution Engine:
When JVM loads byte code instructions it simultaneously uses interpreter and JIT compiler.

Interpreter is used to execute our program line by line procedure and JIT compiler is a part of a JVM which is used to increase the execution speed of our program.

13) Types of classloaders in java explain?

There are three built-In classloaders in java.

1. **Bootstrap classloader:**
   This is the first classloader which is the super class of Extension classloader. It loads the rt.jar file which contains all class files of Java Standard Edition like java.lang package classes, java.net package classes, java.util package classes, java.io package classes, java.sql package classes etc.

2. **Extension classloader:**
   This is the child classloader of Bootstrap and parent classloader of System classloader. It loads the jar files located inside $JAVA_HOME/jre/lib/ext directory.

3. **System/Application classloader:**
   This is the child classloader of Extension classloader. It loads the class files from classpath. By default, classpath is set to current directory. You can change the classpath using "-cp" or "-classpath" switch. It is also known as Application classloader.

14) What is literal?

Any constant value which is assigned to a variable is called literal.

Ex:

```
int       a =   10;
|         |     |____constant value / Literal
|         |__________variable name / Identifier
|____________________datatype / Keyword
```

15) What is command line argument?

The arguments which are passing from command prompt are called command line arguments. The main objective of command line arguments are we can customize the behavior of the main() method.

Ex:

```
java   Test       10       20       30
                  |        |        |___args[2]
                  |        |____________args[1]
                  |_____________________args[0]
```

Here args.length will return size of command line arguments.

program:

```
class Test
{
        public static void main(String[] args)
        {
                for(int i=0;i<=args.length;i++)
                {
```

```
                    System.out.println(args[i]);
                }
            }
        }
```

16) What is Garbage Collector and how many ways we can call Garbage Collector?

Garbage collector is used to destroy unused or useless objects from java.
There are two ways to call garbage collector in java.

1. System.gc() ;
2. Runtime.getRuntime().gc();

17) Difference between System.out.println() vs System.err.println()?

System.out.println():

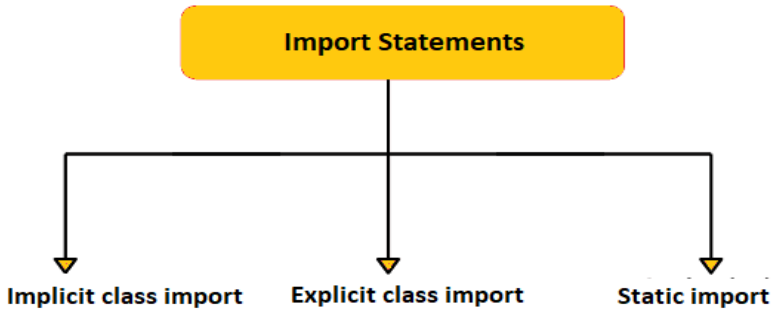
It is mostly used to display results on the console.

System.err.println():

It is mostly used to output error texts.

18) Types of import statements in java?

We have three types of import statements in java.



19) What is static import in java?

Using static import we can access static members of a class directory without class name or object reference.

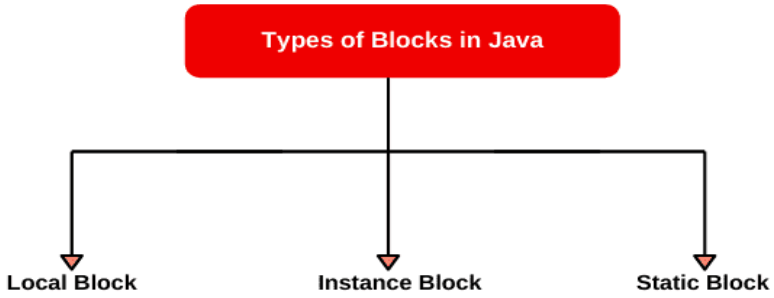
Often use of static import makes our program complex and unreadable.
Ex:

```
import static java.lang.System.*;
class Test
{
    public static void main(String[] args)
    {
        out.println("stmt1");
        out.println("stmt2");
```

```
            out.println("stmt3");
        }
}
```

20) Types of blocks in java?

We have three types of blocks in java.



1. **Instance block:**

   It is used to initialize the instance data members.

   It will execute each time when object of a class is created.

   syntax:

```
        //instance block
        {
                -
                -//code to be execute
                -
        }
```

2. **Static block:**

   It is used to initialize the static data members.

   It is a set of instructions that is run only once when a class is loaded into memory.

   syntax:

```
        //static block
        static
        {
                -
                -//code to be execute
                -
        }
```

3. **Local block:**

   A local block declared inside methods, blocks and constructor.

   A local block will execute whenever the enclosing method, constructor or block executed.

   syntax:

```
        //local block
        {
```

```
                -
                -// code to be execute
                -
        }
```

21) Can we execute java program without main method?

Until 1.6 versions, it is possible to execute java program without main method by using static block. But from 1.7 versions onwards, it is not possible to execute java program without main method.

Ex:

```
class Test
{
        static
        {
                System.out.println("Hello World");
                System.exit(0);
        }
}
```

22) What is type casting in java?

A Process of converting from one datatype to another datatype is called typecasting.
In java we have two types of typecasting.

1. **Implicit typecasting :**
   If we want to store smaller value into a bigger variable then we need to use implicit typecasting. It is also known as widening or upcasting.

2. **Explicit typecasting :**
   If we want to store bigger value into a smaller variable then we need to use explicit typecasting. It is also known as narrowing or downcasting.

23) What is fully qualified class name?

A fully qualified class name contains the package name that the class originated from.

Ex:

```
java.lang.String
java.lang.System
java.util.Scanner and etc.
```

24) How many classes are there in java?

We have following list of predefine classes in java.

Ex:

```
Java 8  -----   4240
Java 9  -----   6005
Java 10 -----   6003
Java 11 -----   4411
```

Java 12 ----- 4433
Java 13 ----- 4545
Java 14 ----- 4569

25) How many types of classes are there in java?

There are seven types of classes in java.

- Static class
- Final class
- Abstract class
- Concrete class
- Singleton class
- POJO class
- Inner class

26) What is singleton class?

A class which allows us to create only one object is called singleton class. If we call any static method by using class name and that returns same class object is called singleton class.

To create a singleton class we need to use private constructor and static method that returns object of the singleton class.

Ex:

```
public class Singleton
{
        private String name;
        private Singleton()
        {
                this.name = "IHUBTALENT";
        }
        public static Singleton getInstance()
        {
                Singleton s=new Singleton();
                return s;
        }
}
```

27) What is final class?

If we declare any class as final then creating child class is not possible.

Ex:

```
        final class
        {
                -
                -//code to be execute
                -
        }
```

28) Which package is a default package in java?

A java.lang package is a default package in java.

29) Difference between default class and public class?

default class we can access with in the same package.

Ex:

```
class Example
{
        -
        -//code to be execute
        -
}
```

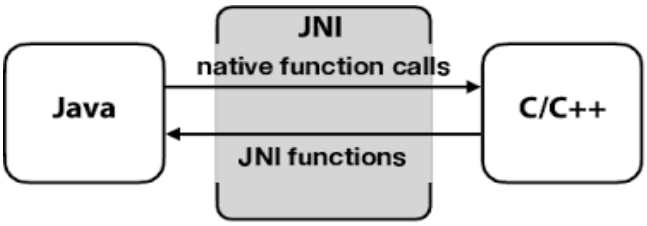
public class we can access within the same package and outside of the package.

Ex:

```
public class Example
{
        -
        -//code to be execute
        -
}
```

30) What is native method in java?

A method which is developed by using some other language is called native method.
Using JNI (Java Native Interface) we can execute native methods in java.



31) Is Java support access specifiers?

No, Java does not support access specifiers.
Java supports four access modifiers i.e default, public, private and protected.

default:

The access level of a default modifier is only within the package.

public:

The access level of a public modifier is everywhere.

private:

The access level of a private modifier is only within the class.

protected:

_____The access level of a protected modifier is within parent and child class.

1.2 MCQ's

1. Java was developed by?
   a) Dennis Ritchie
   b) Bjarne Stroustrup
   c) Guido Van Rossum
   d) James Gosling

2. Java is a product of?
   a) Apple
   b) Microsoft
   c) Oracle Corporation
   d) AWS

3. In which year, java was developed?
   a) 1972
   b) 1995
   c) 1991
   d) 1993

4. Which is default package in java?
   a) java.lang package
   b) java.util package
   c) java.default package
   d) java.io package

5. How many variables are there in java?
   a) 5
   b) 4
   c) 2
   d) 3

6. How many reserved words are there in java?
   a) 48
   b) 53
   c) 50
   d) 26

7. How many primitive datatypes are there in java?
   a) 8

b) 6
c) 4
d) 2

8. A .class file contains what code?
   a) Binary code
   b) Machine code
   c) Byte code
   d) All the above

9. Java originally known as ___?
   a) Silk
   b) OAK
   c) GAMA
   d) Diamond

10. How many datatypes are there in java?
    a) 2
    b) 1
    c) 3
    d) 4

11. How many blocks are there in java?
    a) 1
    b) 2
    c) 3
    d) 4

12. Which is valid declaration for identifier in java?
    a) _abcd
    b) ab$cd
    c) ihub_Talent$
    d) All the above
    e) None

13. Which statement is true about java?
    a) It is platform independent programming language
    b) It is procedure oriented programming language
    c) It is platform dependent programming language
    d) It is sequence dependent programming language

14. Which component is used to execute java program?
    a) JDK
    b) JRE
    c) JVM

d) JIT
e) All the above

15. Which one of the following is not a java feature?
    a) Architecture Neutral
    b) Pointers
    c) Robust
    d) Distributed and Dynamic

16. Which of these cannot be used for a variable name in java?
    a) Keywords
    b) Identifiers
    c) Literals
    d) None

17. _____ is used to find and fix bugs in java programs?
    a) JVM
    b) JRE
    c) JDK
    d) JDB

18. In which memory objects will store in java?
    a) Method Area
    b) Heap Area
    c) Java Stack
    d) PC Register
    e) Native Method Stack

19. In which memory static variables will store in java?
    a) Method Area
    b) Heap Area
    c) Java Stack
    d) PC Register
    e) Native Method Stack

20. In which memory local variables will store in java?
    a) Method Area
    b) Heap Area
    c) Java Stack
    d) PC Register
    e) Native Method Stack

21. A value of a variable which is varied from object to object is called ____?
    a) Instance variable

b) Static variable
c) Local variable
d) All the above

22. A value of a variable which is not varied from object to object is called _____?
    a) Instance variable
    b) Static variable
    c) Local variable
    d) None of the above

23. Can we declare multiple classes in a single java program?
    a) YES
    b) NO

24. If a class contains 4 classes then how many .class files will be generated?
    a) 1
    b) 2
    c) 3
    d) 4

25. To display current date and time we need to use ____?
    a) Date class
    b) Calendar class
    c) Time class
    d) DateTime class

26. Using which operator we can create instances in java?
    a) create operator
    b) build operator
    c) new operator
    d) open operator

27. Which operator is used to check whether an object is an instance of a particular class?
    a) belong
    b) new
    c) all
    d) Instanceof

28. Which modifier accepts by a local variable?
    a) public
    b) static
    c) default
    d) final

29. If we won't initialize any value to instance and static variable then JVM will initialize default values?
    a) TRUE
    b) FALSE
30. What will be the output of following code?
    int i=10;
    System.out.println(i++ * 3);

    a) 30
    b) 33
    c) 13
    d) 23

31. What will the output of following code?
    int i=10;
    System.out.println(i++ + i++);

    a) 20
    b) 21
    c) 22
    d) 23

32. What will be the output of following code?
    int i=10;
    System.out.println(--i + --i + --i);

    a) 30
    b) 27
    c) 24
    d) 7

33. What will be the output of following code?
    int i=10;
    System.out.println(++i++);

    a) 10
    b) 11
    c) 12
    d) C.T.E

34. What will be the output of following code?
    int i= 10 >> 2;

    a) 2

b) 20
c) 5
d) 10

35. What will be the output of following code?

```
int i=100 << 4;
```

a) 25
b) 400
c) 100
d) 4

36. What will be the output of following code?

```
int a =10;
int b = 15;
int c =  a & b;
System.out.println(c);
```

a) 10
b) 15
c) 5
d) 0

37. What will be the output of following code?

```
int a =10;
int b = 15;
int c =  a | b;
System.out.println(c);
```

a) 10
b) 15
c) 5
d) 0

38. What will be the output of following code?

```
int a =10;
int b = 15;
int c =  a ^ b;
System.out.println(c);
```

a) 10
b) 15
c) 5
d) 0

39. What will be the output of following code?
boolean b=(5>2) ? true : false;

a) true
b) false
c) 1
d) 0

40. What will be the output of following code?
System.out.println (5>2 && 6<9 || 2>=1);

a) true
b) false
c) C.T.E
d) R.E

41. What will be the output of following code?
System.out.println (2==2 && 5!=6);

a) true
b) false
c) C.T.E
d) R.E

42. What will be the output of following code?
int i= 2*6+6%3+7/2+6*2-1;
System.out.println(i);

a) 26
b) 25
c) 20
d) 22

43. What will be the output of following code?
int i=10;
i=20;
i=30;
System.out.println(i);

a) 10
b) 20
c) 30
d) 10,20,30

44. What will be the output of following code?

```
int i=10;
int j= ~i;
System.out.println(j);
```

a) 10
b) 11
c) 12
d) 9

45. What will be the output of following code?

```
final int i=10;
i++;
```

a) 10
b) 11
c) C.T.E
d) R.E

46. What will be the output of the following code?

```
boolean b= !(2>5)? true : false;
System.out.println(b);
```

a) true
b) false
c) C.T.E
d) R.E

47. What will be the output of the following code?

```
int i=98;
char ch=i;
System.out.println(ch);
```

a) 98
b) A
c) a
d) C.T.E

48. What will be the output of the following code?

```
float val=10.56f;
```

```
int i=(int)val;
System.out.println(i);
```

a) 10.56 b) 10.00 c) 10 d) C.T.E

49. What will be the output of the following code?

```
char ch='A';
int i=(char)ch;
System.out.println(i);
```

a) A
b) 97
c) 65
d) C.T.E

50. What will be the output of the following code?

```
int i=10;
float f=I;
System.out.println(f);
```

a) 10
b) 10.00
c) C.T.E
d) R.E

51. What will be the output of the following code?

```
byte b=130;
int i=(byte)b;
System.out.println(i);
```

a) 130
b) 127
c) -127
d) -126