

# Assignment - 2.

## Java Basics

Q.1 what is difference between JDK, JRE and JVM

→ JVM : (Java Virtual Machine)

- JVM is an abstract machine.
- It is also called as virtual machine because it doesn't exist physically.
- It provides a runtime environment in which java bytecode can be executed.
- It can also run those programs which are written in other languages and compiled to java bytecode.
- JVM is platform dependent
- There are three notions of the JVM

a) Specification - where working of JVM is specified

b) Implementation - is known as JRE

c) instance → whenever we write java command on the cmd to run the java class, an instance of JVM is created

- The JVM performs the following main tasks:

a) Loads code

b) Verifies code

c) Executes code

d) Provide runtime environment.

- JVM provides definitions for the:-

a) Memory area

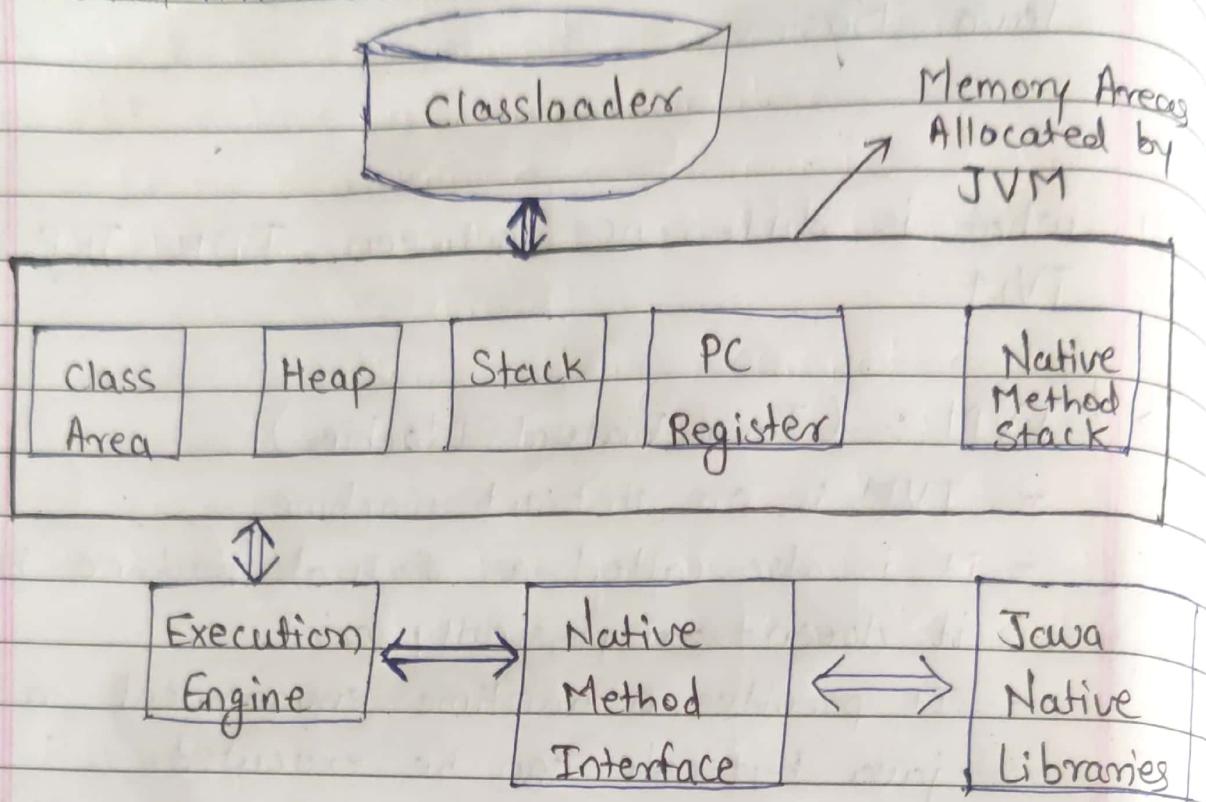
b) Class file format

c) Register set

d) Garbage - Collection heap

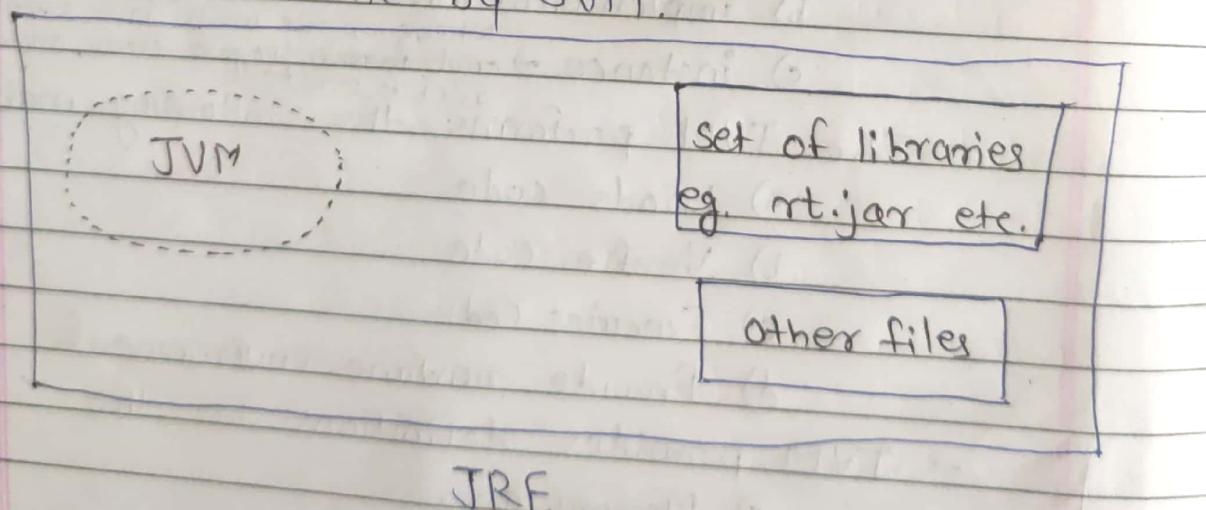
e) Fatal error reporting, etc.

## JVM Architecture :-



## JRE :- (Java Runtime Environment)

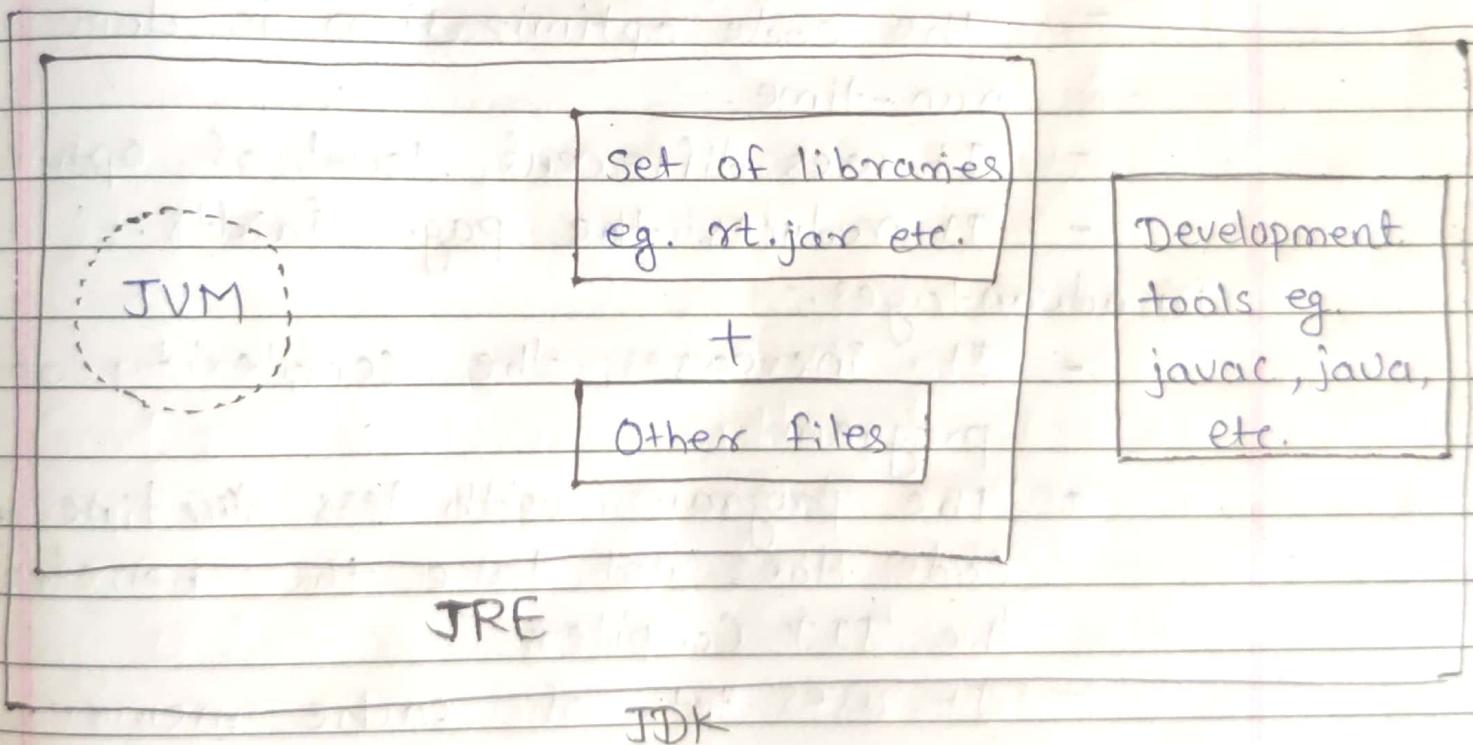
- It is also written as Java RTE
- It physically contains a set of libraries plus other files which are used for runtime by JVM.



JDK :- (Java Development Kit)

- JDK is a software development environment which is used to develop java applications & applets.
- It physically exists.
- It contains JRE + development tools.
- JDK contains a private Java Virtual Machine and few other resources as an interpreter/loader, a compiler, an archiver, a documentation generator (javadoc), etc.

to complete the development of a Java Application.



Q.2 what is JIT Compiler?

→ JIT - Java in time compiler.

- It is also known as dynamic compilation
- JIT is an 'integral part of JIM' (Java In Time)

- It is a long running, computer intensive program that provides the best performance environment.
- It optimizes the performance of the java applications at compile or run time.

Advantages :-

- It requires less memory usage
- The code optimization is done at run-time.
- It uses different level of optimization
- It reduces the page faults:-

Disadvantages:-

- It increases the complexity of program
- The program with less line of code does not take the benefit of the JIT Compiler.
- It uses lots of cache memory.

Q.3 What is class loader?

- - Java class loader is an abstract class
- It belongs to a java.lang package
- It is used to load the classes at run time
- Java classloader is based on 3 principle
  - ① Delegation:- It forwards the request for class loading to prev parent class loader.
  - ② Visibility :- It allows child class loader to see all the classes loaded by parent classloader, but the parent class loader cannot see classes loaded by child class loader
  - ③ Uniqueness:- It allows to load a class once it is achieved by delegation principle. It ensures that child classloader doesn't reload the class, which is already loaded by the parent.

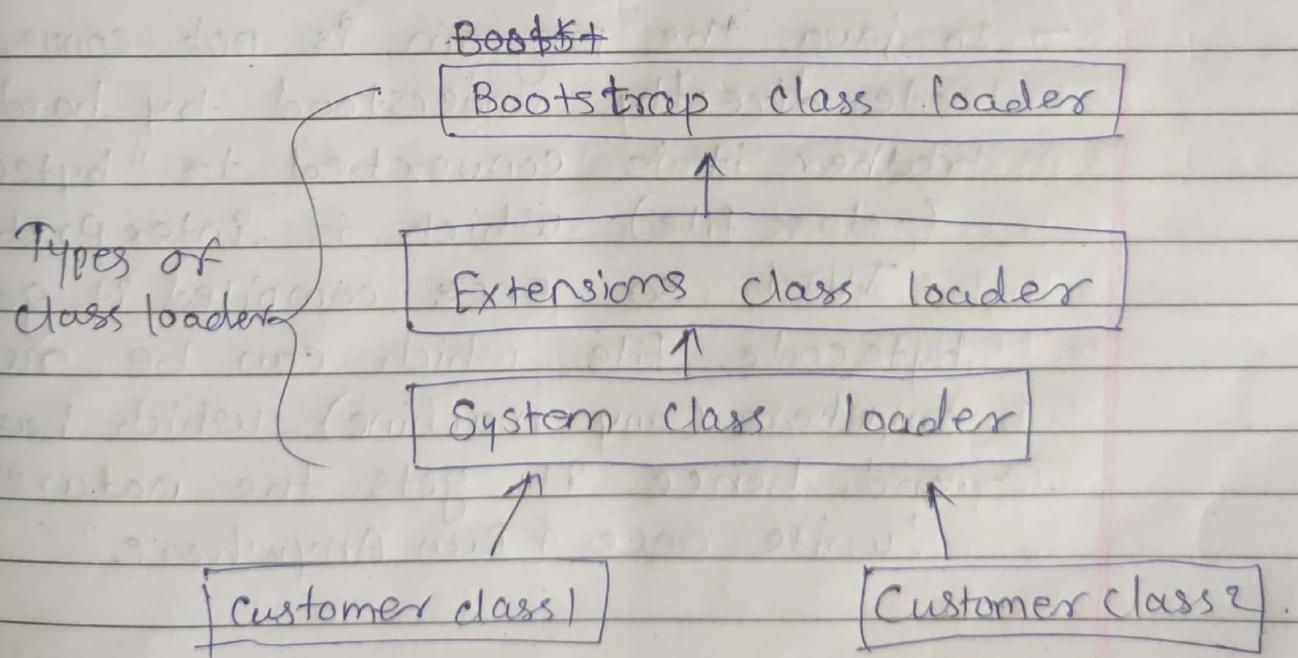
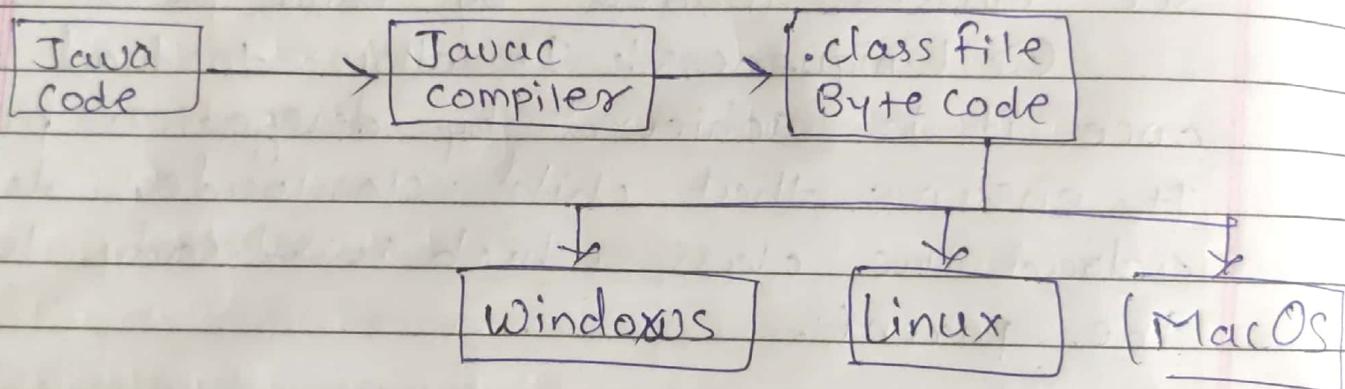


Fig. Hierarchy of class loader

Q.4 what gives java its "Write Once and Run Anywhere" nature?

- - Java applications are called WORA (i.e. Write Once & Run Anywhere)
- This means programmer can develop java code on one system and can expect it to run on any other java-enabled system without any adjustment.
- This is all possible because of JVM

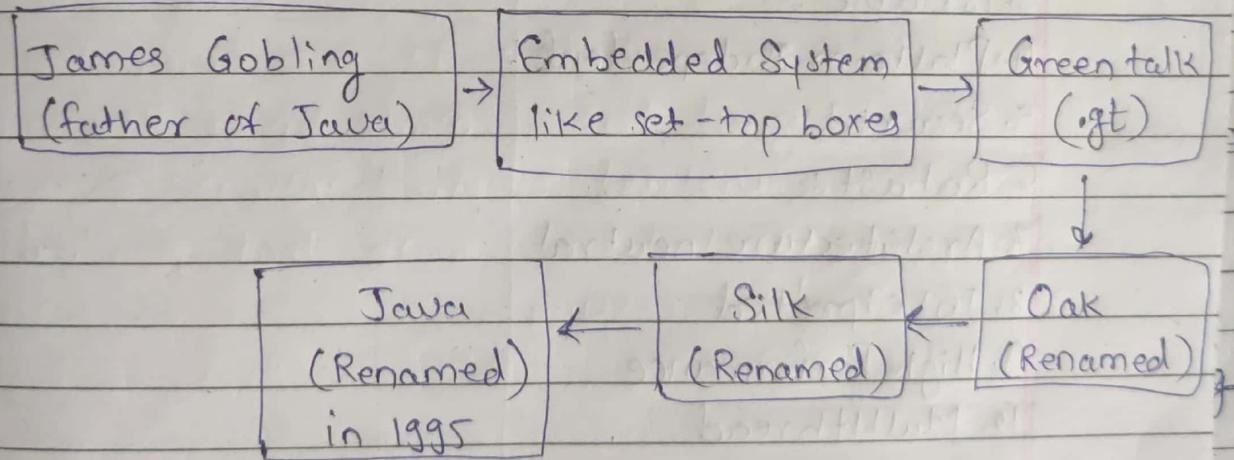


- In java the program is not converted to code directly understood by hardware, rather it is converted to "bytecode" (.class file) which is interpreted by JVM so once compiled it generates bytecode file which can be run anywhere (any machine) which has JVM and hence it gets the nature of "write once & Run Anywhere."

Q.5

Explain history of java and who invented java?

- History of java starts with "Green Team"
- The principle for creating java programming were "Simple, Robust, Portable, Platform-independent, Secured, High performance", etc.
- Java is used in internet programming, mobile devices, games, e-business solutions etc.
- James Gosling, Mike Sheridan, Patrick Naughton initiated java language project in june 1991. This small team of Sun engineers called "Green Team".
- Java was developed by "James Gosling" who is known as father of java in 1995.



Q.6 what was the original name of java?  
why it was renamed?

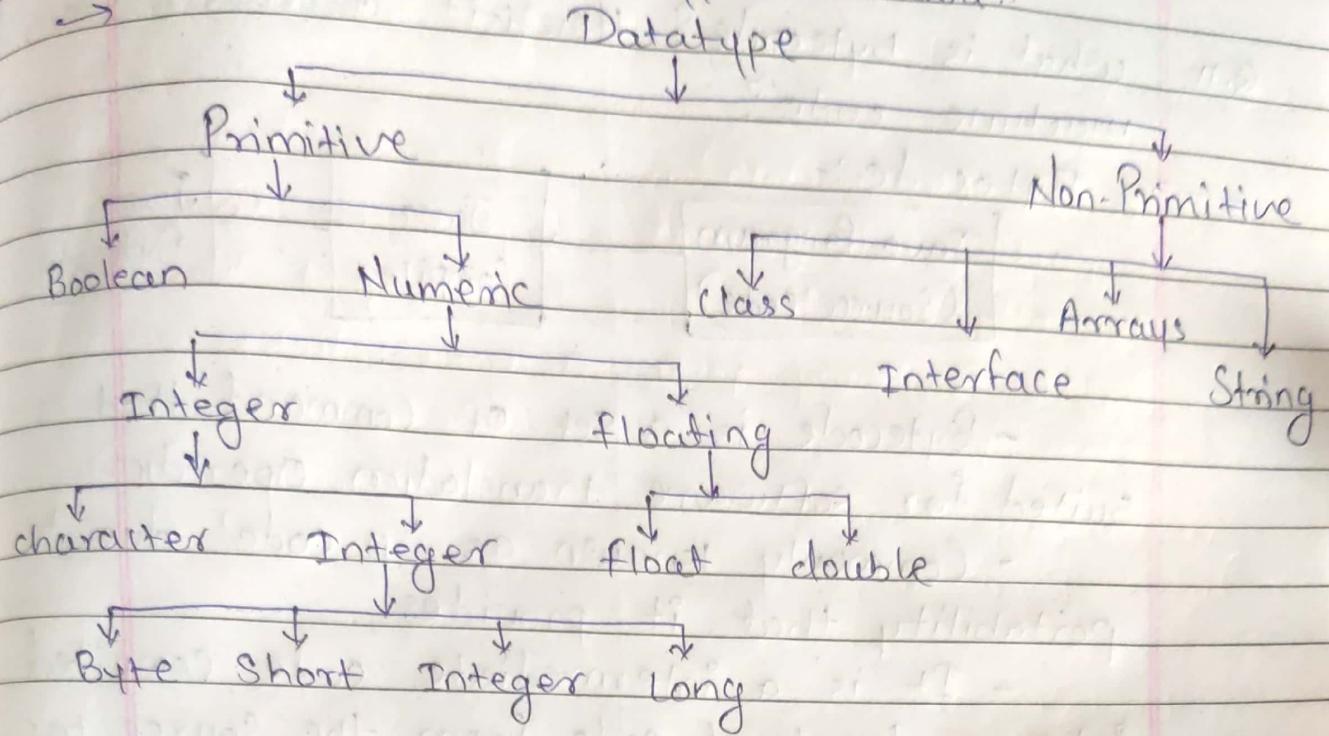
- - The original name of java was 'Oak' which was developed by a small team of engineers working for 'Sun Microsystems'  
- They called themselves the 'Green Team'  
- The 'Oak' name was renamed due to the fact Oak was already registered as part of another trademark.

Q.7 List features of Java?

→ The following are the features of Java:

1. Simple :-
2. Object-Oriented:-
3. Portable :-
4. Platform Independent :-
5. Secured:-
6. Robust :-
7. Architecture neutral
8. Interpreted
9. High Performance
10. Multithread
11. Distributed
12. Dynamic.

Q.8 List Various Datatypes in Java.



Q.9 what is difference between `System.out.print();` and `System.out.println();`

→ `System.out.print();`:- The control or cursor remain on same line after printing.

`System.out.println();`:- The control/cursor moves to the next line after printing.

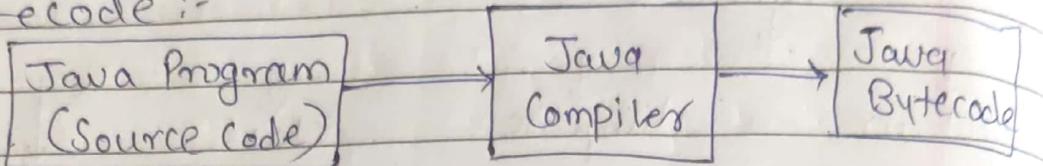
Q.10 How is java platform independent?

→ - when you compile java programs using java compiler it generates bytecode  
- we can execute the bytecode in any platform which has JRE installed.  
i.e. JRE

- with the help of JVM which is present in JRE the java bytecode is translated into machine understandable code.  
- Hence, Java is platform independent but it is purely depended on JDK.

Q.11 What is bytecode? How is it different from machine code?

→ Bytecode :-



- Bytecode is a set of command that is suited for software translation operation.

- Commonly known as 'p-code' due to portability that it provides.

- It is a intermediate code compiled into a low-level code from the source for efficient execution by a software Big Interpreter

ByteCode

Machine Code

- It is a intermediate code designed to run on a virtual machine instead of a Central processing unit (CPU)

- It is a Computer program made up of the native instructions associated with that particular Computer

- The function of bytecode is to be a format that can be

- Machine code is the language which all program must be converted into before they can be run

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>- It is platform independent because it can be executed on any platform using the virtual machine.</li> </ul> | <ul style="list-style-type: none"> <li>- It is not platform independent meaning it cannot be run on just any platform with the same operating system.</li> </ul> |
|--|--|

Q.12 Explain various memory logical Partitions.

- - A logical partition (LPAR) is the division of a computer's memory, and storage into multiple sets of resources so that each set of resources can be operated independently with its own operating system instance and application.
- The number of logical partitions are used for different purpose such as database operative or client/server operation or the separate test & production environment.
- Each partitions can communicate with the other partitions as if other partitions is in a separate machine.

Q.13 what is difference between jar file & Runnable jar file?

- | Jar file   | Runnable jar file  |
|--|--|
| - Jar file is a java appl' which requires a command line to run, a runnable JAR file can be directly executed by double clicking | - Runnable jar file allows a user to run java classes without having to know class names & type them in command prompt, rather the user can just double click on |

the jar file and the program will fire up.

- A JAR (Java Archive) is a package file format typically used to aggregate many java class java

- A runnable jar allows java classes to be loaded just like when a user clicks on exe file.

Q. 14 what is difference bet? Runnable jar file & exe file?

→ Runnable jar file

- Jar file are like dead body

- Jar file is the combination of compiled java classes.

exe file

- exe file are like living men

- Executable jar file is also combination of compiled java classes with main class.

Q.15 How is C platform dependent language?

- - C is a portable programming language because it is not tied to any hardware or System.
- We can say, it is a hardware independent language or platform independent language.
- That is why C is called 'Portable language'.
- C programs does not depend on actually but the executable file that is generated at the end for running the c-program many depend on a platform
  - when you use OS you get other extension for executable file that is generated at the end for running the c-program many depend on a platform.
  - when you use OS you get better extension for executable files.

Q.16 what is difference bet<sup>n</sup> Path & class path?

Path

- Path Variable is used to set the path for all java software tools like javac.exe, java.exe , java doc.exe, and so on.

class Path

- classpath variable is used to set the path for java classes

- Variable name: PATH  
Variable Value: C:\program files\Java\JDK 1.8.0\_21\bin;

- Variable Name: classpath  
Value: - c:\Program Files\Java\jre-1.6.0\jre\lib\rt.jar