BCA – 401: Java Programming

Rahul Kumar Singh

In today's Class we have discussed on Java first program. How to write, compile and run java program.

First Java Program:-

To write a simple Java program, you need to create a class that contains the main method.

The requirement for Java first program:-

For executing any Java program, the following software or application must be properly installed.

- Install the JDK if you don't have installed it, download the JDK and install it.
- Set path of the jdk/bin directory.
- Create the Java program
- Compile and run the Java program

Example:- program to print Hello Java.

To write the program in java, you need to open **notepad** and write a program.

```
public class Simple
{
   public static void main(String args[])
{
```

```
    System.out.println("Hello Java");
  }
}
```

Save the above file as **Simple.java**. The name of the java file must match the class name. When saving the file, save it using the class name and add ".java" to the end of the filename.

Compile and Run the Program:-

To compile and run the program, you need to open the **command prompt**. Then go to your current directory where you write your program first;

To compile:

javac Simple.java

To execute:

java Simple

Output:

Hello Java

Parameters used in First Java Program:-

Let's see what is the meaning of class, public, static, void, main, String[], System.out.println().

- **class** keyword is used to declare a class in Java. Every line of code that runs in Java must be inside a class. In our example, we named the class Simple. A class

should always start with an uppercase first letter. Java is case-sensitive so "Simple" and "simple" has different meaning.

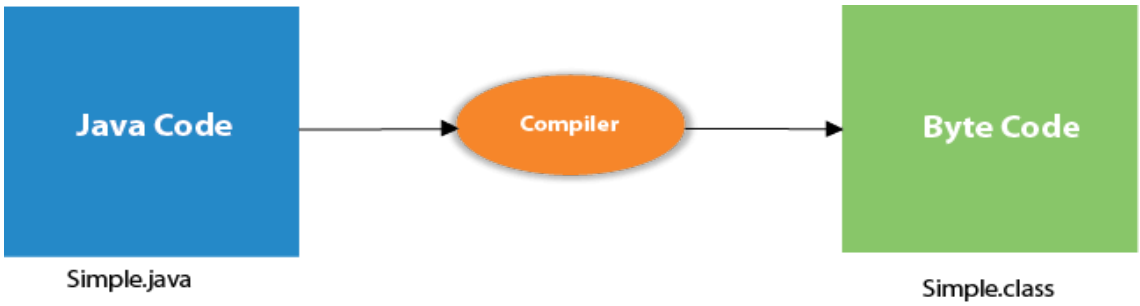
- **public** keyword is an access modifier that represents visibility. It means it is visible to all.
- **static** is a keyword. If we declare any method as static, it is known as the static method. The core advantage of the static method is that there is no need to create an object to invoke the static method. The main() method is executed by the JVM, so it doesn't require creating an object to invoke the main() method. So, it saves memory.
- **void** is the return type of the method. It means it doesn't return any value.
- **main** represents the starting point of the program.
- **String args[]** is used for command line argument.
- **System.out.println()** is used to print statement. Here, **System** is a class, **out** is an object of the PrintStream class, **println()** is a method of the PrintStream class.

Internal Details of Java Program:-

What happens at compile time?

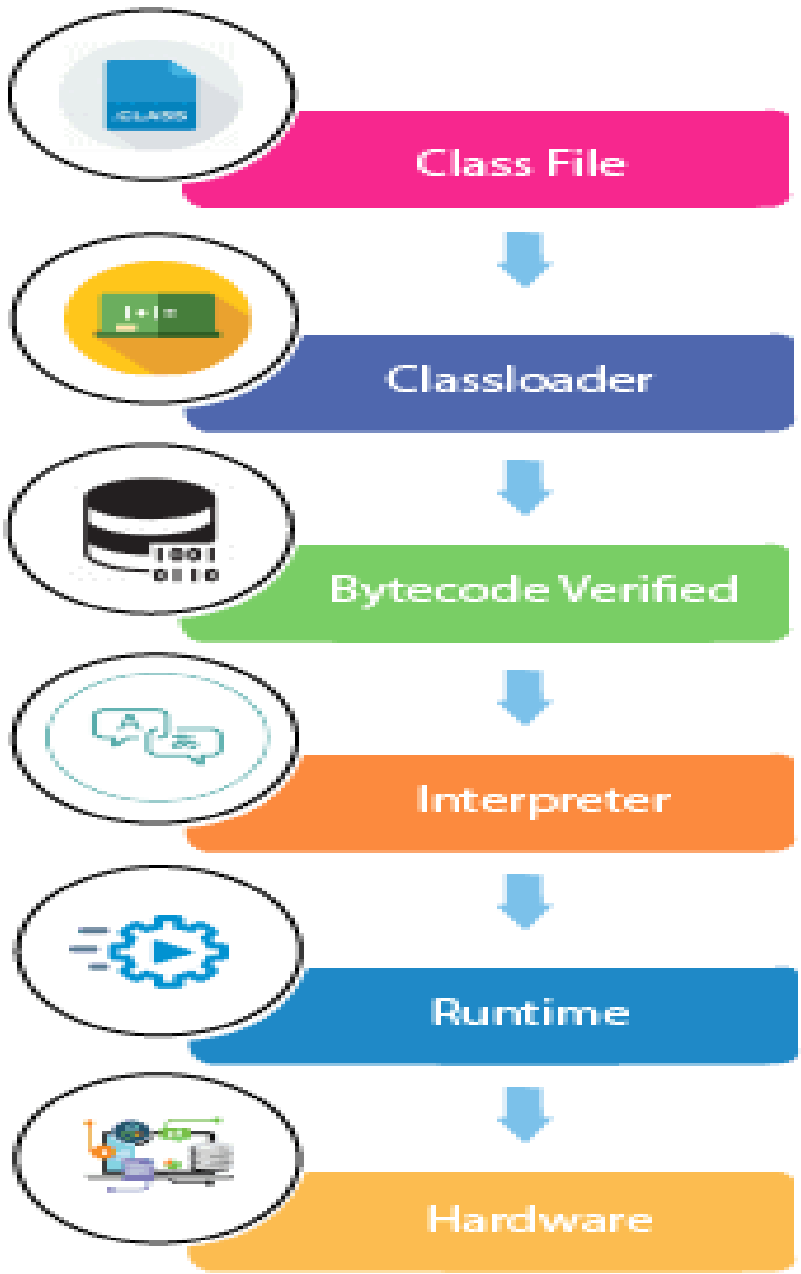
At compile time, the Java file is compiled by Java Compiler (It does not interact with OS) and converts the Java code

into bytecode.



What happens at runtime?

At runtime, the following steps are performed:



Classloader: It is the subsystem of JVM that is used to load class files.

Bytecode Verifier: Checks the code fragments for illegal code that can violate access rights to objects.

Interpreter: Read bytecode stream then execute the instructions.

Difference between JDK, JRE, and JVM:-

Java Virtual Machine (JVM) :-

JVM (Java Virtual Machine) is an abstract machine. It is called a virtual machine because it doesn't physically exist. It is a specification that 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.

JVMs are available for many hardware and software platforms. JVM, JRE, and JDK are platform dependent because the configuration of each OS is different from each other. However, Java is platform independent. There are three notions of the JVM: specification, implementation, and instance.

The JVM performs the following main tasks:

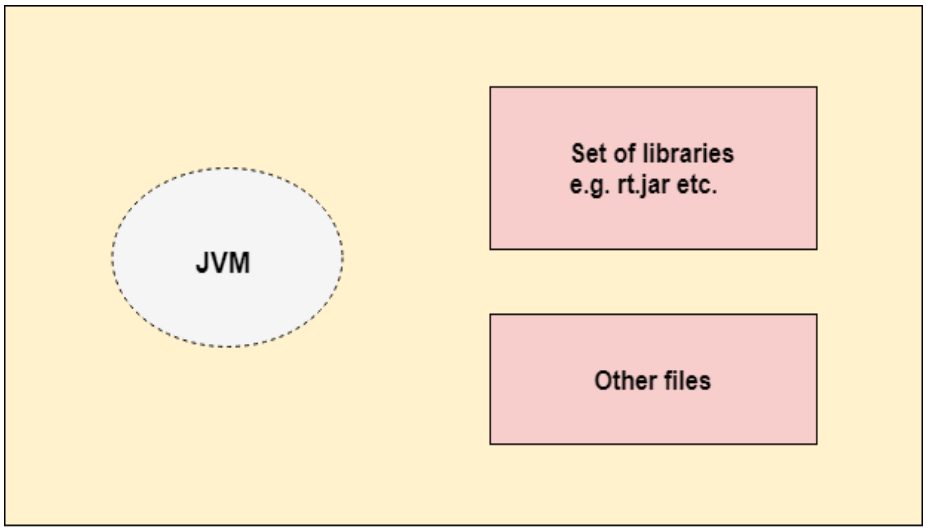
- ➤ Loads code
- ➤ Verifies code
- ➤ Executes code

➤ Provides runtime environment

Java Runtime Environment (JRE):-

JRE (Java Runtime Environment) is also written as Java RTE. The Java Runtime Environment is a set of software tools which are used for developing Java applications. It is used to provide the runtime environment. It is the implementation of JVM. It physically exists. It contains a set of libraries + other files that JVM uses at runtime.

The implementation of JVM is also actively released by other companies besides Sun Micro Systems.



JRE

Java Development Kit (JDK):-

The Java Development Kit (JDK) is a software development environment which is used to develop Java applications and applets. It physically exists. It contains JRE + development tools.

JDK is an implementation of any one of the below given Java Platforms released by Oracle Corporation:

- Standard Edition Java Platform
- Enterprise Edition Java Platform
- Micro Edition Java Platform

The JDK contains a private Java Virtual Machine (JVM) and a few other resources such as an interpreter/loader (java), a compiler (javac), an archiver (jar), a documentation generator (Javadoc), etc. to complete the development of a Java Application.