**What is Java?**

Java is a general-purpose, class-based, object-oriented programming language designed for having lesser implementation dependencies. It is a computing platform for application development. Java is fast, secure, and reliable, therefore. It is widely used for developing Java applications in laptops, data centers, game consoles, scientific supercomputers, cell phones, etc.

Java Platform is a collection of programs that help programmers to develop and run Java programming applications efficiently. It includes an execution engine, a compiler, and a set of libraries in it. It is a set of computer software and specifications.

# Features of Java

* Simple
* Object-Oriented: Object

Class

Inheritance

Polymorphism

Abstraction

Encapsulation

* Portable: Java is portable because it facilitates you to carry the Java bytecode to any platform. It doesn't require any implementation.
* Platform independent: Java is a write once, run anywhere language
* Secured
* Robust: It uses strong memory management.
* High Performance: Java is faster than other traditional interpreted programming languages because Java bytecode is "close" to native code. It is still a little bit slower than a compiled language (e.g., C++).
* Multithreaded: A thread is like a separate program, executing concurrently. We can write Java programs that deal with many tasks at once by defining multiple threads. The main advantage of multi-threading is that it doesn't occupy memory for each thread. It shares a common memory area.
* Distributed: Java is distributed because it facilitates users to create distributed applications in Java
* Dynamic: Java is a dynamic language. It supports the dynamic loading of classes. It means classes are loaded on demand. It also supports functions from its native languages, i.e., C and C++.

**Components of Java Programming Language**

**Java Development kit (JDK)**

JDK is a software development environment used for making applets and Java applications. The full form of JDK is Java Development Kit. Java developers can use it on Windows, macOS, Solaris, and Linux. JDK helps them to code and run Java programs. It is possible to install more than one JDK version on the same computer.

Why use JDK?

* JDK contains tools required to write Java programs and JRE to execute them.
* It includes a compiler, Java application launcher, Appletviewer, etc.
* Compiler converts code written in Java into byte code.
* Java application launcher opens a JRE, loads the necessary class, and executes its main method.

**Java Virtual Machine (JVM):**

Java Virtual Machine (JVM) is an engine that provides a runtime environment to drive the Java Code or applications. It converts Java bytecode into machine language. JVM is a part of the Java Run Environment (JRE). In other programming languages, the compiler produces machine code for a particular system. However, the Java compiler produces code for a Virtual Machine known as Java Virtual Machine.

Why JVM?

* JVM provides a platform-independent way of executing Java source code.
* It has numerous libraries, tools, and frameworks.
* Once you run a Java program, you can run on any platform and save lots of time.
* JVM comes with JIT (Just-in-Time) compiler that converts Java source code into low-level machine language. Hence, it runs faster than a regular application.

**Java Runtime Environment (JRE)**

JRE is a piece of software that is designed to run other software. It contains the class libraries, loader class, and JVM. In simple terms, if you want to run a Java program, you need JRE. If you are not a programmer, you don’t need to install JDK, but just JRE to run Java programs.

Why use JRE?

* JRE contains class libraries, JVM, and other supporting files. It does not include any tool for Java development like a debugger, compiler, etc.
* It uses important package classes like math, swing, util, lang, awt, and runtime libraries.
* If you have to run Java applets, then JRE must be installed in your system.

**Java data types**

Byte: 1 byte -128 to 127

Short: 2 bytes -32,768 to 32,767

Int: 4 bytes -2,147,483,648 to 2,147,483,647

Long: 8 bytes -9,223,372,036,854,775,808 to 9,223,372,036,854,775,807

Float: 4 bytes Sufficient for storing 6 to 7 decimal digits

Double: 8 bytes Sufficient for storing 15 decimal digits

Boolean: 1 bit Stores true or false values

Char: 2 bytes Stores a single character/letter or ASCII values