**JDK**

The JDK is a development environment for building applications, applets, and components using the Java programming language.

The JDK includes tools useful for developing and testing programs written in the Java programming language and running on the Java platform. These tools are designed to be used from the command line.

Java technology is both a programming language and a platform.

The Java platform has two components:

The Java Virtual Machine

The Java Application Programming Interface (API)

**JRE**

J2SE Runtime Environment contains

1. Java virtual machine
2. Runtime class libraries
3. Java application launcher that are necessary to run programs written in the Java programming language.

Performs 3 main tasks

1. Loads Code
2. Verifies Code
3. Executes Code

It is not a development environment and does not contain development tools such as compilers or debuggers.

**JVM**

It has an instruction set and manipulates various memory areas at run time

Class file contains:

1. Java virtual machine instructions (or bytecodes)
2. A symbol table
3. as well as other ancillary information.

**JIT** (just-in-time) Compiler

The **just-in-time compiler comes with JVM** and is used optionally.

Compiles bytecode into platform-specific executable code that is immediately executed.

In Java you have to write and compile a program only once.

The Java on any platform will interpret the compiled bytecode into instructions understandable by the particular processor. However, JVM handles only one bytecode instruction at a time that makes execution slow.

But using the Java just-in-time compiler at the particular system platform compiles the bytecode into the particular system code.

After the code has been (re-)compiled by the JIT compiler, it will usually run more quickly on the computer.

JIT compiler option should be used especially if the method executable is repeatedly reused in the code.

**API** (Application Programming Interface)

The API is a large collection of ready-made software components that provide many useful capabilities. It is grouped into libraries of related classes and interfaces; these libraries are known as packages.

In Java, the source code is "compiled" into byte code which is then "interpreted" and/or "just-in-time compiled" into machine code.

The JIT compiler is automatically used by the JVM when your program runs; it converts Java bytecode to native machine code, as the program runs.

There is an option to switch JIT compilation off (-Xint), you use this when you run your program with the java command (not when compiling your program). Your program will run a lot slower if you do this. This option only exists for debugging, normally you should not use it.

