Assignment No : 02

Q.1 Explain the components of the JDK

→ Java Compiler
  → It translates → Java source code into bytecode

*** Java Runtime Environment
  → It provides libraries, runtime environment for executing Java applications

(!) Development tools
  → These include - debuggers, profilers, etc.

Q.2 Difference between JDK, JVM, JRE

→ JDK → Development kit for building Java applications

JRE → is an environment for running Java applications.

JVM → is an abstract machine → provides runtime environment in which Java bytecode can be executed.

Q.3 Role of JVM in Java? How JVM execute Java?

→ The Java Virtual machine plays a crucial role in executing Java code.
→ It interprets bytecodes generated by the Java compiler and executes it on underlying hardware.

→ It manages memory, handles exceptions and provides various runtime services required for Java application to run

Q.4 Memory management system of Java
→ i) JVM manages memory through automatic memory management
ii) Dynamically allocates memory for objects in heap and deallocate memory for garbage objects

Q.5 JIT compiler ? Bytecode and its importance
→ JIT compiler → part of JVM.
→ improves performance of applications
→ by bytecode into machine code at runtime
→ Bytecode is a platform independent
→ Can run on any system with JVM

Q.6 How Java achieve platform independence
→ Platform independence through
→ JVM by compiling source code
bytecode ↙
compiled
machine code.
→ Since, bytecode → platform independent Java application can run anywhere

Q.6 Architecture of JVM

→ Architecture of JVM

- Class loader
- Runtime data areas
  (heap, stack, method area)
- Engine Execution (JIT compiler)
- Native interface

Q.8. Significance of class loader? Garbage collection

→ i) Class loader in Java is responsible for loading classes into JVM at runtime

ii) Locates and loads class files

iii) Garbage collection

→ Process of deallocating memory of un-referenced objects.

→ Done by JVM garbage collector.

→ Helps to free up memory

→ Avoids memory leak issues