Gemini
Sunfoundry

Assignment - 1 03/09/24

* A short history of Java -

- Java was first developed ~~by~~ in 1991 by team of engineers at Sun Microsystem.
- Java was developed by Sun microsystems, technology company.
- Green Project - it was internal project at Sun microsystems, aimed at finding new opportunities in the consumere electronics industry.
- Java was originally created as a part of this project to run on this devices.

- Green Team -
[James Gosling, Patrick Naughton, mike sheridan
↑
"Father of Java"

* The original language named Oak, was later rename to java in 1995
- The name java was inspired by Java Coffee.

* The "*7" Device (1992) -
In 1992 the team developing java created a device called "*7" to show how their new technology could work in smart gadgets.
* Failuee of "*7" - Time-warner declined to use java for their set-top boxes & video-on-demand service.

* Breakthrough with the web (1994) —

In 19994, java gained significant attentio when team developed a web browser Called webRunner.

This browser had unique ability to run applets, → [applets - is a small Java Program]., that could be embedded in web pages & run directly within the browser. It was major breakthrough.

* first public Implimentation - Java 1.0 in 1996

Java 1.0 was the first official version of java made available to the public in 1996.

* Acquisition of java -

In 2010, oracle Corporation, a major software & hardware Company, acquired Sun microsystems.

* Slogan → "Write once, Run Anywhere".

Java's slogan highlights its most powerful features → Platform independan

It means Java program run of one platform (like windows) it can run on any other platform (like linux or macOS) without needing modification, as long as platform has JVM installed

* Java Virtual Machine [JVM]

When we write code, it gets compiled into bytecode, which the JVM can interpret & execute on any device & OS. This makes java platform-independent.

* Automatic memory management - Java handles ~~process~~ memory automatically through process called 'garbage Collection.

* Java Editions -

1) Java SE [standard Edition] =

The core version of java that includes the basic libraries & tools needed for general-purpose programming.

Key components → Java appln programming Interface (API) & JVM

* Used for - Developing desktop applications, Command line tools, small to medium-sized applications.

2) Java EE → Extended version of Java SE, with additional libraries & frameworks designed for building large-scale, web-based application.

Key Components → Servlets, JSP, Filter, JPA, JTA, JMS, EJB, JSF, Java mail

@) Used for - Developing enterprise-level applications such as online banking systems, e-commerce platforms & large-scale web services.

3) Java ME (micro Edition)

A version of java designed for mobile & embedded devices with limited resources

Used for - Developing appln for smartphones, tablets & small appliances like IoT devices.

Java SE - Basic Java Programming
Java EE - Enterprise level application
Java ME - mobile & embedded devices
Java fx - rich, modern user interfaces.
It is used for building rich, modern user interfaces for desktop appl
Java Card - used for developing appln for smart card & secure IoT devices.

1) Java lan is both, technology as well as platform.
⇒ Is not only programing language is a platform that provides runtime environment (the JVM) where java program can be executed.

2) Java's standardization is managed through the java community process. (JCP)

3) Extension of java source file .java
→ These files are written by developers & are compiled into bytecode by the java compiler.

4) Java is object oriented but also support procedural & functional programming paradigms.

5) Java is statically typed lang. It means type checking is done at compile time.
6) Java is case-sensitive lang.
7) Java, Kotlin, Scala, Groovy are some are JVM based languages these languages are desined to run on JVM. They can use java libraries & tools

What is API -

API - Appln programming Interface.
It is set of tools & protocol that allow different software appln to communicate with each other.

Java version →

1) Java 8 - Long term support
Java 11
Java 17
Java 21

* SDK → Software development kit →
it is collection of tools, libraries, documen & sample code that developers use to create appln for specific platform.
It includes every thing needed to write, compile, test & debug software making it easier & faster to develop appn.

Q. 1) Explain Components of JDK -

* JDK - [Java development kit] -

It provides the tools needed to write compile & run java code.
Writing Code - JDK includes text editor & other tools to write java code
Compiling Code - The java compiler (javac) converts your written code into byte code, ~~which can be run~~

Date
Page

Running Programs - The JDK includes the java runtime environment (JRE) + JVM which allow you to run java programs.

Java runtime Enviroment (JRE)

→ - To execute / run java appl^n on developer's machine / client's machine, we require Java Runtime Environment (JRE).

- The JRE comes with the JDK by default, so developers do not need to download.

- on client machine, we must first download & install the JRE.

* Components of Java Runtime environment -
  1) Java class Library (rt. jar)
  2) Java virtual machine (JVM)

→ rt.jar is the core library file in JRE. It contains standard java classes libraries. necessary for running java application. This includes packages → java.lang, java.util, java.io

rt.jar provides fundamental classes that the JVM needs to execute java programs.

src.zip vs rt.jar vs Java.api docs

Source Code of Java API	Compiled code of Java API	Documentation of Java API
src.zip	rt.jar	jdk-8u-docs-all
Contains .java files	Contains .class files	Contains .html files

* Java program execution flow —

— Java is platform-independent but JVM is platform dependent.

— JRE → JVM + Library classes + Development tools.

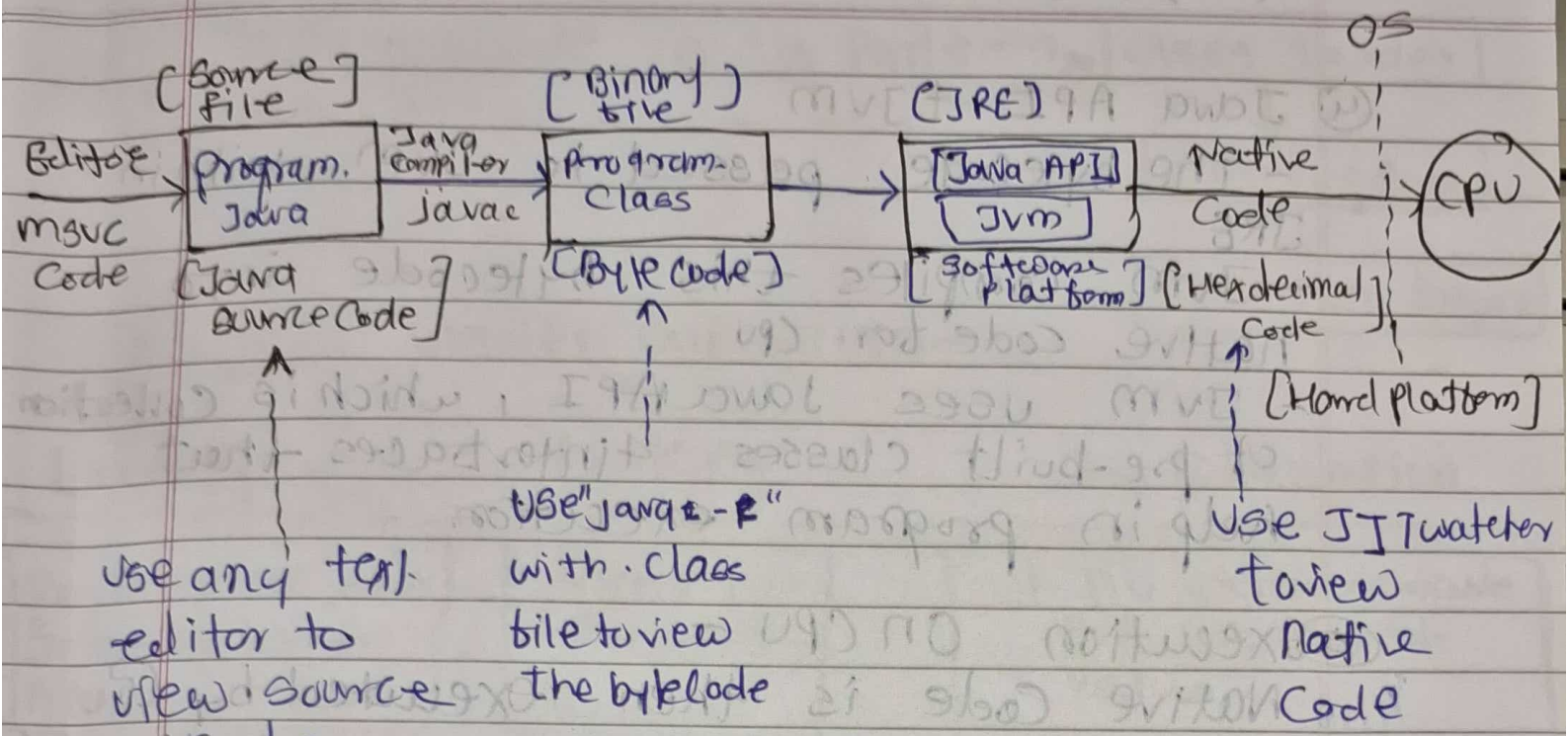
JDK = JRE + Development tool
JRE = JVM + Library

Windows\program files\Java\jre\lib

Class Loaders

- Bootstrap Class loaders
- Extension class loader
- System/Appn classloader

Java Application Execution Flow -



① Source file (Program.java)

- we write java source code in text editor [like msvs code
- The file is saved with a .java extension.

② Java Compiler (javac) -

- The source file passed to java compiler which translate java code to bytecode
- output is binary file with .class extension, known as binary code file.

③ Binary file (Program.class) -

- This bytecode is platform independant can be run on any system that has JRE.
- view bytecode using javap -c