L - 2

Introduction To Java

⇒ Java was developed by James Gosling in the year 1991. It's original name was Oak

↳ name of a tree.

In year 1994, Oak renamed as Java (name of coffee ☕).

In year 1995, first version 1.0 was released. At that time, it was product of sun Microsystem. After that it was governed by Oracle under the project open JDK.

Features Of Java

Java is ~~truly~~ OOPL. because without class and object it will not start to work. whereas, other do not need class and object to run the program.

~~Java is~~

[Main method is itself inside a class.]

Java is two staged PL i.e., it is both

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compiled and interpreted PL.

[Due to the presence of both translators java is considered as the best programming language]

Java Program → Java compiler → Bytecode
first.java (source code) — javac first.java — first.class

Bytecode

It provides ⇒

① Machine independence
② Platform independence (OS, independent)
③ Architecture neutral ← whatever configuration machine is having
④ Binary compatibility (now machines are friendly at binary level).
⑤ Write once, run anywhere, anytime and forever.

Provides IDE → Integrated Development Environment

Bytecode → Java interpreter → Machine
first.class — Java <name of class> — first.exe (executable file (myprogram.exe))

eg:
```
class A
{
public static void main (String args [])
{
System.out.print ("Hello");
}
}
```
file → save → A.java

➡ Compile :-

javac A.java

⇓

A.class

➡ Interpreter :-

java A

Hello ↵

(3) Java is tightly secured PL, due to absence of pointers in Java.

(4) Java supports two types of programming

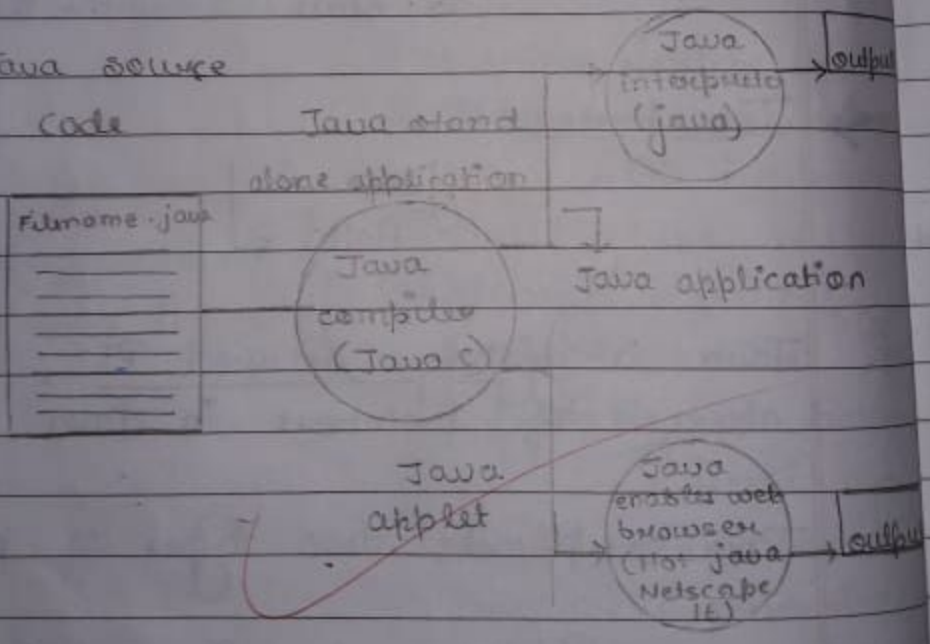
① Application Programming

② Internet Programming / Applet Programming

velopment
nvironment

① Application programming → capable to run in machi
→ Stand alone.

② Internet programming (Applet programmi
- requires web
browser to run (HT
- to achieve multithreading

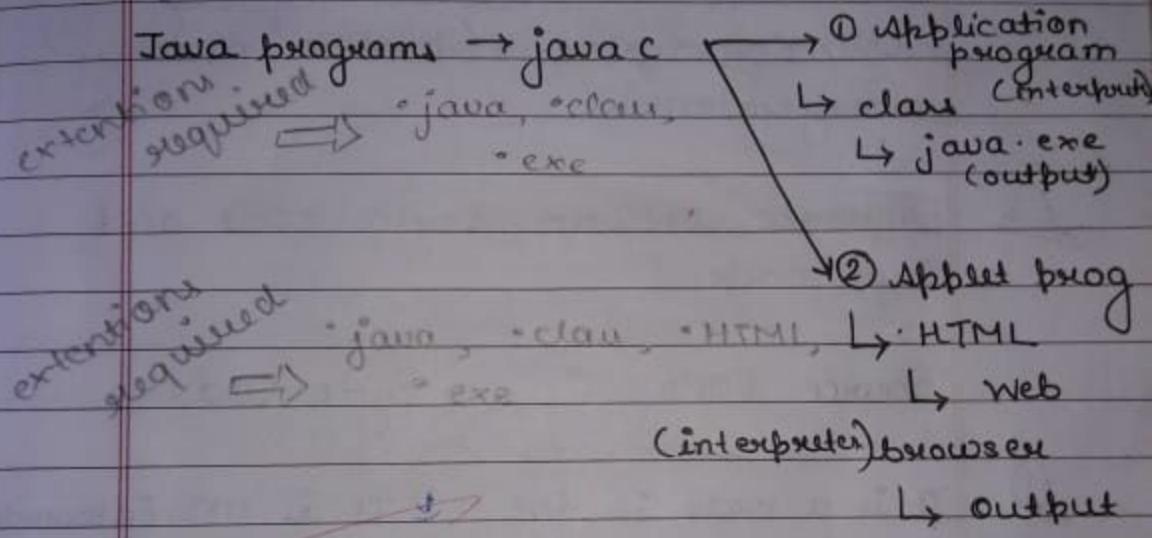


Types of Java Programs

① Applet program = Applet are small

java programs usually run on WWW. It is designed in an HTML web page

② Application program = are stand-alone programs that do not requires the use of any web browser.



⑤ Java is robust PL.

↳ i.e., very strong in error-checking mechanism (also known as exception handling). → method to handle run time errors

Exceptions are run-time errors that causes abnormal termination of program. But in java, through exception handling mechanism we can handle run-time errors.

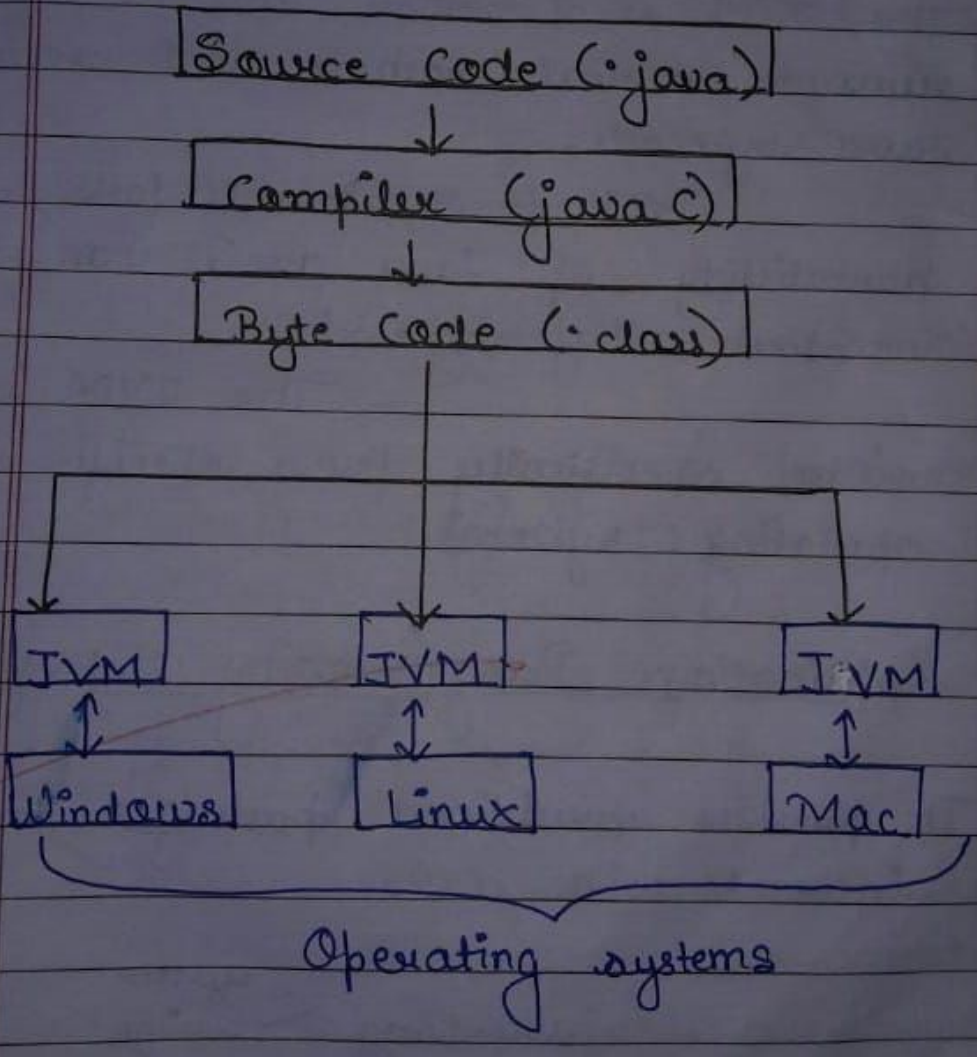
⑥ Multi-threading ⇒ This feature makes possible to write programs that can do many tasks (threads) simultaneously.

⑦ Java supports automatic garbage collecting system. (proper memory management)

I Difference between source code and Byte code.

Source Code	Byte Code
① It is a code in the form of plain text with syntax and grammar of PL.	① It is an intermediate code between source code and machine code.
② It is not directly executed by machine.	② It is executed by machine with JVM (Java Virtual Machine).
Nearest to user.	③ Nearest to machine
File is having extension .java.	④ File is having extension - .class

⑤	Provides platform independence feature.	⑤ Provides → Binary compatibility → Architecture neutrality → Machine independance → Write once, run anywhere and forever
⑥	Speed is minimum.	⑥ Speed is faster.



Source code and Byte code

Note :- All Java programs must run on

the Java platforms that has two components :-

1. JVM (Java Virtual Machine)
2. API (Application Programming Interface)
3. JDK (Java Development Kit).

Java Virtual Machine (JVM)

The JVM is a virtual machine that runs on a real machine and executes Java bytecode.

JVM is responsible for portability of Java as it can interpret any bytecode.

The JVM is written specifically for a specific operating system.

Application Programming Interface (API)

It provides predefined packages to interact with users.

- java.lang < System, String
- java.io
- java.util — Scanner, ...
- java.awt
- java.applet

Java Runtime Environment (JRE)

JRE = JVM + libraries and compiled class files.

JRE is a set of software tools for development of Java applications. JRE combines the JVM, platform core class and supporting libraries which are already built - ready-to - use classes and methods.

Blue J

IDE → Integrated Development Environm

Blue J is an integrated Java environment specifically duigned for introductory teaching.

It supports:

Fully integrated environment.
Built - in editor, compiler, virtual machines, debager etc.
Easy - to - use interface, ideal for beginners.
Interactive testing

⑤ Incremental application development.

★ Compilers :- It is a system s/w used to translate HLL into LL It translate whole program at once. During translation it creates separate file to store translated version of file.

★ Interpreter :- It is a system s/w used to translate HLL into LLL line by line. It does not save translated version in a seperate file. It simply translates and executes.

★ JDK :- Java Development Kit
It contains various tools required to run java program.

eg = java c (java compiler)
java (java interpreter)
Applet viewere (java interpreter for internet program etc)

Source code entered, java compiler creates Bytecode then Interpreter will generate machine code, that will run and give the output
eg ⇒ required in note ⇒