Assignment No : 1

→ A Short History of Java :-

1) Origin :-

Back in 1991, engineers at sun microsystems wanted to create a simple computer language for devices like cable TV boxes. They needed a language that was small, efficient and could work on different types of devices.

2) The Green Project :-

They started a project called "Green" and were inspired by earlier attempts with "Pascal", a computer language used for / designed for 'portability'. They used a similar approach of creating a virtual machine, which could run code on any device with the right interpreter.

3) Development of Oak :-

Instead of Pascal, they based their language on C++ and made it object-oriented. The lead engineer, James Gosling, named the language "Oak" because of an oak tree outside his window. But later, they changed the name to "Java".

4) Early Attempts :-

In 1992, they created their first product called "*7" a smart remote control. Unfortunately, it didn't attract much interest. They tried to market their technology to other companies but didn't find success.

5) Internet Growth :-
Meanwhile, the internet was expanding rapidly and browsers were becoming crucial. In 1994, a browser called **Mosaic** was popular, but there was room for innovation.

6) The Birth of HotJava :-
Realizing the potential, the java team decided to create their own browser, called HotJava. It was not only a browser but also capable of running small programs called applets directly in web pages.

7) Sun Releases Java :-
The success of HotJava led Sun to release the **first** version of Java in 1996.

8) Oecle Corporation :-
Sun Microsystem was the original creater of Java. In 2010, It was acquired by Oracle Corporation.

9) "Write Once, Run Anywhere (WORA) :-
This slogan highlights Java's platform independence, meaning that Java programs can run on any device or operating system that has a Java virtual machine (JVM) installed.

↳ Notes of A Short History of Java.

1) Birth :- 1991

2) Origin :- Sun Microsystem.

3) Green Project :- To explore opportunities in the consumer electronics market

4) Green Team (key members) :- James Gosling
    Patrick Naughton
    Mike Sheridan.

5) From oak to Java :- The original language, named (tree) Oak, was later renamed to Java (coffee)

6) Programming Paradigm :- Object Oriented.

7) The "*7" Device (1992) :- To showcase the technology potentials.

8) Failure of "*7" :- Time-warner denied set-top box OS and video-on-demand technology for demo.

9) Breakthrough with the web (1994) :- WebRunner (a web browser), Applet.

10) First public implementation :- Java 1.0 in 1996

11) Acquisition of Java :- Oracle Corporation acquired Sun Microsystems in 2010.

12) Slogan :- "Write Once, Run Anywhere"

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↳ Java Language Features

There are different features of java included in different version of Java.

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↳ Which version of JDK should I use?

The JDK version depends on specific needs :-

1) Latest LTS Version :-

The latest Long-Term Support (LTS) version is JDK 17. LTS versions are on support for a very long time which increases their reliability and stability when being deployed in production.

2) Latest Release :-

If you want to use the most up-to-date features, you can use JDK21. However, ignore the thinking that non-LTS versions have shortened support time periods.

3) Specific Project Requirements :-

Sometimes you will find that certain projects or libraries are made for a particular JDK version. Refer to the documentation of the tools or frameworks which you are going to use for this purpose.

4) Backward compatibility :-
जेव्हा आपण आधिच्या Project या Maintenance वर काम करत असतो तेव्हा आपल्याला old JDK version ची गरज लागू शकते like JDK 8 or 11.

JDK 17 would be the one or approriate without too many modern features & also the value of is relatively stable

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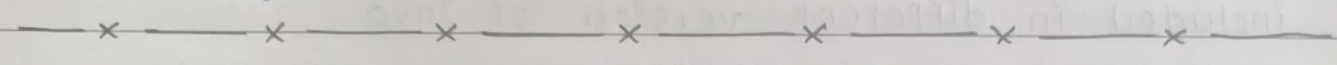
↳ JDK Installation Directory structos :-
The file structure of the JRE is identical to the structure of the jre directory in the JDK.

Java Home → root directory where your java
installation is located.

JDK Home → JDK installed

- Jdk has many files that are essential for java.
Bin folder in java has a rt.jar and jre file which essential for java to run.

- rt.java contains the support files of java so very essential. It contains java support files.

- rt.jar & JVM ── inside ──→ jre (java runtime environment) hence clients only needs jre to run java applications on there system while developer need whole jdk for development.

↳ About Java Technology

1. Java is a language, a technology as well as platform.
2. It is an object oriented as well as procedural & functional programming paradigm.
3. It is case sensitive, strongly statically type language.
4. Many editions :-
    i) Java Standard Edition (Java SE) → For standalone programs.
    ii) Java Enterprise Edition (Java EE) → For client & server based applications.
    iii) Java Micro Edition (Java ME) → For embedded system and old phones.
    iv) Java Fx → For rich GUI
    v) Java card → For smart cards and secure IOT devices.

5. Java Flow :-
    source
    file   →- Compiler -→ java.class →-jvm-→ execution
    (java)

↳ The JVM Architecture Explained

1. JVM stands for java virtual machine.
2. The tag line "WORA" represents that it works on a virtual machine.
3. Source file →- compiler-→ java.class →-jvm-→ loads &
    (Java)   executions
3. JVM divided into 3 parts :-
    - Class Loader Subsystem :- loads, links and initializes class file at runtime.

- Runtime Data Area:
    1. Method Area
    2. Heap Area
    3. Stack Area
    4. PC registers
    5. Native Method Stacks.
- Execution engine :-
    1. Interpreter
    2. Jit compiler
    3. Garbage collector

→ The Java Language Environment : Contents
    1. Primitive Datatypes
    2. Arithmetic & relational operations
    3. Memory Management & garbage collection
    4. Features removed from C & C++