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Java Assignment - 1

Java Basic programming

Part-1: Introduction to Java

(1) What is Java? Explain its significant in modern Software development.

Ans- Java is a high level language, object-oriented and Programming language developed by James Gosling in 1995 at Sun micro systems. It is a platform independent because it use the principle WORA (write once, RUN Anywhere) which can be used by any platform.

Java is significant in modern Software development because of its security, portability, scalability, and rich ecosystem.

(2) List and explain the key features of java?

Ans- features of Java are -

(1) Object-oriented- Java is object-oriented programming language because we use classes and objects for developing applications. And ALSO. it supports four features like Abstractions, Encapsulations, Inheritance and Polymorphism.

(2) Platform independant:- Java is a platform independant

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because we have java Development kit (JDK). The Java c compiles the program to form a byte code or .classfile. This file is independent of the software or hardware running but we need java virtual machine (JVM).

(3) Secure - In the Java we have exceptions handling, memory management and also the memory of the pointer address is not present do to which the data is secure.

(4) Robust - Robust means strong. Java virtual machine is taking care of maximum memory without any loading or problem of running big application or software.

(5) Multithread - Supports concurrent execution of multithread.

(3) what is the difference between compiled and interpreted languages? where does the java fit in?

Ans - Compiled Language - Compiled language is used to convert source code into machine language(binary) before execution.

Interpreted Language - In Interpreted Language it used to

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execute code line by line without prior compilation.

Java fits in both categories such that it first compiles code into bytecode (compiled) and then executes it using the JVM (interpreted).

④ Explain the concepts of platform independent in Java?

Ans- Java is a platform independent because we have Java Development Kit (JDK). This Java compiles the program to form a byte code or .class file. This file is independent of the Software or hardware running but we need Java virtual machine (JVM) file.

⑤ What are the various application of java in the real world?

Ans- various application of Java in real world are:-

① web development - Spring, Hibernate, JSP and Servlets are used in web development.

② Mobile development - Java is used in developing mobile development (Android) Applications using Java or Kotlin.

③ Cloud compting - Java is also used in cloud compting as platform like Amazon web service(Aws),

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and Google Cloud.

④ Embedded systems - Smart devices, Internet of things (IOT) applications are also used through the help of Java.

Part-2: History of Java:

① Who developed Java and when it was introduced?

Ans - Java was developed by James Arthur Gosling in 1995 at Sun microsystems. Then in 1996 he had decided to ~~Angde~~ decided to open source.

② What was Java initially called? why was it name changed?

Ans - Java was initially called 'oak'. ~~The~~ James Gosling and teams ~~but~~ changed names 'oak' to 'Java' after 1991. In 1995 Java 1.0 version officially released by Sun Microsystems.

③ Describe the evolution of java versions from its inceptions to the present.

Ans - Below are the list of evolution of java versions -

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	Year & Versions	Milestone
(1)	Java Java (1) in 1996	Java 1.0 version officially launced with a Java Development Kit (JDK).
(2)	Java (5) in 2005	It introduced generics and enhanced for-loops.
(3)	Java (8) in 2014	It added lambda expressions & streams
(4)	Java (11) in 2018	It included LTS version with enhanced API
(5)	Java (17) in 2021	It latest LTS with performed improvement

(4) What are some major improvements introduced in recent java versions?

Ans - Major improvements in ~~Java~~ Recent java versions -

(1) Java 8 - functional programming, streams, default methods.

(2) Java 11 - Removed Java EE, added HTTP client API.

(3) Java 17 - Sealed classes, enhanced switch statements.

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(5) How does java compare with other programming language like C++ and python in terms of evolution and usability?

Ans- Comparision between java and with C++ and python.

C++ : - faster but more complex memory management.

Python: simpler syntax but slower execution

Java: Balances speed and ease of use has better portability.

Part-3 : Datatypes in java

(1) Explain the importance of datatype in java?

Ans- Datatypes define the type of data a variable can hold and it ensuring power memory allocat-ion and type safety.

(2) Differentiate between primitive and Non-primitive datatypes?

Ans- Primitive Datatypes - In primitive Datatype the default or pre-declared datatype that are present in Java. These are of two types

(1) Boolean Datatypes (True or false) (2) Numeric Datatypes (int, float, char, etc).

NON-primitive Datatypes - In Non-primitive Datatypes datatype are declared by the user. objects,

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arrays and Interface.

(3) List and briefly describe the eight primitive datatypes?

Ans The Eight Primitive Datatypes are -

	Datatype	Size	Default value
(1)	byte	1B	0
(2)	Short	2B	0
(3)	int	4B	0
(4)	Float	4B	0.0f
(5)	long	8B	0L
(6)	double	8B	0.0d
(7)	CHAR	2B	'\u0000'
(8)	boolean	1B	True / false

(4) Provide examples of how to declare and initialize different datatypes.

Ans -

```
Public class TypeCasting Example {
    Public Static Void main(String [] args) {
        int num = 10;
        double numDouble = num;

        double pi = 3.14159;
        int piInt = (int) pi;
        System.out.println(" " + numDouble);
        System.out.println(" " + piInt);
    }
}
```

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Part - 4 Java Development Kit (JDK)

(1) What is JDK? How does it diff from JRE and JVM?

Ans - Java Development Kit (JDK) - It contains Java Resource Environment (JRE) and Development tools like compiler, debugger, etc.

Java Runtime Environment (JRE) - It contain JVM (Java virtual machine) and libraries for execution.

Java Virtual Machine (JVM) - It convert bytecode into machine code.

(2) Explain the main components of JDK

Ans - The main components of JDK are -

(1) compiler (javac) - converts Java code to bytecode
(2) JVM (java) - It Runs Java programs
(3) JAR tool - Packages files into JAR files.
(4) Debugger (jdb) - Helps debug java applications.

(3) Describe the steps to install JDK and configure java on your system.

Ans - Installing JDK steps -

(1) Download JDK from oracle official website depending on your operating system 32 bits or 64 bits.
(2) Install and set JAVA_HOME environment variable.
(3) verify installation using:

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java -version

④ write a simple java program to print "Hello world" and explain its structure.

Ans- Public ~~Static~~ class HelloWorld {
    Public Static void main(String[] args) {
        System.out.println("Hello, world!");
    }
}

⑤ what is the significant of PATH and classPATH environment variables in java?

Ans- PATH - Locates Java tools (javac, java).
CLASSPATH - Locates User-defined classes and JAR files.

⑥ what is the difference b/w open JDK and oracle JDK?

Ans- Open JDK- In Open JDK ~~one~~ it is open-source and free.
oracle JDK- proprietary / commerical and license.

⑦ Explain how java programs are compiled and executed

Ans- ① write java code (.java).
② compile using javac MyProgram.java (creates .class file).
③ Run using java MyProgram.

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