

COMPUTER - CLASS-IX

REMAINING QUESTION & ANSWER OF CHAPTER-2

INTRODUCTION TO JAVA

Q8: What is the java Bytecode?

Ans: The programs written in java are compiled into a machine language for a virtual computer called java virtual machine (JVM). The machine language for this special java virtual machine is called java bytecode. The byte code files are generated with the “.class” extension.

Q9: Describe the slogan ‘Write once. Run anywhere’ in relation to java.

Ans: “The write once, run anywhere” slogan is usually used in reference to java programs because, once written, they can run without modification on any kind of computer. The underlying operating system makes no difference, all that is need is the corresponding JVM

Q10: Describe four features of java.

1. **Robust** – java is a robust and reliable programming language. Its powerful compiler checks for early errors during compilation and the interpreter checks for any run time errors thus, eliminating situations that are error-prone.
2. **Secure** – Java is secure because it allows applets to confine to the java runtime environment only. Applets cannot access any other part of the computer when downloaded one the web browser. This helps to eliminate any damage due to malicious software. For example accessing passwords, or finding you bank details by searching the contents of your computer.
3. **Object Oriented:** Java is a rue object-oriented programming language because it threats everything as an object. This enable us to take full advantage of the object-oriented paradigm and its capabilities or creating flexible and modular programs.
4. **Multithreaded** – Java is also a multithreaded programming language. Multithreading works in a similar way a multiple process run on one computer. To understand it, let’s take the example of a java game. Although the game is a single program, yet different threads within the game manage scores, graphics and hundreds of the core features of the game, hence, a single application executes multiple threads together which enhances the capabilities of a program.

CHAPTER - 1

(INTRODUCTION TO OBJECT ORINTED PROGRAMMING LANGUAGE)

Assignment Questions

Q1. What are programming languages? Describe the various generations of programming languages.

1 First Generation Programming Language:

A first-generation language (1GL) is the first programming language used by the programmers and is regarded as machine language. Machine language instructions are expressed as binary numbers called machine code. A binary number is made up of just two digits — zero (0) and one (1)) Thus, a machine language instruction is just a sequence of zeros and ones. Machine language is a low-level language.

2 Second Generation Programming Language

Assembly language is regarded as a second-generation language (2GL). Assembly language uses symbolic operations called mnemonics instead of binary digits. These mnemonics can have up to maximum five letter combinations, for example: ADD— used to add two data items SUB — used to subtract two data items MOV 'used to move a data item from one location to another) Assembly language is also a low-level language

3 Third Generation Programming Language

CA third-generation language (3GL) is close to English in vocabulary. Writing programs in these languages is much easier than using their predecessors. These languages are easier to read and require less time to write program.

A sample code snippet is shown below:

```
If age >= 18 then
    Print "Candidate can vote"
Else
    Print "Candidate cannot vote"
```

Third-generation programming languages are high-level programming languages, such as FORTRAN, Java, C, and C++.

4 Fourth Generation Programming Language

A fourth-generation language (4GL) is closer to a natural language (for example, English) than a third- generation language. The fourth-generation languages are non-procedural. This means, the programmer specifies what is required as opposed to how it is to be done)In other words, the desired results are outlined by the programmer and the computer is expected to provide them. A **sample code snippet is shown below:**

```
Select Name, Age, Marks
From Students Database
Where Marks > 90
```

In this example, the required series of instructions to get the Name, Age, and Marks from the Students Database is decided by the computer. The user only specifies what is required. Database languages such as Structured Query Language (SQL), report generators such as Oracle Reports, and Python are examples of fourth-generation languages.

5 Fifth Generation Programming Language:

A fifth-generation language (5GL) is designed to solve a given problem using constraints given to the program, rather than using an algorithm written by a programmer. The fifth-generation languages are mainly used in Artificial Intelligence.) Smalltalk, Prolog, and Mercury are good examples of the fifth-generation languages. It is expected that using 5GLs the computer will directly understand human beings! Understanding the speech would be common to computers, and people would be able to talk to computers.

Q2: what are programming paradigms? Briefly explain to popular programming paradigms.

Ans: Programming paradigm is an approach or style of programming that is used to classify programming languages. Each programming language uses one or more programming paradigms. Each programming paradigm supports a set of concepts that makes it the best for a certain kind of problem. For example, Procedure Oriented Programming (POP) paradigm is best suited for problems with step-by-step instructions whereas the Object Oriented Programming (OOP) paradigm is best suited for problems with a large number of related data.

Q3: what are the characteristics of procedural programming?

- I. Procedural programming follows a top-down approach.
- II. The program is divided into blocks of codes called functions, where each function performs a specific task.
- III. Procedural programs model real-world processes as 'procedures' operating on 'data'.
- IV. The data and function are detached from each other.
- V. The data moves freely in a program. vi. It is easy to follow the logic of a program.
- VI. A function can access other function's data by calling that function.

Q4: what are the limitation of procedural programming?

- I. Procedural programming mainly focuses on procedures or functions. Less attention is given to the data.
- II. The data and functions are separate from each other.
- III. Global data is freely moving and is shared among various functions. Thus, it becomes difficult for programmers to identify and fix issues in a program that originate due to incorrect data handling.
- IV. Changes in data types need to be carried out manually all over the program and in the functions using the same data type.
- V. Limited and difficult code reusability.
- VI. It does not model real-world entities (e.g., car, table, bank account, loan) very well where we, as a human being, perceive everything as an object.
- VII. The procedural programming approach does not work well for large and complex systems

Q5: Write a short note on object oriented programming.

Ans: Object oriented programming (OOP) is a programming paradigm which revolves around the behaviours of an object and its interactions with other objects and classes. OOP follows the design principles of data abstraction, encapsulation, inheritance and polymorphism.

Q6: explain the phrase, “Everything is an object”

Ans: In the broadest term, everything we see around us is an object. This can be a tangible thing, such as a car, pen, book, mobile, chair and an ATM. Or it can be an intangible thing, such as the bank account, fee account, an email, and an mp3 file.

An Object is an identifiable entity with some attributes and behaviour. For example, we can say that a car is an object. It has attributes, such as its colour, make, model, and engine size. Its behaviour includes driving forward, backward, accelerating.

Q7: What are the characteristics of object oriented programming?

- I. OOP follows a bottom-up approach.
- II. The program resulting from object-oriented programming is a collection of objects. Each object has its own data and a set of operations.
- III. OOP restricts the free movement of data and the functions that operate on it. It uses a data/information hiding technique that allows better control over data. We will learn about it in the subsequent sections.
- IV. A properly defined class can be reused, giving way to code reusability.
- V. The concept of object-oriented programming models real-world entities very well.
- VI. Due to its object-oriented approach, it is extremely useful in solving complex problems.

Q8: What are the limitations of object oriented programming?

- I. The size of the programs created using this approach may become larger than the programs written using procedure-oriented programming approach.
- II. Software developed using this approach requires a substantial amount of pre-work and planning.
- III. OOP code is difficult to understand if you do not have the corresponding class documentation.
- IV. In certain scenarios, these programs can consume a large amount of memory.

Q9: What do you mean by abstraction?

Ans: Abstraction refers to the act of representing essential features without including the background details. For example, a building can be viewed as a single component (e.g. Hospital) rather than separate components like cement, bricks, and road, abstraction is relative to the perspective of the viewer.