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| **PROGRAM** | **BACHELOR OF COMPUTER APPLICATIONS (BCA)** |
| **SEMESTER** | **4** |
| **COURSE CODE & NAME** | **DCA 2202** |
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**Set-I**

**1. Explain any five features of Java.**

**Ans 1.**

**Five Features of Java**

**Platform Independence** One of the most significant features of Java is its platform independence. Java programs are compiled into bytecode, which is an intermediate representation that can run on any device equipped with a Java Virtual Machine (JVM). Unlike other programming languages like C or C++, which are compiled directly into machine code for specific platforms, Java allows the same program to run on multiple platforms without requiring any modifications. This principle is often referred to as "write once, run anywhere," making Java a highly versatile and portable language.

**Object-Oriented Programming** Java follows an object-oriented programming (OOP) paradigm,

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**2. What are the different types of operators used in Java?**

**Ans 2.**

**Types of Operators Used in Java**

**Arithmetic Operators** Arithmetic operators in Java are used to perform basic mathematical operations such as addition, subtraction, multiplication, division, and modulus. These operators work with both integer and floating-point data types. For example, the + operator adds two values, while the - operator subtracts one value from another. Similarly, the \* operator performs multiplication, the / operator performs division, and the % operator calculates the remainder when one value is divided by another. Arithmetic operators are fundamental for performing calculations in Java programs.

**Relational Operators** Relational operators are used to compare two values and determine the

perators are used to shift bits left or right by a specified number of positions.

**3. What do you mean by Threads in java? Explain with an example.**

**Ans 3.**

**Definition of Threads in Java**

A thread in Java represents the smallest unit of a process that can be executed independently. Java provides a robust multithreading framework that allows multiple tasks to execute concurrently within the same program. Threads share the same memory space but can run independently, enabling parallel execution of tasks. This feature helps improve the performance and efficiency of applications, especially those that involve multiple operations running simultaneously.

Threads are part of Java's built-in java.lang package and can be implemented using two primary

**Set-II**

**4. What is the difference between errors and exceptions?**

**Ans 4.**

**Definition of Errors**

Errors in Java represent serious issues that cannot be recovered during the program's execution. They usually occur at the system level and are caused by underlying problems with the environment or resources, such as hardware failures, out-of-memory issues, or stack overflows. Errors are part of the java.lang.Error class and are unchecked, meaning they are not required to be handled using try-catch blocks. Since errors indicate severe issues, programs typically cannot recover from them, and the application may terminate unexpectedly.

Examples of errors include OutOfMemoryError, StackOverflowError, and VirtualMachineError. For instance, a StackOverflowError occurs when the function call stack exceeds its limit due to

**5. Explain the Synchronization of Threads.**

**Ans 5.**

**Definition of Synchronization in Threads**

Synchronization in Java refers to the mechanism that allows threads to execute in a controlled manner, ensuring that shared resources are accessed safely without causing inconsistency. In a multithreading environment, when multiple threads operate on a shared resource (like a variable, file, or database), there is a risk of data corruption or unexpected behavior if threads are not synchronized. Synchronization ensures that only one thread can access the critical section of code at a time, maintaining the integrity and consistency of shared resources.

Java provides built-in synchronization support through synchronized methods, synchronized

**6. Explain the life cycle of a Servlet**

**Ans 6.**

**Definition of a Servlet**

A servlet is a Java class used to extend the functionality of a web server. It processes requests and generates dynamic responses, making it a core component in Java web development. Servlets run on a server-side Java container (e.g., Apache Tomcat), handling client requests, typically from web browsers. The servlet life cycle is managed by the servlet container and involves distinct phases