Question Paper

Exam Date & Time: 15-Jan-2024 (09:30 AM - 12:30 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

THIRD SEMESTER B.TECH. DEGREE EXAMINATIONS -JANUARY 2024
SUBJECT: CSE 2124- OBJECT ORIENTED PROGRAMMING

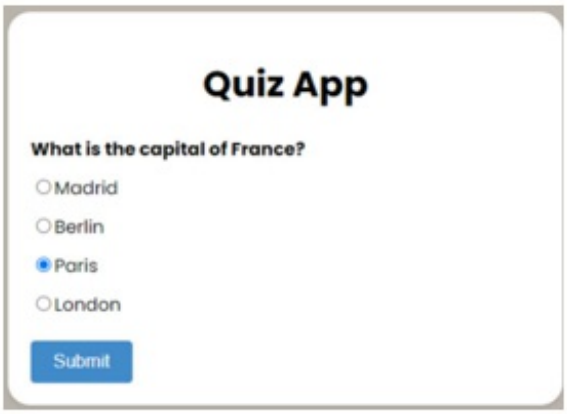
Marks: 50 **Duration: 180 mins.**

Answer all the questions.

1A)	Explain the following with examples: i) Short-circuit logical operators ii) Conditions under which automatic type conversion takes place in Java Why Java is a robust language?	(4)
1B)	Illustrate call by value and call by reference each with an example program	(4)
1C)	Write a Java Program to create an integer array of size n and remove all duplicate elements and display the modified array	(2)
2A)	Design a Java program to demonstrate the concept of inheritance and dynamic polymorphism for different types of vehicles. Create a base class Vehicle with two subclasses, Car and Bicycle. The program should simulate the starting of vehicle engines and display relevant messages depending on the type of vehicle. The goal is to showcase how inheritance and method overriding allow different classes to exhibit unique behavior while sharing a common base. Also demonstrate use of super keyword to call super class constructors.	(4)
2B)	Describe the role of interfaces in achieving polymorphism and abstraction in Java. Provide an example program that demonstrates how interfaces contribute to code flexibility and reusability	(3)
2C)	What is a classpath? What is static import? Explain with an example.	(3)
3A)	Illustrate exception handling mechanism with a specific example in java	(3)
3B)	Design a Java program that simulates the production process in the warehouse using two types of threads: `Manufacturer` and `Packager`. The `Manufacturer` thread should produce products at a fixed rate and put them in a shared buffer [String]. The `Packager` thread should take products from the buffer and pack them into boxes. • The shared buffer has a maximum capacity to prevent overproduction. • The `Manufacturer` thread should wait if the buffer is full and resume production when there is space. • The `Packager` thread should wait if the buffer is empty and resume packing when there are products available. • Implement a mechanism for interthread communication to synchronize the actions of the `Manufacturer` and `Packager` threads. Display appropriate messages to track the production and packaging process, including the current state of the buffer.	(4)
3C)	Write a Java program using multithreading concepts to calculate column sums. Create n threads, where n is the number of columns. Each thread should calculate the column sum and return it to the main thread. The main thread should print the individual column sums and consolidate them to print the total sum	(3)
4A)	Implement a generic bounded type of class to find the average of an array of integers, floats and	(4)

double values.

4B)	Explain java Generics restrictions on Static Members with a suitable example?	(3)
4C)	Explain any two CERT java coding guidelines to be followed while using expressions. Give compliant and non-compliant codes for the same.	(3)
5A)	Write a JavaFX program to accept an integer from the user in a text field and display the multiplication table (up to number *10) for that number. Use FlowPanelayout for the application.	(4)
5B)	Write a program that uses radio buttons to represent the answer options for an MCQ with four options asking the user for capital of France, where the correct answer is Option 3, Once the user selects the answer the application should respond whether the answer was correct or wrong.	(4)



5C) (2)

Consider the following Java program:

```
public class ToughOperatorsDemo {
    public static void main(String[] args) {
        int x = 15;
        int y = 2;
        int z = 5;
        boolean condition1 = x > y || z++ < x;
        boolean condition2 = x % y == 0 && ++z > y;
        int result = (condition1 ? x : y) * z--;

        System.out.println("Condition1: " + condition1);
        System.out.println("Condition2: " + condition2);
        System.out.println("Result: " + result);
    }
}
```

What will be the output of the program? Justify the answer.

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