School of Computer Science Engineering and Information Systems
Fall Semester 2023-2024
Continuous Assessment Test – I

Programme Name & Branch: MCA
Course Name & code: Java Programming – PMCA502L
Class Number (s): VL2023240106170, 6179, 6174
Faculty Name (s): Prof. Mareeswari V, Prof. Vijayarani A, Prof. Thilagavathi M
Exam Duration: 90 Min.   Maximum Marks: 50

Answer ALL Questions (5 * 10 = 50 Marks)

1. a) Java is a portable and a robust programming language. Justify your answer.   **(4 Marks)**

   b) Specify when you will consider using a constructor. Also list and explain the different types of constructors with example code fragments.   **(6 Marks)**

2. a) State the different uses of 'final' keyword with example code fragments.   **(3 Marks)**

   b) Create a class by name SumOfNumbers with members – overloaded method by name sum() having two versions of it. The first version takes one argument of type integer – 'n' and returns the sum of first 'n' natural numbers. The second version takes two arguments, an integer that represent the value of 'n' and a character. If the passed character is 'E', the method should return the sum of even numbers between 1 and 'n' and if the character is 'O' it should return the sum of odd numbers between 1 and 'n'. In case of any other character, it should return zero. Create a main class to test the overloaded functions of the above class.   **(7 Marks)**

3. The government of every country takes effective initiatives to conserve rare plants for future generations. They conduct periodic assessments to determine and store the count of each species and their habitat. Create a class by name ConservePlants and include the following members.

   Instance Variables

       Species Name, Count, and Habitat

   Methods

       i) A getData() method to read input details for the instance variables.

       ii) A display() method to display the details of a plant.

       iii) A static method specificHabitat( ) that takes an array of objects of type ConservePlants, the number of objects, and the habitat as arguments and display the details of those species whose habitat matches with the name of the habitat passed as argument and the count is <50.

   Create a main class to test the above class for an array of 'n' objects.

4. Create a class by name FacultyPublication with the following instance Variables - Faculty ID, Name, Number of Publications and Number of Citations. The class should include a parameterized constructor that initializes instance variables with the values specified by the user and a display() method.

Create an interface by name Calculate. The interface should include a method determinePoints(). Create another class FacultyPublicationPoint that extends FacultyPublication class and implements the Calculate interface. The class should include a parameterized constructor that invokes the parameterized constructor of the base class explicitly. The class also should override the determinePoints() method where the points scored by the faculty for citations is determined and displayed. Use the following criteria to determine the points.

- <25 citations – 3 points
- 25 – 50 citations : 5 Points
- 51 – 75 citations : 7.5 Points
- 76 – 100 citations : 10 Points
- For every additional 50 citation – 2.5 points

Create a main class to test the above class hierarchy.

5. Write a program to read 'n' numbers through command-line arguments and store it in an integer array. Display the square of each element in the integer array (use enhanced for loop). Include appropriate exception handling mechanisms to handle NumberFormatException and ArrayIndexOutOfBoundsException.