Gujarat Vidyapith

Department of Computer Science

(Faculty of Management and Technology)

Sub.: MCA-101 Object Oriented Programming using JAVA Academic Year : 2024-25 Student Enrollment No.:_____

Student Name:_____

No.	Problem Definition	Assignment Date and Submission Date	Sign of Teacher	Grade	Remark
1	Write a program to read five integer numbers from command line and sort them and display minimum, maximum values out of it.				
2	Write a program to read five strings from command line and sort them and display.				
3	Create a class "Utility" with following methods : 1) public static long factorial (long value) above method returns long 2) public static boolean isPrime(int value) The above method returns true if the given number is prime, otherwise false. 3) public static boolean isEven(long value) The above method returns true if the given number is even, otherwise false. 4) public static boolean isOdd(long value) The above method returns true if the given number is odd, otherwise false.				
4	Create class Number with only one private instance variable as a double primitive type. To include the following methods (include respective constructors) isZero(), isPositive(), isNegative( ), isOdd( ), isEven( ), the above methods return boolean type and getFactorial(), the above method returns double type.				
5	Write a Java program that contains two arrays of two dimensions that hold data of matrix and perform matrix operation like addition, subtraction, and multiplication etc. E.g.				

	Matrix 1 $\begin{Bmatrix} 1 & 1 & 1 \\ 2 & 2 & 2 \\ 3 & 3 & 3 \end{Bmatrix}$ Matrix 2 $\begin{Bmatrix} 1 & 1 & 1 \\ 2 & 2 & 2 \\ 3 & 3 & 3 \end{Bmatrix}$ Matrix 1 * Matrix 2 $\begin{Bmatrix} 1*1+1*2+1*3 & 1*1+1*2+1*3 & 1*1+1*2+1*3 \\ 2*1+2*2+2*3 & 2*1+2*2+2*3 & 2*1+2*2+2*3 \\ 3*1+3*2+3*3 & 3*1+3*2+3*3 & 3*1+3*2+3*3 \end{Bmatrix}$ Matrix 1 * Matrix 2 $\begin{Bmatrix} 6 & 6 & 6 \\ 12 & 12 & 12 \\ 18 & 18 & 18 \end{Bmatrix}$				
6	**Create a class "Circle" with-** **1) private variables x, y, and r** **Here x and y are coordinates of center of circle and r is a radius** **2) Define all possible constructors.** **3) Define a method – public double area() which is calculate and return area of a circle.** **4) Define a method – public double circumference() which is calculate and return perimeter of a circle.** **5) Define a method – public double diameter() which is calculate and return diameter of a circle**				
7	**Create a class Stack with all necessary constructors and implement all the necessary methods of stack like:** **1) public void push(int value)** **2) public int pop()** **3) public void traverse() etc.**				
8	**Write a program to implement Matrix and inverse, transpose, additions, subtraction, multiplications, and other relevant operations.** **Define a class 'Matrix' with-** **1) private variables for storing a Matrix (2-dimensional double type array)** **2) private variables for storing no. of rows and no. of columns** **3) Constructors for initializing member variables and for allocating the 2D array (Note:- implement all possible constructors)**				

	4) Methods to transpose Matrix **5) Methods to add 2 matrices and return the result Matrix object :public Matrix add(Matrix m1) and public Matrix addition(Matrix m1, Matrix m2)** **6) Method to subtract 2 matrices and return the result Matrix object : public Matrix sub(Matrix m1) and public Matrix subtraction(Matrix m1, Matrix m2)** **7) Method to multiply 2 matrices and return the result Matrix object : public Matrix mul(Matrix m1) and public Matrix multiplication(Matrix m1, Matrix m2)** **8) Override toString() method to print the Matrix row-by-row: public String toString()** **9) Define one more class with 'main()' function. Define 2 objects m1 and m2 of class Matrix in main(). Get the no. of rows, columns, and values for both the matrices from the user and initialize them by calling the constructor. Perform all operations (inverse, transpose etc.). Also perform addition, subtraction, and multiplication operations on matrices m1 and m2. (You can define additional Matrix objects to hold the results of these operations). Finally, print the result Matrix using the toString() method.**				
9	**Write a java program to create an abstract class named Shape that contains two integers and abstract methods named area() and perimeter(). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class** **Shape. Each one of the classes contains all possible constructor(s) and overridden methods** **1) public double area() that calculate and return area of the given shape. And** **2) public double perimeter() that calculates and returns circumference/perimeter of the given shape.**				
10	**Write a java program to create an interface named Shape that contains methods named area() and perimeter(). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes implements the interface Shape. Each one of the classes contains all possible constructor(s) and overridden method area() and perimeter() that calculate and return area and perimeter of the given shape.**				
11	**Write an application that generates a custom exception if any one of its command line arguments is negative.**				
12	**Create a class Stack with all necessary constructors and methods and create another class StackException which is handle stack related abnormality (stack underflow/overflow).**				

13	**Create a multithreaded program by creating following two classes:** **OddThread class is a subclass of Thread which displays odd number between 1 to 100 at every half second. And PrimeThread class implements Runnable interface which displays prime number between 1 to 100 at every second. Create objects of the above classes and they will execute concurrently.**				
14	**Write a Java program "FileCopy.java" to copy contents (binary/text) of one file to another and display appropriate message. The names of the files and copy mode (binary/text) are getting through command line.**				
15	**Write a java program that read data of students (rollno, name, marks of three subjects) from a text file and calculate percentage. where the data is organized as one line per record and each field of a record is separated by tab(\t).**				
16	**To write program to develop java packages as: -** **org.gvp.dcs.ds which contains the Stack and Queue classes.** **1. Create a class with the class name Stack to demonstrate the application of the stack. Create a constructor to initialize the top value of the stack and necessary methods of stack.** **2. Create a class with the name Queue implement to demonstrate application of queue. Create a constructor to initialize the front and rear and necessary methods of queue.** **org.gvp.dcs.shapes which contains the Sphere and Cube classes.** **1. Create a class with the class name Sphere to demonstrate the application of the Sphere. Create constructor and methods.** **2. Create a class with the class name Cube to demonstrate the application of the Cube. Create constructor and methods.** **Create a main class that demonstrates the use of the packages and its classes.**				

Grade	Marks	Grade	Marks	C	11 - 13	S	Not done
A	18 - 20	E	5 - 7	D	8 -10		
B	14 - 17	F	1 - 4				