Questions :

**Assignment 1**

1. Implement a Java program to find the factorial of a given number.

2. Implement a Java program to check whether a given number is prime or not. (Take the number as a command-line argument.)

3. Implement a Java program to sort a given list of 10 numbers in ascending order.

4. Implement a Java program to merge two sorted arrays.

5. Implement a Java program to perform 2×2 matrix multiplication, addition, and transpose (using a switch case).

**Assignment 2:**

1. Create a class called Employee that includes three pieces of information as instance variables: first name, last name, and monthly salary. Your class should have a constructor that initializes the three instance variables. Provide a setter and getter method for each instance variable. If the monthly salary is not positive, set it to 0.0. Write a test application named EmployeeTest that demonstrates the Employee class's capabilities. Create two Employee objects and display each object's yearly salary. Then give each Employee a 10% raise and display each Employee's yearly salary again.

2. Implement a Java program to print the area of a rectangle by creating a class named 'Area' that has two methods. The first method, named 'setDim', takes the length and breadth of the rectangle as parameters. The second method, named 'getArea', returns the area of the rectangle. The length and breadth of the rectangle are entered through the keyboard.

3. Write a Java program to demonstrate the use of static variables, static blocks, and static methods.

4. Write a Java program to implement a stack and a queue. 5. Write a Java program to arrange 10 names in alphabetical order.

**Assignment 3:**

1. Write a Java program to create a class known as "BankAccount" with methods called deposit() and withdraw(). Create a subclass called SavingsAccount that overrides the withdraw() method to prevent withdrawals if the account balance falls below one hundred.

2. Write a Java program that creates a class hierarchy for employees of a company. The base class should be Employee, with subclasses Manager, Developer, and Programmer. allEach subclass should have properties such as name, address, salary, and job title. Implement methods for calculating bonuses, generating performance reports, and managing projects.

3. Implement Following: a. Create abstract class shapes with dim1, dim2 variables and abstract area() method. Class b. rectangle and triangle inherits shape class. Calculate area of rectangle and triangle.

4. Write a program to perform Multilevel Inheritance

Student roll No:

Test sub1,sub2

Result Display result

**Assignment 4:**

1. **Stack Operations using Interface:** Create an interface Stack with a variable size and abstract methods push(), pop(), display(), overflow(), and underflow(). Implement a subclass IntegerStack that implements the Stack interface. Create a test class to check the working of all methods in the IntegerStack class.

**2. Shape Interface with Rectangle and Triangle: Implement the following:**

a. Create an interface Shape with an abstract method area().

b. Create two classes, Rectangle and Triangle, that implement the Shape interface.

c. Calculate and display the area of both Rectangle and Triangle.

3. **Student Exam Results Using Inheritance and Interface in: Implement the following hierarchy:**

a. Create a class Student with a variable rollNo and methods getRollNo() and setRollNo().

b. Create a class Test that inherits Student and has variables sub1 and sub2 with methods getMarks() and setMarks().

c. Create an interface Sports with a variable sMarks and a method set().

d. Create a class Result that inherits Test and implements the Sports interface. It should display the marks.

e. Demonstrate the functionality of these classes in a test application.

**Assignment 5:**

1. Implement a package LibraryManagement with classes Book and Member. The Book class should have attributes like title, author, and ISBN, while the Member class should store member details. Use this package to create a simple library system.

2. Create a package Ecommerce containing classes Product, Customer, and Order. Implement methods for placing an order, displaying product details, and calculating total order cost. Use this package in another program.

3. Create a package named MathOperations that contains classes for mathematical functions like floor, round, and ceil. Implement a program that uses these functions to perform operations on different numbers. (The Math class in Java contains the methods floor(), ceil(), and round())

**4**. Develop a mathematical package for Statistical operations like factorial, cube. Create a sub package in the math package -convert. In "convert" package provide classes to convert decimal to octal, binary, hex and vice-versa. Develop application program to use this package.

5. Write a Java program to perform employee payroll processing using packages. In the java file, Emp.java creates a package employee and creates a class Emp. Declare the variables name, empid, category, bpay, hra, da, npay, pf, grosspay, incometax, and allowance. Take da 5%, hra 9%, pf 11% and allowance 10% of bpay. Calculate the values in methods. Create another java file Emppay.java. Create an object e to call the methods to perform and print values.