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SAVITRIBAI PHULE PUNE UNIVERSITY

M.Sc.(Computer Application) Sem-I

Practical Examination (From 2023-2024)

SUBJECT: CA-511-MJP: Lab Course on CA-510-A (Java Programming)

Time: 3 Hours Max. Marks: 35

Q.1) Write a Java program to check whether a number is even or odd. (Use Scanner Class) [10 Marks]

⇨ import java.util.Scanner;

```
public class EvenOdd {
   public static void main(String[] args) {
      Scanner sc = new Scanner(System.in);
      System.out.print("Enter a number: ");
      int number = sc.nextInt();

      if (number % 2 == 0) {
         System.out.println(number + " is even.");
      } else {
         System.out.println(number + " is odd.");
      }

      sc.close();
   }
}
```

Q.2) Define an abstract class Shape with abstract methods area () and volume (). Derive a class Cylinder (radius and height). Calculate area and volume of Cylinder. [20 Marks]

⇨ abstract class Shape {

```
   abstract void area();
   abstract void volume();
}
```

```
class Cylinder extends Shape {
    double radius, height;

    // Constructor to initialize radius and height
    Cylinder(double r, double h) {
        radius = r;
        height = h;
    }

    // Implement the area method
    @Override
    void area() {
        double surfaceArea = 2 * Math.PI * radius * (radius + height);
        System.out.println("Surface Area of Cylinder: " + surfaceArea);
    }

    // Implement the volume method
    @Override
    void volume() {
        double volume = Math.PI * radius * radius * height;
        System.out.println("Volume of Cylinder: " + volume);
    }
}

public class TestShape {
    public static void main(String[] args) {
        Cylinder cylinder = new Cylinder(7, 10);  // Radius=7, Height=10
        cylinder.area();
        cylinder.volume();
    }
```

}

Q.3) Viva [5 Marks]

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SAVITRIBAI PHULE PUNE UNIVERSITY

M.Sc.(Computer Application) Sem-I

Practical Examination (From 2023-2024)

SUBJECT: CA-511-MJP: Lab Course on CA-510-A (Java Programming)

Time: 3 Hours Max. Marks: 35

Q.1) Write a Java program to check whether a number is Armstrong or not. (Use BufferedReader) [10 Marks]

⇨ import java.io.BufferedReader;
import java.io.InputStreamReader;

```
public class ArmstrongNumber {
   public static void main(String[] args) throws Exception {
      BufferedReader reader = new BufferedReader(new InputStreamReader(System.in));
      System.out.print("Enter a number: ");
      int number = Integer.parseInt(reader.readLine());

      int temp = number, sum = 0, digits = 0;

      // Count the number of digits
      while (temp != 0) {
         temp /= 10;
         digits++;
      }

      temp = number;
      // Calculate the sum of each digit raised to the power of the number of digits
      while (temp != 0) {
```

```
            int remainder = temp % 10;
            sum += Math.pow(remainder, digits);
            temp /= 10;
        }

        if (sum == number) {
            System.out.println(number + " is an Armstrong number.");
        } else {
            System.out.println(number + " is not an Armstrong number.");
        }
    }
}
```

Q.2) Define an Interface Shape with abstract method area (). Write a java program to calculate an area of Circle and Sphere. (Use final keyword) [20 Marks]

⇨ interface Shape {

```
    double area();
}

class Circle implements Shape {
    final double radius;

    Circle(double r) {
        radius = r;
    }

    @Override
    public double area() {
        return Math.PI * radius * radius;
    }
}
```

```
class Sphere implements Shape {
    final double radius;

    Sphere(double r) {
        radius = r;
    }

    @Override
    public double area() {
        return 4 * Math.PI * radius * radius;
    }
}

public class TestShape {
    public static void main(String[] args) {
        Circle circle = new Circle(7);
        Sphere sphere = new Sphere(7);

        System.out.println("Area of Circle: " + circle.area());
        System.out.println("Area of Sphere: " + sphere.area());
    }
}
```

Q.3) Viva [5 Marks]

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Practical Examination (From 2023-2024)

SUBJECT: CA-511-MJP: Lab Course on CA-510-A (Java Programming)

Time: 3 Hours Max. Marks: 35

Q.1) Write a Java program to check whether a number is Palindrome or not. (Use Scanner Class) [10 Marks]

⇨ import java.util.Scanner;

```
public class Palindrome {
   public static void main(String[] args) {
      Scanner sc = new Scanner(System.in);
      System.out.print("Enter a number: ");
      int number = sc.nextInt();
      int originalNumber = number;
      int reversedNumber = 0;

      while (number != 0) {
         int remainder = number % 10;
         reversedNumber = reversedNumber * 10 + remainder;
         number /= 10;
      }

      if (originalNumber == reversedNumber) {
         System.out.println(originalNumber + " is a Palindrome.");
      } else {
         System.out.println(originalNumber + " is not a Palindrome.");
      }

      sc.close();
   }
}
```

Q.2) Define an interface “Operation” which has methods area (), volume (). Define a constant PI having a value 3.142. Create a class circle (member – radius), cylinder(members – radius, height) which implements this interface. Calculate and display the area and volume.
[20 Marks]

⇨ interface Operation {

```
    double PI = 3.142;

    void area();
    void volume();
}

class Circle implements Operation {
    double radius;

    Circle(double r) {
        radius = r;
    }

    @Override
    public void area() {
        double area = PI * radius * radius;
        System.out.println("Area of Circle: " + area);
    }

    @Override
    public void volume() {
        // Circle does not have a volume, so not applicable here.
    }
}

class Cylinder implements Operation {
    double radius, height;

    Cylinder(double r, double h) {
        radius = r;
```

```
        height = h;
    }

    @Override
    public void area() {
        double area = 2 * PI * radius * (radius + height);
        System.out.println("Surface Area of Cylinder: " + area);
    }

    @Override
    public void volume() {
        double volume = PI * radius * radius * height;
        System.out.println("Volume of Cylinder: " + volume);
    }
}

public class TestOperation {
    public static void main(String[] args) {
        Circle circle = new Circle(7);
        Cylinder cylinder = new Cylinder(7, 10);

        circle.area();
        cylinder.area();
        cylinder.volume();
    }
}
```

Q.3) Viva [5 Marks]

Practical Examination (From 2023-2024)

SUBJECT: CA-511-MJP: Lab Course on CA-510-A (Java Programming)

Time: 3 Hours Max. Marks: 35

Q.1) Write a Java program to accept a number from user and generate multiplication table of a given number. (Use BufferedReader class [10 Marks]

⇨ import java.io.BufferedReader;

```
import java.io.InputStreamReader;

public class MultiplicationTable {
   public static void main(String[] args) throws Exception {
      BufferedReader reader = new BufferedReader(new InputStreamReader(System.in));
      System.out.print("Enter a number: ");
      int number = Integer.parseInt(reader.readLine());

      System.out.println("Multiplication Table of " + number + ":");
      for (int i = 1; i <= 10; i++) {
         System.out.println(number + " x " + i + " = " + (number * i));
      }
   }
}
```

Q.2) Write a Java program to create a super class Vehicle having members Company and Price. Derive two different classes LightMotorVehicle (mileage) and HeavyMotorVehicle (capacity_in_tons). Accept the information for “n” vehicles and display the information in appropriate form. While taking data, ask user about the type of vehicle first.

[20 Marks]

⇨ import java.util.Scanner;

```
class Vehicle {
   String company;
   double price;
```

```
    Vehicle(String company, double price) {
        this.company = company;
        this.price = price;
    }

    void display() {
        System.out.println("Company: " + company + ", Price: " + price);
    }
}

class LightMotorVehicle extends Vehicle {
    double mileage;

    LightMotorVehicle(String company, double price, double mileage) {
        super(company, price);
        this.mileage = mileage;
    }

    @Override
    void display() {
        super.display();
        System.out.println("Mileage: " + mileage + " km/l");
    }
}

class HeavyMotorVehicle extends Vehicle {
    double capacity_in_tons;

    HeavyMotorVehicle(String company, double price, double capacity_in_tons) {
        super(company, price);
        this.capacity_in_tons = capacity_in_tons;
```

```
    }

    @Override
    void display() {
        super.display();
        System.out.println("Capacity: " + capacity_in_tons + " tons");
    }
}

public class VehicleTest {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter the number of vehicles: ");
        int n = sc.nextInt();
        sc.nextLine();  // Consume newline character

        for (int i = 0; i < n; i++) {
            System.out.print("Enter vehicle type (1 for LightMotorVehicle, 2 for HeavyMotorVehicle): ");
            int vehicleType = sc.nextInt();
            sc.nextLine();  // Consume newline

            System.out.print("Enter company: ");
            String company = sc.nextLine();
            System.out.print("Enter price: ");
            double price = sc.nextDouble();

            if (vehicleType == 1) {
                System.out.print("Enter mileage: ");
                double mileage = sc.nextDouble();
                LightMotorVehicle vehicle = new LightMotorVehicle(company, price, mileage);
                vehicle.display();
```

```
        } else if (vehicleType == 2) {
            System.out.print("Enter capacity in tons: ");
            double capacity_in_tons = sc.nextDouble();
            HeavyMotorVehicle vehicle = new HeavyMotorVehicle(company, price, capacity_in_tons);
            vehicle.display();
        }
        sc.nextLine();  // Consume newline
    }
    sc.close();
  }
}
```

Q.3) Viva [5 Marks]

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SUBJECT: CA-511-MJP: Lab Course on CA-510-A (Java Programming)

Time: 3 Hours Max. Marks: 35

Q.1) Write a Java program to display reverse of a given number. (Use Command Line Argument) [10 Marks]

⇨

```
public class ReverseNumber {
  public static void main(String[] args) {
    if (args.length == 0) {
      System.out.println("Please provide a number as command line argument.");
      return;
    }

    int number = Integer.parseInt(args[0]);
    int reversedNumber = 0;
```

```
        while (number != 0) {
            int remainder = number % 10;
            reversedNumber = reversedNumber * 10 + remainder;
            number /= 10;
        }

        System.out.println("Reversed number: " + reversedNumber);
    }
}
```

Q.2) Write a Java program to create a super class Employee (members – name, salary). Derive a sub-class as Developer (member – projectname). Derive a sub-class Programmer (member – proglanguage) from Developer. Create object of Programmer and display the details of it. Implement this multilevel inheritance with appropriate constructor and methods.
[20 Marks]

⇨ class Employee {

```
    String name;
    double salary;

    Employee(String name, double salary) {
        this.name = name;
        this.salary = salary;
    }

    void display() {
        System.out.println("Name: " + name + ", Salary: " + salary);
    }
}

class Developer extends Employee {
    String projectName;
```

```
    Developer(String name, double salary, String projectName) {
        super(name, salary);
        this.projectName = projectName;
    }

    @Override
    void display() {
        super.display();
        System.out.println("Project Name: " + projectName);
    }
}

class Programmer extends Developer {
    String programmingLanguage;

    Programmer(String name, double salary, String projectName, String programmingLanguage) {
        super(name, salary, projectName);
        this.programmingLanguage = programmingLanguage;
    }

    @Override
    void display() {
        super.display();
        System.out.println("Programming Language: " + programmingLanguage);
    }
}

public class TestEmployee {
    public static void main(String[] args) {
        Programmer programmer = new Programmer("John", 80000, "AI Project", "Java");
        programmer.display();
```

```
    }
}
```

Q.3) Viva [5 Marks]

SAVITRIBAI PHULE PUNE UNIVERSITY

M.Sc.(Computer Application) Sem-I

Practical Examination (From 2023-2024)

SUBJECT: CA-511-MJP: Lab Course on CA-510-A (Java Programming)

Time: 3 Hours Max. Marks: 35

Q.1) Write a Java program to print the sum of elements of an array. (Use Scanner Class)

[10 Marks]

⇨ import java.util.Scanner;

```
public class SumArray {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter the number of elements: ");
        int n = sc.nextInt();

        int[] arr = new int[n];
        int sum = 0;

        System.out.println("Enter the elements of the array:");
        for (int i = 0; i < n; i++) {
            arr[i] = sc.nextInt();
            sum += arr[i];
        }

        System.out.println("Sum of elements: " + sum);
        sc.close();
```

```
    }
}
```

Q.2) Define a class Employee having members – id, name, salary. Define default constructor. Create a subclass called Manager with private member bonus. Define methods accept and display in both the classes. Create “n” objects of the Manager class and display the details of the worker having the maximum total salary (salary + bonus). [20 Marks]

⇨ import java.util.Scanner;

```
class Employee {
    int id;
    String name;
    double salary;

    Employee() {
        id = 0;
        name = "Unknown";
        salary = 0.0;
    }

    void accept() {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter ID: ");
        id = sc.nextInt();
        sc.nextLine();  // Consume newline
        System.out.print("Enter Name: ");
        name = sc.nextLine();
        System.out.print("Enter Salary: ");
        salary = sc.nextDouble();
    }

    void display() {
```

```
        System.out.println("ID: " + id + ", Name: " + name + ", Salary: " + salary);
    }
}

class Manager extends Employee {
    private double bonus;

    Manager() {
        super();
        bonus = 0.0;
    }

    void accept() {
        super.accept();
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter Bonus: ");
        bonus = sc.nextDouble();
    }

    void display() {
        super.display();
        System.out.println("Bonus: " + bonus + ", Total Salary: " + (salary + bonus));
    }

    double totalSalary() {
        return salary + bonus;
    }
}

public class ManagerTest {
    public static void main(String[] args) {
```

```
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter number of Managers: ");
        int n = sc.nextInt();

        Manager[] managers = new Manager[n];
        double maxSalary = 0;
        int maxIndex = 0;

        for (int i = 0; i < n; i++) {
            managers[i] = new Manager();
            managers[i].accept();
            if (managers[i].totalSalary() > maxSalary) {
                maxSalary = managers[i].totalSalary();
                maxIndex = i;
            }
        }

        System.out.println("\nManager with highest salary:");
        managers[maxIndex].display();

        sc.close();
    }
}
```

Q.3) Viva [5 Marks]

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M.Sc.(Computer Application) Sem-I

Practical Examination (From 2023-2024)

SUBJECT: CA-511-MJP: Lab Course on CA-510-A (Java Programming)

Time: 3 Hours Max. Marks: 35

Q.1) Write a Java program to accept an array and display array elements in ascending order.

[10 Marks]

⇨ import java.util.Scanner;

```
import java.util.Arrays;

public class AscendingOrder {
   public static void main(String[] args) {
      Scanner sc = new Scanner(System.in);

      // Accept array size
      System.out.print("Enter the number of elements in the array: ");
      int n = sc.nextInt();

      int[] arr = new int[n];

      // Accept array elements
      System.out.println("Enter the elements of the array:");
      for (int i = 0; i < n; i++) {
         arr[i] = sc.nextInt();
      }

      // Sorting the array in ascending order
      Arrays.sort(arr);

      // Display the sorted array
      System.out.println("Array elements in ascending order:");
      for (int i = 0; i < n; i++) {
         System.out.print(arr[i] + " ");
      }

      sc.close();
```

```
    }
}
```

Q.2) Write a program to create class Account (accno, accname, balance). Create an array of 'n' Account objects. Define static method “sortAccount” which sorts the array on the basis of balance. Display account details in sorted order. [20 Marks]

⇨ import java.util.Scanner;

```
class Account {
    int accno;
    String accname;
    double balance;

    // Constructor to initialize account details
    public Account(int accno, String accname, double balance) {
        this.accno = accno;
        this.accname = accname;
        this.balance = balance;
    }

    // Method to display account details
    public void display() {
        System.out.println("Account No: " + accno + ", Account Name: " + accname + ", Balance: " + balance);
    }

    // Static method to sort accounts based on balance
    public static void sortAccount(Account[] accounts) {
        // Sorting using a simple bubble sort based on balance
        for (int i = 0; i < accounts.length - 1; i++) {
            for (int j = 0; j < accounts.length - 1 - i; j++) {
                if (accounts[j].balance > accounts[j + 1].balance) {
```

```
                Account temp = accounts[j];
                accounts[j] = accounts[j + 1];
                accounts[j + 1] = temp;
            }
        }
    }
}

public class AccountTest {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);

        // Accept number of accounts
        System.out.print("Enter the number of accounts: ");
        int n = sc.nextInt();

        Account[] accounts = new Account[n];

        // Accept account details
        for (int i = 0; i < n; i++) {
            System.out.print("Enter Account Number: ");
            int accno = sc.nextInt();
            sc.nextLine(); // Consume the newline character
            System.out.print("Enter Account Name: ");
            String accname = sc.nextLine();
            System.out.print("Enter Balance: ");
            double balance = sc.nextDouble();
            accounts[i] = new Account(accno, accname, balance);
        }
```

```
        // Sort the accounts by balance
        Account.sortAccount(accounts);

        // Display account details after sorting
        System.out.println("\nAccounts sorted by balance:");
        for (Account account : accounts) {
            account.display();
        }

        sc.close();
    }
}
```

Q.3) Viva [5 Marks]

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M.Sc.(Computer Application) Sem-I

Practical Examination (From 2023-2024)

SUBJECT: CA-511-MJP: Lab Course on CA-510-A (Java Programming)

Time: 3 Hours Max. Marks: 35

Q.1) Write a Java program to print the factors of a given number. (Use Scanner Class) [10 Marks]

⇨ import java.util.Scanner;

```
public class Factors {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);

        // Accept the number
        System.out.print("Enter a number to find its factors: ");
        int number = sc.nextInt();
```

```
        System.out.println("Factors of " + number + ":");

        // Print the factors of the number
        for (int i = 1; i <= number; i++) {
            if (number % i == 0) {
                System.out.print(i + " ");
            }
        }

        sc.close();
    }
}
```

Q.2) Write a program which define class Product with data member as id, name and price. Store the information of 5 products and display the name of product having minimum price (Use array of object). [20 Marks]

⇨

```
import java.util.Scanner;

class Product {
    int id;
    String name;
    double price;

    // Constructor to initialize product details
    public Product(int id, String name, double price) {
        this.id = id;
        this.name = name;
        this.price = price;
    }
}
```

```
public class ProductTest {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);

        Product[] products = new Product[5];

        // Accepting product details
        for (int i = 0; i < 5; i++) {
            System.out.print("Enter Product ID: ");
            int id = sc.nextInt();
            sc.nextLine();  // Consume newline character
            System.out.print("Enter Product Name: ");
            String name = sc.nextLine();
            System.out.print("Enter Product Price: ");
            double price = sc.nextDouble();
            products[i] = new Product(id, name, price);
        }

        // Finding product with minimum price
        Product minPriceProduct = products[0];
        for (int i = 1; i < 5; i++) {
            if (products[i].price < minPriceProduct.price) {
                minPriceProduct = products[i];
            }
        }

        // Displaying the name of the product with the minimum price
        System.out.println("Product with minimum price: " + minPriceProduct.name);

        sc.close();
    }
```

}

Q.3) Viva [5 Marks]

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Practical Examination (From 2023-2024)

SUBJECT: CA-511-MJP: Lab Course on CA-510-A (Java Programming)

Time: 3 Hours Max. Marks: 35

Q.1) Write a Java program to check whether a number is Perfect or not. (Use BufferedReader)

[10 Marks]

⇨ import java.io.BufferedReader;

import java.io.InputStreamReader;

```
public class PerfectNumber {
   public static void main(String[] args) throws Exception {
      BufferedReader reader = new BufferedReader(new InputStreamReader(System.in));

      // Accept the number from the user
      System.out.print("Enter a number: ");
      int number = Integer.parseInt(reader.readLine());

      int sum = 0;

      // Find divisors of the number and calculate the sum
      for (int i = 1; i <= number / 2; i++) {
         if (number % i == 0) {
            sum += i;
         }
      }
```

```
        // Check if the sum of divisors equals the number
        if (sum == number) {
            System.out.println(number + " is a Perfect Number.");
        } else {
            System.out.println(number + " is not a Perfect Number.");
        }
    }
}
```

Q.2) Define a class Student with attributes rollno and name. Define default and parameterized constructor. Keep the count of Objects created. Create objects using parameterized constructor and display the object count after each object is created. [20 Marks]

⇨

```
class Student {
    int rollno;
    String name;
    static int objectCount = 0; // Static variable to keep track of object count

    // Default constructor
    public Student() {
        rollno = 0;
        name = "Unknown";
        objectCount++;
    }

    // Parameterized constructor
    public Student(int rollno, String name) {
        this.rollno = rollno;
        this.name = name;
        objectCount++;
    }

    // Method to display student details
```

```
    public void display() {
        System.out.println("Roll No: " + rollno + ", Name: " + name);
    }

    // Method to display object count
    public static void displayObjectCount() {
        System.out.println("Total number of Student objects created: " + objectCount);
    }
}

public class StudentTest {
    public static void main(String[] args) {
        // Creating student objects using parameterized constructor
        Student student1 = new Student(101, "Alice");
        student1.display();
        Student.displayObjectCount(); // Display count

        Student student2 = new Student(102, "Bob");
        student2.display();
        Student.displayObjectCount(); // Display count

        Student student3 = new Student();
        student3.display();
        Student.displayObjectCount(); // Display count
    }
}
```

Q.3) Viva [5 Marks]

Practical Examination (From 2023-2024)

SUBJECT: CA-511-MJP: Lab Course on CA-510-A (Java Programming)

Time: 3 Hours Max. Marks: 35

Q.1) Write a Java program to find multiplication of two matrixes. Accept matrix from user.

[10 Marks]

⇨ import java.util.Scanner;

```
public class MatrixMultiplication {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);

        // Accepting matrix dimensions
        System.out.print("Enter number of rows of Matrix A: ");
        int rowsA = sc.nextInt();
        System.out.print("Enter number of columns of Matrix A (and rows of Matrix B): ");
        int colsA = sc.nextInt();

        System.out.print("Enter number of columns of Matrix B: ");
        int colsB = sc.nextInt();

        int[][] matrixA = new int[rowsA][colsA];
        int[][] matrixB = new int[colsA][colsB];
        int[][] result = new int[rowsA][colsB];

        // Accepting elements of Matrix A
        System.out.println("Enter elements of Matrix A:");
        for (int i = 0; i < rowsA; i++) {
            for (int j = 0; j < colsA; j++) {
                matrixA[i][j] = sc.nextInt();
            }
        }
```

```
        // Accepting elements of Matrix B
        System.out.println("Enter elements of Matrix B:");
        for (int i = 0; i < colsA; i++) {
            for (int j = 0; j < colsB; j++) {
                matrixB[i][j] = sc.nextInt();
            }
        }

        // Matrix multiplication
        for (int i = 0; i < rowsA; i++) {
            for (int j = 0; j < colsB; j++) {
                for (int k = 0; k < colsA; k++) {
                    result[i][j] += matrixA[i][k] * matrixB[k][j];
                }
            }
        }

        // Displaying the result matrix
        System.out.println("Resultant Matrix after multiplication:");
        for (int i = 0; i < rowsA; i++) {
            for (int j = 0; j < colsB; j++) {
                System.out.print(result[i][j] + " ");
            }
            System.out.println();
        }

        sc.close();
    }
}
```

Q.2) Write a java program to accept two numbers from the user and perform division of two

numbers, if second number is zero then throw user defined exception.

[20 Marks]

⇨ import java.util.Scanner;

```
// Custom exception class
class DivisionByZeroException extends Exception {
   public DivisionByZeroException(String message) {
      super(message);
   }
}

public class DivisionException {
   public static void main(String[] args) {
      Scanner sc = new Scanner(System.in);

      // Accept two numbers
      System.out.print("Enter first number: ");
      int num1 = sc.nextInt();
      System.out.print("Enter second number: ");
      int num2 = sc.nextInt();

      try {
         // If second number is zero, throw custom exception
         if (num2 == 0) {
            throw new DivisionByZeroException("Error: Division by zero is not allowed.");
         } else {
            // Perform division
            double result = (double) num1 / num2;
            System.out.println("Result of division: " + result);
         }
      } catch (DivisionByZeroException e) {
```

```
            System.out.println(e.getMessage());
        }

        sc.close();
    }
}
```

Q.3) Viva [5 Marks]

SAVITRIBAI PHULE PUNE UNIVERSITY

M.Sc.(Computer Application) Sem-I

Practical Examination (From 2023-2024)

SUBJECT: CA-511-MJP: Lab Course on CA-510-A (Java Programming)

Time: 3 Hours Max. Marks: 35

Q.1) Write a menu driven java program using switch case for the following:

1. Addition
2. Subtraction
3. Multiplication
4. Division. [10 Marks]

⇨ import java.util.Scanner;

```
public class Calculator {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int num1, num2, result;
        double divResult;
        int choice;

        // Menu for operations
        do {
            System.out.println("\nMenu:");
```

```
System.out.println("1. Addition");
System.out.println("2. Subtraction");
System.out.println("3. Multiplication");
System.out.println("4. Division");
System.out.println("5. Exit");
System.out.print("Enter your choice: ");
choice = sc.nextInt();

if (choice != 5) {
   System.out.print("Enter first number: ");
   num1 = sc.nextInt();
   System.out.print("Enter second number: ");
   num2 = sc.nextInt();
}

switch (choice) {
   case 1:
      result = num1 + num2;
      System.out.println("Result of Addition: " + result);
      break;

   case 2:
      result = num1 - num2;
      System.out.println("Result of Subtraction: " + result);
      break;

   case 3:
      result = num1 * num2;
      System.out.println("Result of Multiplication: " + result);
      break;
```

```
            case 4:
                if (num2 != 0) {
                    divResult = (double) num1 / num2;
                    System.out.println("Result of Division: " + divResult);
                } else {
                    System.out.println("Error! Division by zero.");
                }
                break;

            case 5:
                System.out.println("Exiting...");
                break;

            default:
                System.out.println("Invalid choice, please try again.");
          }
        } while (choice != 5);

        sc.close();
    }
}
```

Q.2) Write a java program to design a Login form using swing.

[20 Marks]

⇨

```
import javax.swing.*;
import java.awt.event.ActionEvent;
import java.awt.event.ActionListener;

public class LoginForm {
    public static void main(String[] args) {
        // Create frame
        JFrame frame = new JFrame("Login Form");
```

```
// Create components
JLabel userLabel = new JLabel("Username:");
JLabel passLabel = new JLabel("Password:");
JTextField userField = new JTextField(20);
JPasswordField passField = new JPasswordField(20);
JButton loginButton = new JButton("Login");

// Set layout for the frame
frame.setLayout(null);

// Set bounds for components
userLabel.setBounds(50, 50, 100, 30);
userField.setBounds(150, 50, 150, 30);
passLabel.setBounds(50, 100, 100, 30);
passField.setBounds(150, 100, 150, 30);
loginButton.setBounds(150, 150, 100, 30);

// Add components to frame
frame.add(userLabel);
frame.add(userField);
frame.add(passLabel);
frame.add(passField);
frame.add(loginButton);

// Define button click action
loginButton.addActionListener(new ActionListener() {
   public void actionPerformed(ActionEvent e) {
      String username = userField.getText();
      String password = new String(passField.getPassword());
```

```
            if (username.equals("admin") && password.equals("admin123")) {
                JOptionPane.showMessageDialog(frame, "Login Successful!");
            } else {
                JOptionPane.showMessageDialog(frame, "Invalid Username or Password.");
            }
        }
    });

    // Set frame properties
    frame.setSize(400, 300);
    frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
    frame.setVisible(true);
  }
}
```

Q.3) Viva [5 Marks]

SAVITRIBAI PHULE PUNE UNIVERSITY

M.Sc.(Computer Application) Sem-I

Practical Examination (From 2023-2024)

SUBJECT: CA-511-MJP: Lab Course on CA-510-A (Java Programming)

Time: 3 Hours Max. Marks: 35

Q.1) Write a Java program to display Fibonacci series up to given number.

[10 Marks]

```
⇨ import java.util.Scanner;
⇨
⇨ public class FibonacciSeries {
⇨     public static void main(String[] args) {
⇨         Scanner sc = new Scanner(System.in);
⇨         System.out.print("Enter the number of terms in the Fibonacci series: ");
⇨         int n = sc.nextInt();
⇨
⇨         int first = 0, second = 1;
⇨
```

```
        System.out.print("Fibonacci Series: " + first + " " + second);

        for (int i = 3; i <= n; i++) {
            int next = first + second;
            System.out.print(" " + next);
            first = second;
            second = next;
        }

        sc.close();
    }
}
```

Q.2) Write a java program to design a registration form using swing.

[20 Marks]

```
import javax.swing.*;
import java.awt.*;
import java.awt.event.ActionEvent;
import java.awt.event.ActionListener;


public class RegistrationForm {
   public static void main(String[] args) {
      JFrame frame = new JFrame("Registration Form");
      frame.setLayout(new FlowLayout());


      JLabel nameLabel = new JLabel("Name:");
      JTextField nameField = new JTextField(20);
      JLabel emailLabel = new JLabel("Email:");
      JTextField emailField = new JTextField(20);
      JLabel passwordLabel = new JLabel("Password:");
      JPasswordField passwordField = new JPasswordField(20);
      JButton submitButton = new JButton("Submit");


      frame.add(nameLabel);
      frame.add(nameField);
      frame.add(emailLabel);
```

```
        frame.add(emailField);
        frame.add(passwordLabel);
        frame.add(passwordField);
        frame.add(submitButton);

        submitButton.addActionListener(new ActionListener() {
            public void actionPerformed(ActionEvent e) {
                String name = nameField.getText();
                String email = emailField.getText();
                String password = new String(passwordField.getPassword());

                // Perform validation (simple example)
                if (name.isEmpty() || email.isEmpty() || password.isEmpty()) {
                    JOptionPane.showMessageDialog(frame, "All fields are required.");
                } else {
                    JOptionPane.showMessageDialog(frame, "Registration Successful!");
                }
            }
        });

        frame.setSize(300, 250);
        frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
        frame.setVisible(true);
    }
}
```

Q.3) Viva [5 Marks]

Practical Examination (From 2023-2024)

SUBJECT: CA-511-MJP: Lab Course on CA-510-A (Java Programming)

Time: 3 Hours Max. Marks: 35

Q.1) Write a java program to check whether given candidate is eligible for voting or not. [10 Marks]

⇨ import java.util.Scanner;

```
public class VotingEligibility {
   public static void main(String[] args) {
      Scanner sc = new Scanner(System.in);

      // Take age input from the user
      System.out.print("Enter your age: ");
      int age = sc.nextInt();

      // Check eligibility
      if (age >= 18) {
         System.out.println("You are eligible to vote.");
      } else {
         System.out.println("You are not eligible to vote.");
      }

      sc.close();
   }
}
```

Q.2 Write a program to accept ‘n’ integers from the user & store them in an Array List collection. Display the elements of Array List. [20 Marks]

⇨ import java.util.ArrayList;

```
import java.util.Scanner;

public class ArrayListExample {
```

```
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);

        // Ask user for the number of integers
        System.out.print("Enter the number of integers you want to input: ");
        int n = sc.nextInt();

        // Create an ArrayList to store integers
        ArrayList<Integer> numbers = new ArrayList<>();

        // Accept 'n' integers from the user
        System.out.println("Enter " + n + " integers:");
        for (int i = 0; i < n; i++) {
            numbers.add(sc.nextInt());
        }

        // Display the elements in the ArrayList
        System.out.println("Elements in the ArrayList:");
        for (int num : numbers) {
            System.out.print(num + " ");
        }

        sc.close();
    }
}
```

Q.3) Viva [5 Marks]

SUBJECT: CA-511-MJP: Lab Course on CA-510-A (Java Programming)

Time: 3 Hours Max. Marks: 35

Q.1) 14 Write a Java program to display odd numbers between 1 to 50.

[10 Marks]

⇨ public class OddNumbers {

```
  public static void main(String[] args) {
     System.out.println("Odd numbers between 1 and 50:");
     for (int i = 1; i <= 50; i++) {
        if (i % 2 != 0) {
           System.out.print(i + " ");
        }
     }
  }
}
```

Q.2) Define an abstract class Staff with members name and address. Define two sub-classes of this class – FullTimeStaff (members - department, salary, hra - 8% of salary, da – 5% of salary) and PartTimeStaff (members - number-of-hours, rate-per-hour). Define appropriate constructors. Write abstract method as calculateSalary() in Staff class. Implement this method in subclasses. Create n objects which could be of either FullTimeStaff or PartTimeStaff class by asking the user ‘s choice. Display details of all FullTimeStaff objects and all PartTimeStaff objects along with their salary. [20 Marks]

⇨ import java.util.ArrayList;

```
import java.util.Scanner;

abstract class Staff {
   String name;
   String address;

   public Staff(String name, String address) {
      this.name = name;
      this.address = address;
```

```
    }

    // Abstract method to calculate salary
    public abstract double calculateSalary();
}

class FullTimeStaff extends Staff {
    double salary;

    public FullTimeStaff(String name, String address, double salary) {
        super(name, address);
        this.salary = salary;
    }

    @Override
    public double calculateSalary() {
        double hra = 0.08 * salary;  // HRA is 8% of salary
        double da = 0.05 * salary;   // DA is 5% of salary
        return salary + hra + da;
    }

    public void displayDetails() {
        System.out.println("Full-Time Staff - Name: " + name + ", Address: " + address + ", Salary: " +
calculateSalary());
    }
}

class PartTimeStaff extends Staff {
    double hoursWorked;
    double ratePerHour;
```

```
    public PartTimeStaff(String name, String address, double hoursWorked, double ratePerHour) {
        super(name, address);
        this.hoursWorked = hoursWorked;
        this.ratePerHour = ratePerHour;
    }

    @Override
    public double calculateSalary() {
        return hoursWorked * ratePerHour;
    }

    public void displayDetails() {
        System.out.println("Part-Time Staff - Name: " + name + ", Address: " + address + ", Salary: " +
calculateSalary());
    }
}

public class StaffDetails {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        ArrayList<Staff> staffList = new ArrayList<>();

        // Input number of staff
        System.out.print("Enter the number of staff: ");
        int n = sc.nextInt();
        sc.nextLine();  // Consume newline

        for (int i = 0; i < n; i++) {
            System.out.print("Enter the name of staff " + (i + 1) + ": ");
            String name = sc.nextLine();
            System.out.print("Enter the address of staff " + (i + 1) + ": ");
```

```
            String address = sc.nextLine();

            System.out.println("Is the staff full-time or part-time? (Enter 1 for Full-Time, 2 for Part-Time):
");
            int choice = sc.nextInt();
            sc.nextLine();  // Consume newline

            if (choice == 1) {
                System.out.print("Enter the salary for full-time staff: ");
                double salary = sc.nextDouble();
                sc.nextLine();  // Consume newline
                staffList.add(new FullTimeStaff(name, address, salary));
            } else if (choice == 2) {
                System.out.print("Enter the number of hours worked: ");
                double hoursWorked = sc.nextDouble();
                System.out.print("Enter the rate per hour: ");
                double ratePerHour = sc.nextDouble();
                sc.nextLine();  // Consume newline
                staffList.add(new PartTimeStaff(name, address, hoursWorked, ratePerHour));
            } else {
                System.out.println("Invalid choice! Please try again.");
            }
        }

        // Display staff details and salaries
        System.out.println("\nFull-Time Staff Details:");
        for (Staff staff : staffList) {
            if (staff instanceof FullTimeStaff) {
                ((FullTimeStaff) staff).displayDetails();
            }
        }
```

```
        System.out.println("\nPart-Time Staff Details:");
        for (Staff staff : staffList) {
            if (staff instanceof PartTimeStaff) {
                ((PartTimeStaff) staff).displayDetails();
            }
        }

        sc.close();
    }
}
```

Q.3) Viva [5 Marks]

SAVITRIBAI PHULE PUNE UNIVERSITY

M.Sc.(Computer Application) Sem-I

Practical Examination (From 2023-2024)

SUBJECT: CA-511-MJP: Lab Course on CA-510-A (Java Programming)

Time: 3 Hours Max. Marks: 35

Q.1) Write a Java program to calculate area of Circle, Triangle & Rectangle.(Use Method Overloading) [10 Marks]

⇨ public class AreaCalculator {

```
    // Method to calculate area of a Circle
    public double calculateArea(double radius) {
        return Math.PI * radius * radius;
    }

    // Method to calculate area of a Triangle
    public double calculateArea(double base, double height) {
        return 0.5 * base * height;
```

```
    }

    // Method to calculate area of a Rectangle
    public double calculateArea(double length, double width) {
        return length * width;
    }

    public static void main(String[] args) {
        AreaCalculator calculator = new AreaCalculator();

        // Calculate and display area of a Circle
        double circleArea = calculator.calculateArea(5); // radius = 5
        System.out.println("Area of Circle: " + circleArea);

        // Calculate and display area of a Triangle
        double triangleArea = calculator.calculateArea(10, 5); // base = 10, height = 5
        System.out.println("Area of Triangle: " + triangleArea);

        // Calculate and display area of a Rectangle
        double rectangleArea = calculator.calculateArea(6, 4); // length = 6, width = 4
        System.out.println("Area of Rectangle: " + rectangleArea);
    }
}
```

Q.2 Define a class MyNumber having one private integer data member. Write a default constructor initialize it to 0 and another constructor to initialize it to a value. Write methods isNegative(), isPositive(), isOdd(), iseven(). [20 Marks]

⇨

```
public class MyNumber {
    private int number;

    // Default constructor to initialize number to 0
    public MyNumber() {
```

```
    this.number = 0;
}

// Parameterized constructor to initialize number with a specific value
public MyNumber(int number) {
    this.number = number;
}

// Method to check if the number is negative
public boolean isNegative() {
    return number < 0;
}

// Method to check if the number is positive
public boolean isPositive() {
    return number > 0;
}

// Method to check if the number is odd
public boolean isOdd() {
    return number % 2 != 0;
}

// Method to check if the number is even
public boolean isEven() {
    return number % 2 == 0;
}

// Method to display the value of the number
public void displayNumber() {
    System.out.println("The number is: " + number);
```

```
    }

    public static void main(String[] args) {
        // Creating objects with both default and parameterized constructors
        MyNumber num1 = new MyNumber(); // Default constructor (number = 0)
        MyNumber num2 = new MyNumber(7); // Parameterized constructor (number = 7)

        // Displaying and checking properties of num1
        num1.displayNumber();
        System.out.println("Is Negative? " + num1.isNegative());
        System.out.println("Is Positive? " + num1.isPositive());
        System.out.println("Is Odd? " + num1.isOdd());
        System.out.println("Is Even? " + num1.isEven());

        // Displaying and checking properties of num2
        num2.displayNumber();
        System.out.println("Is Negative? " + num2.isNegative());
        System.out.println("Is Positive? " + num2.isPositive());
        System.out.println("Is Odd? " + num2.isOdd());
        System.out.println("Is Even? " + num2.isEven());
    }
}
```

Q.3) Viva [5 Marks]