Institute of Computer Technology

B. Tech. Computer Science and Engineering

Semester: III

Sub: Object-Oriented Programming
Course Code: 2CSE303

Practical Number:6

Objective:

To understand the concept of class, object, function, array type of object.

Q.1.Problem Definition:

Write an appropriate program, where you have to store any random 10 number from user, and then, you have to find total count of even and odd number. [Note: Perform this program by using function with and without parameter.]

Code :

```java
import java.util.Scanner;

public class EvenOddCount {

    // Method without parameters
    public static void countEvenOddWithoutParams() {
        Scanner scanner = new Scanner(System.in);
        int[] numbers = new int[10];
        int evenCount = 0, oddCount = 0;

        System.out.println("Enter 10 numbers:");
        for (int i = 0; i < 10; i++) {
            numbers[i] = scanner.nextInt();
            if (numbers[i] % 2 == 0) {
                evenCount++;
            } else {
                oddCount++;
            }
        }

        System.out.println("Even count: " + evenCount);
        System.out.println("Odd count: " + oddCount);
    }

    // Method with parameters
    public static void countEvenOddWithParams(int[] numbers) {
        int evenCount = 0, oddCount = 0;

        for (int num : numbers) {
            if (num % 2 == 0) {
```

```
            evenCount++;
        } else {
            oddCount++;
        }
    }

    System.out.println("Even count: " + evenCount);
    System.out.println("Odd count: " + oddCount);
    }

    public static void main(String[] args) {
        // Using the method without parameters
        System.out.println("Counting Even and Odd numbers without
parameters:");
        countEvenOddWithoutParams();

        // Using the method with parameters
        Scanner scanner = new Scanner(System.in);
        int[] numbers = new int[10];

        System.out.println("Enter 10 numbers for the parameterized method:");
        for (int i = 0; i < 10; i++) {
            numbers[i] = scanner.nextInt();
        }

        System.out.println("Counting Even and Odd numbers with parameters:");
        countEvenOddWithParams(numbers);

        scanner.close();
    }
}
```

Output :

```
Counting Even and Odd numbers without parameters:
Enter 10 numbers:
1 2 3 4 5 6 7 8 9 10
Even count: 5
Odd count: 5
Enter 10 numbers for the parameterized method:
2 3 4 5 6 7 8 9 10 11
Counting Even and Odd numbers with parameters:
Even count: 5
Odd count: 5
```

Q.2. Problem definition:

Make an appropriate program of the following by using function with and without parameter.

1. Find prime number of user input number.

2. Find each digit addition of one five-digit user input number.

3. Find simple and compound interest.

4. Find reverse number of given numbers.

5. Find two number swap value.

[Note: After completing the all (1 to 5) program individually, perform this program using switch case condition also like menu driven program]

Code :

```java
import java.util.Scanner;

public class MenuDrivenProgram {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int choice;
        do {
            System.out.println("Menu:");
            System.out.println("1. Find Prime Number");
            System.out.println("2. Find Digit Sum of a Five-Digit Number");
            System.out.println("3. Find Simple and Compound Interest");
            System.out.println("4. Reverse a Number");
            System.out.println("5. Swap Two Numbers");
            System.out.println("6. Exit");
            System.out.print("Enter your choice: ");
            choice = sc.nextInt();

            switch (choice) {
                case 1:
                    System.out.print("Enter a number to check if it's prime: ");
                    int num1 = sc.nextInt();
                    if (isPrime(num1)) {
                        System.out.println(num1 + " is a Prime number.");
                    } else {
                        System.out.println(num1 + " is not a Prime number.");
                    }
                    break;

                case 2:
                    System.out.print("Enter a five-digit number: ");
```

```java
                int num2 = sc.nextInt();
                System.out.println("Sum of digits: " + sumOfDigits(num2));
                break;

            case 3:
                System.out.print("Enter principal amount: ");
                double principal = sc.nextDouble();
                System.out.print("Enter rate of interest: ");
                double rate = sc.nextDouble();
                System.out.print("Enter time period in years: ");
                double time = sc.nextDouble();
                System.out.println("Simple Interest: " +
simpleInterest(principal, rate, time));
                System.out.println("Compound Interest: " +
compoundInterest(principal, rate, time));
                break;

            case 4:
                System.out.print("Enter a number to reverse: ");
                int num3 = sc.nextInt();
                System.out.println("Reversed number: " +
reverseNumber(num3));
                break;

            case 5:
                System.out.print("Enter first number: ");
                int a = sc.nextInt();
                System.out.print("Enter second number: ");
                int b = sc.nextInt();
                swapNumbers(a, b);
                break;

            case 6:
                System.out.println("Exiting...");
                break;

            default:
                System.out.println("Invalid choice. Please try again.");
                break;
        }
    } while (choice != 6);

    sc.close();
}

// Function to check if a number is prime
public static boolean isPrime(int num) {
    if (num <= 1) return false;
```

```java
        for (int i = 2; i <= Math.sqrt(num); i++) {
            if (num % i == 0) return false;
        }
        return true;
    }

    // Function to find sum of digits of a number
    public static int sumOfDigits(int num) {
        int sum = 0;
        while (num > 0) {
            sum += num % 10;
            num /= 10;
        }
        return sum;
    }

    // Function to calculate simple interest
    public static double simpleInterest(double principal, double rate, double
time) {
        return (principal * rate * time) / 100;
    }

    // Function to calculate compound interest
    public static double compoundInterest(double principal, double rate,
double time) {
        return principal * Math.pow((1 + rate / 100), time) - principal;
    }

    // Function to reverse a number
    public static int reverseNumber(int num) {
        int reversed = 0;
        while (num != 0) {
            reversed = reversed * 10 + num % 10;
            num /= 10;
        }
        return reversed;
    }

    // Function to swap two numbers
    public static void swapNumbers(int a, int b) {
        System.out.println("Before swap: a = " + a + ", b = " + b);
        int temp = a;
        a = b;
        b = temp;
        System.out.println("After swap: a = " + a + ", b = " + b);
    }
}
```

Output :

```
 Menu:
1. Find Prime Number
2. Find Digit Sum of a Five-Digit Number
3. Find Simple and Compound Interest
4. Reverse a Number
5. Swap Two Numbers
6. Exit
Enter your choice: 1
Enter a number to check if it's prime: 2
2 is a Prime number.

 Menu:
1. Find Prime Number
2. Find Digit Sum of a Five-Digit Number
3. Find Simple and Compound Interest
4. Reverse a Number
5. Swap Two Numbers
6. Exit
Enter your choice: 2
Enter a five-digit number: 12643
Sum of digits: 16

 Menu:
1. Find Prime Number
2. Find Digit Sum of a Five-Digit Number
3. Find Simple and Compound Interest
4. Reverse a Number
5. Swap Two Numbers
6. Exit
Enter your choice: 3
Enter principal amount: 34
Enter rate of interest: 1
Enter time period in years: 2
Simple Interest: 0.68
Compound Interest: 0.6833999999999989

 Menu:
1. Find Prime Number
2. Find Digit Sum of a Five-Digit Number
3. Find Simple and Compound Interest
4. Reverse a Number
5. Swap Two Numbers
6. Exit
Enter your choice: 4
Enter a number to reverse: 345
Reversed number: 543
```

```
 Menu:
1. Find Prime Number
2. Find Digit Sum of a Five-Digit Number
3. Find Simple and Compound Interest
4. Reverse a Number
5. Swap Two Numbers
6. Exit
Enter your choice: 5
Enter first number: 22 33
Enter second number: Before swap: a = 22, b = 33
After swap: a = 33, b = 22

 Menu:
1. Find Prime Number
2. Find Digit Sum of a Five-Digit Number
3. Find Simple and Compound Interest
4. Reverse a Number
5. Swap Two Numbers
6. Exit
Enter your choice: 6
Exiting...
```

Q.3. Vivek College, which is situated at Mumbai. College authority has decided to come up with a new idea for student seating arrangement system in the exam for different-different courses. For that, college wants separate records, for those students, who one is giving a remedial exam for semester-III. For that, the college examination committee wants to take all the type of information related to students like rollno, name, class, semester, subject, and exam fee. So, whenever is required to search records by id, or by name or by class, he can search randomly. So, for the fulfilment purpose of the above said requirement make an appropriate program, where you have to store minimum five record information from the user and accordingly you have to write following function

1. Record five student information.

2. Display student record information.

3. Search information by id and name.

Code :

```java
import java.util.ArrayList;
import java.util.Scanner;

class Student {
```

```java
    String id, name, className, semester, subject;
    int fee;

    Student(String id, String name, String className, String semester, String
subject, int fee) {
        this.id = id;
        this.name = name;
        this.className = className;
        this.semester = semester;
        this.subject = subject;
        this.fee = fee;
    }

    public String toString() {
        return id + " " + name + " " + className + " " + semester + " " +
subject + " " + fee;
    }
}

public class StudentManagementSystem {

    static ArrayList<Student> students = new ArrayList<>();

    public static void recordStudentInfo() {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter number of students to record: ");
        int n = sc.nextInt();
        sc.nextLine();  // Consume newline

        for (int i = 0; i < n; i++) {
            System.out.println("Enter details for student " + (i + 1) + ":");
            System.out.print("ID: ");
            String id = sc.nextLine();
            System.out.print("Name: ");
            String name = sc.nextLine();
            System.out.print("Class: ");
            String className = sc.nextLine();
            System.out.print("Semester: ");
            String semester = sc.nextLine();
            System.out.print("Subject: ");
            String subject = sc.nextLine();
            System.out.print("Fee: ");
            int fee = sc.nextInt();
            sc.nextLine();  // Consume newline

            students.add(new Student(id, name, className, semester, subject,
fee));
        }
```

```java
    }

    public static void displayStudentInfo() {
        for (Student student : students) {
            System.out.println(student);
        }
    }

    public static void searchStudentByIdOrName() {
        Scanner sc = new Scanner(System.in);
        System.out.println("Search by:");
        System.out.println("1. ID");
        System.out.println("2. Name");
        System.out.print("Enter choice: ");
        int choice = sc.nextInt();
        sc.nextLine();  // Consume newline

        switch (choice) {
            case 1:
                System.out.print("Enter ID to search: ");
                String id = sc.nextLine();
                for (Student student : students) {
                    if (student.id.equals(id)) {
                        System.out.println(student);
                        return;
                    }
                }
                System.out.println("Student not found.");
                break;

            case 2:
                System.out.print("Enter name to search: ");
                String name = sc.nextLine();
                for (Student student : students) {
                    if (student.name.equalsIgnoreCase(name)) {
                        System.out.println(student);
                    }
                }
                break;

            default:
                System.out.println("Invalid choice.");
        }
    }

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

```java
        do {
            System.out.println("\n Menu:");
            System.out.println("1. Record Student Information");
            System.out.println("2. Display Student Information");
            System.out.println("3. Search Information by ID or Name");
            System.out.println("4. Exit");
            System.out.print("Enter your choice: ");
            choice = sc.nextInt();

            switch (choice) {
                case 1:
                    recordStudentInfo();
                    break;
                case 2:
                    displayStudentInfo();
                    break;
                case 3:
                    searchStudentByIdOrName();
                    break;
                case 4:
                    System.out.println("Exiting...");
                    break;
                default:
                    System.out.println("Invalid choice. Try again.");
            }
        } while (choice != 4);
    }
}
```

Output :

```
1. Record Student Information
2. Display Student Information
3. Search Information by ID or Name
4. Exit
Enter your choice: 1
Enter number of students to record: 2
Enter details for student 1:
ID: 21291371033
Name: vishva
Class: IT
Semester: 3
Subject: OOP
Fee: 200
Enter details for student 2:
ID: 21291371034
Name: Jayan
Class: IT
```

```
Semester: 3
Subject: OOP
Fee: 200

 Menu:
1. Record Student Information
2. Display Student Information
3. Search Information by ID or Name
4. Exit
Enter your choice: 2
21291371033 vishva IT 3 OOP 200
21291371034 Jayan IT 3 OOP 200

 Menu:
1. Record Student Information
2. Display Student Information
3. Search Information by ID or Name
4. Exit
Enter your choice: 3
Search by:
1. ID
2. Name
Enter choice: 1
Enter ID to search: 21291371033
21291371033 vishva IT 3 OOP 200

 Menu:
1. Record Student Information
2. Display Student Information
3. Search Information by ID or Name
4. Exit
Enter your choice: 4
Exiting...
```