C-DAC Mumbai
Lab Assignment-3

Answers

Problem 1: Sum of Two Numbers (Using a Method)
Problem Statement: Write a Java program that includes a method to calculate the sum of two numbers.
1. Create a method sumOfTwoNumbers() that takes two integers as parameters, calculates their sum, and returns the result.
2. In the main method, use the Scanner class to prompt the user to enter two integers.
3. Pass the user inputs to the sumOfTwoNumbers() method and print the sum.

Sample Input:
Enter first number: 15
Enter second number: 25
Expected Output:
The sum of 15 and 25 is 40.

```java
import java.util.Scanner;

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

        System.out.print(s:"Enter first number: ");
        int num1 = sc.nextInt();

        System.out.print(s:"Enter second number: ");
        int num2 = sc.nextInt();

        int result = sumOfTwoNumbers(num1, num2);

        System.out.println("The sum of " + num1 + " and " + num2 + " is " + result + ".");

        sc.close();
    }

    static int sumOfTwoNumbers(int a, int b) {
        return a + b;
    }
}
```

```
PS C:\Users\baenu\test> javac SumTwoNumbers.java
PS C:\Users\baenu\test> java SumTwoNumbers
Enter first number: 5
Enter second number: 12
The sum of 5 and 12 is 17.
```

Problem 2: Simple Age Checker (Using a Method)
Problem Statement: Write a Java program that includes a method to check the age category.
1. Create a method checkAgeCategory() that takes an integer (age) as a parameter and prints whether the user is a minor, adult, or senior citizen.
2. In the main method, use the Scanner class to prompt the user to enter their age.
3. Pass the user's age to the checkAgeCategory() method.

Sample Input:
Enter your age: 30
Expected Output:
You are an adult.

```java
import java.util.Scanner;

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

        System.out.print(s:"Enter your age: ");
        int age = sc.nextInt();

        checkAgeCategory(age);

        sc.close();
    }

    static void checkAgeCategory(int age) {
        if (age < 18) {
            System.out.println(x:"You are a minor.");
        } else if (age >= 18 && age < 60) {
            System.out.println(x:"You are an adult.");
        } else {
            System.out.println(x:"You are a senior citizen.");
        }
    }
}
```

```
PS C:\Users\baenu\test> javac AgeChecker.java
PS C:\Users\baenu\test> java AgeChecker
Enter your age: 22
You are an adult.
```

Problem 3: Print Even Numbers (Using while Loop)
Problem Statement: Write a Java program that prints all even numbers between 1 and 50 using a while loop.
1. Create a method printEvenNumbers() that prints all even numbers from 1 to 50.
2. Use a while loop to iterate from 1 to 50 and print the even numbers.

Sample Output:
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50

```java
public class EvenNumbersWhileLoop {
    Run | Debug
    public static void main(String[] args) {
        printEvenNumbers();
    }

    static void printEvenNumbers() {
        int i = 1;
        while (i <= 50) {
            if (i % 2 == 0) {
                System.out.print(i + " ");
            }
            i++;
        }
    }
}
```

```
PS C:\Users\baenu\test> javac EvenNumbersWhileLoop.java
PS C:\Users\baenu\test> java EvenNumbersWhileLoop
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50
```

Problem 4: User Input for Positive Numbers (Using do-while Loop)
Problem Statement: Write a Java program that repeatedly asks the user to enter a positive number.
1. Create a method askForPositiveNumber() that uses a do-while loop to ask the user for a number until they enter a positive number.
2. Use the Scanner class to take the user's input.
3. Once a positive number is entered, the program should display the number.

Sample Input:
Enter a positive number: -5
Enter a positive number: 0
Enter a positive number: 8
Expected Output:
You entered a positive number: 8

```java
import java.util.Scanner;

public class PositiveNumberInput {
    Run | Debug
    public static void main(String[] args) {
        askForPositiveNumber();
    }

    static void askForPositiveNumber() {
        Scanner sc = new Scanner(System.in);
        int number;

        do {
            System.out.print(s:"Enter a positive number: ");
            number = sc.nextInt();
        } while (number <= 0);

        System.out.println("You entered a positive number: " + number);
        sc.close();
    }
}
```

```
PS C:\Users\baenu\test> javac PositiveNumberInput.java
PS C:\Users\baenu\test> java PositiveNumberInput
Enter a positive number: -9
Enter a positive number: -87
Enter a positive number: 0
Enter a positive number: 25
You entered a positive number: 25
```

Problem 5: Print Multiplication Table (Using for Loop)
Problem Statement: Write a Java program that prints the multiplication table for a given number (e.g., number 5) using a for loop. The program should:
1. Create a method printMultiplicationTable() that takes a number as a parameter and prints its multiplication table from 1 to 10.
2. Use a for loop to iterate through numbers 1 to 10 and print the multiplication results.

Sample Input:
Enter a number: 5
Expected Output:
5 x 1 = 5
5 x 2 = 10
5 x 3 = 15
5 x 4 = 20
5 x 5 = 25
5 x 6 = 30
5 x 7 = 35
5 x 8 = 40
5 x 9 = 45
5 x 10 = 50

```java
import java.util.Scanner;

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

        System.out.print(s:"Enter a number: ");
        int number = sc.nextInt();

        printMultiplicationTable(number);

        sc.close();
    }

    static void printMultiplicationTable(int number) {
        for (int i = 1; i <= 10; i++) {
            System.out.println(number + " x " + i + " = " + (number * i));
        }
    }
}
```

```
PS C:\Users\baenu\test> javac MultiplicationTable.java
PS C:\Users\baenu\test> java MultiplicationTable
Enter a number: 6
6 x 1 = 6
6 x 2 = 12
6 x 3 = 18
6 x 4 = 24
6 x 5 = 30
6 x 6 = 36
6 x 7 = 42
6 x 8 = 48
6 x 9 = 54
6 x 10 = 60
```

Problem 6: Calculate the Sum of Numbers from 1 to N (Using for Loop)
Problem Statement: Write a Java program that calculates the sum of all integers from 1 to N (where N is a positive integer) using a for loop. The program should:
1. Create a method calculateSum() that takes a number N and calculates the sum of all integers from 1 to N.
2. Use a for loop to iterate through all integers from 1 to N and add them up.

Sample Input:
Enter a number: 5
Expected Output:
The sum of numbers from 1 to 5 is: 15

```java
import java.util.Scanner;

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

        System.out.print(s:"Enter a number: ");
        int n = sc.nextInt();

        int result = calculateSum(n);

        System.out.println("The sum of numbers from 1 to " + n + " is: " + result);

        sc.close();
    }

    static int calculateSum(int n) {
        int sum = 0;
        for (int i = 1; i <= n; i++) {
            sum += i;
        }
        return sum;
    }
}
```

```
PS C:\Users\baenu\test> javac SumOfNumbers.java
PS C:\Users\baenu\test> java SumOfNumbers
Enter a number: 10
The sum of numbers from 1 to 10 is: 55
```

Bonus Problem: Menu-Driven Java Program (Switch-Case)
Problem Statement:
You are required to write a **menu-driven Java program** that implements **four separate problems**. The program should allow the user to select which problem to run, execute the corresponding logic, and then return to the menu until the user chooses to exit.
The four problems are as follows (Already done in assignment 2, just put it in switch case):
Problem 1: Grade Evaluation System
Problem 2: Leap Year Check
Problem 3: Day of the week
Problem 4: Identify Default Values of Variables
Case 5: Exit

```java
import java.util.Scanner;

public class MenuDriven {
    Run | Debug
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int choice;

        do {
            System.out.println(x:"\nMENU");
            System.out.println(x:"1. Grade Evaluation System");
            System.out.println(x:"2. Leap Year Check");
            System.out.println(x:"3. Day of the Week");
            System.out.println(x:"4. Identify Default Values of Variables");
            System.out.println(x:"5. Exit");
            System.out.print(s:"Enter your choice: ");
            choice = sc.nextInt();

            switch (choice) {
                case 1:
                    gradeEvaluationSystem();
                    break;
                case 2:
                    leapYearCheck(sc);
                    break;
                case 3:
                    dayOfWeek(sc);
                    break;
                case 4:
                    identifyDefaultValues();
                    break;
                case 5:
                    System.out.println(x:"Exiting the program. Goodbye!");
                    break;
                default:
                    System.out.println(x:"Invalid choice. Please try again.");
            }
        } while (choice != 5);

        sc.close();
    }
```

```java
static void gradeEvaluationSystem() {
    int maths = 80, science = 85, history = 90;
    double average = (maths + science + history) / 3.0;
    String grade;

    if (average >= 90) {
        grade = "A";
    } else if (average >= 70) {
        grade = "B";
    } else if (average >= 50) {
        grade = "C";
    } else if (average >= 30) {
        grade = "D";
    } else {
        grade = "Fail";
    }

    System.out.println("Maths = " + maths);
    System.out.println("Science = " + science);
    System.out.println("History = " + history);
    System.out.println("Average = " + average);
    System.out.println("Grade = " + grade);
}

static void leapYearCheck(Scanner sc) {
    System.out.print(s:"Enter a year: ");
    int year = sc.nextInt();

    if ((year % 4 == 0 && year % 100 != 0) || (year % 400 == 0)) {
        System.out.println(year + " is a leap year.");
    } else {
        System.out.println(year + " is not a leap year.");
    }
}
```

```java
    static void dayOfWeek(Scanner sc) {
        System.out.print(s:"Enter a day number (1-7): ");
        int day = sc.nextInt();

        switch (day) {
            case 1:
                System.out.println(x:"The day is Sunday.");
                break;
            case 2:
                System.out.println(x:"The day is Monday.");
                break;
            case 3:
                System.out.println(x:"The day is Tuesday.");
                break;
            case 4:
                System.out.println(x:"The day is Wednesday.");
                break;
            case 5:
                System.out.println(x:"The day is Thursday.");
                break;
            case 6:
                System.out.println(x:"The day is Friday.");
                break;
            case 7:
                System.out.println(x:"The day is Saturday.");
                break;
            default:
                System.out.println(x:"Invalid day number.");
        }
    }
    static void identifyDefaultValues() {
        byte a = 0;
        short b = 0;
        int c = 0;
        long d = 0L;
        float e = 0.0f;
        double f = 0.0;
        char g = '\u0000';
        boolean h = false;

        System.out.println("byte a = " + a);
        System.out.println("short b = " + b);
        System.out.println("int c = " + c);
        System.out.println("long d = " + d);
        System.out.println("float e = " + e);
        System.out.println("double f = " + f);
        System.out.println("char g = '" + g + "'");
        System.out.println("boolean h = " + h);
    }
}
```

```
PS C:\Users\baenu\test> javac MenuDriven.java
PS C:\Users\baenu\test> java MenuDriven

MENU
1. Grade Evaluation System
2. Leap Year Check
3. Day of the Week
4. Identify Default Values of Variables
5. Exit
Enter your choice: 1
Maths = 80
Science = 85
History = 90
Average = 85.0
Grade = B

MENU
1. Grade Evaluation System
2. Leap Year Check
3. Day of the Week
4. Identify Default Values of Variables
5. Exit
Enter your choice: 2
Enter a year: 2024
2024 is a leap year.

MENU
1. Grade Evaluation System
2. Leap Year Check
3. Day of the Week
4. Identify Default Values of Variables
5. Exit
Enter your choice: 3
Enter a day number (1-7): 5
The day is Thursday.

MENU
1. Grade Evaluation System
2. Leap Year Check
3. Day of the Week
4. Identify Default Values of Variables
5. Exit
Enter your choice: 4
byte a = 0
short b = 0
int c = 0
long d = 0
float e = 0.0
double f = 0.0
char g = ''
boolean h = false

MENU
1. Grade Evaluation System
2. Leap Year Check
3. Day of the Week
4. Identify Default Values of Variables
5. Exit
Enter your choice: 5
Exiting the program. Goodbye!
```