Object Oriented Programming using Java Laboratory (DJS23FLES201)
Academic Year 2023-24

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BATCH – B1

DATE – 7-2-24

EXPERIMENT NO. 1

AIM / OBJECTIVE:

To implement Java control statements and loops

1. **To implement Java control statements, loops, and command line arguments**
   a. Given an integer, n, perform the following conditional actions:
      - If n is odd, print Weird
      - If n is even and in the inclusive range of 2 to 5, print Not Weird
      - If n is even and in the inclusive range of 6 to 20, print Weird
      - If n is even and greater than 20, print Not Weird

Program:

```
import java.util.*;
public class Main {
  public static void main(String[] args) {

    Scanner sc= new Scanner(System.in);
    int a = sc.nextInt();
    if (a%2!=0)
    {
      System.out.println("Weird");
    }
```

```java
    else if (a%2==0 && a>=2 && a<=5)
     {
        System.out.println("Not Weird");
     }


     else if (a%2==0 && a>=6 && a<=20)
     {
        System.out.println("Weird");
     }


     else if (a%2==0 && a>20)
     {
        System.out.println("Not Weird");
     }


    }
}
```

Output:(Screen shot)

```
C:\Users\Arshad\Desktop\java>java Main.java
Enter a number :
7
Weird

C:\Users\Arshad\Desktop\java>
```

    b.   WAP to find largest of 3 numbers using nested if else and nested ternary operator.

Program:

```java
import java.util.*;


public class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.println("----BY USING NESTED IF-ELSE----");
        int a, b, c;
```

```java
        System.out.println("Enter 1st number:");

        a = sc.nextInt();

        System.out.println("Enter 2nd number:");

        b = sc.nextInt();

        System.out.println("Enter 3rd number:");

        c = sc.nextInt();


        if (a >= b && a >= c) {

            System.out.println(a + " is the largest number");

        } else if (b >= a && b >= c) {

            System.out.println(b + " is the largest number");

        } else {

            System.out.println(c + " is the largest number");

        }


        System.out.println("----BY USING TERNARY OPERATOR----");

        System.out.println("Enter 1st number:");

        a = sc.nextInt();

        System.out.println("Enter 2nd number:");

        b = sc.nextInt();

        System.out.println("Enter 3rd number:");

        c = sc.nextInt();


        int largest = (a >= b && a >= c) ? a : ((b >= a && b >= c) ? b : c);

        System.out.println(largest + " is the largest number");

    }

}
```

Output:

Object Oriented Programming using Java Laboratory (DJS23FLES201)
Academic Year 2023-24

```
C:\Users\Arshad\Desktop\java>java Main.java
----BY USING NESTED IF-ELSE----
Enter 1st number:
54
Enter 2nd number:
65
Enter 3rd number:
8
65 is the largest number
----BY USING TERNARY OPERATOR----
Enter 1st number:
66
Enter 2nd number:
47
Enter 3rd number:
25
66 is the largest number
```

c. Write a Java program that reads a positive integer from **command line** and count the number of digits the number (less than ten billion) has.

Program:

```java
import java.util.Scanner;

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

    System.out.println("Enter a positive integer less than ten billion:");
    String input = scanner.nextLine();

    if (!input.matches("\\d+") || input.startsWith("-") || input.length() >= 11) {
      System.out.println("Please provide a valid positive integer less than ten billion.");
      return;
    }

    long num = Long.parseLong(input);

    int digits = 0;
    while (num > 0) {
      digits++;
      num = num / 10;
    }
```

```
        System.out.println("The number of digits in the number is " + digits);

    }

}
```

Output:

```
C:\Users\Arshad\Desktop\java>java Main.java
Enter a positive integer less than ten billion:
454655
The number of digits in the number is 6
```

d. Write a menu driven program using switch case to perform mathematical operations.

Program:

```
import java.util.Scanner;

public class Main {

    public static void main(String[] args) {

        Scanner scanner = new Scanner(System.in);

        System.out.println("Calculator Menu:");

        System.out.println("1. Addition");

        System.out.println("2. Subtraction");

        System.out.println("3. Multiplication");

        System.out.println("4. Division");

        System.out.print("Enter your choice (1-4): ");

        int choice = scanner.nextInt();

        System.out.print("Enter the first number: ");

        double num1 = scanner.nextDouble();

        System.out.print("Enter the second number: ");

        double num2 = scanner.nextDouble();

        switch (choice) {

            case 1:

                System.out.println("Result: " + (num1 + num2));

                break;

            case 2:

                System.out.println("Result: " + (num1 - num2));

                break;
```

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Academic Year 2023-24

```
    case 3:
        System.out.println("Result: " + (num1 * num2));
        break;
    case 4:
        if (num2 != 0) {
            System.out.println("Result: " + (num1 / num2));
        } else {
            System.out.println("Error: Division by zero!");
        }
        break;
    default:
        System.out.println("Invalid choice. Please enter a number between 1 and 4.");
        }
    }
}
```

Output:

```
C:\Users\Arshad\Desktop\java>java Main.java
Calculator Menu:
1. Addition
2. Subtraction
3. Multiplication
4. Division
Enter your choice (1-4): 3
Enter the first number: 5
Enter the second number: 4
Result: 20.0
```

e. WAP to find grade of student from input marks using if else ladder and switch case.

Program:

```java
import java.util.Scanner;

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

        System.out.print("Enter marks: ");
```

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Academic Year 2023-24

```java
int marks = scanner.nextInt();


// Determine grade using IF-ELSE ladder
    System.out.println("----BY USING IF-ELSE LADDER----");
if (marks >= 0 && marks <= 100) {
    // Determine grade using if-else ladder
    if (marks >= 90) {
        System.out.println("Grade: A");
    } else if (marks >= 80) {
        System.out.println("Grade: B");
    } else if (marks >= 70) {
        System.out.println("Grade: C");
    } else if (marks >= 60) {
        System.out.println("Grade: D");
    } else if (marks >= 50) {
        System.out.println("Grade: E");
    } else {
        System.out.println("Grade: F");
    }

    // Determine grade using switch-case statement
    System.out.println("----BY USING SWITCH-CASE STATEMENT----");

    int tensDigit = marks / 10;
    switch (tensDigit) {
        case 10:
        case 9:
            System.out.println("Switch-Case Grade: A");
            break;
        case 8:
            System.out.println("Switch-Case Grade: B");
            break;
        case 7:
```

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Academic Year 2023-24

```
                System.out.println("Switch-Case Grade: C");

                break;

            case 6:

                System.out.println("Switch-Case Grade: D");

                break;

            case 5:

                System.out.println("Switch-Case Grade: E");

                break;

            default:

                System.out.println("Switch-Case Grade: F");

            }

        } else {

            System.out.println("Invalid marks, marks should be between 0 and 100.");

        }

    }

}
```

Output:

```
C:\Users\Arshad\Desktop\java>java Main.java
Enter marks: 95
----BY USING IF-ELSE LADDER----
Grade: A
----BY USING SWITCH-CASE STATEMENT----
Switch-Case Grade: A
```

f. WAP to print the sum of following series $1+1/2^2+1/3^2+1/4^2\ldots\ldots+1/n^2$

Program:

```
import java.util.Scanner;

public class Main{

    public static void main(String[] args){

        Scanner sc = new Scanner(System.in);

        System.out.print("Enter the value of nth term upto which you want sum: ");

        int n = sc.nextInt();

        double result=0;

        for(int i=1;i<=n;i++){

            result += 1.0/(i*i);
```

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Academic Year 2023-24

```
    }
    System.out.println("The result of the summation is " + result);
  }
}
```

Output:

```
C:\Users\Arshad\Desktop\java>java Main.java
Enter the value of nth term upto which you want sum: 5
The result of the summation is 1.4636111111111112
```

        g.   WAP to display the following patterns:

a).

```
1
2   1
1   2   3
4   3   2   1
1   2   3   4   5
6   5   4   3   2   1
1   2   3   4   5   6   7
```

Program:

```java
public class Main {
  public static void main(String[] args) {
    int checking_inverse = 1;
    for (int i = 1; i <= 7; i++) {
      if (checking_inverse % 2 != 0){
        for (int j = 1; j <= i; j++) {
          System.out.print(" "+ j);
        }
      }
      else{
        for (int j = i; j >= 1; j--) {
          System.out.print(" "+j);
        }
```

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Academic Year 2023-24

```
        }
        System.out.println("");
        checking_inverse++;
      }
    }
  }
}
```

Output:

```
C:\Users\Arshad\Desktop\java>java Main.java
 1
 2 1
 1 2 3
 4 3 2 1
 1 2 3 4 5
 6 5 4 3 2 1
 1 2 3 4 5 6 7
```

b).

```
              A
            CB
           FED
          JIHG
```

Program:

```java
import java.util.Scanner;
public class Main {
    public static void main(String[] args) {
        int count = 3;
        int charnum = 65;
        int alpha;
        int temp1 = 1;
        for (int i = 1; i <= 4; i++) {
            for (int k = 1; k <= count; k++) {
                System.out.print(" ");
            }
            alpha = charnum;
```

Object Oriented Programming using Java Laboratory (DJS23FLES201)
Academic Year 2023-24

```java
        for (int j = 1; j <= i; j++) {
            System.out.print((char) alpha + "");
            alpha--;


        }
        charnum = charnum + (++temp1);
        System.out.println();
        count--;
      }
    }
}
```

Output:

```
C:\Users\Arshad\Desktop\java>java Main.java
   A
  CB
 FED
JIHG
```

CONCLUSION:

Writing these Java problems demonstrates understanding of various programming concepts such as user input, conditional statements, loops and pattern printing. It also shows ability to solve problems using Java programming language effectively.

Moreover, it highlightsfamiliarity with Java syntax, standard libraries, and best practices, as seen in usage of Scanner for input, proper error handling, and organization of code into functions where appropriate.