SHIVAM KUMAR JHA

RA2411056010039

Level 3 Practice Programs

Q1)Write a LeapYear program that takes a year as input and outputs the Year is a Leap Year or not a Leap Year.
CODE:
```java
import java.util.Scanner;
public class Leapyear{
    public static void main(String[] args){
        Scanner sc=new Scanner(System.in);
        int year;
        System.out.print("ENTER THE YEAR");
        year=sc.nextInt();
        if(year>=1582){
            if((year%400==0)  || ((year%4==0) && (year%100 !=0 ))){
                System.out.printf(" %d IT IS THE LEAP YEAR",year);
            }else{
                System.out.printf("%d IT IS NOT THE LEAP YEAR ",year);
            }
        }else{
            System.out.print("ENTER YEAR GREATER THAN 1582");
        }
    }
}
```
OUTPUT:

```
F:\STEP\controlflow\week2 level 3>java Leapyear.java
ENTER THE YEAR2007
2007 IT IS NOT THE LEAP YEAR
F:\STEP\controlflow\week2 level 3>
```

Q2) Rewrite program 1 to determine Leap Year with single if condition using logical and **&&** and or **||** operators

CODE:

```java
import java.util.Scanner;
public class Leapyear2{
    public static void main(String[] args){
        Scanner sc=new Scanner(System.in);
        int year;
        System.out.print("ENTER THE YEAR");
        year=sc.nextInt();
        if(year>=1582){
            if((year%400==0)  || ((year%4==0) && (year%100 !=0 ))){
                System.out.printf(" %d IT IS THE LEAP YEAR",year);
            }else{
                System.out.printf("%d IT IS NOT THE LEAP YEAR ",year);
            }
        }else{
            System.out.print("ENTER YEAR GREATER THAN 1582");
        }
    }
}
```

OUTPUT:

```
F:\STEP\controlflow\week2 level 3>java Leapyear2.java
ENTER THE YEAR2024
 2024 IT IS THE LEAP YEAR
```

Q3) Write a program to input marks and 3 subjects physics, chemistry and maths. Compute the percentage and then calculate the grade as per the following guidelines

CODE:

```java
import java.util.Scanner;
public class StudentGrade {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter Physics marks: ");
        int physics = sc.nextInt();
        System.out.print("Enter Chemistry marks: ");
        int chemistry = sc.nextInt();
        System.out.print("Enter Maths marks: ");
        int maths = sc.nextInt();
        double average = (physics + chemistry + maths) / 3.0;
        String grade;
        if (average >= 80) grade = "A (Level 4, above agency-normalized standards)";
        else if (average >= 70) grade = "B (Level 3, at agency-normalized standards)";
        else if (average >= 60) grade = "C (Level 2, below, but approaching standards)";
```

```
        else if (average >= 50) grade = "D (Level 1, well below standards)";
        else if (average >= 40) grade = "E (Level 1-, too below standards)";
        else grade = "R (Remedial standards)";
        System.out.println("Average Marks: " + average);
        System.out.println("Grade: " + grade);
        sc.close();
    }
}
```

OUTPUT:

```
F:\STEP\controlflow\week2 level 3>java StudentGrade.java
Enter Physics marks: 65
Enter Chemistry marks: 87
Enter Maths marks: 95
Average Marks: 82.33333333333333
Grade: A (Level 4, above agency-normalized standards)
```

Q4) Write a Program to check if the given number is a prime number or not
CODE:

```
import java.util.Scanner;
public class PrimeCheck {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter a number: ");
        int number = sc.nextInt();
        boolean isPrime = true;
        if (number <= 1) isPrime = false;
        else {
            for (int i = 2; i <= number / 2; i++) {
                if (number % i == 0) {
                    isPrime = false;
                    break;
                }
            }
        }
        if (isPrime)
            System.out.println(number + " is a Prime Number.");
        else
            System.out.println(number + " is NOT a Prime Number.");
        sc.close();
    }
```

}
OUTPUT:

```
F:\STEP\controlflow\week2 level 3>java PrimeCheck.java
Enter a number: 25
25 is NOT a Prime Number.
```

Q5)Create a program to check if a number is armstrong or not. Use the hints to show the steps clearly in the code
CODE:

```java
import java.util.Scanner;
public class ArmstrongNumber {
    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, sum = 0;
        while (originalNumber != 0) {
            int digit = originalNumber % 10;
            sum += digit * digit * digit;
            originalNumber /= 10;
        }
        if (sum == number)
            System.out.println(number + " is an Armstrong number.");
        else
            System.out.println(number + " is NOT an Armstrong number.");
        sc.close();
    }
}
```

OUTPUT:

```
F:\STEP\controlflow\week2 level 3>java ArmstrongNumber.java
Enter a number: 42
42 is NOT an Armstrong number.
```

Q6) Create a program to count the number of digits in an integer.
CODE:

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

```
    System.out.print("Enter a number: ");
    int number = sc.nextInt();
    int count = 0;
    while (number != 0) {
        number /= 10;
        count++;
    }
    System.out.println("Number of digits: " + count);
    sc.close();
    }
}
```
OUTPUT:

Q7) Create a program to find the BMI of a person
CODE:
```
import java.util.Scanner;
public class BMICalculator {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter weight (kg): ");
        double weight = sc.nextDouble();
        System.out.print("Enter height (cm): ");
        double height = sc.nextDouble();
        height = height / 100; // Convert cm to meters
        double bmi = weight / (height * height);
        System.out.printf("BMI: %.2f\n", bmi);
        if (bmi < 18.4)
            System.out.println("Status: Underweight");
        else if (bmi <= 24.9)
            System.out.println("Status: Normal");
        else if (bmi <= 39.9)
            System.out.println("Status: Overweight");
        else
            System.out.println("Status: Obese");
        sc.close();
    }
}
```
OUTPUT:

```
F:\STEP\controlflow\week2 level 3>java BMICalculator.java
Enter weight (kg): 72
Enter height (cm): 171
BMI: 24.62
Status: Normal
```

Q8) Create a program to check if a number taken from the user is a Harshad Number.
CODE:
```java
import java.util.Scanner;
public class HarshadNumber {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter a number: ");
        int number = sc.nextInt();

        int sum = 0, temp = number;
        while (temp > 0) {
            sum += temp % 10;
            temp /= 10;
        }
        if (number % sum == 0)
            System.out.println(number + " is a Harshad Number.");
        else
            System.out.println(number + " is NOT a Harshad Number.");
        sc.close();
    }
}
```
OUTPUT:
```
F:\STEP\controlflow\week2 level 3>java HarshadNumber.java
Enter a number: 154
154 is NOT a Harshad Number.
```

Q9)Create a program to check if a number is an Abundant Number.
CODE:
```java
import java.util.Scanner;
public class AbundantNumber {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter a number: ");
        int number = sc.nextInt();

        int sum = 0;
        for (int i = 1; i < number; i++) {
            if (number % i == 0)
                sum += i;
        }
```

```java
        if (sum > number)
            System.out.println(number + " is an Abundant Number.");
        else
            System.out.println(number + " is NOT an Abundant Number.");
        sc.close();
    }
}
```

OUTPUT:

```
F:\STEP\controlflow\week2 level 3>java AbundantNumber.java
Enter a number: 15
15 is NOT an Abundant Number.
```

Q10)Write a program to create a calculator using **switch...case**.
CODE:

```java
import java.util.Scanner;

public class Calculator {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter first number: ");
        double first = sc.nextDouble();
        System.out.print("Enter second number: ");
        double second = sc.nextDouble();
        System.out.print("Enter operator (+, -, *, /): ");
        String op = sc.next();
        switch (op) {
            case "+":
                System.out.println("Result: " + (first + second));
                break;
            case "-":
                System.out.println("Result: " + (first - second));
                break;
            case "*":
                System.out.println("Result: " + (first * second));
                break;
            case "/":
                if (second != 0)
                    System.out.println("Result: " + (first / second));
                else
                    System.out.println("Error: Division by zero");
                break;
            default:
                System.out.println("Invalid Operator");
        }
```

```
        sc.close();
    }
}
```
OUTPUT:

```
F:\STEP\controlflow\week2 level 3>java Calculator.java
Enter first number: 15
Enter second number: 45
Enter operator (+, -, *, /): +
Result: 60.0
```

Q11)Write a program **DayOfWeek** that takes a date as input and prints the day of the week that the date falls on. Your program should take three command-line arguments: m (month), d (day), and y (year). For m use 1 for January, 2 for February, and so forth. For output print 0 for Sunday, 1 for Monday, 2 for Tuesday, and so forth. Use the following formulas, for the Gregorian calendar (where / denotes integer division):
CODE:

```java
import java.util.Scanner;
public class DayOfWeek {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter month (1-12): ");
        int m = sc.nextInt();
        System.out.print("Enter day (1-31): ");
        int d = sc.nextInt();
        System.out.print("Enter year: ");
        int y = sc.nextInt();
        int y0 = y - (14 - m) / 12;
        int x = y0 + y0 / 4 - y0 / 100 + y0 / 400;
        int m0 = m + 12 * ((14 - m) / 12) - 2;
        int d0 = (d + x + (31 * m0) / 12) % 7;
        String[] days = { "Sunday", "Monday", "Tuesday", "Wednesday", "Thursday", "Friday",
"Saturday" };
        System.out.println("Day of the week: " + days[d0]);
        sc.close();
    }
}
```
Output:

```
F:\STEP\controlflow\week2 level 3>java DayOfWeek.java
Enter month (1-12): 5
Enter day (1-31): 30
Enter year: 2001
Day of the week: Wednesday
```