Level 3 Practice Programs

1. **Write a LeapYear program that takes a year as input and outputs the Year is a Leap Year or not a Leap Year.**

```java
import java.util.Scanner;
public class LeapYear2{
    public static void main(String[] args){
        Scanner input = new Scanner(System.in);

        //Declaring Variables
        int year;
        System.out.print("Enter a year : ");
        year = input.nextInt();

        //Conditional Statements
        if(year % 4 == 0){
            System.out.println("The given year is a leap year.");
        }
        else if(year % 100 != 0){
            System.out.println("The given year is a leap year.");
        }
        else if(year % 400 == 0){
            System.out.println("The given year is a leap year.");
        }
        else{
            System.out.println("The given year is not a leap year.");
        }
    }
}
```

```
C:\Users\Shounak Roy\Desktop\JAVA\WEEK 3\LEVEL 3>javac LeapYear2.java

C:\Users\Shounak Roy\Desktop\JAVA\WEEK 3\LEVEL 3>java LeapYear
Enter a year : 2000
The given year is a leap year.
```

2. **Rewrite program 1 to determine Leap Year with single if condition using logical and `&&` and or `||` operators**

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

        //Declaring Variables
        int year;
        System.out.print("Enter a year : ");
        year = input.nextInt();

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

```
C:\Users\Shounak Roy\Desktop\JAVA\WEEK 3\LEVEL 3>javac LeapYear.java

C:\Users\Shounak Roy\Desktop\JAVA\WEEK 3\LEVEL 3>java LeapYear
Enter a year : 2040
The given year is a leap year.
```

3. **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.**

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

        //Declaring Variables
        float phy, chem, maths, percentage, avg, remark;
        System.out.print("Enter the marks of Physics out of 100 : ");
        phy = input.nextFloat();
        System.out.print("Enter the marks of Maths out of 100 : ");
        maths = input.nextFloat();
        System.out.print("Enter the marks of Chemistry out of 100 : ");
        chem = input.nextFloat();

        //Calculation
        avg = (phy+chem+maths)/3;
        percentage = avg*100;

        System.out.println("The average of 3 subjects is : " +avg);

        //Conditional Statements
        if(percentage >= 80){
            System.out.println("Remark obtained : A, Level 4, Above agency-normalized standards");
        }
        else if(percentage >= 70 && percentage <= 79){
            System.out.println("Remark obtained : B, Level 3, At agency-normalized standards");
        }
        else if(percentage >= 60 && percentage <= 69){
            System.out.println("Remark obtained : C, Level 2, Below but approaching agency-normalized standards");
        }
        else if(percentage >= 50 && percentage <= 59){
            System.out.println("Remark obtained : D, Level 1, Well below agency-normalized standards");
        }
        else if(percentage >= 40 && percentage <= 49){
            System.out.println("Remark obtained : E, Level 1, Too below agency-normalized standards");
        }
        else{
            System.out.println("Remark obtained : R, Remedial standards");
        }
    }
}
```

```
C:\Users\Shounak Roy\Desktop\JAVA\WEEK 3\LEVEL 3>javac Marks.java

C:\Users\Shounak Roy\Desktop\JAVA\WEEK 3\LEVEL 3>java Marks
Enter the marks of Physics out of 100 : 89
Enter the marks of Maths out of 100 : 95
Enter the marks of Chemistry out of 100 : 75
The average of 3 subjects is : 86.333336
Remark obtained : A, Level 4, Above agency-normalized standards
```

4. **Write a Program to check if the given number is a prime number or not.**

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

        //Declaring Variables
        int n;
        System.out.print("Enter a number : ");
        n = input.nextInt();
        boolean isPrime = true;

        //Conditional Statements
        if(n <= 1){
            isPrime = false;
        }else{
            for(int i = 2; i <= n/2; i++){
                if (n%i == 0){
                    isPrime = false;
                    break;
                }
            }
        }

        //Printing Output
        if(isPrime){
            System.out.println("The number is a Prime Number.");
        }else{
            System.out.println("The number is not a Prime Number.");
        }
    }
}
```

```
C:\Users\Shounak Roy\Desktop\JAVA\WEEK 3\LEVEL 3>java Prime
Enter a number : 9
The number is not a Prime Number.

C:\Users\Shounak Roy\Desktop\JAVA\WEEK 3\LEVEL 3>java Prime
Enter a number : 17
The number is a Prime Number.
```

5. **Create a program to check if a number is armstrong or not. Use the hints to show the steps clearly in the code.**

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

        //Declaring Variables
        int n;
        System.out.print("Enter the number : ");
        n = input.nextInt();
        int sum = 0;
        int originalNumber = n;

        //Using while loop
        while(n != 0){
            int lastDigit = n % 10;
            sum += lastDigit*lastDigit*lastDigit;
            n= n/10;
        }

        //Conditional Statements
        if(sum == originalNumber){
            System.out.println("The number is an Armstrong Number.");
        }else{
            System.out.println("The number is not an Armstrong Number.");
        }
    }
}
```

```
C:\Users\Shounak Roy\Desktop\JAVA\WEEK 3\LEVEL 3>javac Armstrong.java

C:\Users\Shounak Roy\Desktop\JAVA\WEEK 3\LEVEL 3>java Armstrong
Enter the number : 153
The number is an Armstrong Number.

C:\Users\Shounak Roy\Desktop\JAVA\WEEK 3\LEVEL 3>java Armstrong
Enter the number : 164
The number is not an Armstrong Number.
```

6. **Create a program to count the number of digits in an integer.**

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

        //Declaring Variables
        int n;
        System.out.print("Enter a number : ");
        n = input.nextInt();
        int count = 0;
        int originalNumber = n;

        //Using while loop
        while(n != 0){
            n = n/10;
            count++;
        }

        if(originalNumber == 0){
            count = 1;
        }

        //Printing Output
        System.out.println("The total number of digits in " +originalNumber+ " is : " +count);
    }
}
```

```
C:\Users\Shounak Roy\Desktop\JAVA\WEEK 3\LEVEL 3>javac Count.java

C:\Users\Shounak Roy\Desktop\JAVA\WEEK 3\LEVEL 3>java Count
Enter a number : 96547
The total number of digits in 96547 is : 5
```

7. **Create a program to find the BMI of a person.**

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

        //Declaring Variables
        double weight_in_kg, height_in_cm;
        System.out.print("Enter the weight in kg : ");
        weight_in_kg = input.nextDouble();
        System.out.print("Enter the height in cm : ");
        height_in_cm = input.nextDouble();

        double height_in_m = height_in_cm/100;
        double BMI = weight_in_kg/(height_in_m*height_in_m);

        //Conditional Statements
        if(BMI <= 18.4){
            System.out.println("Status : Underweight");
        }
        else if(BMI >= 18.5 && BMI <= 24.9){
            System.out.println("Status : Normal");
        }
        else if(BMI >= 25.0 && BMI <= 39.9){
            System.out.println("Status : Overweight");
        }
        else{
            System.out.println("Status : Obese");
        }
    }
}
```

```
C:\Users\Shounak Roy\Desktop\JAVA\WEEK 3\LEVEL 3>javac BMI.java

C:\Users\Shounak Roy\Desktop\JAVA\WEEK 3\LEVEL 3>java BMI
Enter the weight in kg : 65
Enter the height in cm : 157
Statues : Overweight

C:\Users\Shounak Roy\Desktop\JAVA\WEEK 3\LEVEL 3>javac BMI.java

C:\Users\Shounak Roy\Desktop\JAVA\WEEK 3\LEVEL 3>java BMI
Enter the weight in kg : 55
Enter the height in cm : 169
Status : Normal
```

8. **Create a program to check if a number taken from the user is a Harshad Number.**

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

        //Declaring Variables
        int n;
        int sum = 0;
        System.out.print("Enter a number : ");
        n = input.nextInt();
        int oN = n;

        //Using while loop
        while(n != 0){
            sum += n % 10;
            n = n/10;
        }

        //Conditional Statements
        if(oN % sum == 0){
            System.out.println("It is a Harshad Number.");
        }else{
            System.out.println("It is not a Harshad Number.");
        }
    }
}
```

```
C:\Users\Shounak Roy\Desktop\JAVA\WEEK 3\LEVEL 3>javac Harshad.java

C:\Users\Shounak Roy\Desktop\JAVA\WEEK 3\LEVEL 3>java Harshad
Enter a number : 56
It is not a Harshad Number.

C:\Users\Shounak Roy\Desktop\JAVA\WEEK 3\LEVEL 3>java Harshad
Enter a number : 21
It is a Harshad Number.
```

9. **Create a program to check if a number is an Abundant Number.**

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

        //Declaring Variables
        int n;
        int sum = 0;
        System.out.print("Enter a number : ");
        n = input.nextInt();
        int oN = n;

        //Using for loop
        for(int i = 1; i<n; i++){
            if(n%i==0){
                sum+=i;
            }
        }

        //Conditional Statements
        if(sum > oN){
            System.out.println("The number is an Abundant number.");
        }else{
            System.out.println("The number is not an Abundant number.");
        }
    }
}
```

```
C:\Users\Shounak Roy\Desktop\JAVA\WEEK 3\LEVEL 3>java Abundant
Enter a number : 12
The number is an Abundant number.

C:\Users\Shounak Roy\Desktop\JAVA\WEEK 3\LEVEL 3>java Abundant
Enter a number : 6
The number is not an Abundant number.
```

10. **Write a program to create a calculator using *switch...case*.**

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

        //Delcaring Variables
        double a, b, result;
        String op;
        System.out.print("Enter the first number: ");
        a = input.nextDouble();
        System.out.print("Enter the second number: ");
        b = input.nextDouble();
        System.out.print("Enter an operator (+, -, *, /): ");
        op = input.next();

        //Using for loop and switch case
        for (int i = 1; i < 2; i++) {
            switch (op) {
                case "+":
                    result = a + b;
                    System.out.println("Result: " + a + " + " + b + " = " + result);
                    break;

                case "-":
                    result = a - b;
                    System.out.println("Result: " + a + " - " + b + " = " + result);
                    break;

                case "*":
                    result = a * b;
                    System.out.println("Result: " + a + " * " + b + " = " + result);
                    break;

                case "/":
                    if (b != 0) {
                        result = a / b;
                        System.out.println("Result: " + a + " / " + b + " = " + result);
                    } else {
                        System.out.println("Error! Division by zero is not allowed.");
                    }
                    break;

                default:
                    System.out.println("Invalid Operator. Please use one of the following: +, -, *, /");
                    break;
            }
        }
    }
}
```

```
C:\Users\Shounak Roy\Desktop\JAVA\WEEK 3\LEVEL 3>javac Calculator.java

C:\Users\Shounak Roy\Desktop\JAVA\WEEK 3\LEVEL 3>java Calculator
Enter the first number: 96
Enter the second number: 48
Enter an operator (+, -, *, /): *
Result: 96.0 * 48.0 = 4608.0

C:\Users\Shounak Roy\Desktop\JAVA\WEEK 3\LEVEL 3>java Calculator
Enter the first number: 96
Enter the second number: 48
Enter an operator (+, -, *, /): +
Result: 96.0 + 48.0 = 144.0

C:\Users\Shounak Roy\Desktop\JAVA\WEEK 3\LEVEL 3>java Calculator
Enter the first number: 96
Enter the second number: 48
Enter an operator (+, -, *, /): -
Result: 96.0 - 48.0 = 48.0

C:\Users\Shounak Roy\Desktop\JAVA\WEEK 3\LEVEL 3>java Calculator
Enter the first number: 96
Enter the second number: 48
Enter an operator (+, -, *, /): /
Result: 96.0 / 48.0 = 2.0

C:\Users\Shounak Roy\Desktop\JAVA\WEEK 3\LEVEL 3>java Calculator
Enter the first number: 96
Enter the second number: 48
Enter an operator (+, -, *, /): \
Invalid Operator. Please use one of the following: +, -, *, /
```

11. **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):**

```java
public class DayOfWeek {
    public static void main(String[] args) {
        //command-line arguments
        int m = Integer.parseInt(args[0]);
        int d = Integer.parseInt(args[1]);
        int y = Integer.parseInt(args[2]);

        //Calculations
        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;

        //Printing Output
        System.out.println(d0);
    }
}
```

```
C:\Users\Shounak Roy\Desktop\JAVA\WEEK 3\LEVEL 3>javac DayOfWeek.java

C:\Users\Shounak Roy\Desktop\JAVA\WEEK 3\LEVEL 3>java DayOfWeek 3 14 2025
5
```