**WEEK-2 LEVEL-3**

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

Import java.util.Scanner;

Public class LeapYear {

Public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

System.out.print(“Enter a year: “);

Int year = scanner.nextInt();

If (year >= 1582) {

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”);

}

} else {

System.out.println(“Enter a year greater than or equal to 1582”);

}

Scanner.close();

}

}

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

import java.util.Scanner;

public class LeapYear {

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

System.out.print("Enter a year: ");

int year = scanner.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.");

}

scanner.close();

}

}

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.

import java.util.Scanner;

public class GradeCalculator {

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

int physics, chemistry, maths;

double percentage;

char grade;

System.out.print("Enter marks for Physics: ");

physics = scanner.nextInt();

System.out.print("Enter marks for Chemistry: ");

chemistry = scanner.nextInt();

System.out.print("Enter marks for Maths: ");

maths = scanner.nextInt();

int totalMarks = physics + chemistry + maths;

percentage = (totalMarks / 3.0); // Calculate percentage

if (percentage >= 90) {

grade = 'A';

} else if (percentage >= 80) {

grade = 'B';

} else if (percentage >= 70) {

grade = 'C';

} else if (percentage >= 60) {

grade = 'D';

} else {

grade = 'F';

}

System.out.println("Total Marks: " + totalMarks + "/300");

System.out.println("Percentage: " + percentage + "%");

System.out.println("Grade: " + grade);

scanner.close();

}

}

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

import java.util.Scanner;

public class PrimeNumberChecker {

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

System.out.print("Enter a number: ");

int number = scanner.nextInt();

if (isPrime(number)) {

System.out.println(number + " is a Prime Number.");

} else {

System.out.println(number + " is not a Prime Number.");

}

scanner.close();

}

public static boolean isPrime(int num) {

if (num <= 1) {

return false;

}

for (int i = 2; i \* i <= num; i++) {

if (num % i == 0) {

return false; // If divisible, it's not prime

}

}

return true; // If no divisors found, it is prime

}

}

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

import java.util.Scanner;

public class ArmstrongNumberChecker {

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

System.out.print("Enter a number: ");

int number = scanner.nextInt();

if (isArmstrong(number)) {

System.out.println(number + " is an Armstrong number.");

} else {

System.out.println(number + " is not an Armstrong number.");

}

scanner.close();

}

public static boolean isArmstrong(int num) {

int originalNumber = num; // Step 1: Store the original number

int sum = 0; // Step 2: Initialize sum to 0

int numberOfDigits = 0;

while (num != 0) {

num /= 10; // Remove the last digit

numberOfDigits++; // Increment the number of digits

}

num = originalNumber; // Restore the original number

while (num != 0) {

int digit = num % 10; // Extract the last digit

sum += Math.pow(digit, numberOfDigits); // Add the power of the digit to the sum

num /= 10; // Remove the last digit

}

return sum == originalNumber; // If the sum matches the original number, it's an Armstrong number

}

}

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

import java.util.Scanner;

public class DigitCounter {

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

System.out.print("Enter a number: ");

int number = scanner.nextInt();

int digitCount = countDigits(number);

System.out.println("The number of digits in " + number + " is: " + digitCount);

scanner.close();

}

public static int countDigits(int num) {

int count = 0;

num = Math.abs(num);

while (num != 0) {

num /= 10; // Remove the last digit

count++; // Increment count for each digit

}

if (count == 0) {

count = 1;

}

return count;

}

}

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

import java.util.Scanner;

public class BMICalculator {

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

// Input weight and height from the user

System.out.print("Enter weight in kilograms: ");

double weight = scanner.nextDouble();

System.out.print("Enter height in meters: ");

double height = scanner.nextDouble();

double bmi = calculateBMI(weight, height);

System.out.println("Your BMI is: " + bmi);

classifyBMI(bmi);

scanner.close();

}

public static double calculateBMI(double weight, double height) {

return weight / (height \* height);

}

public static void classifyBMI(double bmi) {

if (bmi < 18.5) {

System.out.println("You are underweight.");

} else if (bmi >= 18.5 && bmi < 24.9) {

System.out.println("You have a normal weight.");

} else if (bmi >= 25 && bmi < 29.9) {

System.out.println("You are overweight.");

} else {

System.out.println("You are obese.");

}

}

}

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

import java.util.Scanner;

public class HarshadNumberChecker {

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

System.out.print("Enter a number: ");

int number = scanner.nextInt();

if (isHarshadNumber(number)) {

System.out.println(number + " is a Harshad Number.");

} else {

System.out.println(number + " is not a Harshad Number.");

}

scanner.close();

}

public static boolean isHarshadNumber(int num) {

int originalNumber = num; // Store the original number

int sumOfDigits = 0;

while (num != 0) {

sumOfDigits += num % 10; // Add the last digit to sum

num /= 10; // Remove the last digit

}

return originalNumber % sumOfDigits == 0;

}

}

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

import java.util.Scanner;

public class AbundantNumberChecker {

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

System.out.print("Enter a number: ");

int number = scanner.nextInt();

if (isAbundantNumber(number)) {

System.out.println(number + " is an Abundant Number.");

} else {

System.out.println(number + " is not an Abundant Number.");

}

scanner.close();

}

public static boolean isAbundantNumber(int num) {

int sumOfDivisors = 0;

for (int i = 1; i <= num / 2; i++) {

if (num % i == 0) {

sumOfDivisors += i; // Add divisor to sum

}

}

return sumOfDivisors > num;

}

}

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

import java.util.Scanner;

public class Calculator {

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

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

double num1 = scanner.nextDouble();

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

double num2 = scanner.nextDouble();

System.out.println("Choose an operation:");

System.out.println("1. Add (+)");

System.out.println("2. Subtract (-)");

System.out.println("3. Multiply (\*)");

System.out.println("4. Divide (/)");

System.out.println("5. Modulus (%)");

System.out.print("Enter your choice (1/2/3/4/5): ");

int choice = scanner.nextInt();

double result = 0;

switch (choice) {

case 1:

result = num1 + num2;

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

break;

case 2:

result = num1 - num2;

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

break;

case 3:

result = num1 \* num2;

System.out.println("Result: " + num1 + " \* " + num2 + " = " + result);

break;

case 4:

if (num2 != 0) {

result = num1 / num2;

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

} else {

System.out.println("Error: Division by zero is not allowed.");

}

break;

case 5:

if (num2 != 0) {

result = num1 % num2;

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

} else {

System.out.println("Error: Division by zero is not allowed.");

}

break;

default:

System.out.println("Invalid choice. Please choose a valid operation.");

}

scanner.close();

}

}

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.

public class DayOfWeek {

public static void main(String[] args) {

if (args.length != 3) {

System.out.println("Usage: java DayOfWeek <month> <day> <year>");

return;

}

int m = Integer.parseInt(args[0]);

int d = Integer.parseInt(args[1]);

int y = Integer.parseInt(args[2]);

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;

System.out.println(d0);

}

}