**JAVA BASICS - I/O**

1.  a) Write a Java program that prompts the user to enter an integer, reads the input, and displays the entered integer on the console.

**CODE:**

import java.util.Scanner;

public class Integer {

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

System.out.print("Enter an integer: ");

int Integer = scanner.nextInt();

System.out.println("You entered: " + Integer);

scanner.close();

}

}

b) Develop a Java program that reads two floating-point numbers from the user, calculates their average, and displays the result on the console with two decimal places.

**CODE:**

import java.util.Scanner;

public class Average {

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

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

double number1 = scanner.nextDouble();

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

double number2 = scanner.nextDouble();

double average = (number1 + number2) / 2;

System.out.printf("The average is: %.2f%n", average);

scanner.close();

}

}

2. Implement a Java program that simulates a basic calculator with functionalities to perform addition, subtraction, multiplication, and division.

The program should prompt the user to enter two numbers and an operator (+, -, , /), perform the corresponding operation, and display the result.

Ensure to handle division by zero and invalid operator inputs.

**CODE:**

import java.util.Scanner;

public class Calculator {

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

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

double num1 = scanner.nextDouble();

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

double num2 = scanner.nextDouble();

System.out.print("Enter the operator (+, -, \*, /): ");

char operator = scanner.next().charAt(0);

double result = 0;

boolean isValidOperator = true;

switch (operator) {

case '+':

result = num1 + num2;

break;

case '-':

result = num1 - num2;

break;

case '\*':

result = num1 \* num2;

break;

case '/':

if (num2 != 0) {

result = num1 / num2;

} else {

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

isValidOperator = false;

}

break;

default:

System.out.println("Error: Invalid operator.");

isValidOperator = false;

}

if (isValidOperator) {

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

}

scanner.close();

}

}

3.   Write an Java program to determine if a number n is happy.

A happy number is a number defined by the following process:

Starting with any positive integer, replace the number by the sum of the squares of its digits. Repeat the process until the number equals 1 (where it will stay), or it loops endlessly in a cycle which does not include 1.Those numbers for which this process ends in 1 are happy.

Print true *if* n *is a happy number, and* false *if not*

**CODE:**

import java.util.HashSet;

import java.util.Scanner;

import java.util.Set;

public class HappyNumber {

public static void main(String[] args) {

Scanner scanner = new Scanner(System.in);

System.out.print("Enter a positive integer: ");

int n = scanner.nextInt();

boolean isHappy = isHappyNumber(n);

System.out.println(isHappy);

scanner.close();

}

public static boolean isHappyNumber(int n) {

Set<Integer> seen = new HashSet<>();

while (n != 1 && !seen.contains(n)) {

seen.add(n);

n = getNextNumber(n);

}

return n == 1;

}

public static int getNextNumber(int n) {

int sum = 0;

while (n > 0) {

int digit = n % 10;

sum += digit \* digit;

n /= 10;

}

return sum;

}

}