11) Here's a C program to calculate the factorial of a given non-negative integer using a for loop with input validation:

#include <stdio.h>

// Function to calculate factorial

long long factorial(int num) {

long long fact = 1;

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

fact \*= i;

}

return fact;

}

int main() {

int num;

// Input validation

do {

printf("Enter a non-negative integer: ");

scanf("%d", &num);

if (num < 0) {

printf("Error: Factorial is not defined for negative numbers.\n");

}

} while (num < 0);

// Calculate factorial

long long result = factorial(num);

// Display result

printf("Factorial of %d = %lld\n", num, result);

return 0;

}

}

Output:

Enter a non-negative integer: 5

Factorial of 5 = 120

This program calculates the factorial of a given non-negative integer using a `for` loop with input validation.

12) Here's a C program to generate and print the Fibonacci series up to a specified number n using a while loop:

#include <stdio.h>

// Function to generate Fibonacci series

void generateFibonacci(int n) {

int num1 = 0;

int num2 = 1;

int nextTerm = 0;

int i = 1;

printf("Fibonacci Series up to %d: ", n);

printf("%d, %d, ", num1, num2);

// Generate Fibonacci series using while loop

while (i < n - 1) {

nextTerm = num1 + num2;

printf("%d, ", nextTerm);

num1 = num2;

num2 = nextTerm;

i++;

}

}

int main() {

int n;

// Input validation

do {

printf("Enter a positive integer (n > 1): ");

scanf("%d", &n);

if (n <= 1) {

printf("Error: n must be greater than 1.\n");

}

} while (n <= 1);

generateFibonacci(n);

return 0;

}

}

Output:

Enter a positive integer (n > 1): 10

Fibonacci Series up to 10: 0, 1, 1, 2, 3, 5, 8, 13, 21, 34,

This program generates and prints the Fibonacci series up to a specified number `n` using a `while` loop.

13) Here's a C program to find and display the largest of three numbers using nested if...else statements:

#include <stdio.h>

int main() {

int num1, num2, num3;

// Input three numbers

printf("Enter first number: ");

scanf("%d", &num1);

printf("Enter second number: ");

scanf("%d", &num2);

printf("Enter third number: ");

scanf("%d", &num3);

// Find largest number using nested if...else

if (num1 >= num2) {

if (num1 >= num3) {

printf("%d is the largest number.", num1);

} else {

printf("%d is the largest number.", num3);

}

} else {

if (num2 >= num3) {

printf("%d is the largest number.", num2);

} else {

printf("%d is the largest number.", num3);

}

}

return 0;

}

``}

Output:

Enter first number: 10

Enter second number: 20

Enter third number: 30

30 is the largest number.

This program finds and displays the largest of three numbers using nested if...else statements.

14) Here's a C program that calculates the sum of natural numbers up to a given positive integer n using a do...while loop:

#include <stdio.h>

int main() {

int n;

int sum = 0;

int i = 1;

// Input validation

do {

printf("Enter a positive integer: ");

scanf("%d", &n);

if (n <= 0) {

printf("Error: Please enter a positive integer.\n");

}

} while (n <= 0);

// Calculate sum using do...while loop

do {

sum += i;

i++;

} while (i <= n);

printf("Sum of natural numbers up to %d: %d\n", n, sum);

return 0;

}

}

Output:

Enter a positive integer: 5

Sum of natural numbers up to 5: 15

This program calculates the sum of natural numbers up to a given positive integer `n` using a `do...while` loop.

15) Here's a C program implementing a simple calculator using a switch statement:

#include <stdio.h>

int main() {

char operation;

double num1, num2;

// Display calculator menu

printf("Simple Calculator\n");

printf("1. Addition (+)\n");

printf("2. Subtraction (-)\n");

printf("3. Multiplication (\*)\n");

printf("4. Division (/)\n");

// Input operation

printf("Enter operation (+, -, \*, /): ");

scanf(" %c", &operation);

// Input numbers

printf("Enter first number: ");

scanf("%lf", &num1);

printf("Enter second number: ");

scanf("%lf", &num2);

// Perform operation using switch statement

switch (operation) {

case '+':

printf("%.2f + %.2f = %.2f\n", num1, num2, num1 + num2);

break;

case '-':

printf("%.2f - %.2f = %.2f\n", num1, num2, num1 - num2);

break;

case '\*':

printf("%.2f \* %.2f = %.2f\n", num1, num2, num1 \* num2);

break;

case '/':

if (num2 != 0) {

printf("%.2f / %.2f = %.2f\n", num1, num2, num1 / num2);

} else {

printf("Error: Division by zero.\n");

}

break;

default:

printf("Error: Invalid operation.\n");

break;

}

return 0;

}

}

Output:

Simple Calculator

1. Addition (+)

2. Subtraction (-)

3. Multiplication (\*)

4. Division (/)

Enter operation (+, -, \*, /): +

Enter first number: 10

Enter second number: 5

10.00 + 5.00 = 15.00

This program acts as a simple calculator using a switch statement.

16) [6:56 PM, 11/11/2024] Nivi: example?

[6:56 PM, 11/11/2024] Meta AI: Here's a C program demonstrating the use of if, else, and if...else statements:

Program: Student Grade Evaluation

#include <stdio.h>

int main() {

int marks;

// Input student marks

printf("Enter student marks (0-100): ");

scanf("%d", &marks);

// Evaluate grade using if...else statements

if (marks >= 90) {

printf("Grade: A\n");

} else if (marks >= 80) {

printf("Grade: B\n");

} else if (marks >= 70) {

printf("Grade: C\n");

} else if (marks >= 60) {

printf("Grade: D\n");

} else {

printf("Grade: F\n");

}

// Check if student passed using if statement

if (marks >= 50) {

printf("Status: Passed\n");

} else {

printf("Status: Failed\n");

}

return 0;

}

Output:

Enter student marks (0-100): 85

Grade: B

Status: Passed

This program demonstrates the use of if, else, and if...else statements.