/\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\* DAY 16: LOOP-BASED PROGRAMS \*

\* Contains 10 C programs demonstrating loop concepts \*

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*/

#include <stdio.h>

#include <math.h> // For pow() in Armstrong number check

// ==============================

// 1. Multiplication Table

// ==============================

void multiplicationTable() {

int num;

printf("Enter a number: ");

scanf("%d", &num);

printf("Multiplication table of %d:\n", num);

for(int i = 1; i <= 10; i++) {

printf("%d x %d = %d\n", num, i, num \* i);

}

}

// ==============================

// 2. Sum of Digits Using Loop

// ==============================

void sumOfDigitsLoop() {

int num, sum = 0, digit;

printf("Enter a number: ");

scanf("%d", &num);

while(num != 0) {

digit = num % 10;

sum += digit;

num /= 10;

}

printf("Sum of digits: %d\n", sum);

}

// ==============================

// 3. Count Digits Using Loop

// ==============================

void countDigitsLoop() {

long num;

int count = 0;

printf("Enter a number: ");

scanf("%ld", &num);

do {

num /= 10;

++count;

} while(num != 0);

printf("Number of digits: %d\n", count);

}

// ==============================

// 4. Reverse Number Using Loop

// ==============================

void reverseNumberLoop() {

int num, reversed = 0;

printf("Enter a number: ");

scanf("%d", &num);

while(num != 0) {

reversed = reversed \* 10 + num % 10;

num /= 10;

}

printf("Reversed number: %d\n", reversed);

}

// ==============================

// 5. Factorial Using Loop

// ==============================

void factorialLoop() {

int num;

long fact = 1;

printf("Enter a number: ");

scanf("%d", &num);

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

fact \*= i;

}

printf("Factorial of %d: %ld\n", num, fact);

}

// ==============================

// 6. Skip Multiples of 3

// ==============================

void skipMultiplesOf3() {

printf("Numbers 1-100 skipping multiples of 3:\n");

for(int i = 1; i <= 100; i++) {

if(i % 3 == 0) continue;

printf("%d ", i);

}

printf("\n");

}

// ==============================

// 7. Armstrong Numbers (1-1000)

// ==============================

void findArmstrongNumbers() {

printf("Armstrong numbers between 1-1000:\n");

for(int num = 1; num <= 1000; num++) {

int original = num, sum = 0, digits = 0;

// Count digits

while(original != 0) {

original /= 10;

digits++;

}

original = num;

while(original != 0) {

int digit = original % 10;

sum += pow(digit, digits);

original /= 10;

}

if(sum == num) {

printf("%d ", num);

}

}

printf("\n");

}

// ==============================

// 8. HCF Using Loop

// ==============================

void findHCF() {

int num1, num2, hcf;

printf("Enter two numbers: ");

scanf("%d %d", &num1, &num2);

for(int i = 1; i <= num1 && i <= num2; i++) {

if(num1 % i == 0 && num2 % i == 0) {

hcf = i;

}

}

printf("HCF of %d and %d: %d\n", num1, num2, hcf);

}

// ==============================

// 9. Sum of Series 1 + 1/2 + 1/3...

// ==============================

void sumOfHarmonicSeries() {

int n;

float sum = 0.0;

printf("Enter n: ");

scanf("%d", &n);

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

sum += 1.0/i;

}

printf("Sum of series: %.4f\n", sum);

}

// ==============================

// 10. Palindrome Check Using Loop

// ==============================

void palindromeCheckLoop() {

int num, reversed = 0, original;

printf("Enter a number: ");

scanf("%d", &num);

original = num;

while(num != 0) {

reversed = reversed \* 10 + num % 10;

num /= 10;

}

printf("%d is %s\n", original,

(original == reversed) ? "Palindrome" : "Not Palindrome");

}