CSE 107 TAKE HOME ASSIGNMENT 4

23.10.2024

QUESTION 1

Write a C program that prompts the user to input a positive integer and performs one of the following actions based on the number entered:

- If the number is **less than 10**, the program should calculate and display the factorial of the number.
- If the number is **10 or greater**, the program should calculate and display the square of the number.

Instructions

1. Ensure the user inputs a positive integer. If the input is not valid (i.e., a negative number or zero), prompt the user to enter a valid positive integer again.
2. If the input number is **below 10**, compute the factorial using a `for` loop. The factorial of a number n is the product of all positive integers from 1 to n. For example, for $n = 5$:

$$5! = 5 \times 4 \times 3 \times 2 \times 1 = 120$$

3. If the input number is **10 or above**, calculate and display the square of the number. For example, for $n = 12$:

$$12^2 = 12 \times 12 = 144$$

Input Format

The program should request a single **positive integer** from the user.

Output Format

- If the number is **less than 10**, display the factorial in the format: `Factorial of <number> is <result>.`
- If the number is **10 or greater**, display the square in the format: `Square of <number> is <result>.`

Example 1

Input: `Enter a positive integer: 5`
Output: `Factorial of 5 is 120`

Example 2

Input: `Enter a positive integer: 12`
Output: `Square of 12 is 144`

Make sure to follow best coding practices by commenting your code and handling input errors effectively.

QUESTION 2

Write a C program that generates the Fibonacci sequence up to a specific number of terms entered by the user. The Fibonacci sequence is a series where each number is the sum of the two preceding ones, starting from 0 and 1.
For example, the Fibonacci sequence looks like this:

$$0, 1, 1, 2, 3, 5, 8, 13, 21, \ldots$$

Input Format

The program should request a single **positive integer** from the user, representing the number of terms they want to display.

Output Format

Display the Fibonacci sequence up to the specified number of terms, starting from 0.

Example

Input:
`Please enter the number of terms to display: 10`
Output:
`First 10 terms: 0, 1, 1, 2, 3, 5, 8, 13, 21, 34`