

**Programming Fundamentals (CS-1002)** BCS-1N

Assignment # 4, Fall 2021

Submission Deadline: Tuesday, November 16, 2021 (11:00 pm)

Total Marks: 100

**You are not allowed to use math library functions.**

Write a **menu-driven C++ calculator program** that reads data from the interactive user and accordingly computes and print the results.

Note that you are required to write down functions for each functionality, and you can reuse your function in other parts of the program (if needed).

**Also note that all the functions computing a single value should be value-returning functions.**

Enter your option (1 to 10):

1. Finding the factorial of a given number (number ranges from 0 to 15)
2. Finding  $x^y$  ( $y$  is an integer and  $x$  is a floating-point number).
3. Finding the square root of a given positive integer. (Must be correct upto 2 decimal places).  
**Library function is not allowed.**
4. Finding all the prime factors of a given integer (Assume that the maximum value of the integer is 10000).
5. Finding **LCM** and **GCD** of 2 integers.
6. Finding  $n^{th}$  element of **Fibonacci Series**. First two terms being 0 and 1.
7. Finding the value of  $e^x$  using Taylor expansion.  
e.g.,  $e^x = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \frac{x^4}{4!} + \dots$   
Use a maximum of 10 terms to compute  $e^x$ .
8. Finding  $\sin$  of an angle (angle will be provided by the user in degrees).  
**Use the Maclaurin Series to compute it.**  
e.g.,  $\sin(x) = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \frac{x^9}{9!} + \dots$   
where  $x$  is in radians.
9. Finding  $\cos$  of an angle (angle will be provided by the user in degrees).  
**Use the Maclaurin Series to compute it.**  
e.g.,  $\cos(x) = x - \frac{x^2}{2!} + \frac{x^4}{4!} - \frac{x^6}{6!} + \frac{x^8}{8!} + \dots$   
where  $x$  is in radians.
10. Finding  $\sin^{-1}$  of a number. The function should make sure that the number lies between  $-1$  and  $1$ .  
**Use the Maclaurin Series to compute it.**