Alexandria University
Faculty of Engineering
Computer and Systems Engineering Department

CS121: Computer Programming 1
Assigned: Saturday, November 2nd, 2024
Due: Saturday, November 9th, 2024

Lab 4
2D Arrays - functions

Lab Objectives

1. Getting Familiar with C programming language.
2. Practice Loops Problems.
3. Practice Functions

Problem Set

1. Given a matrix of dimension n x m, find its transpose, where 1 ≤ n, m ≤ 1000.
   Scan the matrix size from user, then scan the matrix itself, Output its Transpose

2. Write a program in C to convert a decimal number to a binary number using a function.

3. Write a program in C to check whether a number is a prime number or not using the function.

4. Write a function that computes the value of the following polynomial: $3x^5+2x^4-5x^3-x^2+7x-6$
   Write a program that scans the value of x, calls the function to compute the value of the polynomial, and then displays the value returned by the function.

5. The sine of x can be calculated approximately by summing the first N terms of the infinite series:

$$sin(x) = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + ... \ (x \textbf{ in radians})$$

   You are required to solve the sin(x) problem from previous lab with the following restrictions:
   - Write a function that takes the angle in degrees and converts it to radian.
   - Write a function that takes an input n. Calculates and returns its factorial (n!).
   - Write your own power function: double power(double n, int m), that takes two arguments n, m. Calculates and returns nm as double.
   - Write a function that takes in an angle in degrees and computes its sine, using the above formula. Your function should call the above three functions.

NOTES

1. You are encouraged to ask any questions on MS teams, or in person.
2. Cheating will be severely penalized (for both parties). So, it is better to deliver nothing than deliver a copy!.
3. You are not allowed to use any AI Tool.
4. Submission details will be announced on MS Teams.

Good Luck