National University of Computer and Emerging Sciences, Lahore Campus

Course Name:	Operating Systems - LAB	Course Code:	CL2006
Program:	BS(DS)	Semester:	Fall 2023
Duration:	1 Hour	Total Marks:	20
Paper Date:		Weight:	
Section:		Pages:	1
Exam:	Quiz 2		

Student : Name:_____ **Roll No.**_____ **Section:**_____

Instruction/Notes:

1. Understanding the question paper is also part of the exam, so do not ask for any clarification.
2. Talking/Discussion is not allowed. You are responsible for protecting your code and saving it from being copied. If you don't protect it all matching codes are considered copy/cheating cases.
3. Failure to observe above mentioned instructions will lead to a negative mark on the Exam.

Question 1: **[Marks 20]**

Write a multithreaded program using 'POSIX threads' to perform matrix operations as instructed below. You will perform task decomposition as well as data decomposition. Your program should provide the following functionality.

- Take a matrix of size (m x n) where 'm' and 'n' values are taken as input from the user. Initialize the matrix by some random values or user input.
- The following tasks will be performed in parallel.
  - find the total number of primes in the given matrix.
  - maximum value in the whole matrix
- These tasks should be performed using data decomposition by assigning each row to a new thread.
- Mutual exclusion should be used to modify shared variables.