	Course Name:	Parallel and Distributed Computing	Course Code:	CS3006
	Program:	BS(Computer Science)	Semester:	Spring 2025
	Sections	PDC(K,J,H)	Total Marks:	30
	Due Date:	7-02-25	Weight	~3
	Exam Type:	Assignment 1	Page(s):	1

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

Note: You have to use Linux operating system to complete this assignment.

Question1 [20]

Write a multithreaded program using 'Posix threads' to perform matrix operations as instructed below. Your program should provide the following functionality. You can paste your code in this document. Teaching assistant can ask any student to run the code or she can conduct a viva to check the authenticity.

1. Take a matrix of size (mxn) where 'm' and 'n' values are taken as input from user. Initialize the matrix by some random values or user input.

2. Then following tasks will be performed in parallel

- **Find total number of primes in the given matrix**
- **Maximum value in whole matrix**

3. These tasks should be performed by assigning each row to a new thread.

4. Mutual exclusion should be used to modify shared variables.

Question2 [10]

Write a multithreaded program to search for a given element in a large array. Divide the array into equal parts, and assign each part to a separate thread for searching. The threads should run concurrently and notify the main thread if the element is found. The main thread should print whether the element was found and in which part(s) of the array.

1. **Divide the array into N parts (e.g., 4 parts for 4 threads).**
2. **Synchronize access to shared resources (like a flag or result variable) to ensure thread-safety.**
3. **The main thread should wait for all threads to complete and then print the result.**
4. **Use a shared flag or result variable to store the search status (e.g., found = true if the element is found, or false otherwise).**
5. **Ensure that the main thread doesn't terminate before all threads**
6. **Maximum Array size: 50**