	Course Name:	Parallel and Distributed Computing	Course Code:	CS3006
	Program:	BS(Computer Science)	Semester:	Spring 2025
	Sections	PDC(K,J,H)	Total Marks:	40
	Due Date:	17-03-25	Weight	~3
	Exam Type:	Assignment 2	Page(s):	1

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

Note: You have to use Linux operating system and OpenMP to complete this assignment. Plagiarism will result in zero marks of both students.

Question1 [30]

Write a multithreaded program using 'OpenMP' 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 he/she can conduct a viva to check the authenticity.

1. **Take 2 matrices of size (100 by 100). Initialize them by some random values or user input.**
2. **Then following tasks will be performed in parallel**
   - **Addition of matrices**
   - **Multiplication of matrices**
3. **Apply coarse and fine grained approaches and report the resulting execution time with different number of threads.**
4. **Also use static, dynamic and guided scheduling and report the resulting execution time. Which of the above mentioned scheduling gave best results in terms of performance?**

Question2 [10]

Implement a parallel BFS traversal for an unweighted graph using OpenMP tasks. Given an adjacency list representation of a graph and a starting node, traverse the graph using BFS while ensuring parallel execution of node exploration.

1. **Use OpenMP tasks to process neighboring nodes in parallel.**
2. **Ensure proper synchronization to avoid duplicate visits to nodes.**
3. **Use a queue-based approach to maintain BFS order.**
4. **The graph is based on singly link list data structure.**