



**CST232 – Operating Systems  
Semester 1, Academic Year 2024/2025**

**Assignment 2**

**Students' declaration:**

We declare that we understand what is meant by plagiarism. This assignment is all our own work and we have acknowledged any use of the published or unpublished works of other people. We hold a copy of this assignment. We can produce if the original is lost or damaged.

<b>Student Name</b>	<b>Signature</b>

Lecturer has, and may exercise, the right NOT TO MARK this assignment if the above declaration has NOT BEEN SIGNED and if the above declaration is FOUND TO BE FALSE, appropriate action will be taken which would lead to ZERO marks being awarded for this assignment

This **GROUP** assignment shall contribute **15%** of the overall evaluation. For this assignment, each group is required to complete the following tasks in **THREE (3)** weeks.

## Assignment Objectives

To explore and demonstrate the practical implementation of disk scheduling algorithms used in operating systems for efficient device management.

## Assignment Description:

### Task 1:

#### Instructions:

#### Report preparations:

1. Explain in detail about the difference between binary semaphore and counting semaphore.
2. The following code is related to a semaphore. Identify the type of semaphore and explain in detail about the semaphore based on the code provided.

```
volatile int semaphore = 1;

void P( ) {
    while (semaphore == 0);
    semaphore = 0;
}

void V( ) {
    semaphore = 1;
}

int main( ) {
    printf("Entering critical section...\n");
    P();
    printf("In critical section!\n");
    V();
    printf("Exited critical section.\n");
    return 0;
}
```

### Task 2:

#### Instructions:

Write a program to simulate two disk scheduling algorithms of your choice (e.g., FCFS, SSTF, SCAN, C-SCAN, or LOOK). Your program should take the following inputs:

- The disk's initial head position.
- The total number of cylinders on the disk.
- A list of I/O requests (sequence of cylinder numbers).
- The program should output:
  - The order in which requests are processed for each algorithm.
  - The total seek time for each algorithm.

## Report preparations:

- A brief explanation of the chosen algorithms and their working principles.
- A sample input/output from your program with an explanation of the results.
- A performance comparison of the two algorithms based on seek time and efficiency.
- Your observations and conclusions about the strengths and weaknesses of each algorithm.
- Submit the program code, screenshots of the execution, and the report as part of the assignment.

## Online Submission

Upload the assignment to eLearning portal. Only one submission per group is required. The submission due date is **9th January 2025** (latest by 11.59 PM).

## Report Format

The FORMAT of the assignment should be Font Name/Size: Times New Roman, 12pt; Line spacing of 1.5; Justified (Alignment); Page Number should be typed.

## Important Note

Plagiarism is not tolerated. Materials taken directly from internet or other sources is not acceptable. You must show this is your own work, created using your own effort. For late submission, marks shall be deducted accordingly.

## Group:

Each group should consist of at least 4 and no more than 5 members. All members of the group are expected to contribute equally to the project. Failure to adhere to the group size and contribution guidelines may result in a deduction of marks.

## Contribution:

15% of coursework.

## Due date:

9<sup>th</sup> January 2025 (11.59pm)

## Grading Rubric

Criteria	Marks
Difference between semaphores (10 marks)	
Semaphore code explanations (10marks)	
Algorithm Explanation. (20 marks)	
Program Implementation. (40 marks)	
Performance Comparison (10 marks)	
Report Quality (10 marks)	
Total (/100)	