

**Department of CSE**

**ASSIGNMENT PLAN**

**Name of the Course-Coordinator:** Prof.Amanpreet Singh Brar

**Dr.Daljit Singh**

**Prof.Harkomalpreet Kaur**

**Prof.Kamaljeet Kaur**

Branch	Semester	Subject	Code	Session
CSE	4 <sup>th</sup>	Operating System	PCCS-105	Jan – May, 2025

**Assignment No. 2**

**Course-Content Covered:**

**Deadlocks:** Introduction to deadlocks, Conditions for deadlock, Resource allocation graphs, Deadlock prevention and avoidance, Deadlock detection and recovery.

**Memory Management:** Basic concept, Logical and Physical address map, Memory allocation: Contiguous Memory allocation – Fixed and variable partition–Internal and External fragmentation and Compaction; Paging: Principle of operation – Page allocation – Hardware support for paging, Protection and sharing, Disadvantages of paging, Segmentation.

**File Management:** Concept of File, Access methods, File types, File operation, Directory structure, Allocation methods (contiguous, linked, indexed), Free-space management (bit vector, linked list, grouping), directory implementation (linear list, hash table), efficiency and performance.

**Secondary Storage:** Disk structure, Disk scheduling – FCFS, SSTF, SCAN, C-SCAN, LOOK, CLOOK, Disk Management, Disk Formatting, Boot blocks, Bad blocks.

**ASSIGNMENT -2**

Q1. (a) Analyze the Banker's Algorithm used in operating systems for deadlock avoidance. Explain its working mechanism in detail and critically evaluate its effectiveness by illustrating with a practical example. How does it ensure system safety, and what are its limitations in real-world applications?

Q1. (b) Given the page reference string:

**1, 2, 3, 4, 5, 3, 4, 1, 6, 7, 8, 7, 8, 9, 7, 8, 9, 5, 4, 5, 4, 2**

Determine the number of page faults that would occur using the **FIFO (First-In-First-Out)** page replacement algorithm when the number of available frames is:

**a. Four frames**

**b. Six frames**

Q2 (a).Analyze and compare the following disk scheduling algorithms in terms of their efficiency, advantages, and limitations. Provide suitable examples to illustrate how each algorithm handles disk I/O requests, and critically evaluate which algorithm performs best under different system conditions.

1.FCFS 2. SSTF 3.SCAN 4. C-SCAN 5.LOOK 6.CLOOK

Q2 (b). Compare and contrast different disk space allocation methods used in file systems. Evaluate their strengths, limitations, and suitable use cases. How do these methods impact file access speed, space efficiency, and fragmentation?