

Syllabus ...

1. Introduction to Operating System

[Lectures 3]

- 1.1 What is Operating System
- 1.2 Computer System Architecture
- 1.3 Services provided by OS
- 1.4 Types of OS
- 1.5 Operating System Structure:
 - Simple Structure
 - Layered Approach
 - Micro Kernels
 - Modules
- 1.6 Virtual Machines – Introduction, Benefits

2. System Structure

[Lectures 3]

- 2.1 User Operating System Interface
- 2.2 System Calls:
 - Process or Job Control
 - Device Management
 - File Management
- 2.3 System Program
- 2.4 Operating System Structure

3. Process Management

[Lectures 4]

- 3.1 Process Concept:
 - The Process
 - Process States
 - Process Control Block
- 3.2 Process Scheduling:
 - Scheduling Queues
 - Schedulers
 - Context Switch
- 3.3 Operation on Process:
 - Process Creation
 - Process Termination
- 3.4 Interprocess Communication:
 - Shared Memory System
 - Message Passing Systems

4. CPU Scheduling

[Lectures 6]

- 4.1 What is Scheduling
- 4.2 Scheduling Concepts:
 - CPU - I/O Burst Cycle
 - CPU Scheduler
 - Preemptive and Non-preemptive Scheduling
 - Dispatcher

4.3 Scheduling Criteria

4.4 Scheduling Algorithms:

- FCFS
- SJF (Preemptive and Non-Preemptive)
- Priority Scheduling (Preemptive and Non-Preemptive)
- Round Robin Scheduling
- Multilevel Queues
- Multilevel Feedback Queues

5. Process Synchronization

[Lectures 6]

5.1 Introduction

5.2 Critical Section Problem

5.3 Semaphores:

- Concept
- Implementation
- Deadlock & Starvation
- Types of Semaphores

5.4 Classical Problems of Synchronization:

- Bounded Buffer Problem
- Readers & Writers Problem
- Dining Philosophers Problem

6. Deadlock

[Lectures 7]

6.1 Introduction

6.2 Deadlock Characterization

6.3 Necessary Condition

6.4 Deadlock Handling Technique:

- Deadlock Prevention
- Deadlock Avoidance:
 - Safe State
 - Resource Allocation Graph Algorithm
 - Bankers Algorithm
- Deadlock Detection
- Recovery from Deadlock:
 - Process Termination
 - Resource Preemption

7. Memory Management

[Lectures 8]

7.1 Background:

- Basic Hardware
- Address Binding
- Logical versus Physical Address Space
- Dynamic Loading
- Dynamic Linking and Shared Libraries

7.2 Swapping

7.3 Contiguous Memory Allocation:

- Memory Mapping and Protection
- Memory Allocation
- Fragmentation

7.4 Paging:

- Basic Method
- Hardware Support
- Protection
- Shared Pages

7.5 Segmentation:

- Basic Concept
- Hardware

7.6 Virtual Memory Management:

- Background
- Demand Paging
- Performance of Demand Paging
- Page Replacement:
 - FIFO
 - OPT
 - LRU
 - Second Chance Page Replacement
 - MFU
 - LFU

8. File System

[Lectures 7]

8.1 Introduction and File concepts (File Attributes, Operations on Files)

8.2 Access Methods:

- Sequential Access
- Direct Access

8.3 File Structure:

- Allocation Methods
- Contiguous Allocation
- Linked Allocation
- Indexed Allocation

8.4 Free Space Management:

- Bit Vector
- Linked List
- Grouping
- Counting

9. I/O System

[Lectures 4]

9.1 Introduction

9.2 I/O Hardware

9.3 Application of I/O Interface

9.4 Kernel I/O Subsystem

9.5 Disk Scheduling:

- FCFS
- Shortest Seek Time First
- SCAN
- C- SCAN
- C- Look

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