

## **Basic Concepts of OS**

1. Interrupts ,Storage structure , I/O structure
2. Operating-System Operations , Multiprogramming , Multi Processing, Dual Moed, Multi Mode ,Timer
3. Computing Environments, Traditional Computing, Mobile Computing , Client Serve Computing, Peer to peer Computing, Cloud Computing, Real Time Embedded System
4. System Services, Linker and Loader, Kernel Structure

## **Topics and sub topics of Chapter 3 Processes**

1. Process Concept
  - a. Process
  - b. Process State
  - c. Process Control Block
  - d. Threads
2. Process Scheduling
  - a. Scheduling Queues
  - b. CPU scheduling
  - c. Context Switches
3. Operations on Processes
  - a. Process creation
  - b. Process Termination
4. Interprocess Communication
5. IPC shared memory system
6. IPC in message Passing System
  - a. Naming
  - b. Synchronization
  - c. Buffering
7. Pipes
  - a. Named Pipes
  - b. Unnamed Pipes

## **Topic and sub Topic of Chapter 4: Thread and Concurrency**

1. Overview
2. Multi core programming
  - a. Programming challenges
  - b. Types of parallelism
3. Multi-Threading Model
  - a. Many to one Model
  - b. One to one Model
  - c. Many to many Model
4. Threads Libraries
  - a. P-thread
5. Thread Creation
6. Thread Issue

- a. The fork() and exec() system call
- b. Signal Handling
- c. Threading Cancellation
- d. Thread local Storage
- e. Scheduler activation

### **Topic and sub Topic of Chapter 5: CPU Scheduling**

1. Basic Concepts
  - a. CPU I/O Burst Cycle
  - b. CPU scheduler
  - c. Preemptive and non-preemptive
  - d. Dispatcher
2. Scheduling Criteria
3. Scheduling Algorithm
  - a. First Come First Serve scheduler
  - b. Shortest Job scheduler
  - c. Round Robin Scheduling
  - d. Priority Scheduling
  - e. Multilevel Queue Scheduling
  - f. Multilevel feedback Queue Scheduling
4. Thread Scheduling
  - a. Contention Scope
  - b. Pthread Scheduling
5. Multi-Processor scheduling
  - a. Approaches of multi-processor scheduling
  - b. Multi Core Processor
  - c. Multithreading Multicore system
  - d. Load Balancing
    - i. Push Migration
    - ii. Pull Migration
  - e. Processor Affinity
- i. Hard Affinity
  - iii. Soft affinity
  - f. Heterogenous Multiprocessing

### **Topic and Sub Topic of Chapter 5 CPU Scheduling**

1. Basic Concepts
  - a. CPU I/O Burst Cycle
  - b. CPU scheduler
  - c. Preemptive and non-preemptive
  - d. Dispatcher
2. Scheduling Criteria
3. Scheduling Algorithm
  - a. First Come First Serve scheduler
  - b. Shortest Job scheduler

- c. Round Robin Scheduling's
  - d. Priority Scheduling
  - e. Multilevel Queue Scheduling
  - f. Multilevel feedback Queue Scheduling
- 4. Thread Scheduling
  - a. Contention Scope
  - b. Pthread Scheduling
- 5. Multi-Processor scheduling
  - a. Approaches of multi-processor scheduling
  - b. Multicore CPUs
  - c. Multithreaded cores
  - d. NUMA systems

### **Topic and Sub Topic of Chapter 6 Process Synchronization**

- 1. Background
- 2. The Critical Section Problem
- 3. Peterson's Solution
- 4. Mutex Lock
- 5. Semaphore
  - a. Binary Semaphore
  - b. Counted Semaphore
- 6. Liveness
  - a. Deadlock
  - b. Priority Inversion

### **Topic and Sub Topic of Chapter 8 Deadlocks**

- 1. System Model
- 2. Deadlock in Multithreaded Application
  - a. Live Lock
- 3. Deadlock Characterization
  - a. Necessary Condition
  - b. Resource Allocation
- 4. Methods of Handling Deadlock
- 5. Deadlock Prevention
  - a. Mutual Exclusion
  - b. Hold and wait.
  - c. No Preemption
  - d. Circular Wait
- 6. Deadlock Avoidance
  - a. Safe State
  - b. Resource allocation Graph Algorithm
  - c. Banker's Algorithm
- 7. Deadlock Detection
  - a. Single Instance of each resource type
  - b. Several instance of resource type
  - c. Detection-Algorithm Usage
- 8. Recovery from Deadlock

- a. Process and Thread Termination
- b. Resource Preemption

### **Topic and Sub Topic of Chapter 9 Memory Management**

- 1. Background
  - a. Basic Hardware
  - b. Address Binding
  - c. Logical Versus Physical Address Space
  - d. Dynamic Loading
  - e. Dynamic Linking and Shared Libraries
- 2. Contiguous Memory Allocation
  - a. Memory Protection
  - b. Memory Allocation Fragmentation
  - c. Allocation Algorithms
- 3. Paging
  - a. Basic Method
  - b. Address Translation Scheme
  - c. Paging Model
  - d. Address Binding
  - e. Paging Table of Logical and Physical Memory
  - f. Paging Hardware with TLB
  - g. Effective Access Time