1. What is an OS?
2. Standard Library and Resource Coordinator
3. Functionalities in OS
4. Evolution of OS: Batch processing, Spooling, Multiprogramming, Time Sharing (Multi Tasking)
5. Programme and Process
6. Threads and processes (remember your assignment 1)
7. Dispatch Mechanism
   - User mode
   - System/Kernel/Privileged mode
   - Traps and Hardware Interrupts
   - System call – When a process executing in user mode requests something from the system that can be done only in the kernel mode
8. Process Creation – fork()
9. Synchronization
   - Independent Vs Cooperating Processes
   - Race conditions
   - Mutual exclusion
   - Deadlock
   - Starvation
   - Solution to Critical Section using Boolean lock, 2 boolean locks, using turn, final
   - Bakery Algorithm
10. Synchronization using Semaphores
    - Motivation and Definition
    - P()/down()/wait() and S()/up()/signal()
    - Mutual Exclusion with Semaphore
    - Two types of Semaphores
    - Deadlock and Starvation with Semaphores
    - Scheduling Constraint w/ Semaphore
    - Bounded Buffer and Producer/Consumer – 3 solutions
    - Dining Philosophers Problem and Readers Writers problem
11. Monitors
    - Hoare Vs Mesa Semantics and Java Style
12. Message Passing Systems
    - Message
    - Mailbox
    - Operations
    - Naming, Synchronization, Buffering and Message Size
13. Deadlocks (serially sharable resources)
    - Representing deadlocks in Wait-for graph and Resource Allocation graph
    - Four necessary conditions
    - Handling deadlocks
14. Scheduling Processes
    - Types of resources (Preemptible/Non preemptible)
    - Dispatcher Vs Scheduler
    - Scheduling Performance metrics
    - Scheduling Algorithms (Short-term scheduling): FCFS, SJF, SRTF/STCF, RR(q), Priority, MLFQ
15. Memory Management
    - Allocation
    - Allocation Algorithms – First Fit, Best Fit, Next Fit, Worst Fit
    - Fragmentation – Internal and External
    - Compaction and Garbage Collection: Reference Counting, Mark and Sweep, Generational
    - Swapping
16. Paging
    - Virtual/logical and Physical address
    - Page Fault
    - What will Interrupt Handler do on Page Fault
    - Page Tables
    - Page size = Frame size = offset
    - How to calculate number of entries in page table?
    - Page Allocation Algorithms and determining # of Page Faults
    - FIFO, RAND, OPT (or Belady’s MIN), LRU