LEC-12: Intro to Process Scheduling | FCFS | Convoy Effect

1. **Process Scheduling**
    a. Basis of Multi-programming OS.
    b. By switching the CPU among processes, the OS can make the computer more productive.
    c. Many processes are kept in memory at a time, when a process must wait or time quantum expires, the OS takes the CPU away from that process & gives the CPU to another process & this pattern continues.
2. **CPU Scheduler**
    a. Whenever the CPU become ideal, OS must select one process from the ready queue to be executed.
    b. Done by STS.
3. **Non-Preemptive scheduling**
    a. Once CPU has been allocated to a process, the process keeps the CPU until it releases CPU either by terminating or by switching to wait-state.
    b. Starvation, as a process with long burst time may starve less burst time process.
    c. Low CPU utilization.
4. **Preemptive scheduling**
    a. CPU is taken away from a process after time quantum expires along with terminating or switching to wait-state.
    b. Less Starvation
    c. High CPU utilization.
5. **Goals of CPU scheduling**
    a. Maximum CPU utilization
    b. Minimum Turnaround time (TAT).
    c. Min. Wait-time
    d. Min. response time.
    e. Max. throughput of system.
6. **Throughput**: No. of processes completed per unit time.
7. **Arrival time (AT)**: Time when process is arrived at the ready queue.
8. **Burst** time (BT): The time required by the process for its execution.
9. **Turnaround** time (TAT): Time taken from first time process enters ready state till it terminates. (CT - AT)
10. **Wait** time (WT): Time process spends waiting for CPU. (WT = TAT – BT)
11. **Response** time: Time duration between process getting into ready queue and process getting CPU for the first time.
12. **Completion** Time (CT): Time taken till process gets terminated.
13. **FCFS** (First come-first serve):
    a. Whichever process comes first in the ready queue will be given CPU first.
    b. In this, if one process has longer BT. It will have major effect on average WT of diff processes, called **Convoy effect.**
    c. Convoy Effect is a situation where many processes, who need to use a resource for a short time, are blocked by one process holding that resource for a long time.
        i. This cause poor resource management.