OPERATING SYSTEM

Scheduler in Operating System

A **scheduler** is a part of the operating system that **decides which process should run next** on the CPU.
Since multiple processes may be ready at the same time, the scheduler ensures fairness, efficiency, and good performance.

Types of Schedulers

The OS typically uses **three types of schedulers**:

1. Long-Term Scheduler (Job Scheduler)

Purpose:

- Controls the **admission of processes** into the system.
- Selects which jobs should be **brought into the ready queue**.

Key Points:

- Runs **less frequently**.
- Determines the **degree of multiprogramming** (number of processes in memory).
- Mainly used in older batch systems.

2. Short-Term Scheduler (CPU Scheduler)

Purpose:

- Decides **which ready process gets the CPU next**.

Key Points:

- Runs **very frequently** (milliseconds).
- Responsible for **context switching**.
- Most important scheduler for multitasking.

3. Medium-Term Scheduler

Purpose:

- Handles **swapping** of processes between memory and disk.

Key Points:

- Suspends (swaps out) a process when system is overloaded.
- Brings it back later (swaps in).
- Improves system performance.

Scheduling Criteria

Schedulers try to optimize:

- **CPU Utilization** (keep CPU busy)
- **Throughput** (number of processes completed)
- **Turnaround Time** (total time for a process)
- **Waiting Time**
- **Response Time** (important in interactive systems)
- **Fairness**

Scheduling Algorithms Used by the Scheduler

Common algorithms include:

- **FCFS** (First-Come, First-Served)
- **SJF** (Shortest Job First)
- **SRTF** (Shortest Remaining Time First)
- **Priority Scheduling**
- **Round Robin**
- **Multilevel Queue Scheduling**
- **Multilevel Feedback Queue**

Summary

A **scheduler** is a key OS component that:

- Selects processes for CPU execution,
- Manages process admission and suspension,
- Ensures efficient and fair use of system resources.