

# PROCESS SCHEDULERS

**Long Term scheduler, Short term scheduler**

**&**

**Medium-term scheduler**

# Process Scheduler

- Process scheduling is an essential part of a Multiprogramming operating systems.
- Operating systems allow more than one process to be loaded into the executable memory at a time and the loaded process shares the CPU using time multiplexing.
- Schedulers are special system software which handle process scheduling.
- Schedulers are of three types –
  - ✓ Long-Term Scheduler
  - ✓ Short-Term Scheduler
  - ✓ Medium-Term Scheduler

# Long-Term Scheduler

- Long-term scheduler also called job scheduler.
- The long-term scheduler controls the degree of multiprogramming (the number of processes in memory).
- In multiprogramming system, more processes are submitted than can be executed immediately.
- These processes are spooled to a mass-storage device (typically a disk), where they are kept for later execution.
- Job scheduler selects processes from this pool and loads them into memory for execution.
- The long-term scheduler executes much less frequently.

# Long-Term Scheduler

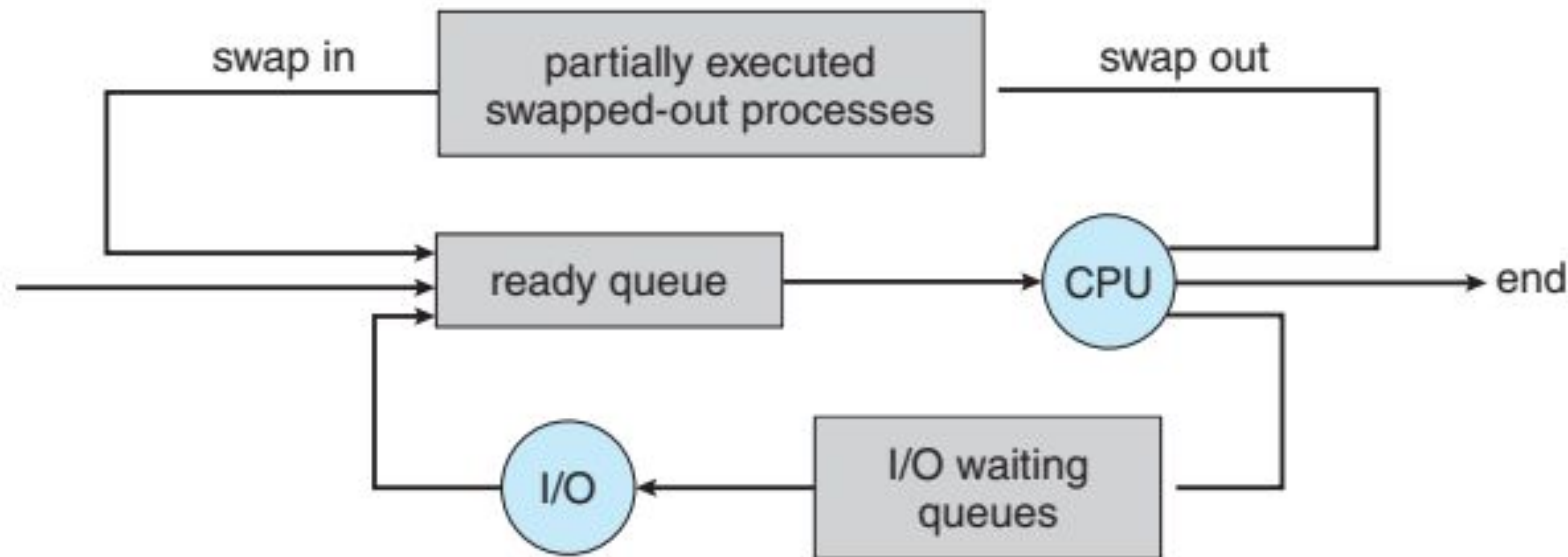
- It is important that the long-term scheduler make a careful selection of both IO and CPU bound process.
- IO bound tasks are which use much of their time in input and output operations
- while CPU bound processes are which spend their time on CPU.
- The job scheduler increases efficiency by maintaining a balance between the IO and CPU bound process.

# Short-Term Scheduler

- Short-term scheduler also called CPU scheduler.
- The role of the CPU scheduler is to select from among the processes that are in the ready queue and allocate a CPU core to one of them.
- The CPU scheduler is responsible for ensuring there is no starvation owing to high burst time processes.
- Short-term scheduler only selects the process to schedule it doesn't load the process on running.
- Dispatcher is responsible for loading the process selected by Short-term scheduler on the CPU.
- Short-term schedulers are faster than long-term schedulers.

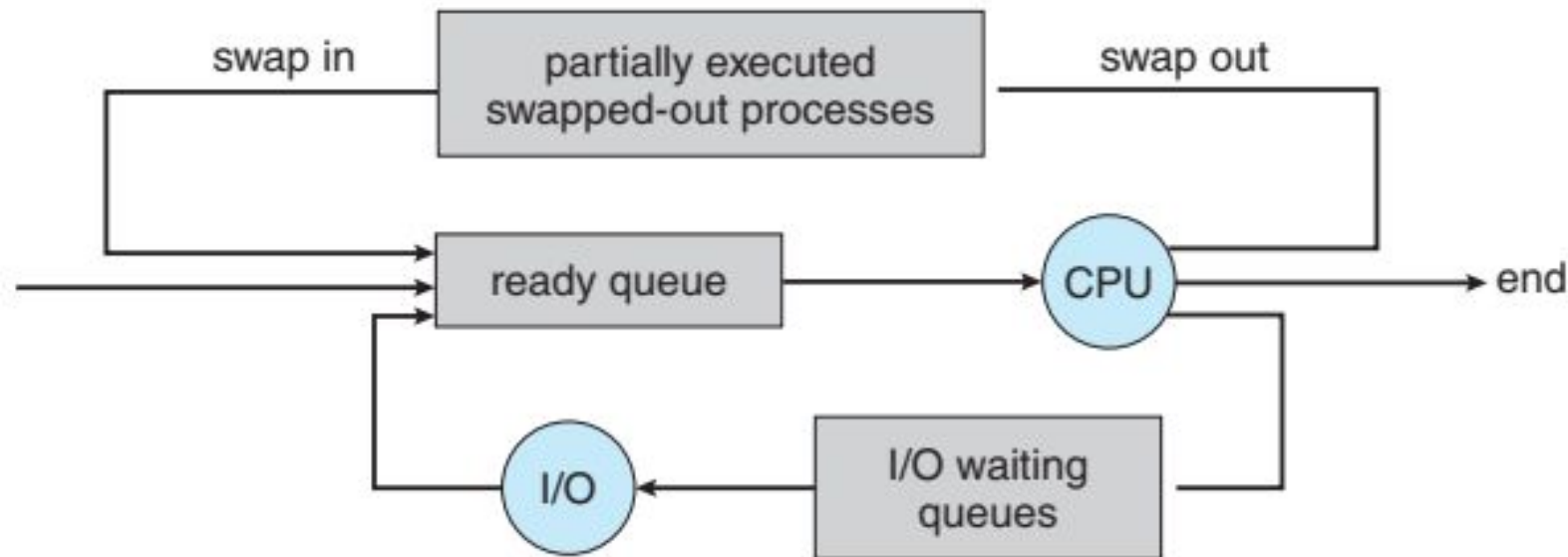
# Medium-Term Scheduler

- Some operating systems, such as time-sharing systems, may introduce an additional, intermediate level of scheduling.
- The key idea behind a medium-term scheduler is that sometimes it can be advantageous to remove processes from memory (and from active contention for the CPU) and thus reduce the degree of multiprogramming.
- Later, the process can be reintroduced into memory, and its execution can be continued where it left off. This scheme is called swapping.



# Medium-Term Scheduler

- The process is swapped out, and is later swapped in, by the **medium-term scheduler**.
- It is responsible for suspending and resuming the process.
- Swapping may be necessary to improve the process mix or because a change in memory requirements has overcommitted available memory, requiring memory to be freed up.



# Schedulers

| Long-Term Scheduler   | Short-Term Scheduler                                       | Medium-Term Scheduler   |
|---|--|---|
| It is a job scheduler   | It is a CPU scheduler                                      | It is a process swapping scheduler.   |
| Speed is lesser than short term scheduler                               | Speed is fastest among other two                           | Speed is in between both short and long term scheduler.                     |
| It controls the degree of multiprogramming                              | It provides lesser control over degree of multiprogramming | It reduces the degree of multiprogramming.                                  |
| It is almost absent or minimal in time sharing system                   | It is also minimal in time sharing system                  | It is a part of Time sharing systems.                                       |
| It selects processes from pool and loads them into memory for execution | It selects those processes which are ready to execute      | It can re-introduce the process into memory and execution can be continued. |