# Common Task: OS (Task 1)

Explain what waiting time and turnaround time means in the context of process scheduling.

### Waiting Time

**Definition**: Waiting time is the total time a process spends in the ready queue waiting to be executed. It does not include the time during which the process is executing on the CPU.

Formula:

Waiting Time = Turnaround Time − Burst Time

Significance:

1. Lower waiting time is generally desirable as it means processes are spending less time waiting to be executed.
2. Reducing waiting time improves system responsiveness and overall performance.

### Turnaround Time

**Definition**: Turnaround time is the total time taken from the submission of a process to the completion of the process. It includes all the time spent waiting in the ready queue, the time spent executing on the CPU, and any other delays

Formula:

Turnaround Time = Completion Time − Arrival Time

**Significance**:

1. Turnaround time gives an indication of how quickly processes are completed.
2. Minimizing turnaround time ensures that processes finish faster, improving the throughput of the system.

Example:

|  |  |  |
| --- | --- | --- |
| Process | Arrival Time | Burst Time |
| P1 | 0 | 4 |
| P2 | 1 | 3 |
| P3 | 2 | 1 |
| P4 | 3 | 2 |

Using FIFO scheduling, the processes are executed in the order they arrive.

* **Process P1**:
  + Arrival Time: 0
  + Start Time: 0 (since it arrives first)
  + Completion Time: 4 (0 + 4)
  + Turnaround Time: 4 (Completion Time - Arrival Time)
  + Waiting Time: 0 (Turnaround Time - Burst Time)
* **Process P2**:
  + Arrival Time: 1
  + Start Time: 4 (after P1 completes)
  + Completion Time: 7 (4 + 3)
  + Turnaround Time: 6 (7 - 1)
  + Waiting Time: 3 (6 - 3)
* **Process P3**:
  + Arrival Time: 2
  + Start Time: 7 (after P2 completes)
  + Completion Time: 8 (7 + 1)
  + Turnaround Time: 6 (8 - 2)
  + Waiting Time: 5 (6 - 1)
* **Process P4**:
  + Arrival Time: 3
  + Start Time: 8 (after P3 completes)
  + Completion Time: 10 (8 + 2)
  + Turnaround Time: 7 (10 - 3)
  + Waiting Time: 5 (7 - 2)