**Operating Systems: Questions**

*Q1. Schedule the jobs given below using FCFS algorithm. Find CT, TAT, WT, Average TAT and Average WT.*

|  |  |  |
| --- | --- | --- |
| Process Number | Arrival Time | Burst Time |
| 1 | 0 | 4 |
| 2 | 1 | 3 |
| 3 | 2 | 1 |
| 4 | 3 | 2 |
| 5 | 4 | 5 |

Answer

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| P1 | P2 | P3 | P4 | P5 |

0 4 7 8 10 15

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Process Number | Arrival Time(AT) | Burst Time(BT) | **Completion Time(CT)** | **TAT = CT – AT** | **WT = TAT - BT** |
| 1 | 0 | 4 | 4 | 4 | 0 |
| 2 | 1 | 3 | 7 | 6 | 3 |
| 3 | 2 | 1 | 8 | 6 | 5 |
| 4 | 3 | 2 | 10 | 7 | 5 |
| 5 | 4 | 5 | 15 | 11 | 6 |

***Now in non-preemptive FCFS algorithm, Response Time (the first time a process gets scheduled) is equal to the Waiting time.***

**Average Turn Around Time = 4 + 6 + 6 + 7 + 11/ 5 = 6.8**

**Average waiting time = 0 + 3 + 5 + 5 + 6 / 5 = 3.8**

It is not always going to be that your processes are coming one after the other in consecutive Arrival Times. There might be gaps in the Gantt chart. These gaps can be the extra time taken by the processes to come into memory and then get scheduled. This is primarily context switching time.

*Q2. Schedule the given processes using FCFS algorithm when the context switching time is on 1 unit.*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Process No. | Arrival Time | Burst Time | Completion Time | Turn Around Time | Waiting Time |
| 1 | 0 | 3 | 4 | 4 | 1 |
| 2 | 1 | 2 | 7 | 6 | 4 |
| 3 | 2 | 1 | 9 | 7 | 6 |
| 4 | 3 | 4 | 14 | 11 | 7 |
| 5 | 4 | 5 | 20 | 16 | 11 |
| 6 | 5 | 2 | 23 | 18 | 16 |

Context Switching Time = 1 unit.

Essentially this time is taken by the highlighted part: **Short Term Scheduler -> Dispatcher ->** (Process schedule)

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | P1 |  | P2 |  | P3 |  | P4 |  | P5 |  | P6 |

0 1 4 5 7 8 9 10 14 15 20 21 23

Useless time = Context switching time which is an **OVERHEAD** = 6 units

Inefficiency = 6/23 \* 100 = 26

Efficiency = 1 – inefficiency (1-6/23)/100