**Department of Information Engineering Technology**

**Superior University Lahore**

**Assignment-2**

**SUBJECT: Operating System COURSE CODE: TIT601460**

**Due Date: 21-11-2023 MARKS: 10**

**TERM: FALL 2023 DATED: 18-11-2023**

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| **Sr. No** | **CLO** | **Domain** | **Taxonomy Level** | **PLO** |
| **1** | **Explain** the fundamental components and functions of an operating system, its role in managing computer resources, and its process models. | Cognitive | C2 | 1 |
| **2** | **Analyze** different scheduling algorithms, their objectives, and criteria for scheduling decisions. | Cognitive | C4 | 2 |
| **3** | **Apply** the concept of memory management (physical/virtual), paging segmentation, and page replacement algorithms. | Cognitive | C3 | 2 |
| **4** | **Describe** the concepts of multitasking, threads, multithreading models, concurrent processes, issues related to race conditions and deadlock situations in the context of operating systems. | Cognitive | C2 | 1 |

**Guidelines:**

* Submit all questions in **hardcopy** form.
* In case of copy paste, marks will be **deducted.**
* No assignment will be accepted after due date.

**Question No. 1:**

Compare different scheduling algorithm and discuss which scheduling algorithm is faster?

Ans :

* **FCFS (First-Come, First-Served):**

The FCFS is better for a small burst time.

* **SJF (Shortest Job First):**

The SJF is better if the process comes to processor simultaneously.

* **Round Robin**

Round Robin, is better to adjust the average waiting time desired. Round Robin quantum time will set it towards more SJF or FCFS value.

All algorithm is good, but the speed of the process depends on the processor load

**Question No. 1:**

**Shortest Job First**

P1

**Non-Preemptive :**

P2

P3

1

6

0

P4

3

5

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Process No.** | **Arrival Time** | **Burst Time** | **Completion Time** | **Turn Around Time** | **Waiting Time** | **Response Time** |
| **P1** | 0 | 2 | 3 | 3 | 1 | 1 |
| **P2** | 0 | 1 | 1 | 1 | 0 | 0 |
| **P3** | 2 | 2 | 5 | 3 | 1 | 3 |
| **P4** | 5 | 1 | 6 | 1 | 0 | 5 |

**Average Turnaround Time: (3 + 1 + 3 + 1) / 4 = 8 / 4 = 2**

**Average Waiting Time: (1 + 0 + 1 + 0) / 4 = 2 / 4 = 0.5**

**Shortest Job First**

P1

**Preemptive :**

P2

P4

1

6

0

P4

3

5

P3

4

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Process No.** | **Arrival Time** | **Burst Time** | **Completion Time** | **Turn Around Time** | **Waiting Time** | **Response Time** |
| **P1** | 0 | 2 | 3 | 3 | 1 | 1 |
| **P2** | 0 | 1 | 1 | 1 | 0 | 0 |
| **P3** | 2 | 2 | 5 | 3 | 1 | 3 |
| **P4** | 5 | 1 | 6 | 1 | 0 | 5 |

**Average Turnaround Time: (3 + 1 + 3 + 1) / 4 = 8 / 4 = 2**

**Average Waiting Time: (1 + 0 + 1 + 0) / 4 = 2 / 4 = 0.5**

**Question No 3 :**

Consider the set of 4 processes whose arrival time and burst time are given below-

|  |  |  |  |
| --- | --- | --- | --- |
| **Process No.** | **Arrival Time** | **Priority** | **Burst Time** |
| **P1** | 0 | 2 | 2 |
| **P2** | 2 | 3 | 1 |
| **P3** | 3 | 1 | 2 |

After analyze different scheduling algorithms, make Gantt chart and calculate the completion time, average waiting time and turnaround time, if the CPU scheduling policy is Priority Scheduling (preemptive).

**(Lower number means higher priority).**

P1

P3

2

0

3

P2

5

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Process No.** | **Arrival Time** | **Priority** | **Burst Time** | **Completion Time** | **Turn Around Time** | **Waiting Time** | **Response Time** |
| **P1** | 0 | 2 | 2 | 2 | 2 | 0 | 0 |
| **P2** | 2 | 3 | 1 | 3 | 1 | 0 | 2 |
| **P3** | 3 | 1 | 2 | 5 | 2 | 0 | 3 |

**Average Waiting Time=(0+0+0​)/3=0**

**Average Turnaround Time=(2+1+2​)/3=5/3**