**Lab Assignment 5**

**To perform: Create and execute C programs for following CPU Scheduling Algorithms:**

**Q1. First Come First Serve (FCFS)**

**🔹 Description:**

* **This is the simplest scheduling algorithm.**
* **Processes are scheduled in the order they arrive in the ready queue.**
* **It is non-preemptive, meaning once a process starts execution, it runs till completion.**

**🔹 Characteristics:**

* **Easy to implement using a FIFO (First-In-First-Out) queue.**
* **Longer waiting times for processes that arrive later.**
* **Can cause convoy effect (a short process waits for a long one to finish).**

**🔹 Example:**

|  |  |  |
| --- | --- | --- |
| Process | Arrival Time | Burst Time |
| P1 | **0** | **5** |
| P2 | **1** | **3** |
| P3 | **2** | **1** |

**Execution Order: P1 → P2 → P3  
Waiting Times: P1 = 0, P2 = 4, P3 = 6  
Average Waiting Time: (0+4+6)/3 = 3.33**

**Q2. Shortest Job First (SJF)**

**🔹 Description:**

* **The process with the shortest burst time is executed first.**
* **It can be preemptive (Shortest Remaining Time First) or non-preemptive.**
* **Minimizes average waiting time.**

**🔹 Characteristics:**

* **Best for batch systems.**
* **Requires prior knowledge or estimation of the burst time.**
* **May lead to starvation of long processes if short ones keep arriving.**

**🔹 Example (Non-Preemptive):**

|  |  |  |
| --- | --- | --- |
| Process | Arrival Time | Burst Time |
| P1 | **0** | **8** |
| P2 | **1** | **4** |
| P3 | **2** | **2** |
| P4 | **3** | **1** |

**Execution Order: P1 → P4 → P3 → P2 (depends on arrival and burst times)**

**Q3. Round Robin Scheduling**

**🔹 Description:**

* **Each process is assigned a fixed time slice (quantum).**
* **After a time quantum, the process is preempted and moved to the back of the queue.**
* **Suitable for time-sharing systems.**

**🔹 Characteristics:**

* **Preemptive scheduling.**
* **Fair: Every process gets an equal share of CPU time.**
* **Performance depends on the size of the time quantum:**
  + **Too small → Too many context switches.**
  + **Too large → Becomes like FCFS.**

**🔹 Example:**

**Let Time Quantum = 2**

|  |  |  |
| --- | --- | --- |
| Process | Arrival Time | Burst Time |
| P1 | **0** | **5** |
| P2 | **1** | **4** |
| P3 | **2** | **2** |

**Execution Order: P1 (2) → P2 (2) → P3 (2) → P1 (3) → P2 (2)**