Al-Safwa High Institute of Engineering
Al-Safwa
معهد الصفوة العالي للهندسة

Report on FCFS (First-Come, First-Serve) Scheduling Algorithm

Table of Contents

1. Introduction

The First-Come, First-Serve (FCFS) scheduling algorithm is one of the simplest and most straightforward process scheduling methods used in operating systems. It processes tasks in the order they arrive, much like a queue in real-life scenarios such as people waiting in line for service. In this report, we will discuss how FCFS works, its advantages and disadvantages, and provide an illustrative example.

2. How FCFS Works

FCFS is a non-preemptive scheduling algorithm, meaning once a process starts its execution, it runs to completion without being interrupted. The CPU selects processes based on their arrival time, processing the earliest arrivals first. This approach is similar to a queue, where the first person to arrive is the first to be served.

Step-by-Step Execution:
1. Queue Formation: All processes are placed in a queue in the order of their arrival. The process at the front of the queue is chosen for execution first.
2. Execution Order: The CPU executes the first process in the queue to completion. After the current process completes, the CPU picks the next process in line.
3. Calculation of Metrics: Waiting Time (time a process spends waiting in the queue before its execution starts) and Turnaround Time (total time from the arrival of the process to its completion, including both waiting time and burst time).

3. Example

Let's consider a set of processes with the following details:

Process ID	Arrival Time	Burst Time
P1	0	4
P2	1	3
P3	2	1

Execution Order:
1. The CPU starts with P1 because it arrived first (at time 0).
2. After P1 completes (at time 4), the CPU executes P2, which arrived at time 1 but had to wait until P1 finished.
3. Finally, P3 is executed after P2 completes.

Calculations:
- Waiting Times: P1: 0, P2: 4, P3: 7
- Turnaround Times: P1: 4, P2: 7, P3: 8
- Average Waiting Time: (0 + 4 + 7) / 3 = 3.67 units

- Average Turnaround Time: (4 + 7 + 8) / 3 = 6.33 units
Gantt Chart: | P1 |------4------| P2 |---3---| P3 |-1-|

4. Advantages and Disadvantages

Advantages:
- Simplicity: FCFS is easy to implement and understand.
- Predictable: The order of process execution is predictable.

Disadvantages:
- Convoy Effect: A long process can delay many shorter processes, leading to increased waiting times.
- Poor Average Waiting Time: High average waiting time when there is significant variation in burst times.
- Non-Preemptive: Inefficient for time-sharing systems where response time is crucial.

5. Conclusion

The FCFS scheduling algorithm is an intuitive and simple approach to process management. However, its non-preemptive nature can result in inefficiencies, especially when there is a mix of long and short processes. It is suitable for batch processing but not ideal for interactive systems requiring quick responsiveness. Despite its drawbacks, FCFS is a fundamental concept in understanding basic process scheduling.

6. References

- Silberschatz, A., Galvin, P. B., & Gagne, G. (2018). Operating System Concepts (10th ed.). Wiley.
- Stallings, W. (2018). Operating Systems: Internals and Design Principles (9th ed.). Pearson.

7.Names:

1. Joesph George Wahba

2. Zeyad Saad Abdel-Fattah

3. Muhammed Ashraf El-Kateb

4. Zyad Gamal Saeed

5. Menna-Allah Ahmed

6. Abdelhalim Ramadan