SET-224 /CET-225
Operating Systems

LAB # 08

LAB Title

CPU Scheduling Algorithm-FCFS ,SJF

Assessment of CLO: 04, PLO: 05

Student Name:			
Roll No.			
Semester		Session	

S. No.	Perf. Level / Criteria	Excellent (2.5)	Good (2)	Satisfactory (1.5)	Needs Improvement (0 ~ 1)	Marks Obtained
1	Project Execution & Implementation	Fully functional, optimized, and well-structured.	Minor errors, mostly functional.	Some errors, requires guidance.	Major errors, non-functional, or not Performed.	
2	Results & Debugging Or Troubleshooting	Accurate results with effective debugging Or Troubleshooting.	Mostly correct, some debugging Or Troubleshooting needed.	Partial results, minimal debugging Or Troubleshooting.	Incorrect results, no debugging Or Troubleshooting, or not attempted.	
3	Problem-Solving & Adaptability (VIVA)	Creative approach, efficiently solves challenges.	Adapts well, minor struggles.	Some adaptability, needs guidance.	Lacks innovation or no innovation, unable to solve problems.	
4	Report Quality & Documentation	Clear, structured, with detailed visuals.	Mostly clear, minor gaps.	Some clarity issues, missing details.	Poorly structured, lacks clarity, or not submitted.	
					Total Marks Obtained Out of 10	

Experiment evaluated by

Instructor's Name	Engr.Bushra Aziz		
Date		Signature	

Objective: To implement and evaluate the First-Come, First-Served (FCFS) and Shortest Job First(SJF) CPU scheduling algorithm to understand its basic operation and impact on process waiting times and turnaround **time**

Theory:

1. **FCFS:**

First Come First Serve is a Non-preemptive Scheduling algorithm where each process is executed according to its arrival time.

Step 1: Input the number of processes required to be scheduled using FCFS, burst time for each process and its arrival time.

Step 2: Using enhanced bubble sort technique, sort the all given processes in ascending order according to arrival time in a ready queue.

Step 3: Calculate the Finish Time, Turnaround Time and Waiting Time for each process which in turn help to calculate Average Waiting Time and Average Turnaround Time required by CPU to schedule given set of process using FCFS.

Step 4: Process with less arrival time comes first and gets scheduled first by the CPU.

Step 5: Calculate the Average Waiting Time and Average Turn Around Time.

Step 6: Stop.

Sample Run:

Enter total number of processes (maximum 20):3

Enter Process Arrival Time and Burst time.

Calculate Waiting time and turnaround time for each process

Process	Arrival time	Burst time
P1	0 ms	18 ms
P2	2 ms	7 ms
P3	2 ms	10 ms

Gantt Chart

P1		P2		P3	
0 ms	18 ms	18 ms	25 ms	25 ms	35 ms

Process	Waiting Time	Turnaround Time
P1	0ms	18ms
P2	16ms	23ms
P3	23ms	33ms

Total waiting time: (0 + 16 + 23) = 39ms

Average waiting time: (39/3) = 13ms

Total turnaround time: (18 + 23 + 33) = 74ms

Average turnaround time: (74/3) = 24.66ms

SJF CPU SCHEDULING ALGORITHM

Shortest job first (SJF) or shortest job next, is a scheduling policy that selects the waiting process with the smallest execution time to execute next. SJN is a non-preemptive algorithm.

Step 1: Input the number of processes required to be scheduled using SJF, burst time for each process and its arrival time.

Step 2: Using selection sort technique, sort the all given processes in ascending order according to burst time in ascending order.

Step 3: Calculate the Finish Time, Turnaround Time and Waiting Time for each process which in turn help to calculate Average Waiting Time and Average Turnaround Time required by CPU to schedule given set of process

Step 4: Process with less Burst and arrival time comes first and gets scheduled first by the CPU.

Step 5: Calculate the Average Waiting Time and Average Turn Around Time.

Step 6: Stop.

Sample Run:

Enter number of process: 4

Enter Process Arrival Time and Burst time.

Process	Arrival time	Burst time
P1	3 ms	5 ms
P2	0 ms	4 ms
P3	4 ms	2 ms
P4	5 ms	4 ms

Gantt Chart

P2		P3		P4		P1	
0ms	4ms	4ms	6ms	6ms	10ms	10ms	15ms

Calculate Waiting time and turnaround time for each process

Process	Waiting Time	Turnaround Time
P1	7ms	12ms
P2	0ms	4ms
P3	0ms	2ms
P4	1ms	5ms

Total waiting time: (7 + 0 + 0 + 1) = 8ms

Average waiting time: (8/4) = 2ms

Total turnaround time: (12 + 4 + 2 + 5) = 23ms

Average turnaround time: (23/4) = 5.75ms

Terms and formulas used in above scheduling algorithms:

Completion Time: Time at which process completes its execution.

Turn Around Time: Time Difference between completion time and arrival time.

Turn Around Time = Completion Time – Arrival Time

Waiting Time (W.T): Time Difference between turnaround time and burst time.

Waiting Time = Turn Around Time – Burst Time.

Exercises

1. Write a Python program to implement and simulate the FCFS Algorithm.
2. Write a Python program to implement and simulate the SJF Algorithm.
3. Modify both algorithms for the different arrival time.