MULTI-LEVEL FEEDBACK QUEUE
SIMULATOR

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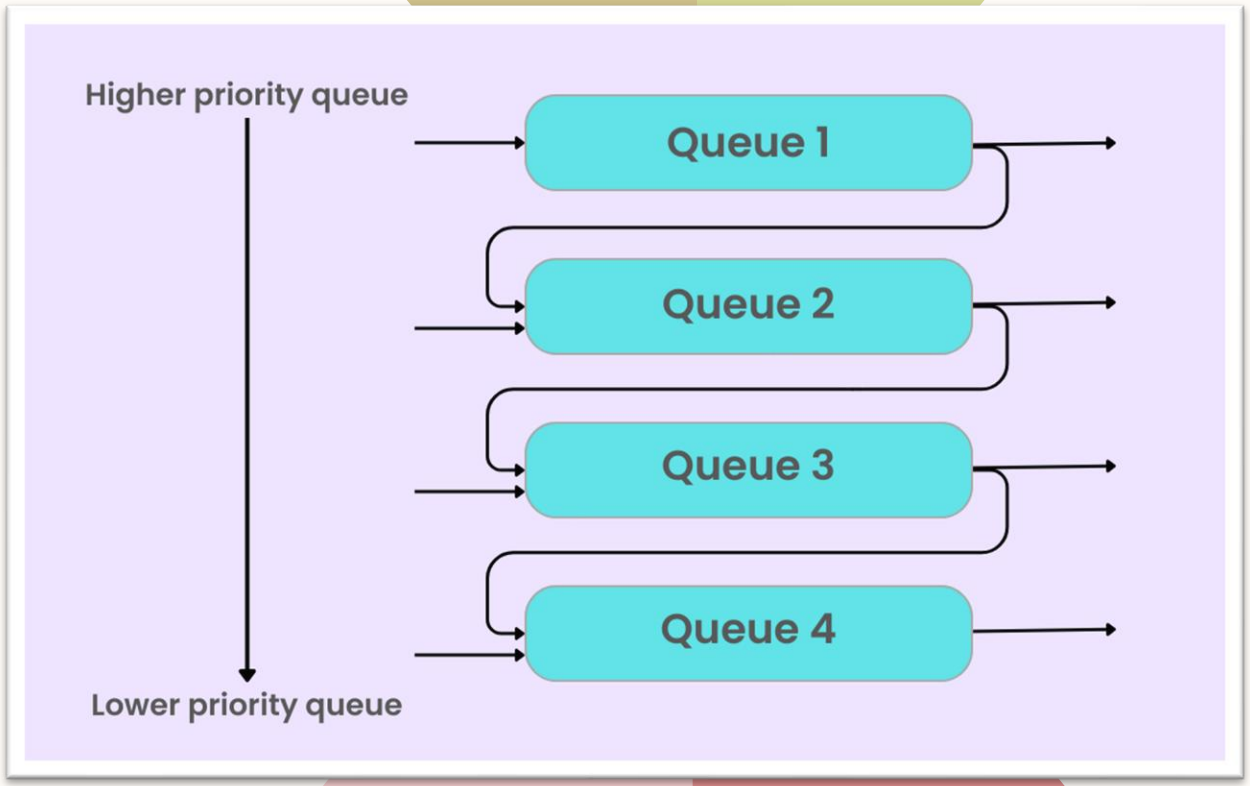
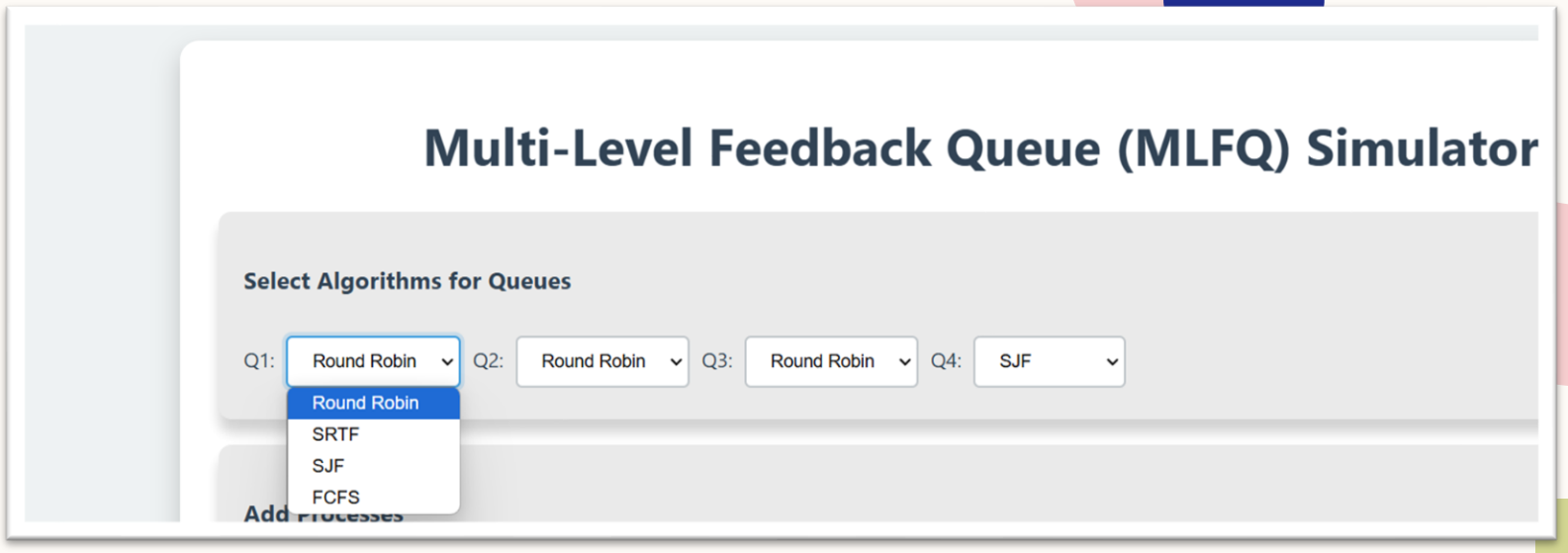
❖ Basic idea for our MLFQ simulator

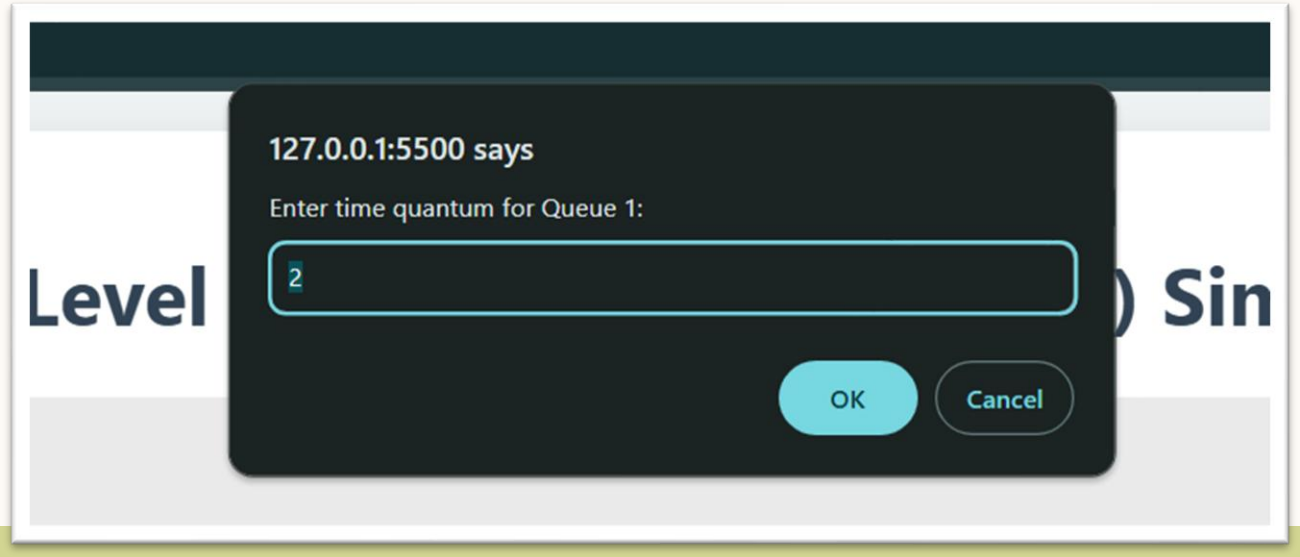
- In our Multilevel Feedback Queue (MLFQ) simulator (WEB version), users can assign different scheduling algorithms to each queue, such as Round Robin (RR), Shortest Remaining Time First (SRTF), Shortest Job First (SJF), or First Come First Serve (FCFS).
- Processes are assigned to queues based on their priority: higher-priority processes are placed in upper queues, while lower-priority processes are placed in lower queues.
- Each process runs in its assigned queue for a specified time quantum. If a process is not completed within this quantum, it is moved to a lower-priority queue. After the simulation, the program generates detailed outputs, including queue intervals and a Gantt chart illustrating the execution of processes.



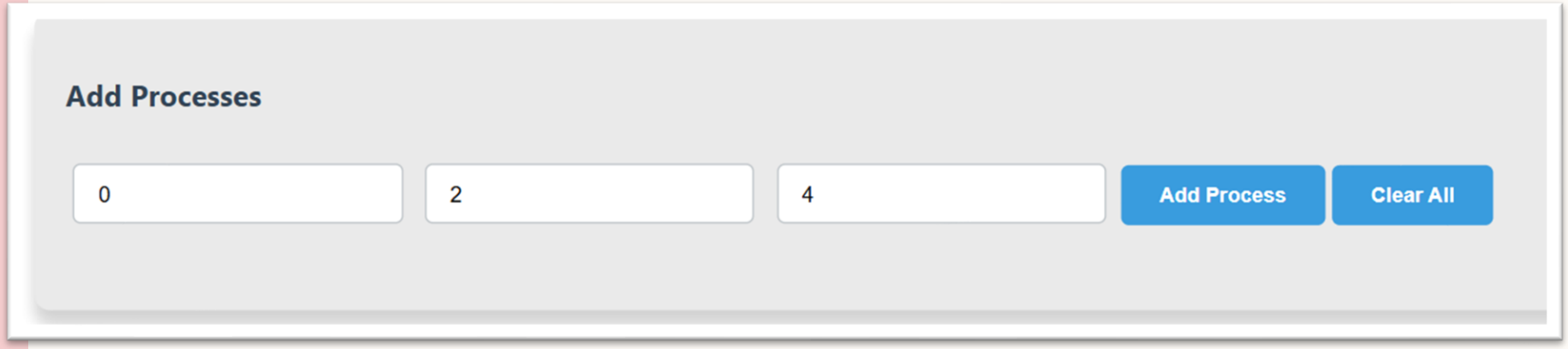
❖ Instructions to get familiar with the simulator

Here you can select whatever scheduling algorithm for each queue .



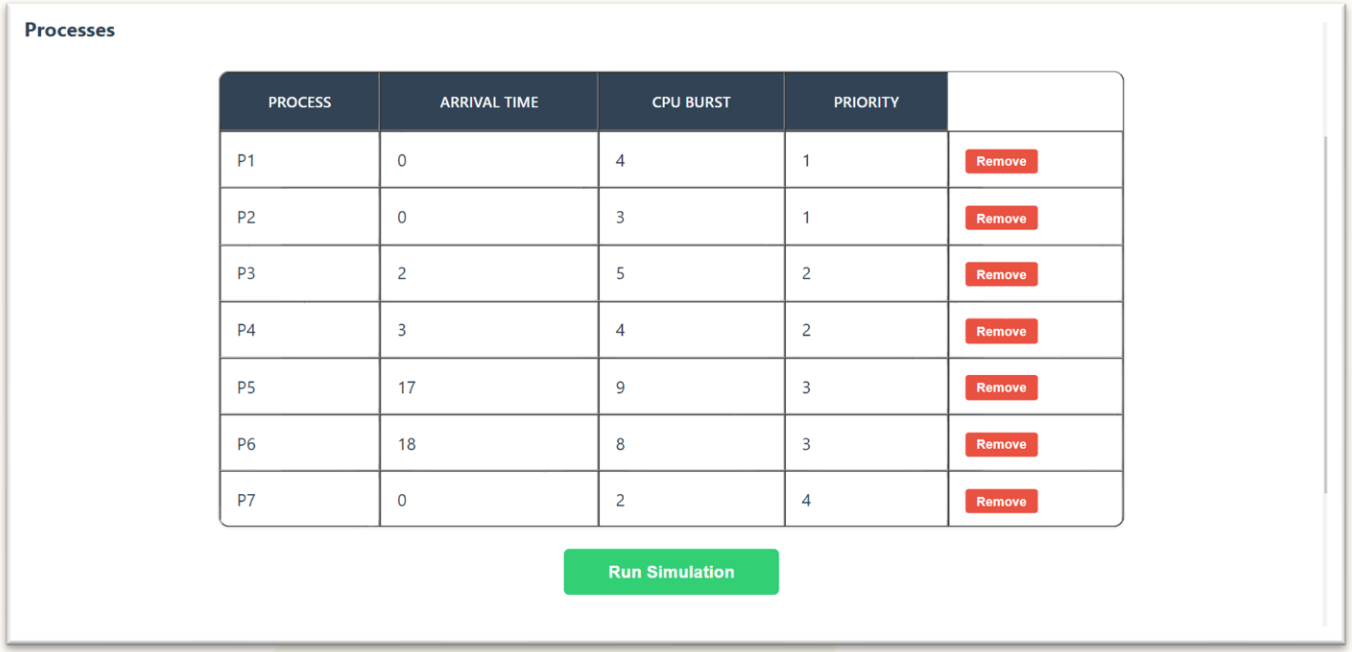


If you want to set to Round Robin(RR), it will ask for time quantum. But before selecting Round Robin(RR) select other schedular then select RR to work properly.

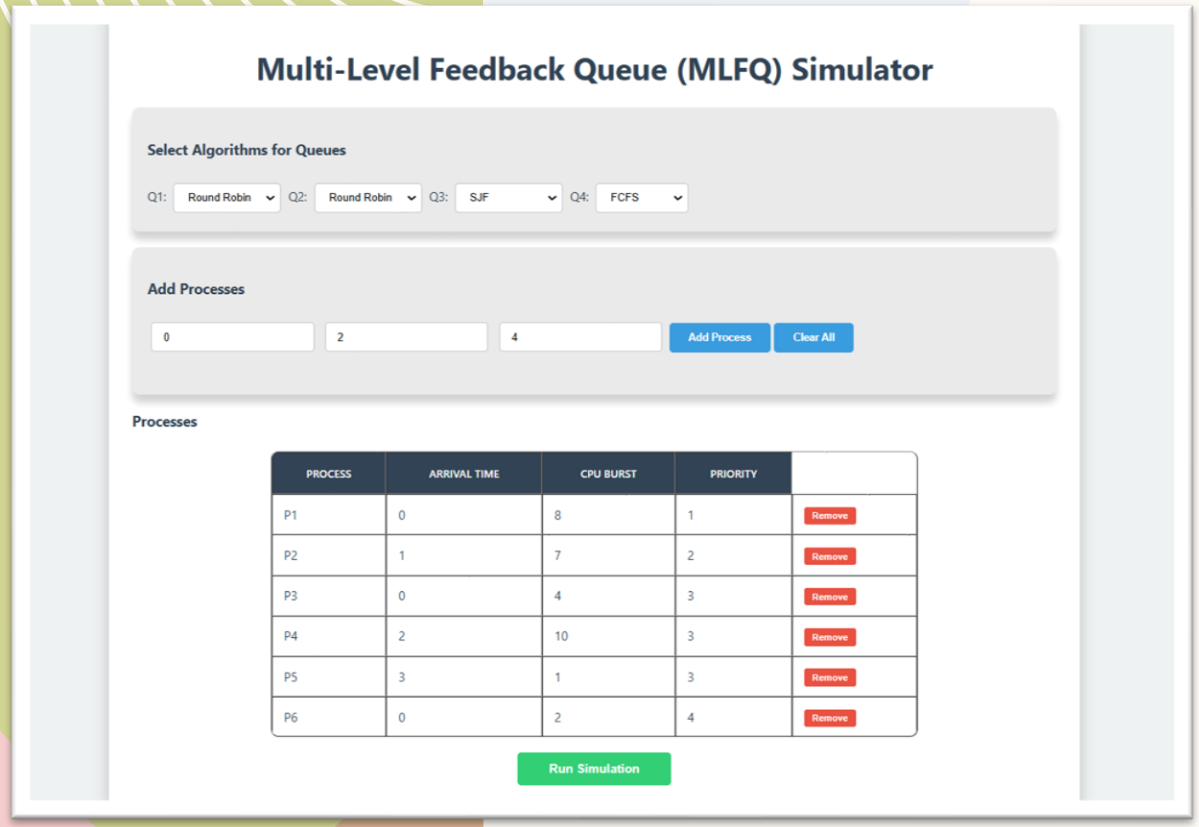


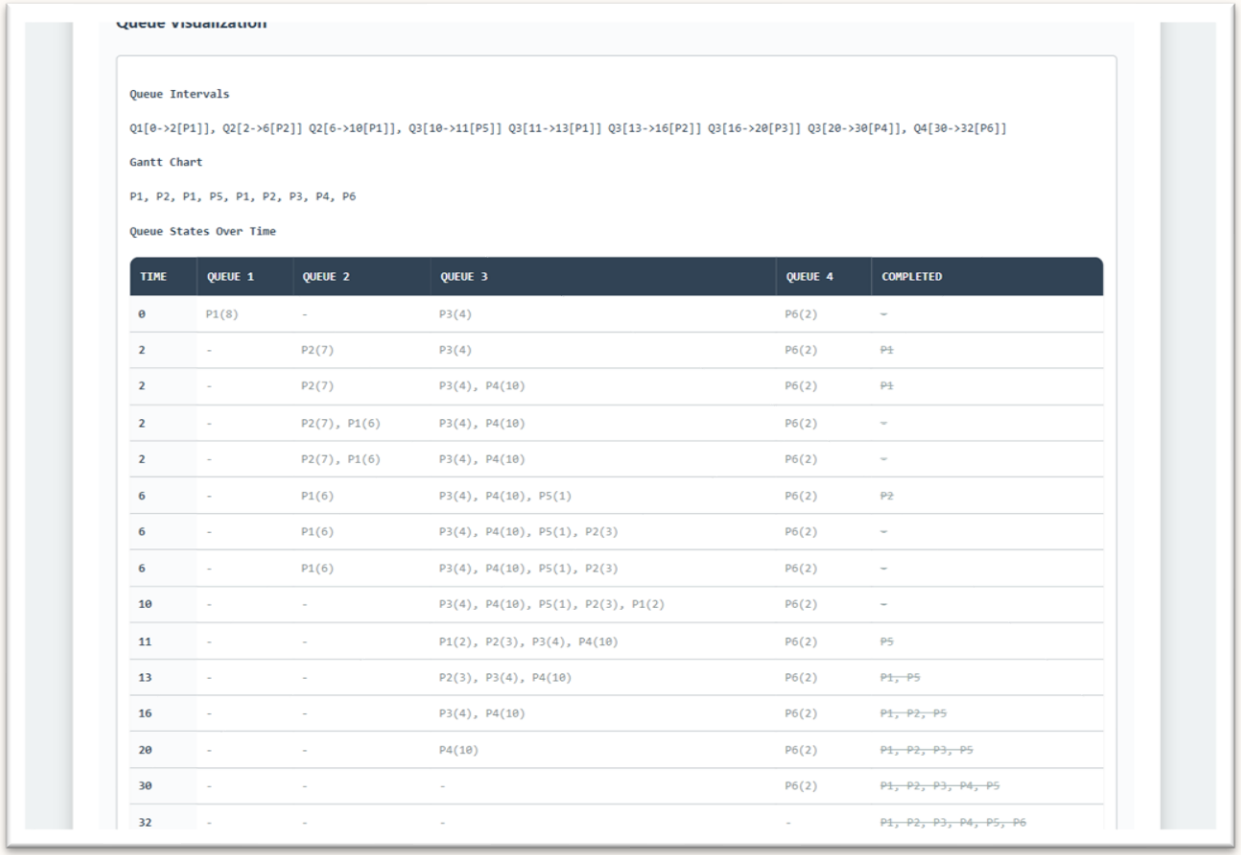
Here you can add the processes you want with Arrival Time, Burst Time and Priority.

After adding the processes, it will also show the table and you can run simulation by pressing the button.



❖ Here are some examples.





Queue Visualization

Queue Intervals

Q1[0->2[P1]], Q2[2->6[P2]] Q2[6->10[P1]], Q3[10->11[P5]] Q3[11->13[P1]] Q3[13->16[P2]] Q3[16->20[P3]] Q3[20->30[P4]], Q4[30->32[P6]]

Gantt Chart

P1, P2, P1, P5, P1, P2, P3, P4, P6

Queue States Over Time

TIME	QUEUE 1	QUEUE 2	QUEUE 3	QUEUE 4	COMPLETED
0	P1(8)	-	P3(4)	P6(2)	-
2	-	P2(7)	P3(4)	P6(2)	~~P1~~
2	-	P2(7)	P3(4), P4(10)	P6(2)	~~P1~~
2	-	P2(7), P1(6)	P3(4), P4(10)	P6(2)	-
2	-	P2(7), P1(6)	P3(4), P4(10)	P6(2)	-
6	-	P1(6)	P3(4), P4(10), P5(1)	P6(2)	~~P2~~
6	-	P1(6)	P3(4), P4(10), P5(1), P2(3)	P6(2)	-
6	-	P1(6)	P3(4), P4(10), P5(1), P2(3)	P6(2)	-
10	-	-	P3(4), P4(10), P5(1), P2(3), P1(2)	P6(2)	-
11	-	-	P1(2), P2(3), P3(4), P4(10)	P6(2)	~~P5~~
13	-	-	P2(3), P3(4), P4(10)	P6(2)	~~P1, P5~~
16	-	-	P3(4), P4(10)	P6(2)	~~P1, P2, P5~~
20	-	-	P4(10)	P6(2)	~~P1, P2, P3, P5~~
30	-	-	-	P6(2)	~~P1, P2, P3, P4, P5~~
32	-	-	-	-	~~P1, P2, P3, P4, P5, P6~~

Multi-Level Feedback Queue (MLFQ) Simulator

Select Algorithms for Queues

Q1: FCFS Q2: SJF Q3: Round Robin Q4: FCFS

Add Processes

0 | 4 | 3 | Add Process | Clear All

Processes

PROCESS	ARRIVAL TIME	CPU BURST	PRIORITY	
P1	0	5	1	Remove
P2	1	4	2	Remove
P3	2	3	2	Remove
P4	3	2	2	Remove
P5	4	1	2	Remove
P6	0	4	3	Remove

Run Simulation

Queue Visualization

Queue Intervals

Q1[0->5[P1]], Q2[5->6[P5]] Q2[6->8[P4]] Q2[8->11[P3]] Q2[11->15[P2]], Q3[15->17[P6]], Q4[17->19[P6]]

Gantt Chart

P1, P5, P4, P3, P2, P6, P6

Queue States Over Time

TIME	QUEUE 1	QUEUE 2	QUEUE 3	QUEUE 4	COMPLETED
5	-	-	P6(4)	-	~~P1~~
6	-	P4(2), P3(3), P2(4)	P6(4)	-	~~P1, P5~~
8	-	P3(3), P2(4)	P6(4)	-	~~P1, P4, P5~~
11	-	P2(4)	P6(4)	-	~~P1, P3, P4, P5~~
15	-	-	P6(4)	-	~~P1, P2, P3, P4, P5~~
15	-	-	P6(4)	-	~~P1, P2, P3, P4, P5~~
17	-	-	-	P6(2)	~~P1, P2, P3, P4, P5~~
19	-	-	-	-	~~P1, P2, P3, P4, P5, P6~~

Multi-Level Feedback Queue (MLFQ) Simulator

Select Algorithms for Queues

Q1: Round Robin Q2: SJF Q3: Round Robin Q4: FCFS

Add Processes

11 | 8 | 4 | Add Process | Clear All

Processes

PROCESS	ARRIVAL TIME	CPU BURST	PRIORITY	
P1	0	5	1	Remove
P2	0	4	2	Remove
P3	1	8	3	Remove
P4	11	8	4	Remove

Run Simulation

Queue Visualization

Queue Intervals

Q1[0->2[P1]], Q2[2->5[P1]] Q2[5->9[P2]], Q3[9->13[P3]], Q4[13->21[P4]] Q4[21->25[P3]]

Gantt Chart

P1, P1, P2, P3, P4, P3

Queue States Over Time

TIME	QUEUE 1	QUEUE 2	QUEUE 3	QUEUE 4	COMPLETED
0	P1(5)	P2(4)	-	-	~~-~~
2	-	P2(4)	P3(8)	-	~~P1~~
2	-	P2(4), P1(3)	P3(8)	-	~~-~~
5	-	P2(4)	P3(8)	-	~~P1~~
9	-	-	P3(8)	-	~~P1, P2~~
9	-	-	P3(8)	-	~~P1, P2~~
13	-	-	-	P4(8)	~~P1, P2, P3~~
13	-	-	-	P4(8), P3(4)	~~P1, P2~~
21	-	-	-	P3(4)	~~P1, P2, P4~~
25	-	-	-	-	~~P1, P2, P3, P4~~

Multi-Level Feedback Queue (MLFQ) Simulator

Select Algorithms for Queues

Q1: SJF Q2: SJF Q3: SJF Q4: FCFS

Add Processes

0 | 2 | 4 | Add Process | Clear All

Processes

PROCESS	ARRIVAL TIME	CPU BURST	PRIORITY	
P1	0	4	1	Remove
P2	0	3	1	Remove
P3	2	5	2	Remove
P4	3	4	2	Remove
P5	17	9	3	Remove
P6	18	8	3	Remove
P7	0	2	4	Remove

Run Simulation

Queue Visualization

Queue Intervals

Q1[0->3[P2]] Q1[3->7[P1]], Q2[7->11[P4]] Q2[11->16[P3]], Q3[18->26[P6]] Q3[26->35[P5]], Q4[16->18[P7]]

Gantt Chart

P2, P1, P4, P3, P7, P6, P5

Queue States Over Time

TIME	QUEUE 1	QUEUE 2	QUEUE 3	QUEUE 4	COMPLETED
3	P1(4)	-	-	P7(2)	~~P2~~
7	-	P3(5), P4(4)	-	P7(2)	~~P1, P2~~
11	-	P3(5)	-	P7(2)	~~P1, P2, P4~~
16	-	-	-	P7(2)	~~P1, P2, P3, P4~~
18	-	-	-	-	~~P1, P2, P3, P4, P7~~
26	-	-	P5(9)	-	~~P1, P2, P3, P4, P6, P7~~
35	-	-	-	-	~~P1, P2, P3, P4, P5, P6, P7~~

MLFQ Simulator link.

GitHub Repository link.

❖ References:

- https://www.geeksforgeeks.org/multilevel-feedback-queue-scheduling-mlfq-cpu-scheduling/
- https://www.youtube.com/watch?v=4bFeMIy-ekE

*Used AI tool copilot for debugging and to give various cases for testing.