Ain Shams University

Faculty of Engineering

OS Project

Schedulers

Presented to:

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Senior 1

Introduction:

Welcome in “Schedulers Software” this software is doing the scheduling to a set of processes of your choice.

Scheduling is the way the operating system does to arrange, control and optimize work and workloads in a production process or manufacturing process. It is used to allocate plant and machinery resources, plan human resources, plan production processes and purchase materials.

There many types of scheduling like:

a) First come first serve “FCFS”
b) Short job first “SJF
    a. Preemptive
    b. Non-preemptive
c) Priority
    a. Preemptive
    b. Non-preemptive
d) Round robin
e) Multi-level queue
f) Multilevel Feedback Queue

But in our software, we are handling the first 4 types only and calculate the average waiting time for each type.

Description:

As we will see the software based on entering the processes one by one and then the result will be shown in a separate window

For the bonus types, you can find:

1) **Interrupt:**

   You can enter a new process to the list of processes and the software will reschedule the processes and show the new result with new average waiting time based on the new scheduling

2) **Gaps handling:**

   This software also handles the gaps that when there is a gap in the middle of the processes "that there is no process to enter the scheduling process now" you can see a "NOP" in the Gantt chart.

   Except for

   - **preemptive priority and preemptive SJF "gaps can be handled only if the NOP is in the beginning of the list of processes else it will cause an error"**
   - **Round robin "not handled cause it does not depend on arrival time"**

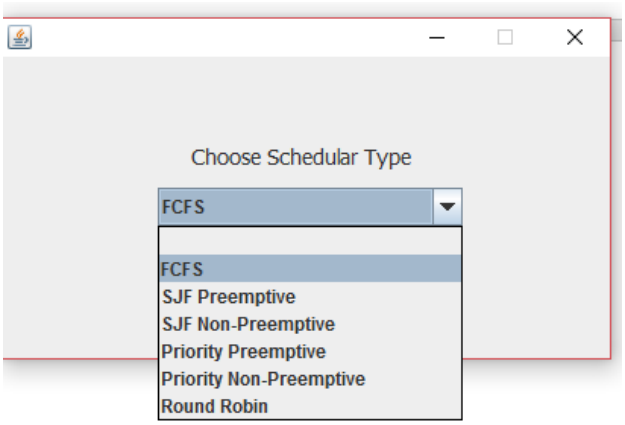
And you can return to the start window and choose another scheduling type.

In the next pages, you will see a guideline for how to use this application with screenshots and then you will find test cases for all operations this application can do.

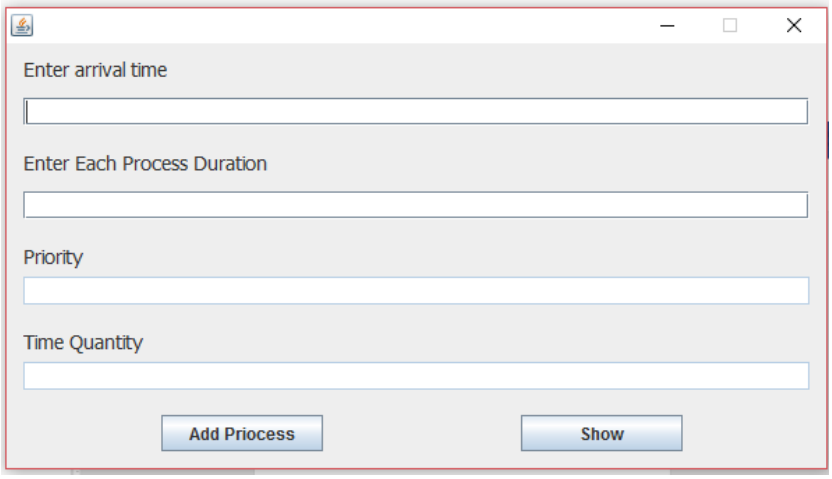
User guide:

Steps:

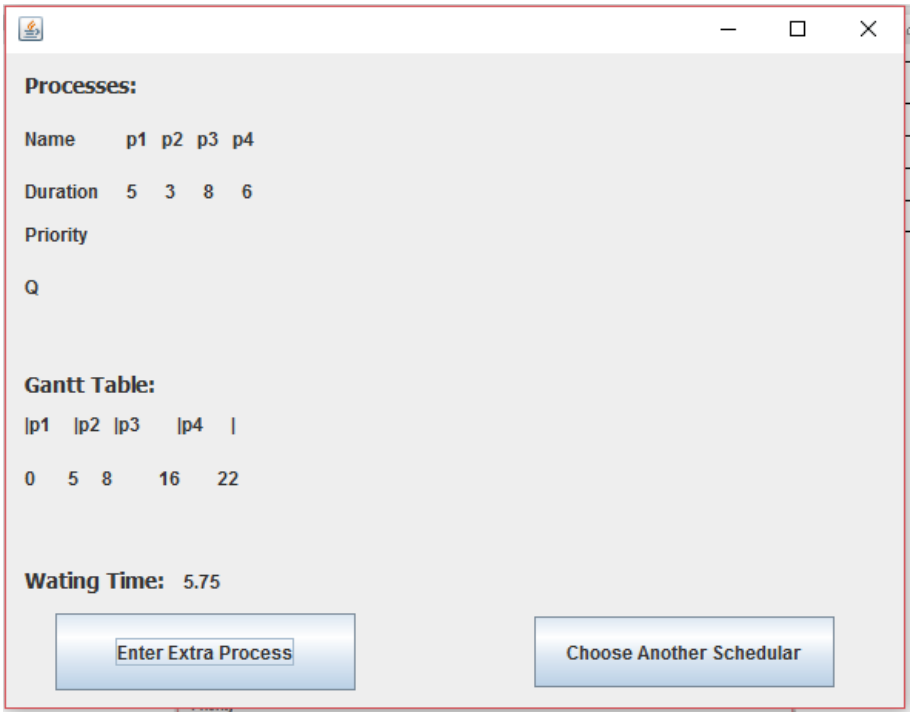
1) Choose the scheduler you want from the list and then press Start



2) Enter the processes one by one “arrival time, duration, priority “when prioirity scheduler”, q “when round robin” and then press “Add Process” and enter the next process
3) When you finish all processes press “Show”

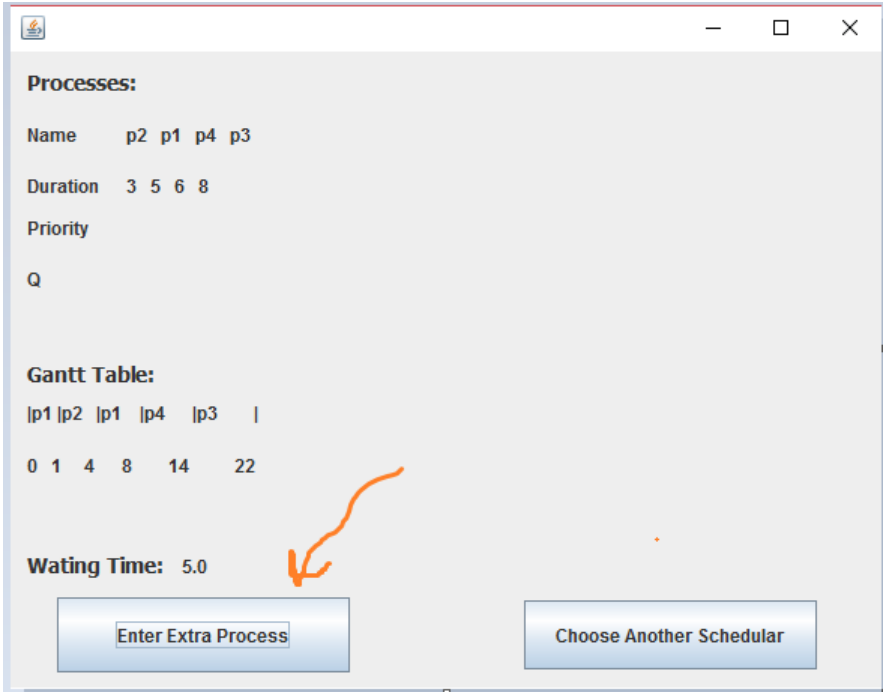


4) Then the result will be shown in a window

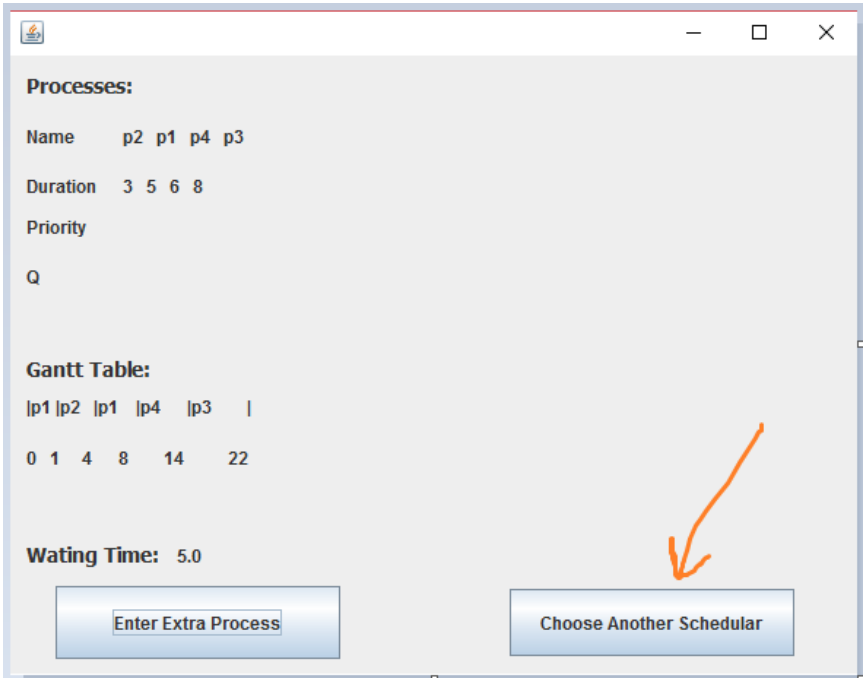


Other features:

- You can enter another process to the list by pressing “Enter Extra Process” and the processes frame will be open.



You can return and choose another scheduler type by pressing “Choose Another Scheduler” and you will see that the first frame will open again.



Test cases

without gaps

1. FCFS:

- Input:

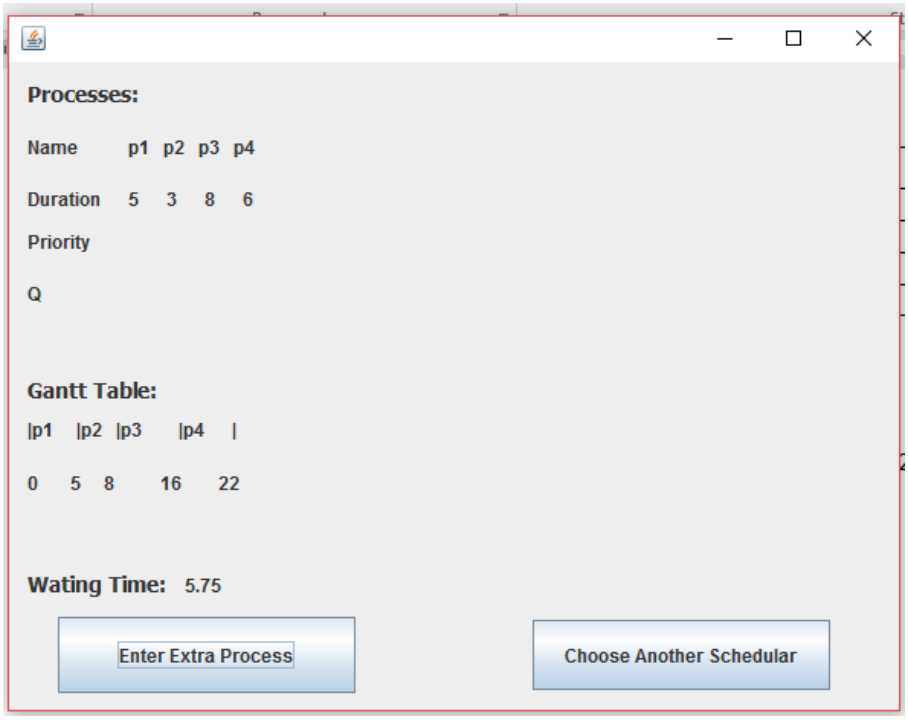
Name	Arrival Time	Burst Time
P1	0	5
P2	1	3
P3	2	8
P4	3	6

- Expected output:

P1	P2	P3	P4	
0	5	8	16	22

Expected waiting time: 5.75

- Program output:



2. Preemptive SJF:

- Input:

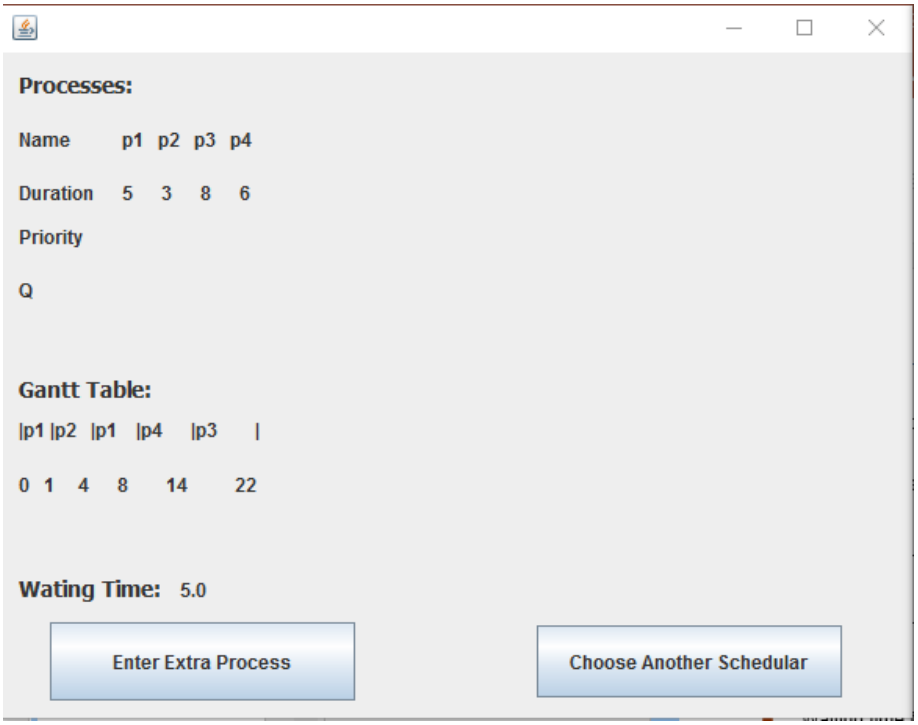
Name	Arrival Time	Burst Time
P1	0	5
P2	1	3
P3	2	8
P4	3	6

- Expected output:

P1	P2	P1	P4	P3	
0	1	4	8	14	22

- Expected waiting time: 5

- Program output:



3. Non-preemptive SJF:

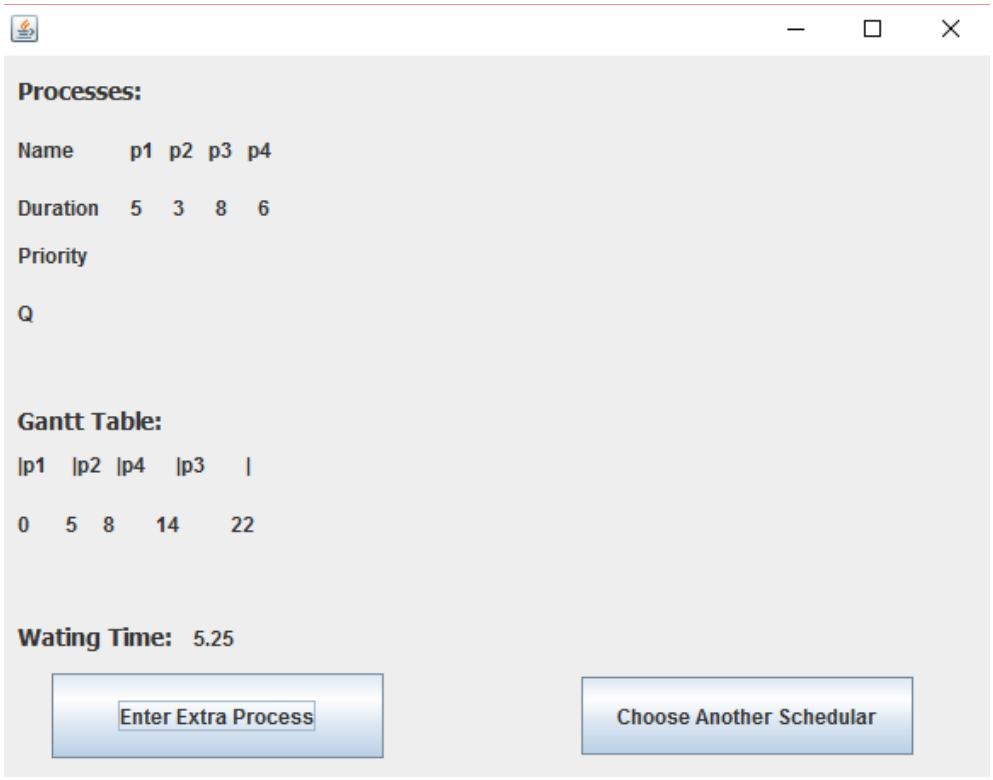
- Input:

Name	Arrival Time	Burst Time
P1	0	5
P2	1	3
P3	2	8
P4	3	6

- Expected output:

P1	P2	P4	P3	
0	5	8	14	22

- Expected waiting time: 5.25
- Program output:



4. Preemptive priority:

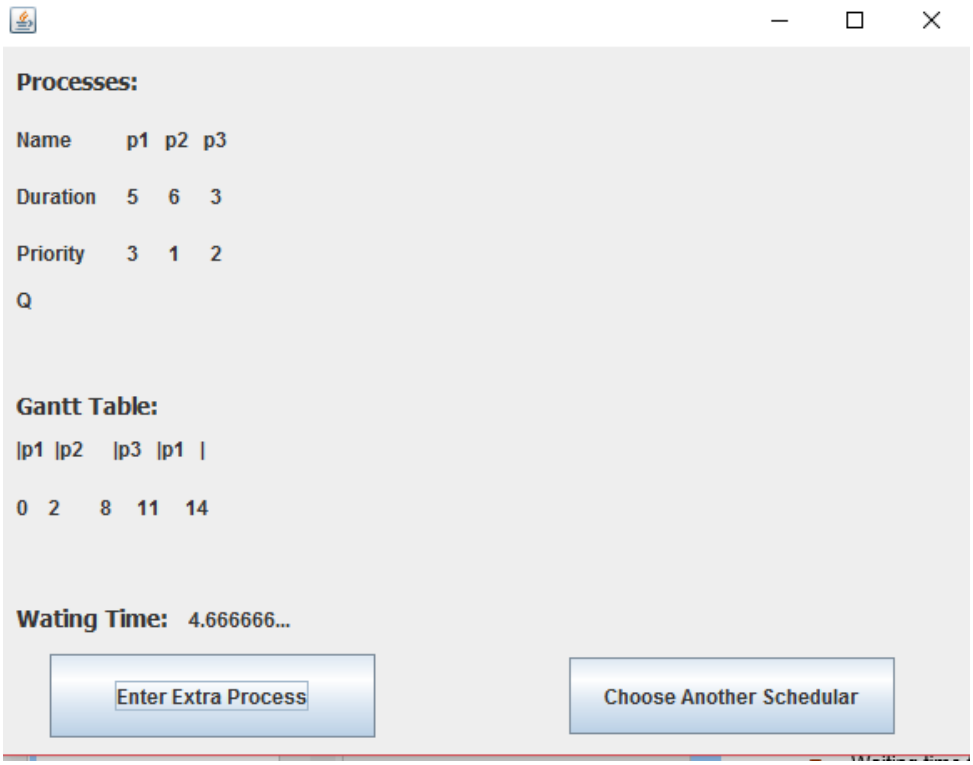
- Input:

Name	Arrival Time	Burst Time	Priority
P1	0	5	3
P2	2	6	1
P3	3	3	2

- Expected output:

P1	P2	P3	P1	
0	2	8	11	14

- Expected waiting time: 4.66666
- Program output:



5. Non-preemptive priority:

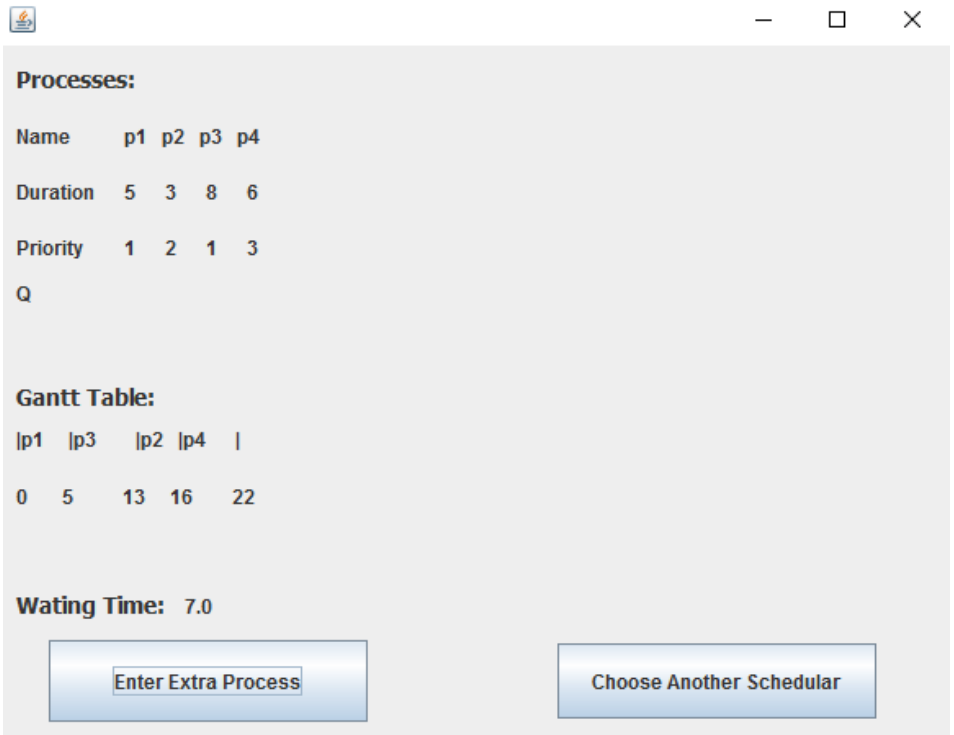
- Input:

Name	Arrival Time	Burst Time	Priority
P1	0	5	1
P2	1	3	2
P3	2	8	1
P4	3	6	3

- Expected output:

P1	P3	P2	P4	
0	5	13	16	22

- Expected waiting time: 7
- Program output:



6. Round Robin:

- Input:

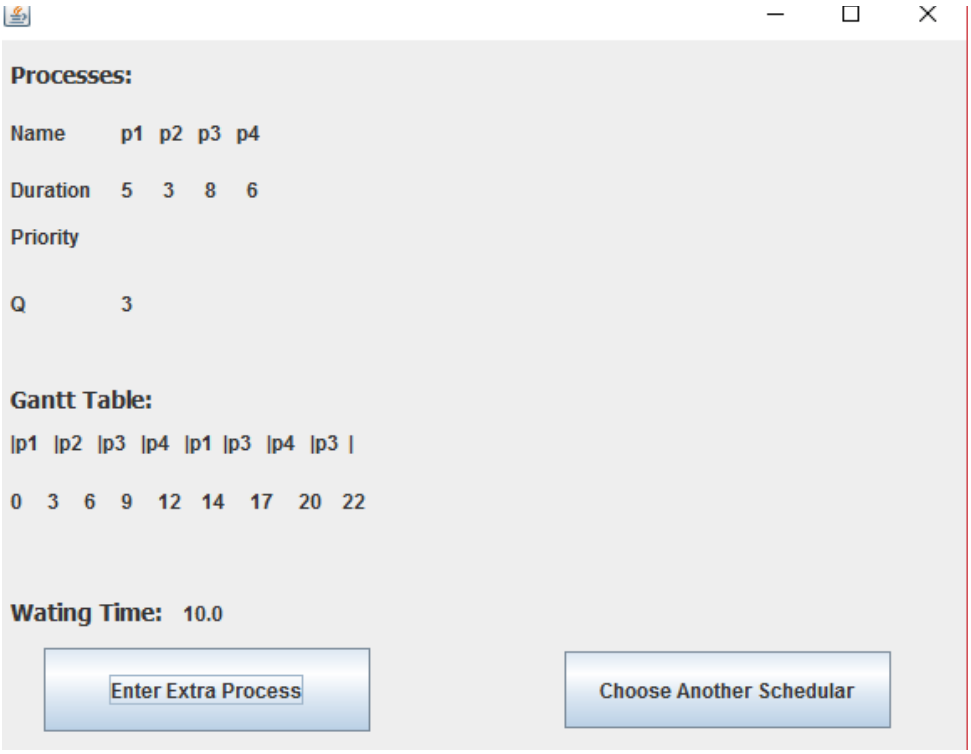
Name	Burst Time
P1	5
P2	3
P3	8
P4	6

With q=3

- Expected output:

P1	P2	P3	P4	P1	P3	P4	P3	
0	3	6	9	12	14	17	20	22

- Expected waiting time: 10
- Program output:



with gaps:

1. FCFS:

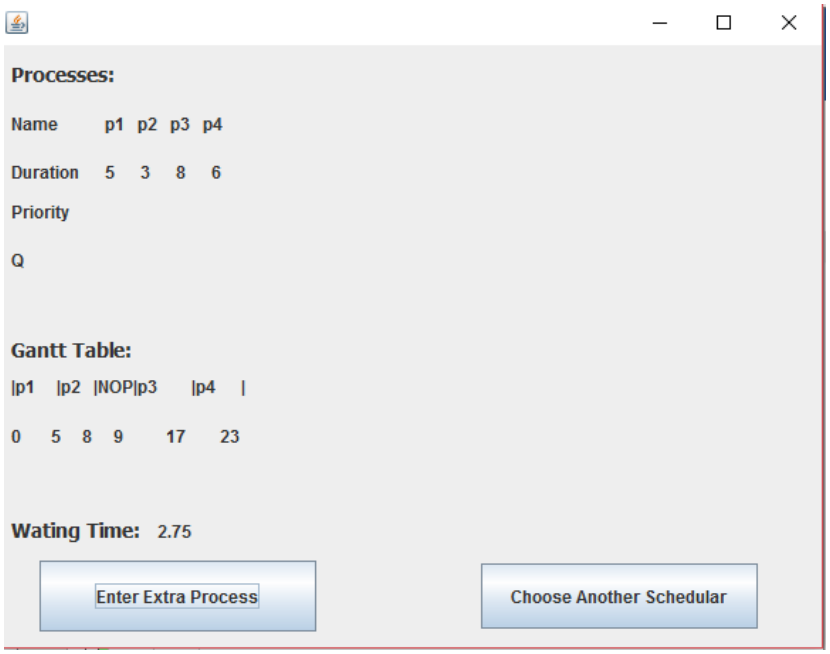
- Input:

Name	Arrival Time	Burst Time
P1	0	5
P2	1	3
P3	9	8
P4	10	6

- Expected output:

P1	P2	NOP	P3	P4	
0	5	8	9	17	23

- Expected waiting time: 2.75
- Program output:



2. Non-preemptive SJF:

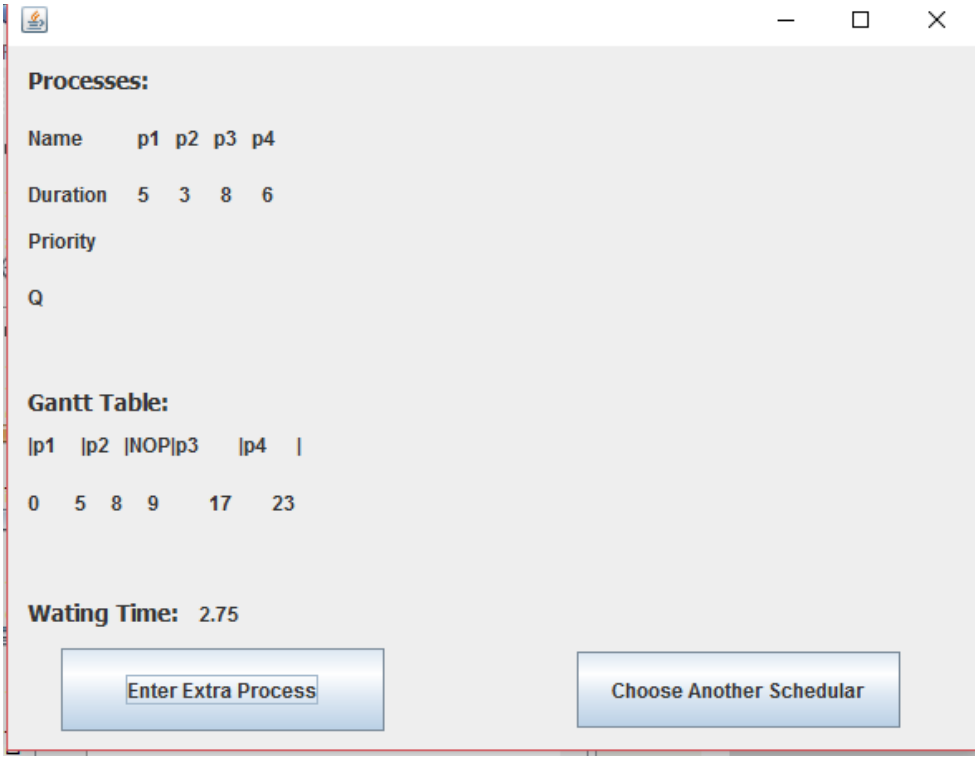
- Input:

Name	Arrival Time	Burst Time
P1	0	5
P2	1	3
P3	9	8
P4	10	6

- Expected output:

P1	P2	NOP	P3	P4	
0	5	8	9	17	23

- Expected waiting time: 2.75
- Program output:



3. Non-preemptive priority:

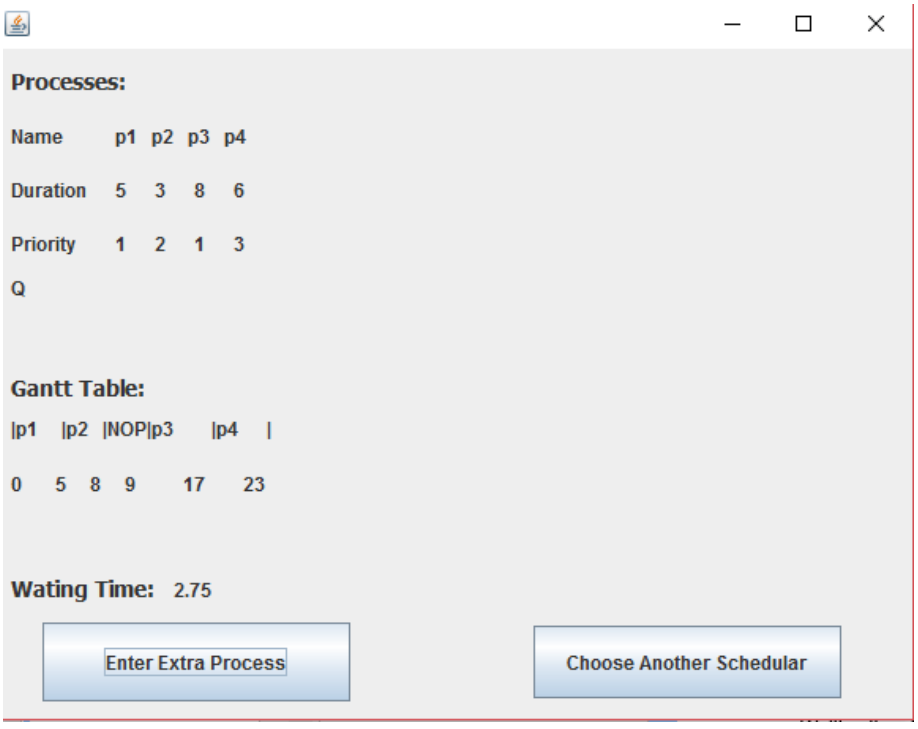
- Input:

Name	Arrival Time	Burst Time	Priority
P1	0	5	1
P2	1	3	2
P3	9	8	1
P4	10	6	3

- Expected output:

P1	P2	NOP	P3	P4	
0	5	8	9	17	23

- Expected waiting time: 2.75
- Program output:



- Or as an example we can just start the previous testcases from1 not 0 and then just NOP process will be in the beginning of the Gantt chart and the average witing time will be the same

4. Preemptive priority:

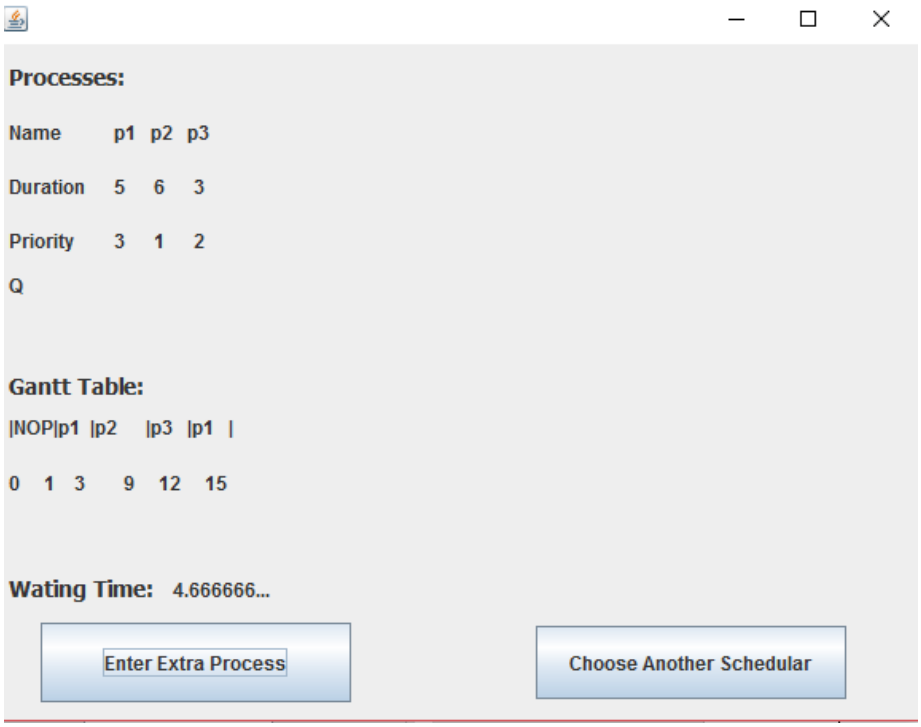
- Input:

Name	Arrival Time	Burst Time	Priority
P1	1	5	3
P2	3	6	1
P3	4	3	2

- Expected output:

NOP	P1	P2	P3	P1	
0	1	3	9	12	15

- Expected waiting time: 4.66666
- Program output:



5. Preemptive SJF:

- Input:

Name	Arrival Time	Burst Time
P1	1	5
P2	2	3
P3	3	8
P4	4	6

- Expected output:

NOP	P1	P2	P1	P4	P3	
0	1	2	5	9	15	23

- Expected waiting time: 5
- Program output: