

# Cpu-Scheduler

This project is for Operating System Course. it was written based on Windows Forms in Visual Studio with C#.

## Aim

implement a static and dynamic scheduler that supports

1. FCFS
2. SJF (Preemptive and Non Preemptive)
3. Priority (Preemptive and Non Preemptive) (the smaller the priority number the higher the priority)
4. Round Robin.

## Procedure Details

- A live scheduler is run with each 1 unit of time mapped to 1 second
- Remaining burst time table is updated as time progresses.
- An option to run the currently existing processes only without live scheduling must be available.

## Output

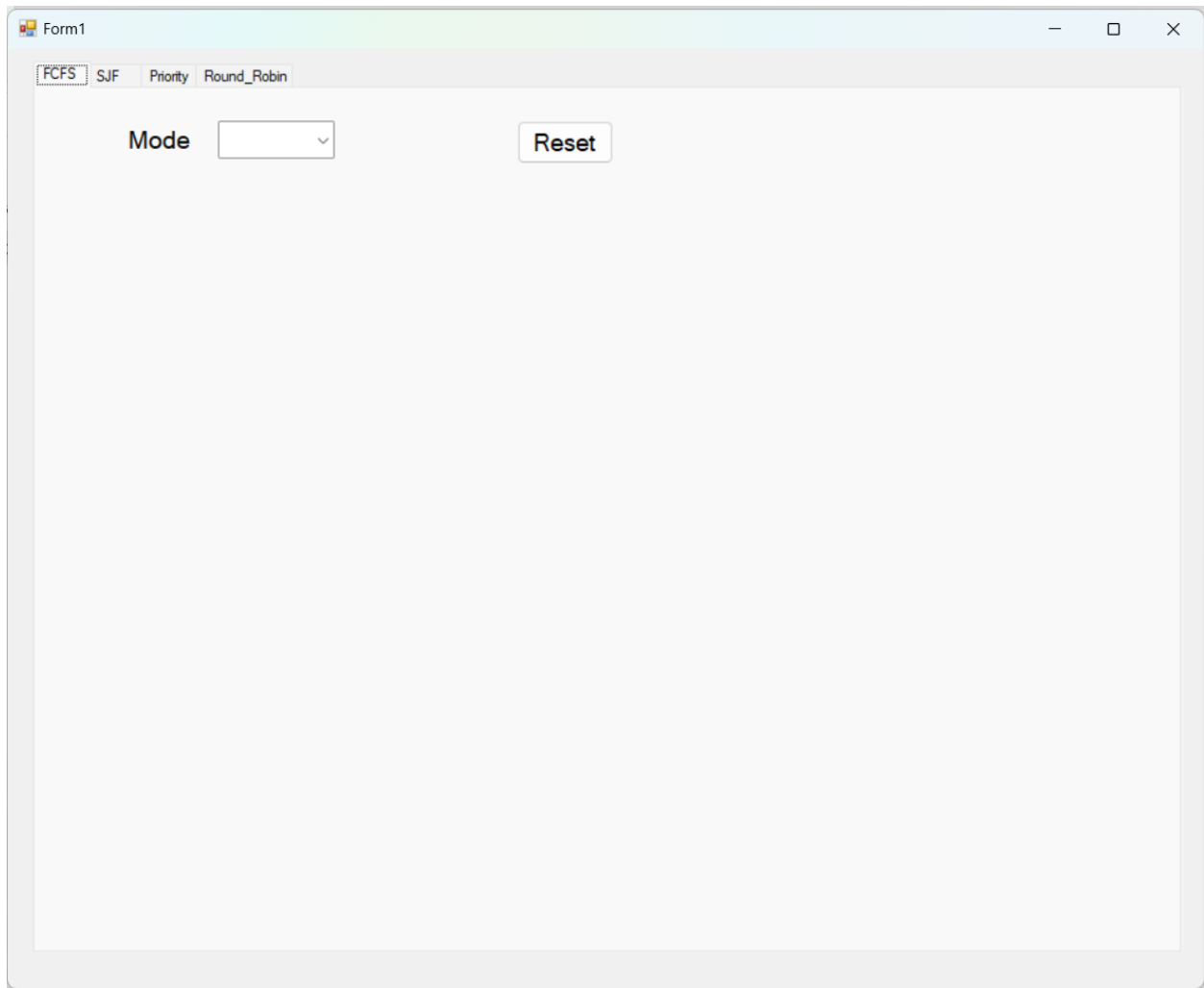
- Timeline showing the order and time taken by each process (Gantt Chart) drawn live.
- Average waiting time and average turnaround time
- Remaining burst time updated table live

# GUI

The image shows a graphical user interface (GUI) window titled "Form1". The window has a standard Windows-style title bar with minimize, maximize, and close buttons. Below the title bar is a tabbed interface with four tabs: "FCFS", "SJF", "Priority", and "Round\_Robin". The "FCFS" tab is currently selected. Below the tabs, there is a "Mode" label followed by a dropdown menu. To the right of the dropdown menu is a "Reset" button. The main area of the window is empty.

## 1.FCFS

It allows you to run only First Come First Served algorithm.



The screenshot shows a Windows application window titled "Form1". At the top, there is a menu bar with four options: "FCFS", "SJF", "Priority", and "Round\_Robin". The "FCFS" option is currently selected. Below the menu bar, there is a label "Mode" followed by a dropdown menu. To the right of the dropdown menu is a button labeled "Reset". The main area of the window is empty.

Form1

FCFS

SJF

Priority

Round\_Robin

Mode

Static

Reset

No of Processes

4

OK

Arrival Time

7

Burst Time

0

Insert

PID	Arrival	Burst
-----	---------	-------

Form1

FCFS

SJF

Priority

Round\_Robin

Mode

Dynamic

Reset

Burst Time

☐ LIVE

☐ JUMP

Insert

PID	Arrival	Burst
-----	---------	-------

sum of waiting time

0

sum of turnaround time

0

Average Waiting Time

0

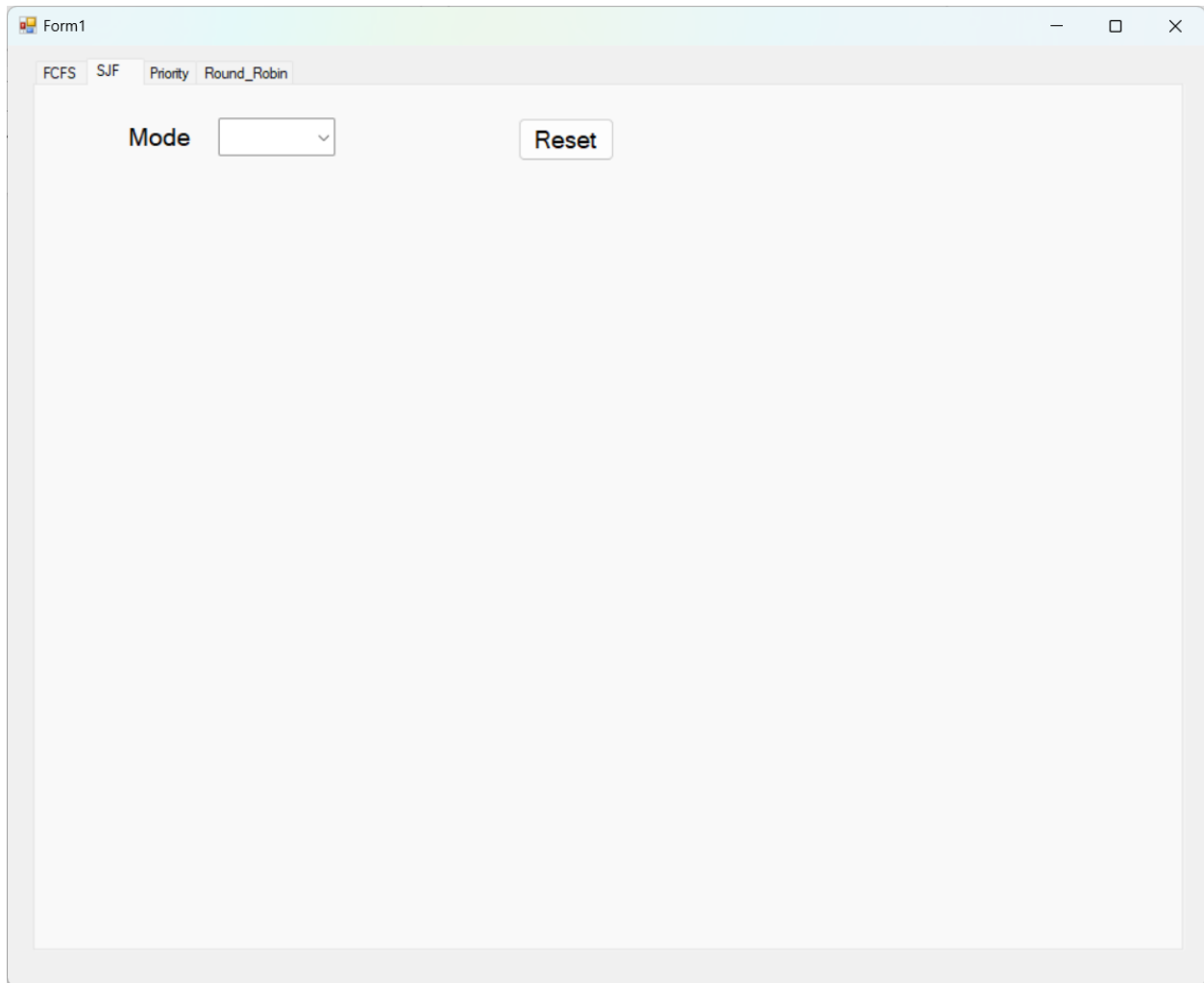
Average Turnaround Time

0

0 slot

## 2. SJF

It allows you to run only Shortest Job First algorithm



The image shows a screenshot of a Windows application window titled "Form1". The window has a standard Windows title bar with minimize, maximize, and close buttons. Inside the window, there is a tabbed interface with four tabs: "FCFS", "SJF", "Priority", and "Round\_Robin". The "SJF" tab is currently selected. Below the tabs, there is a label "Mode" followed by a dropdown menu. To the right of the dropdown menu is a button labeled "Reset". The main area of the window is currently empty.

Form1

PCFS SJF Priority Round\_Robin

Mode Static

Reset

☐ Preemptive

No of Processes 4

OK

Arrival Time 7

Burst Time 0

Insert

PID	Arrival	Burst
-----	---------	-------

Form1

FCFS

SJF

Priority

Round\_Robin

Mode

Dynamic

Reset

☐ Preemptive

☐ LIVE

☐ JUMP

Burst Time

4

Insert

PID	Arrival	Burst
-----	---------	-------

Sum of Waiting Time

0

Sum of Turnaround Time

0

Average Waiting Time

0

Average Turnaround Time

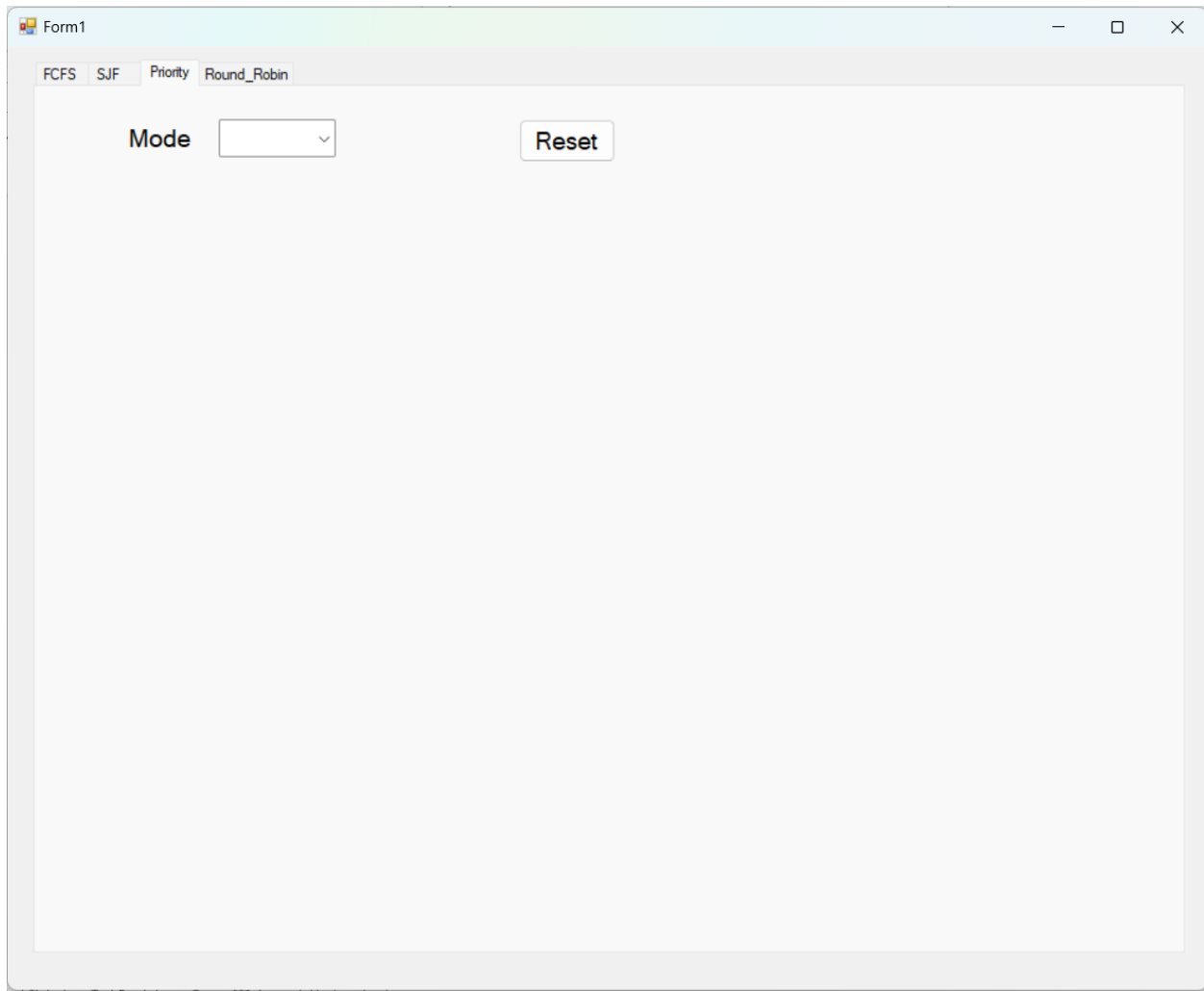
0

0 slot



### 3. Priority

It allows you to run only Priority algorithm



The image shows a screenshot of a Windows application window titled "Form1". The window has a standard Windows title bar with minimize, maximize, and close buttons. Inside the window, there is a tabbed interface with four tabs: "FCFS", "SJF", "Priority", and "Round\_Robin". The "Priority" tab is currently selected and highlighted. Below the tabs, there is a large white area containing a label "Mode" followed by a dropdown menu. To the right of the dropdown menu is a button labeled "Reset". The window is set against a light gray background.

Form1

FCFS SJF Priority Round\_Robin

Mode Static

Reset

☐ Preemptive

No of Processes 4

OK

Arrival Time 0

Burst Time 7

Priority 1

Insert

	PID	Arrival	Burst	Priority
--	-----	---------	-------	----------

Form1

FCFS

SJF

Priority

Round\_Robin

Mode

Dynamic

Reset

☐ Preemtive

☐ LIVE

☐ JUMP

Burst Time

7

Priority

1

Insert

	PID	Arrival	Burst	Priority

Sum of Waiting Time

0

Sum of Turnaround Time

0

Average Waiting Time

0

Average Turnaround Time

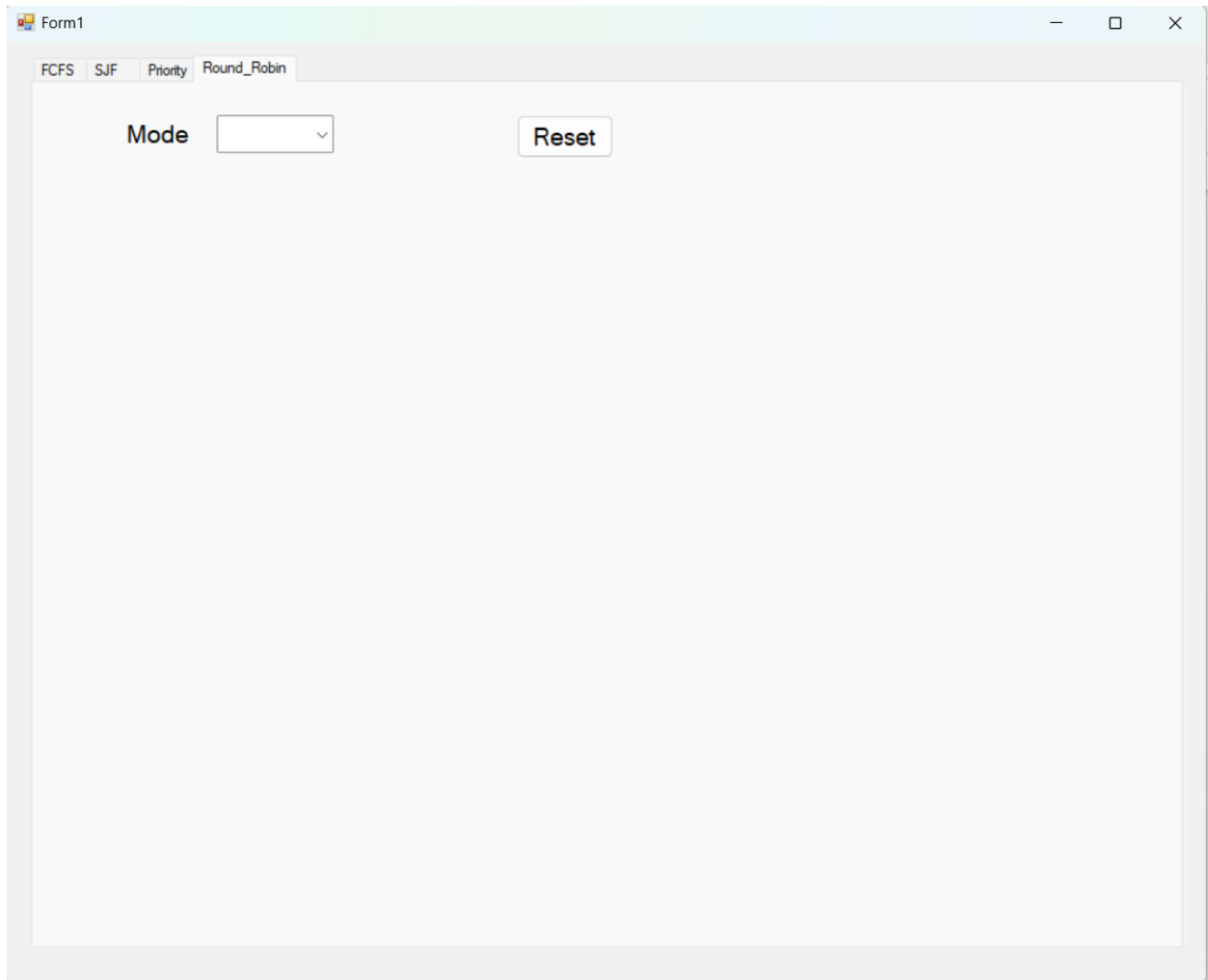
0

0

slot

## 4. Round Robin

It allows you to run only Round Robin algorithm.



The image shows a screenshot of a Windows application window titled "Form1". The window has a standard Windows title bar with minimize, maximize, and close buttons. Inside the window, there is a tabbed interface with four tabs: "FCFS", "SJF", "Priority", and "Round\_Robin". The "Round\_Robin" tab is currently selected. Below the tabs, there is a label "Mode" followed by a dropdown menu. To the right of the dropdown menu is a button labeled "Reset". The rest of the window is empty.

**Form1**

FCFS SJF Priority Round\_Robin

Mode Static ▼ Reset

No of Processes 4

Quantum Time 2 OK

Arrival Time 0

Burst Time 7 Insert

PID	Arrival	Burst

Form1

FCFS

SJF

Priority

Round\_Robin

Mode

Dynamic

Reset

Quantum Time

5

OK

Burst Time

Insert

☐ LIVE

☐ JUMP

PID	Arrival	Burst
-----	---------	-------

sum of waiting time

0

sum of turnaround time

0

Average Waiting Time

0

Average Turnaround Time

0

0 slot

# Text Boxes, buttons and Table

No of Processes

OK

R/W Test Box to enter no of processes and if user enters invalid data, program ignores it.

Burst Time

R/W Test Box to enter burst time of process and if user enters invalid data, program ignores it.

Arrival Time

R/W Test Box to enter arrival time of process and if user enters invalid data, program ignores it.

Piority

R/W Test Box to enter priority of process and if user enters invalid data, program ignores it.

Quantum Time

R/W Test Box to enter time quantum of round robin and if user enters invalid data, program ignores it.

sum of waiting time	<input type="text" value="0"/>
sum of turnaround time	<input type="text" value="0"/>
Average Waiting Time	<input type="text" value="0"/>
Average Turnaround Time	<input type="text" value="0"/>

Read Only Text Box to show sum of waiting time of executed processes.

Read Only Text Box to show average turnaround time of executed processes.

Read Only Text Box to show sum of waiting time of executed processes.

Read Only Text Box to show average turnaround time of executed processes.

	PID	Arrival	Burst	Piority
▶	1	0	4	1
	2	2	6	3
	3	4	7	0
	4	7	2	5
	5	5	9	10

Table of Processes that shows PID, Burst Time, Arrival Time, Priority for every process

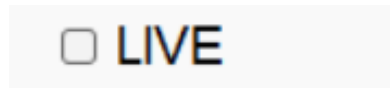
Insert

Button used to Add a process data like arrival time, priority, burst time given by user

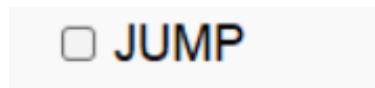




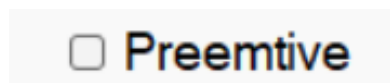
Reset Button



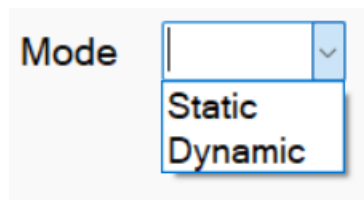
Button used to start or pause run scheduler.



Button used to display all current processes exists in queue immediately (jumping in time).



Button used to determine Preemptive or non- Preemptive.



Combo box used to determine static or dynamic mode.



Trackbar for speed up of down scheduler.

0 slot

Label used to show current slot during live scheduling.

## 1. Dynamic mode

Note: A new process can be added dynamically while the scheduler is running.

Note: Remaining burst time is updated while the scheduler is running.

Note: average waiting time, turnaround time are updated as time progresses.

Form1

FCFS SJF Priority Round\_Robin

Mode Dynamic Reset

Burst Time  ☒ LIVE ☐ JUMP

Insert

	PID	Arrival	Burst
▶	1	5	3

sum of waiting time 0  
sum of turnaround time 2  
Average Waiting Time 0.00  
Average Turnaround Time 2.00

0 1 2 3 4 5  
IDL IDL IDL IDL IDL P1

6 slot

**Form1**

FCFS SJF Priority Round\_Robin

Mode: Dynamic ▾

☒ Preemptive    ☒ LIVE    ☐ JUMP

Burst Time:

PID	Arrival	Burst
1	0	5
4	10	10

Sum of Waiting Time: 41

Sum of Turnaround Time: 67

Average Waiting Time: 8.20

Average Turnaround Time: 13.40

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17

P1 P1 P1 P2 P2 P3 P3 P3 P3 P2 P2 P2 P2 P2 P2 P5 P5 P5

18 19 20 21 22 23 24

P5 P5 P5 P1 P1 P1 P1

25 slot

## 2. static mode

Form1

FCFS SJF Priority Round\_Robin

Mode Static

Reset

☒ Preemptive

No of Processes 4

OK

Arrival Time

Burst Time

Insert

	PID	Arrival	Burst
▶	1	0	7
	2	2	4
	3	4	1
	4	5	4
Sum of Waiting Time		12	
Sum of Turnaround Time		28	
Average Waiting Time		3.00	
Average Turnaround Time		7.00	

0 2 4 5 7 11 16

P1 P2 P3 P2 P4 P1

Form1

FCFS

SJF

Priority

Round\_Robin

Mode

Static

Reset

☐ Preemptive

No of Processes

5

OK

Arrival Time

Burst Time

Priority

Insert

	PID	Arrival	Burst	Priority
▶	1	0	11	2
	2	5	28	0
	3	12	2	3
	4	2	10	1
	5	9	16	4

Sum of Waiting Time

122

Sum of Turnaround Time

189

Average Waiting Time

24.40

Average Turnaround Time

37.80

0

11

39

49

51

67

P1

P2

P4

P3

P5