# 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.
- The remaining burst time table is updated as time progresses.
- An option to run the currently existing processes only without live scheduling must be available.

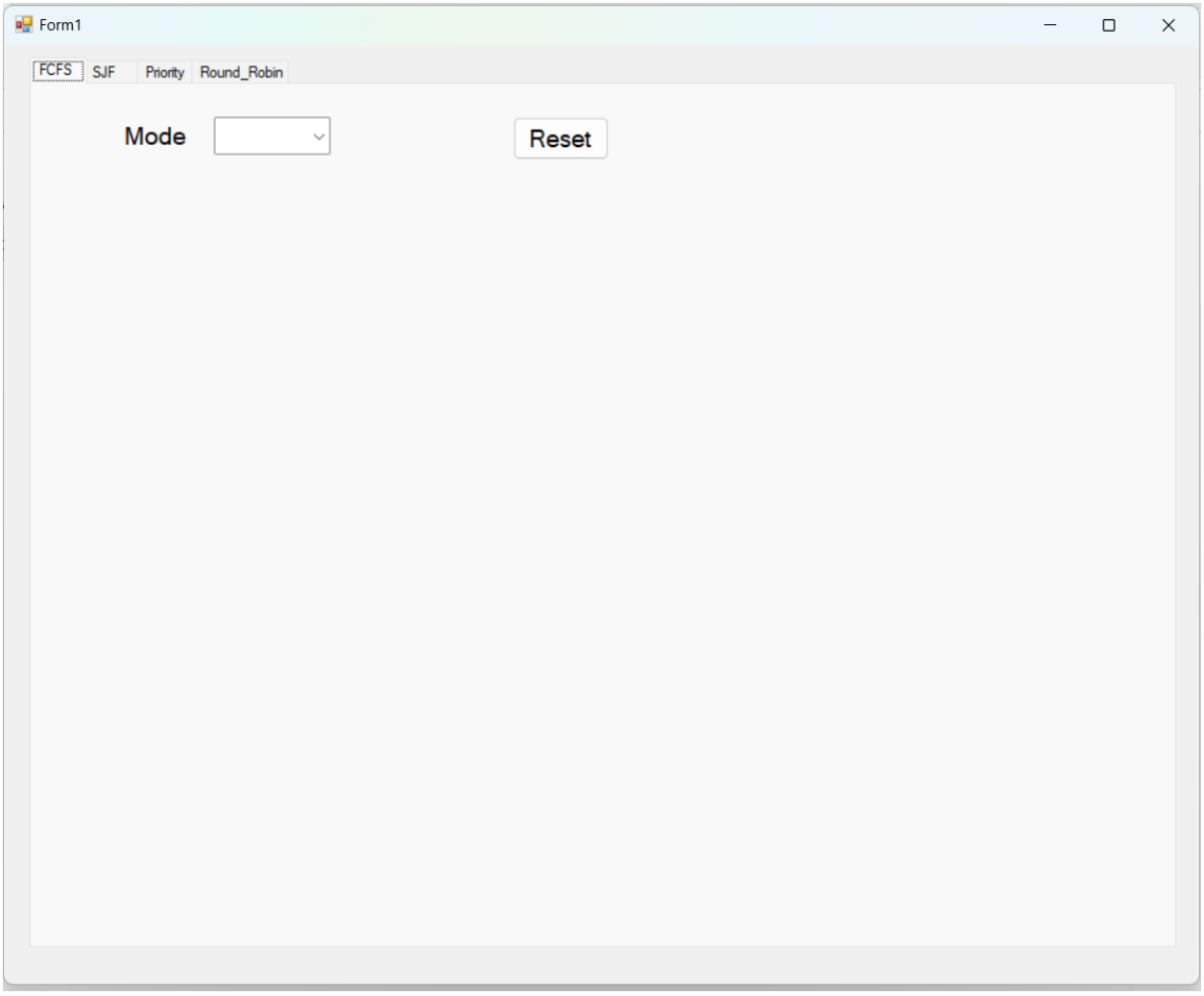
# Output

- 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

# features

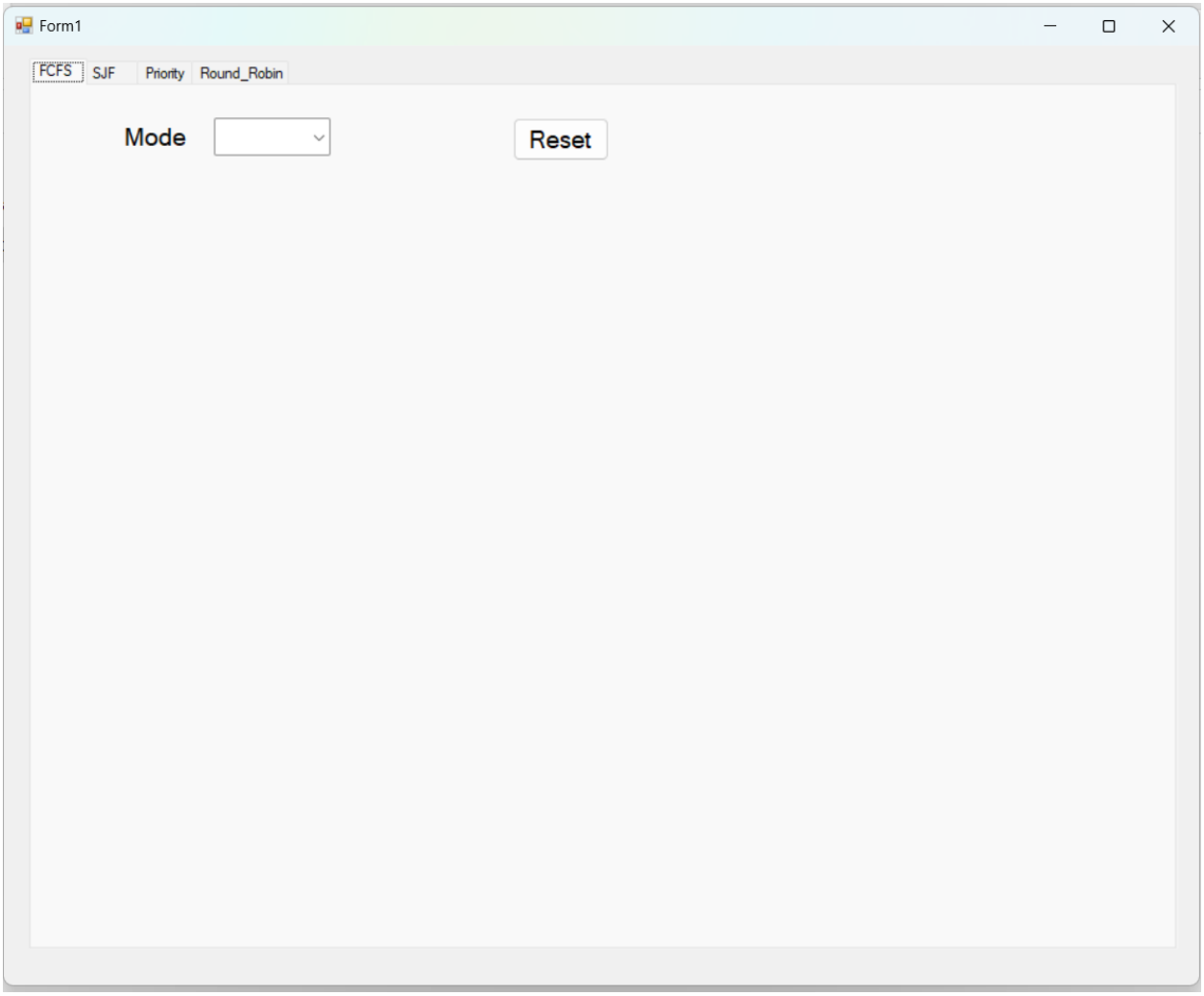
- ability to switch from preemptive to non-preemptive while scheduler is running.
- ability to display the current processes immediately while scheduler is running. (Continue as if the scheduler finishes executing current exist processes)
- ability to stop scheduler while it is running.
- ability to speed up or down scheduler.
- don’t ask the user for unneeded data.
- Gui gradually asks the user for data.
- program ignores invalid data.
- program ignores insertion  if invalid data is entered or left empty.

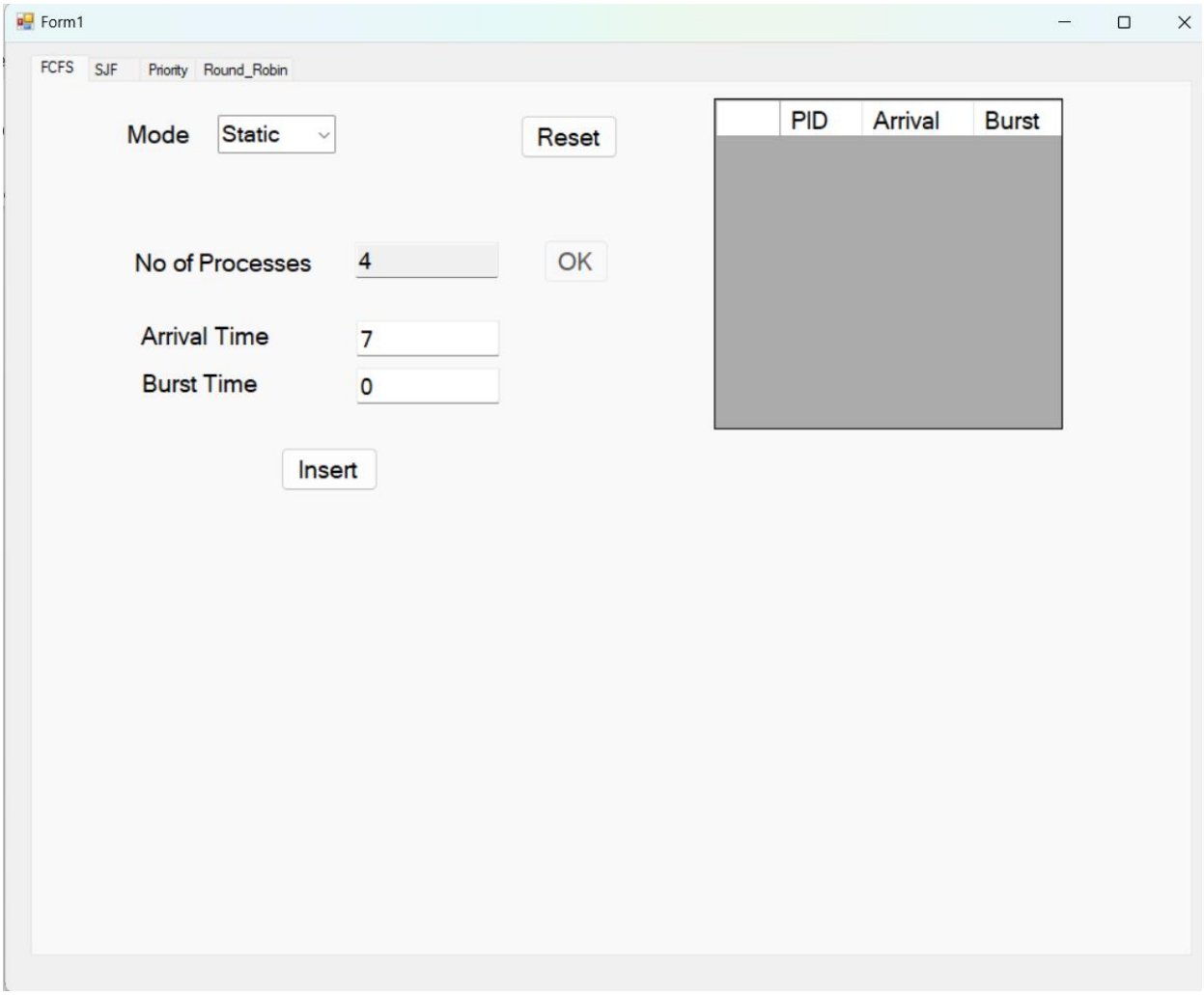
# GUI

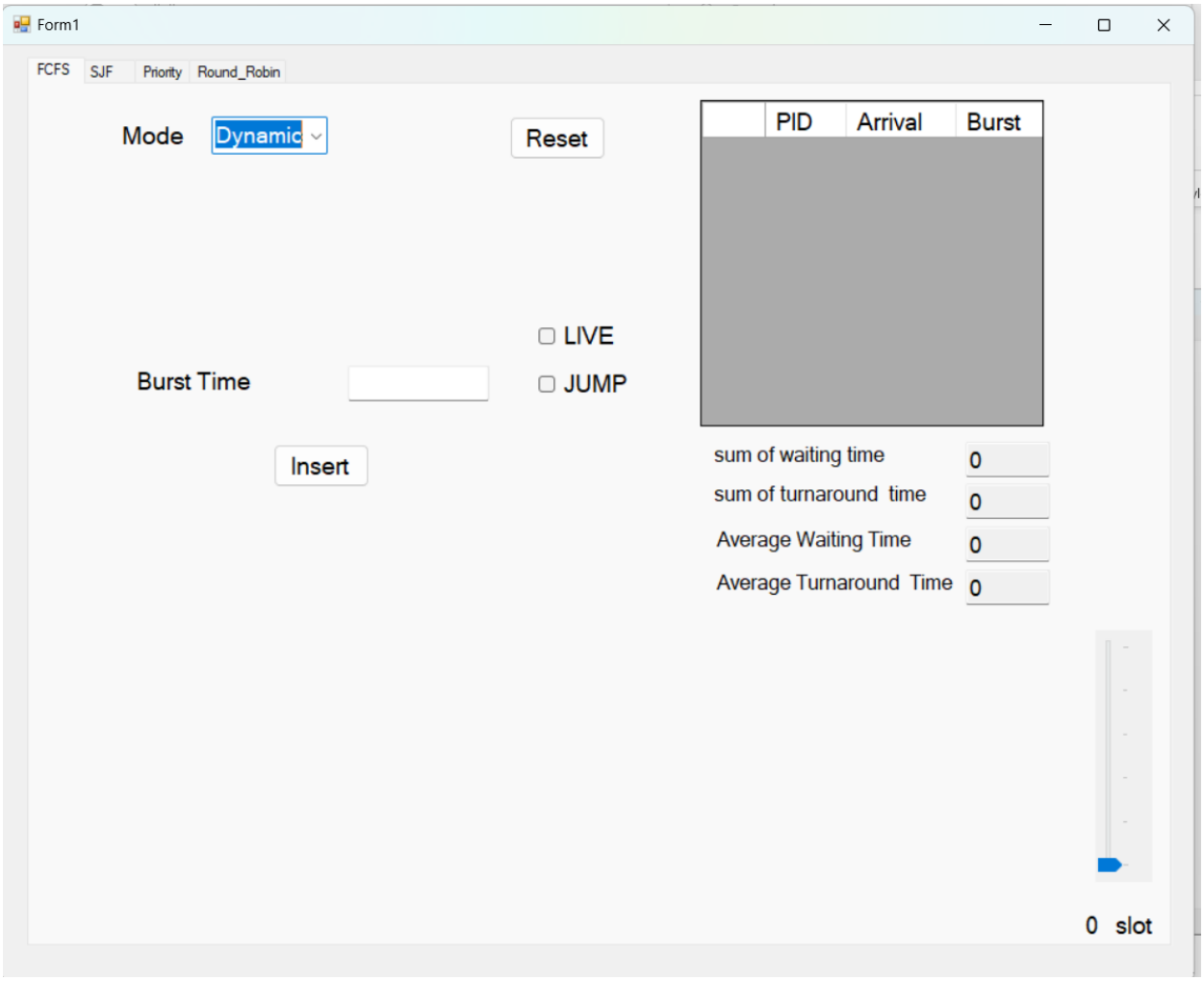


## 1.FCFS

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

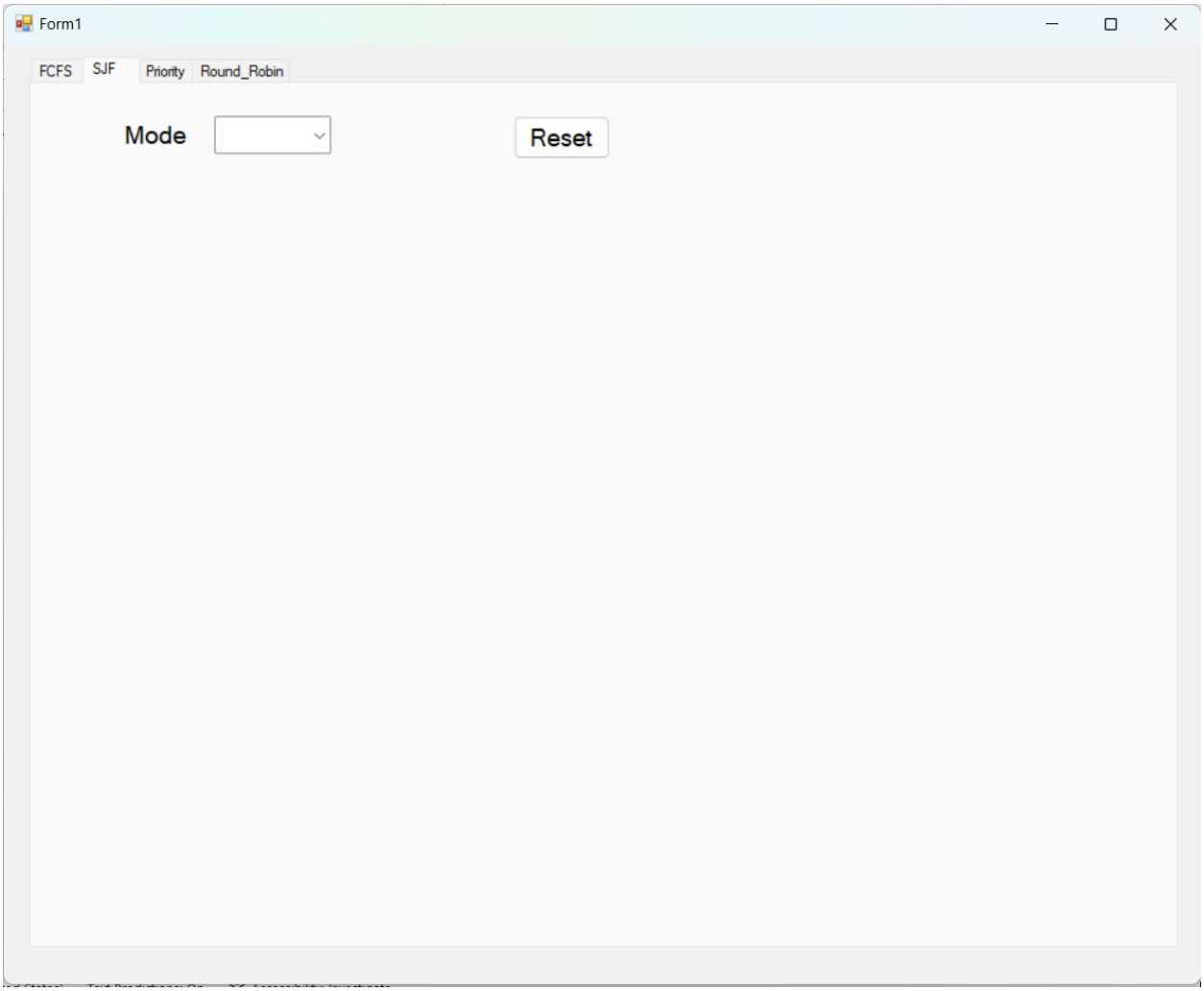


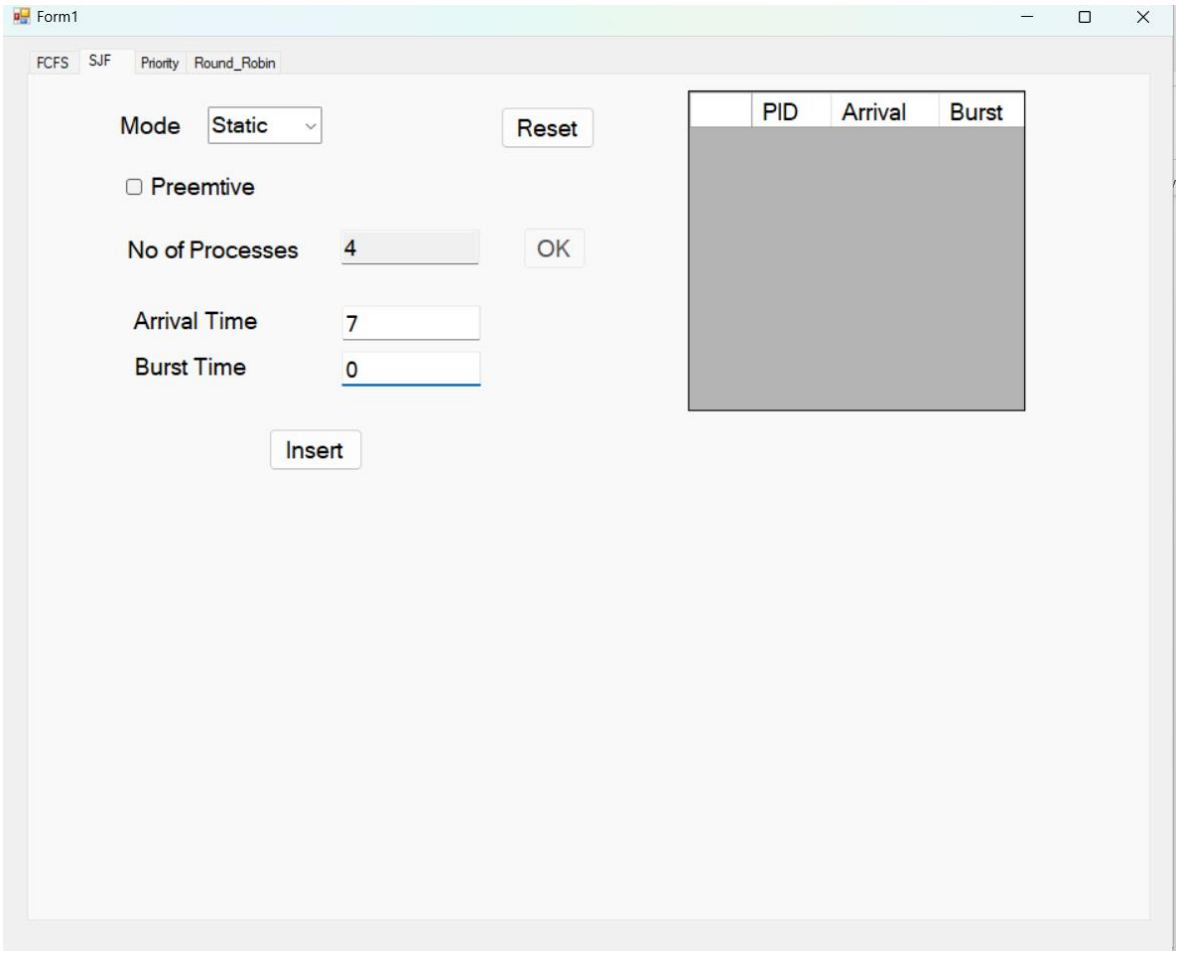

Form1
FCFS
SJF
Priority
Round_Robin
Mode
Static
Reset
No of Processes
4
OK
Arrival Time
7
Burst Time
0
Insert
PID
Arrival
Burst

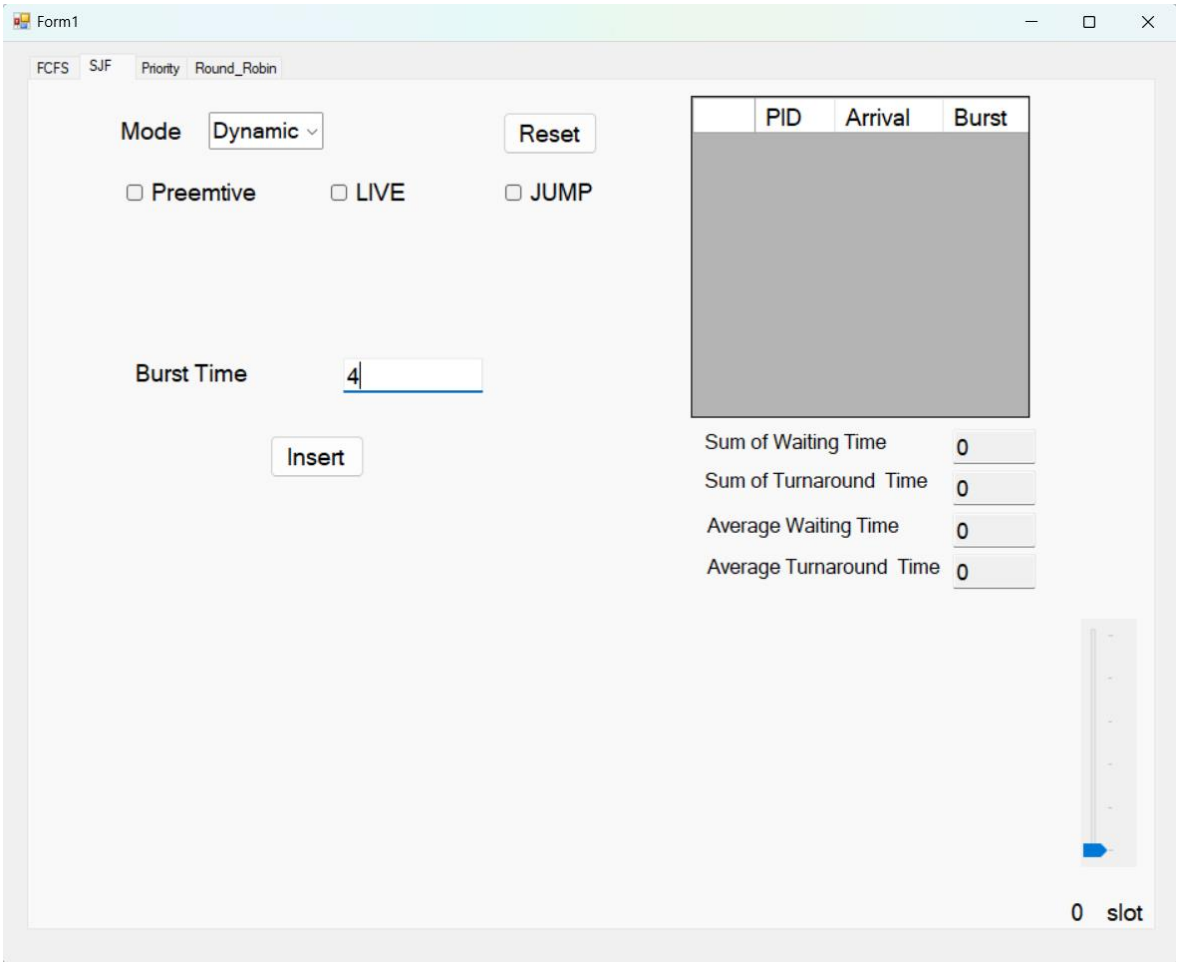

Form1
FCFS
SJF
Priority
Round_Robin
Mode
Dynamic
Reset
PID
Arrival
Burst
LIVE
Burst Time
JUMP
Insert
sum of waiting time
0
sum of turnaround time
0
Average Waiting Time
0
Average Turnaround Time
0
0 slot

## 2. SJF

It allows you to run only Shortest Job First algorithm

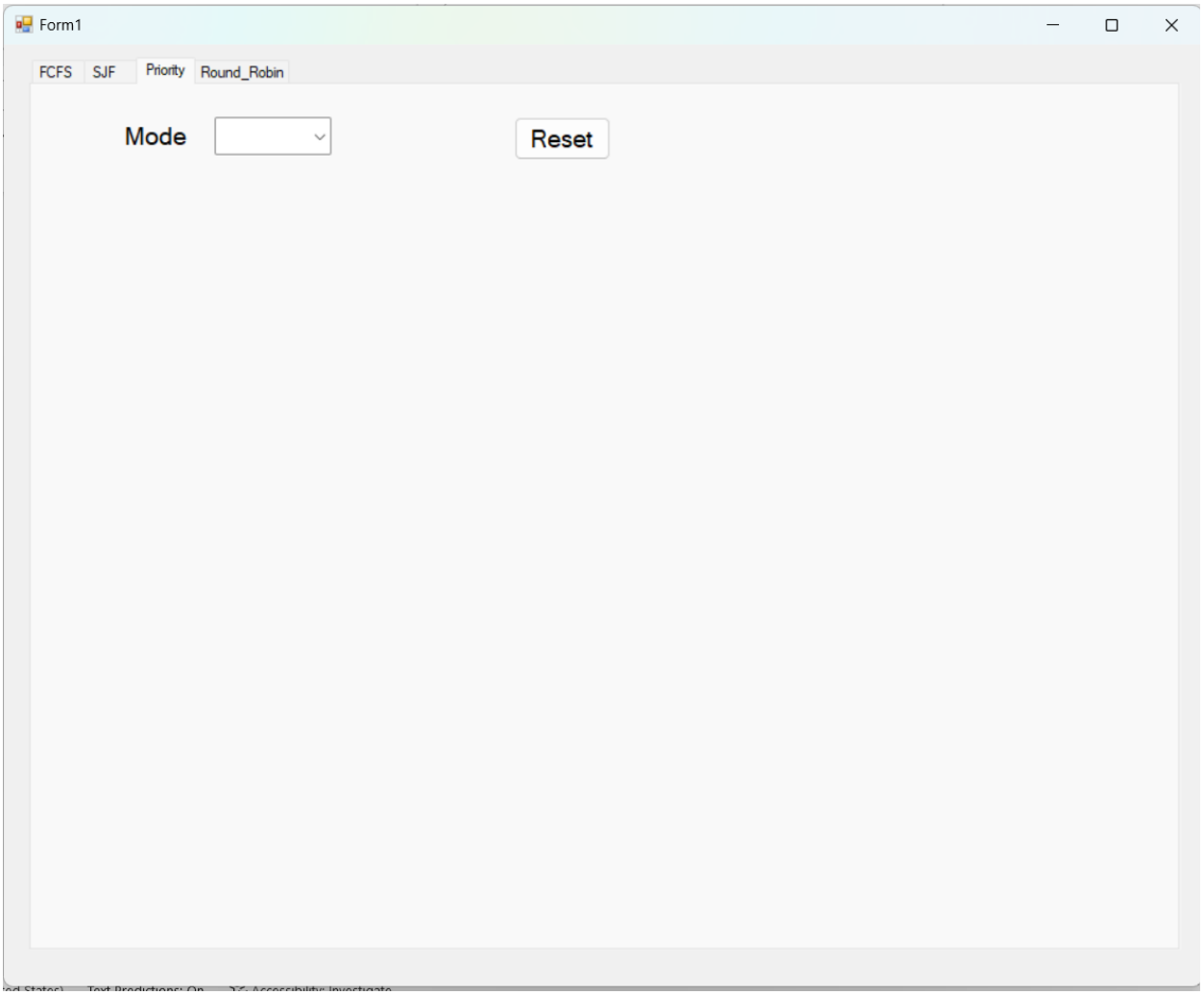


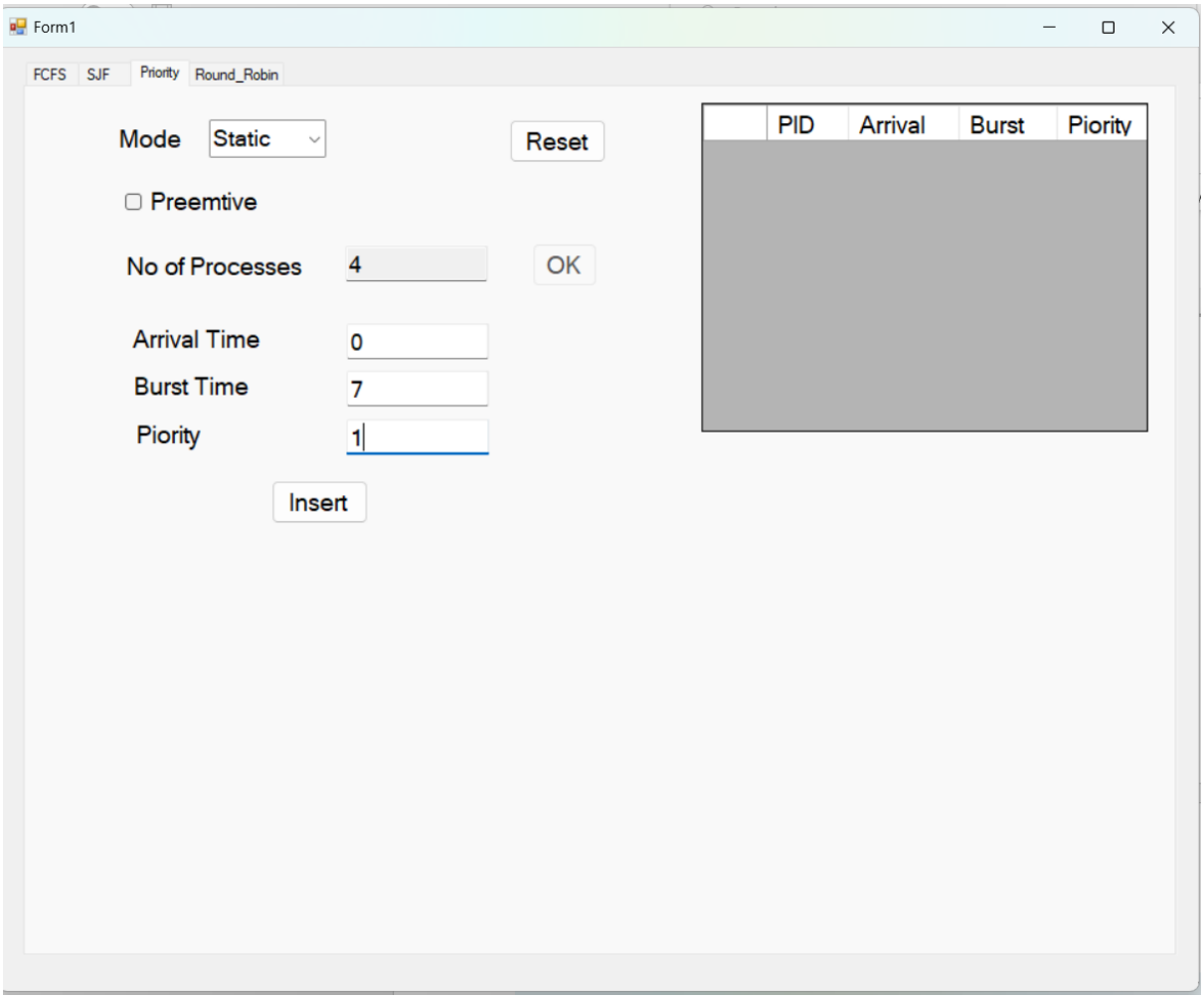

Form1
FCFS
SJF
Priority
Round_Robin
Mode
Static
Reset
Preemtive
No of Processes
4
OK
Arrival Time
7
Burst Time
0
Insert
PID
Arrival
Burst

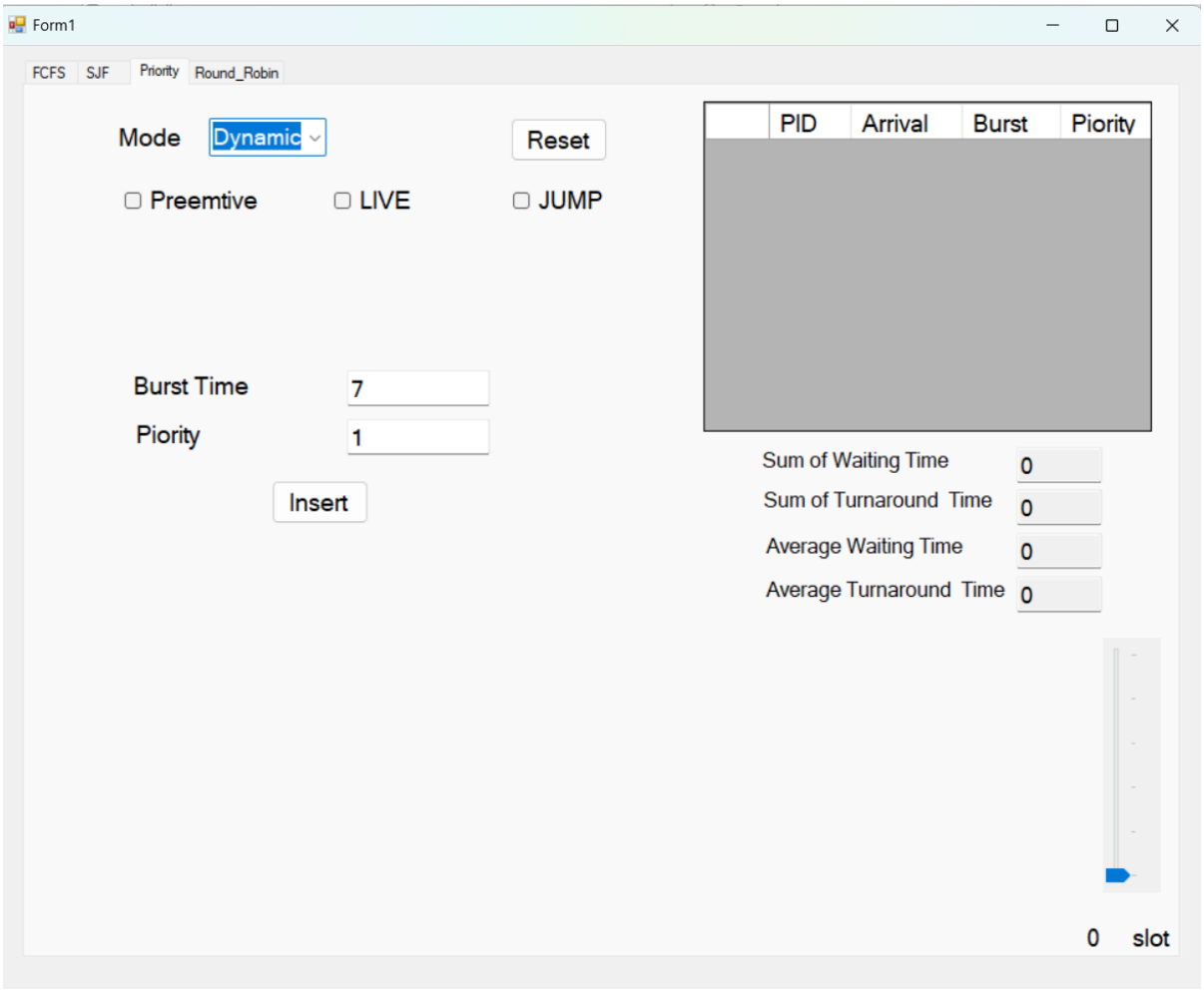

Form1
FCFS
SJF
Priority
Round_Robin
Mode
Dynamic
Reset
Preemtive
LIVE
JUMP
PID
Arrival
Burst
Burst Time
4
Insert
Sum of Waiting Time
0
Sum of Turnaround Time
0
Average Waiting Time
0
Average Turnaround Time
0
0
slot

## 3. Priority

It allows you to run only Priority algorithm

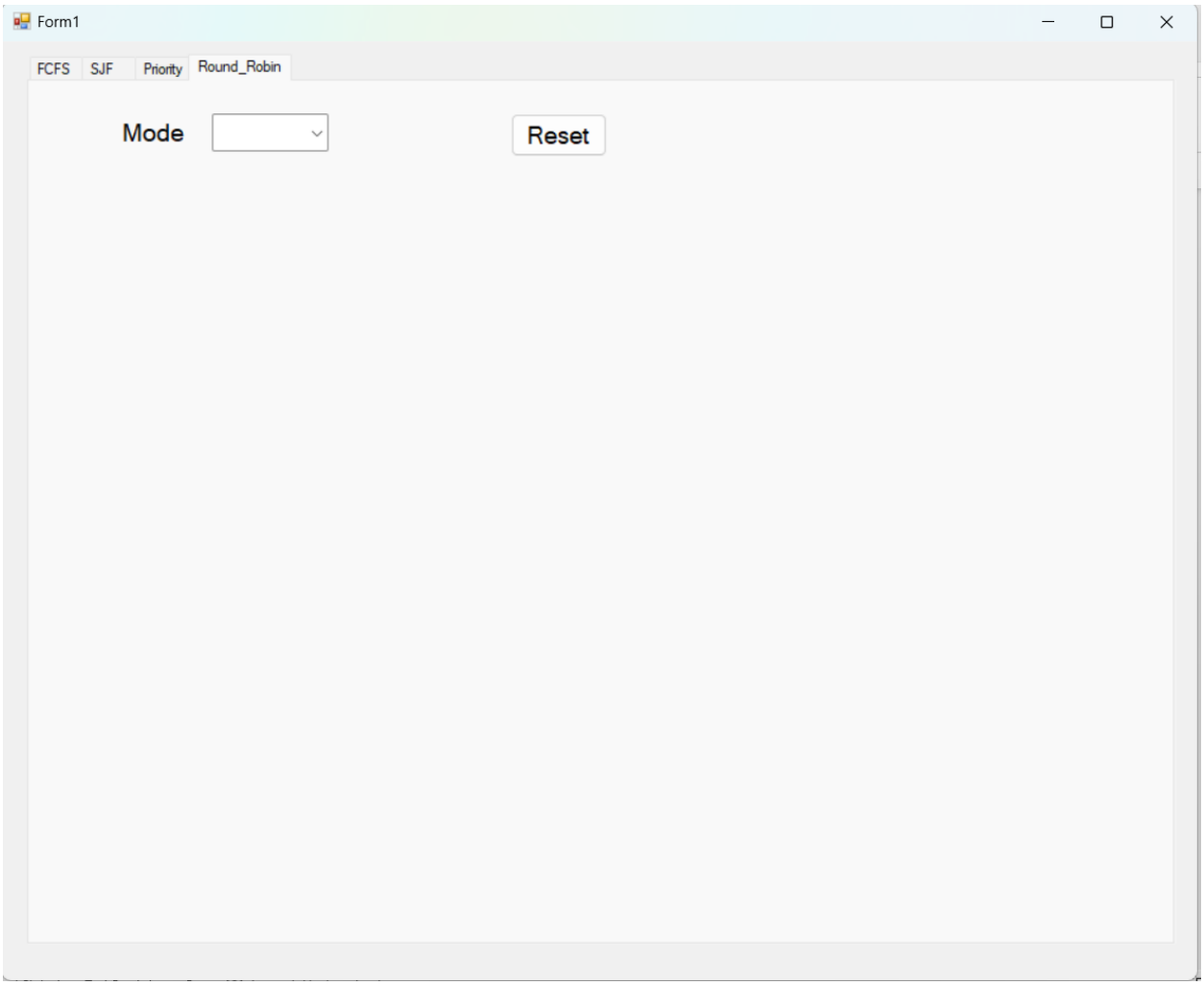


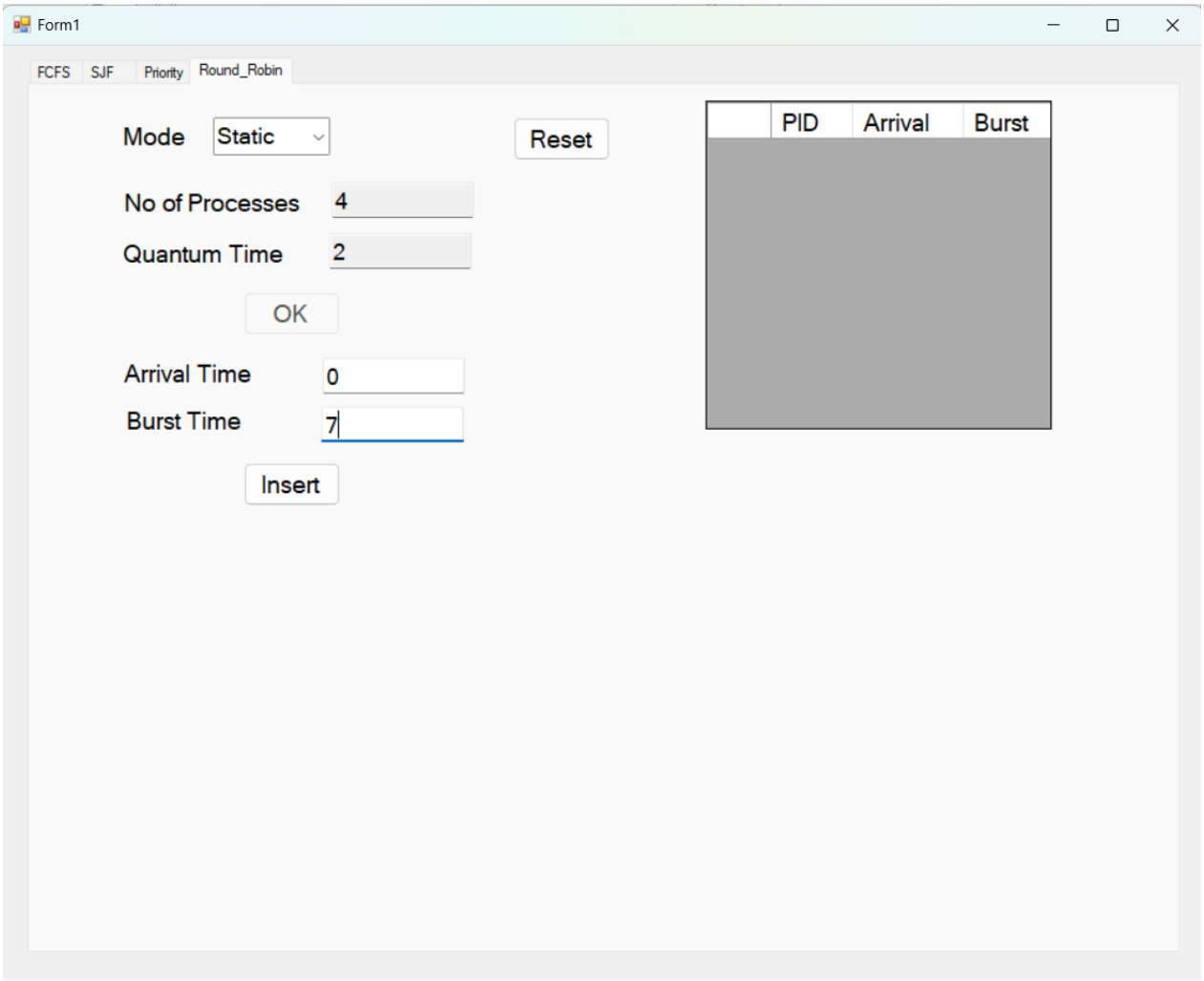

Form1
FCFS
SJF
Priority
Round_Robin
Mode
Static
Reset
Preemtive
No of Processes
4
OK
Arrival Time
0
Burst Time
7
Piority
1
Insert
PID
Arrival
Burst
Piority

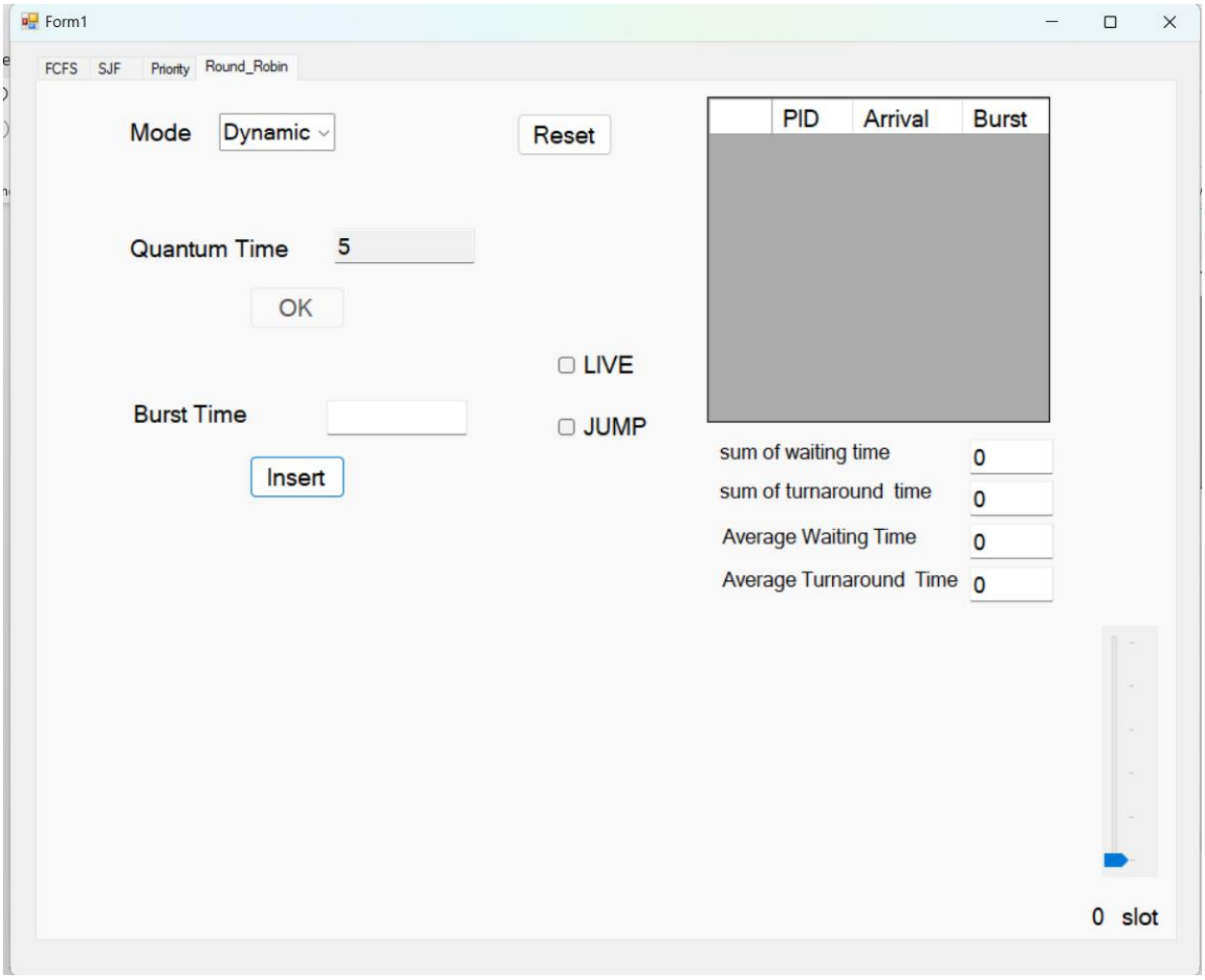

Form1
FCFS
SJF
Priority
Round_Robin
Mode
Dynamic
Reset
Preemtive
LIVE
JUMP
PID
Arrival
Burst
Piority
Burst Time
7
Piority
1
Insert
Sum of Waiting Time
0
Sum of Turnaround Time
0
Average Waiting Time
0
Average Turnaround Time
0
0
slot

## 4. Round Robin

It allows you to run only Round Robin algorithm.




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
PID
Arrival
Burst
Quantum Time
5
OK
LIVE
Burst Time
JUMP
Insert
sum of waiting time
0
sum of turnaround time
0
Average Waiting Time
0
Average Turnaround Time
0
0 slot

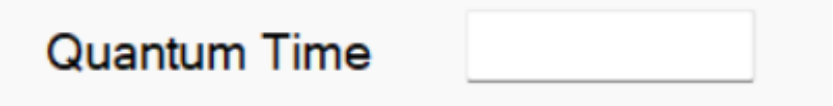
# Text Boxes, buttons and Table


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

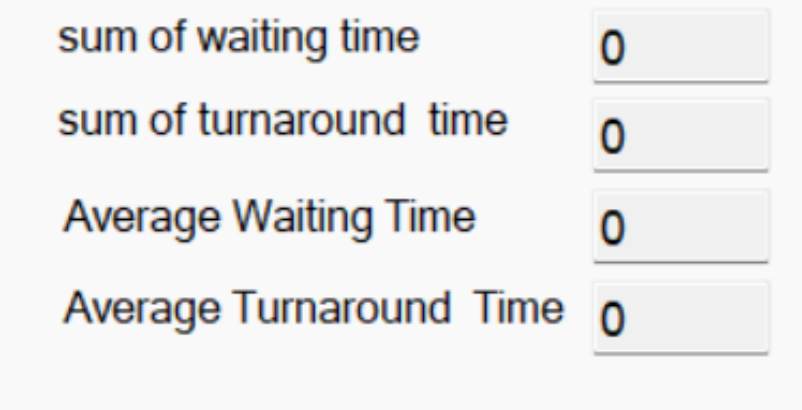

R/W Test Box to enter burst time of process and if user enters invalid data, program ignores it.


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


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




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

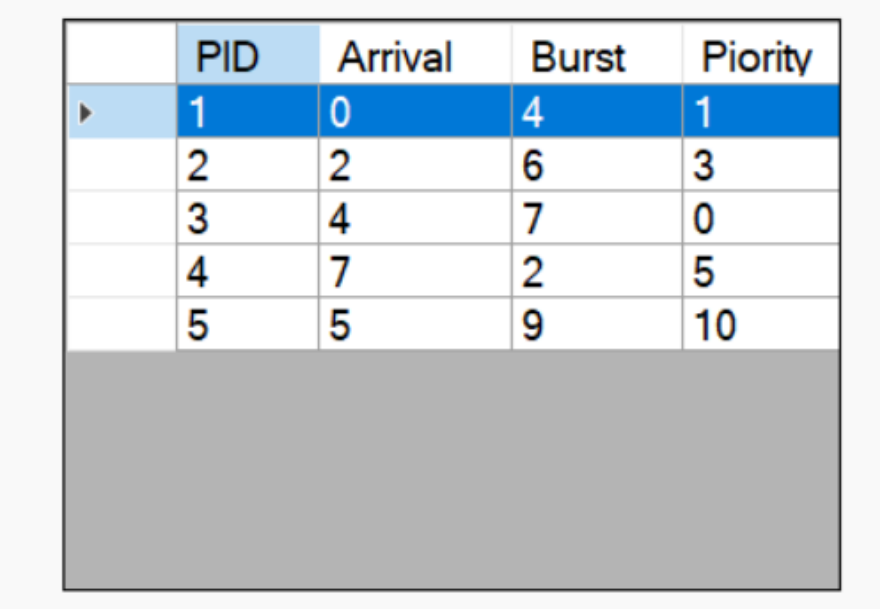



Read Only Text Box to show sum of waiting time of executed processes.

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

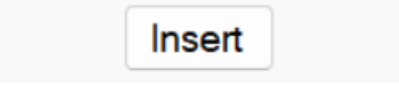
Read Only Text Box to show sum of waiting time of executed processes.

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 |

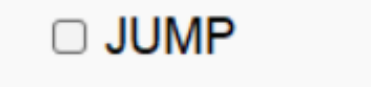
Table of Processes that shows PID, Burst Time, Arrival Time, Priority for every process



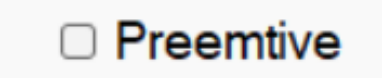

Button used to Add a process data like arrival time, priority, burst time given by user


Reset Button

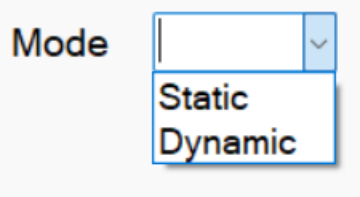

Button used to start or pause run scheduler.




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

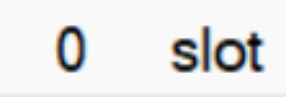



Button used to determine Preemptive or non- Preemptive.




Combo box used to determine static or dynamic mode.

Trackbar for speed up of down scheduler.



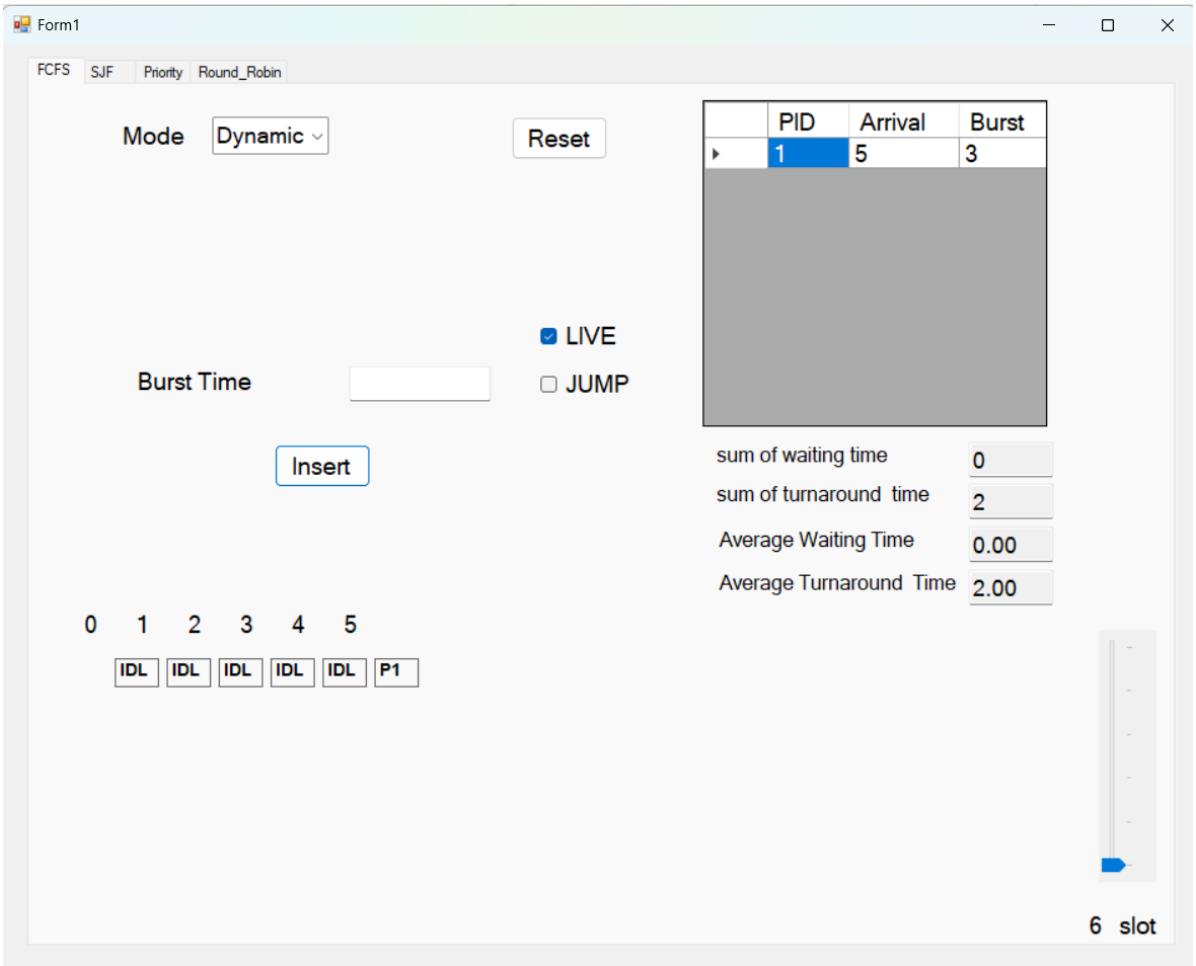

Label used to show current slot during live scheduling.

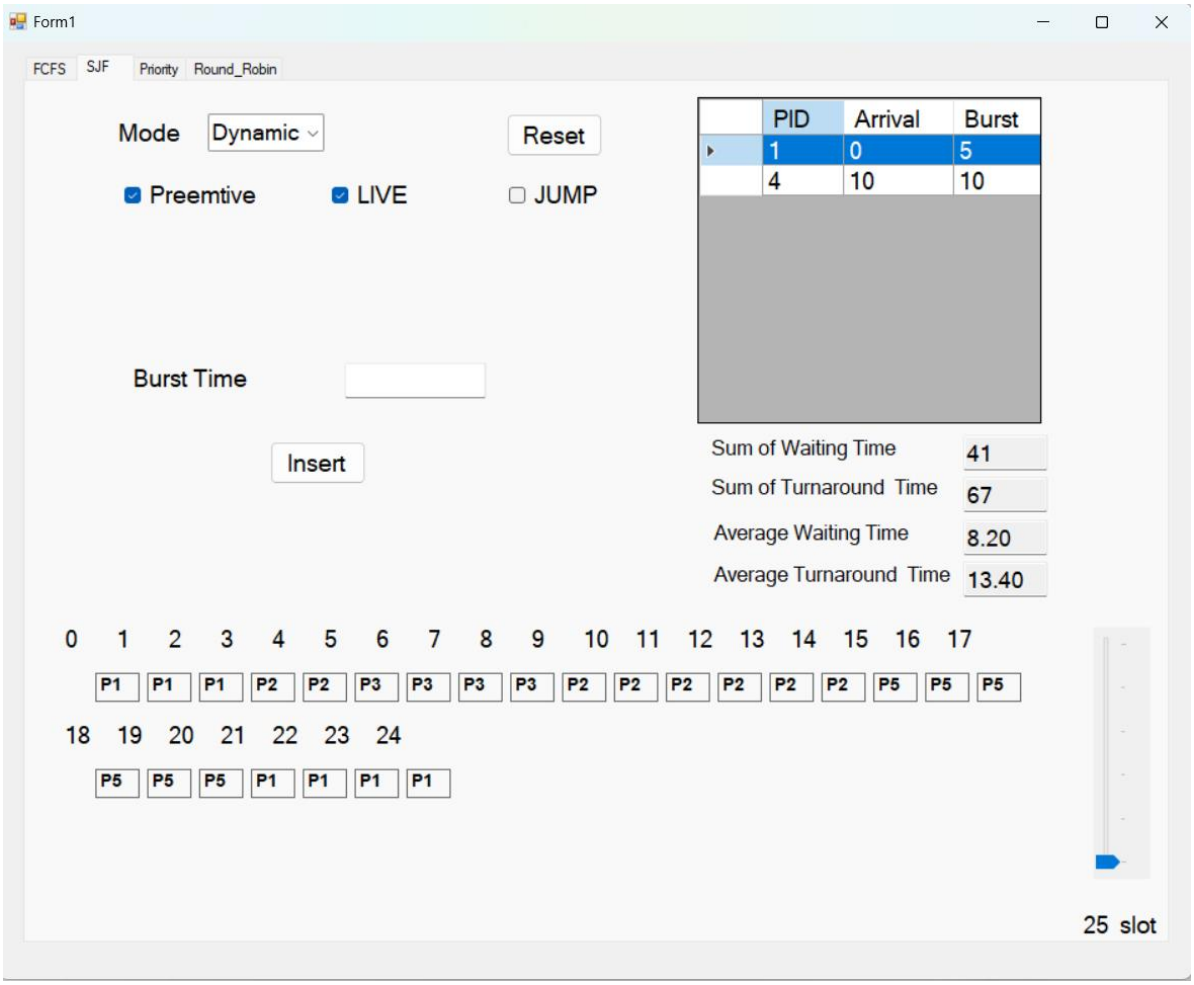
## 1. Dynamic mode

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

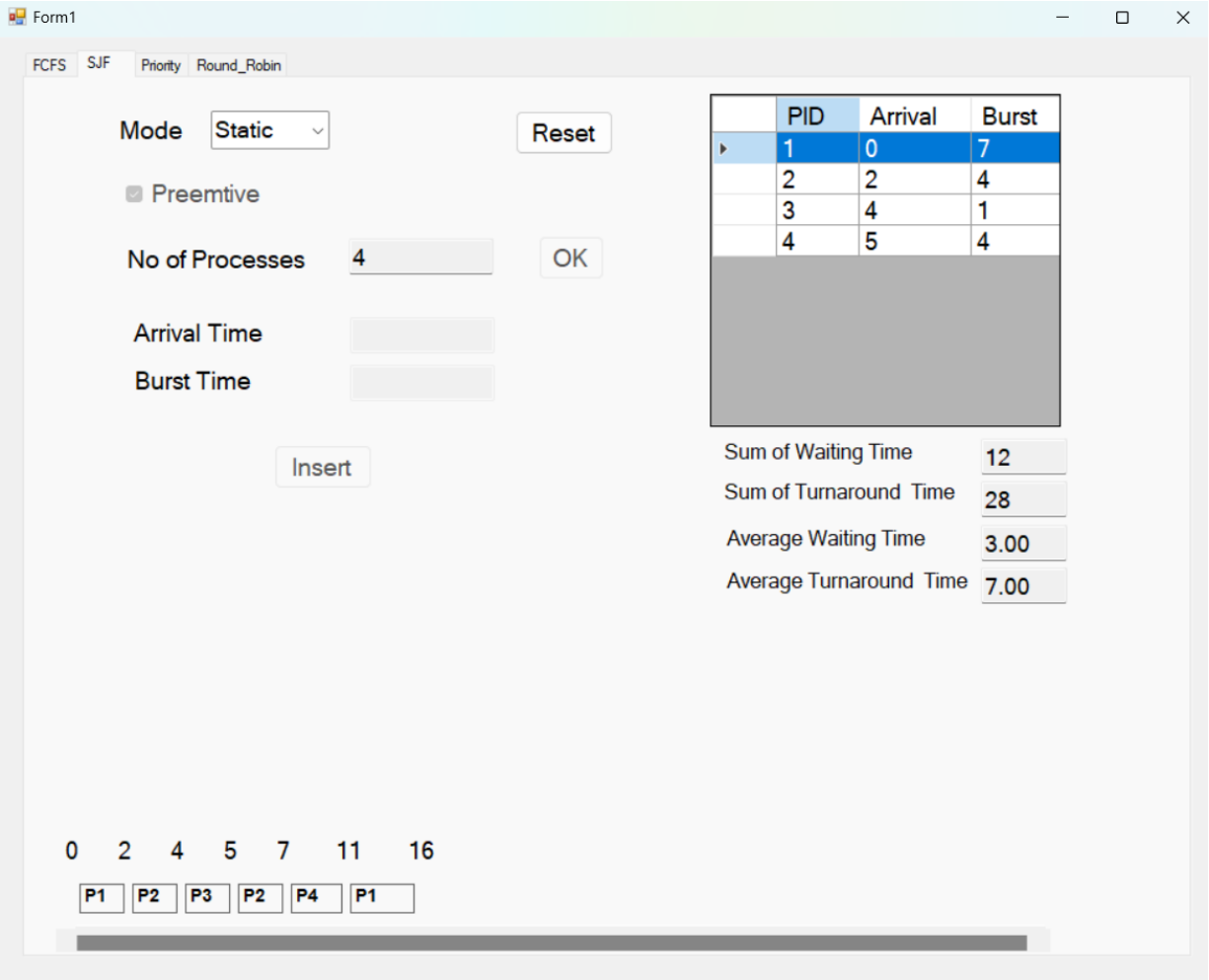
Note: Remaining burst time is updated while the scheduler is running.

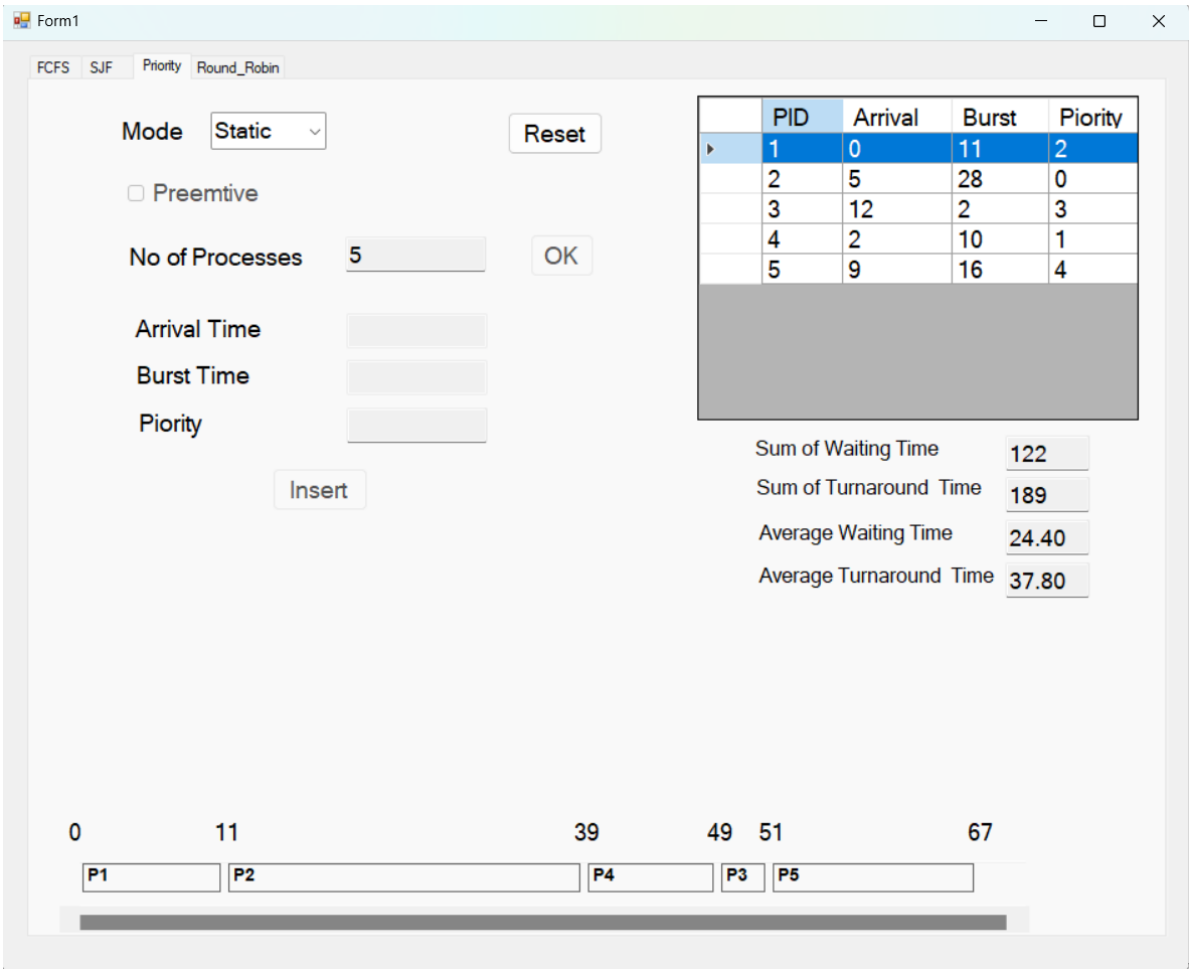
Note: average waiting time, turnaround time are updated as time progresses.




Form1
FCFS
SJF
Priority
Round_Robin
Mode
Dynamic
Reset
Preemtive
LIVE
JUMP
Burst Time
Insert
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
Preemtive
No of Processes
5
OK
Arrival Time
Burst Time
Piority
Insert
PID
Arrival
Burst
Piority
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