

Operating Systems Laboratory

Assignment 4

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Scheduling schemes:

1. Shortest job first (SJF):

SJF is a non-preemptive scheduling method used by CPU to schedule processes based on the time a process requires to completion. At any given point in time, if CPU is free, the process with least execution time is given priority and CPU will become free only after that process has finished execution.

2. Round Robin (RR):

Round Robin is a preemptive scheduling method which gives fixed time slices for each process, then executes the next process. Each process is treated fairly. This decreases the average response time, but may increase the average turnaround time.

Job characteristics:

1. SJF:

Predictable run time, Low average turnaround time, low average waiting time, high average response time.

2. RR:

No starvation, fairness irrespective of runtime, low average response time, possibly high turnaround time and high waiting time.

Test Process data:

Process	Arrival time	Burst time
P1	0	5
P2	1	3
P3	2	8
P4	3	1

SJF schedules as follows:

Process	Start time	Finish time	Turnaround time
P1	0	5	5
P4	5	6	3
P2	6	9	8
P3	9	17	15

RR schedules as follows (time slice = 3) :

Process	Start time	Finish time	Remaining time
P1	0	3	2
P4	3	4	0
P2	4	7	0
P3	7	10	5
P1	10	12	0
P3	12	15	2
P3	15	17	0

Suitability:

SJF: Average turnaround time is low.

RR: Average response time is low.

Shortcomings:

SJF: The average response time is high, P4 has to wait for 9 time slots to execute.

RR: The average turnaround time is high, P1 takes 5 time slots to complete, but it is completed after 12 time slots.

Screenshots:

Averages:

SJF – process1.dat

```
Average turnaround time: 718.714  
Average waiting time: 507.714  
Average penalty ratio: 6.42857
```

SJF – process2.dat

```
Average turnaround time: 215.5  
Average waiting time: 157.5  
Average penalty ratio: 6.5
```

SJF – process3.dat

```
Average turnaround time: 792.333  
Average waiting time: 596.917  
Average penalty ratio: 3.75
```

RR – process1.dat

```
Average turnaround time: 874.857  
Average waiting time: 663.857  
Average penalty ratio: 4
```

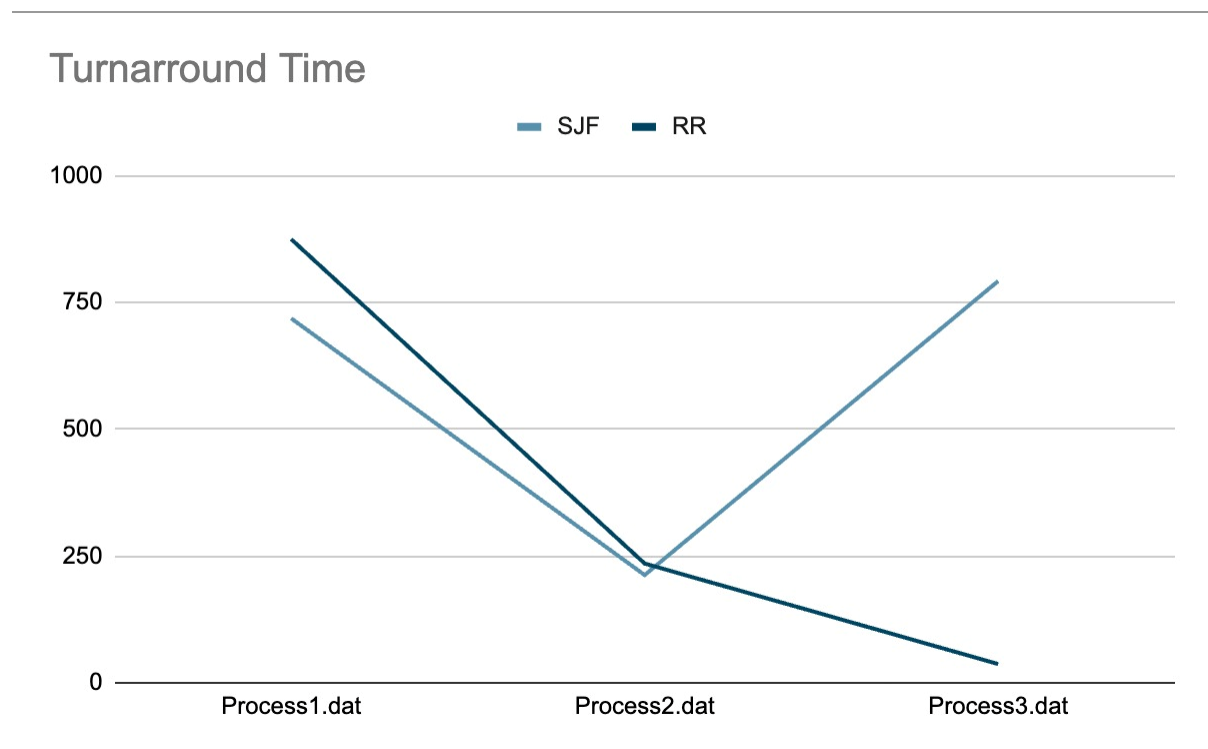
RR – process2.dat

```
Average turnaround time: 235.167  
Average waiting time: 177.167  
Average penalty ratio: 6.72222
```

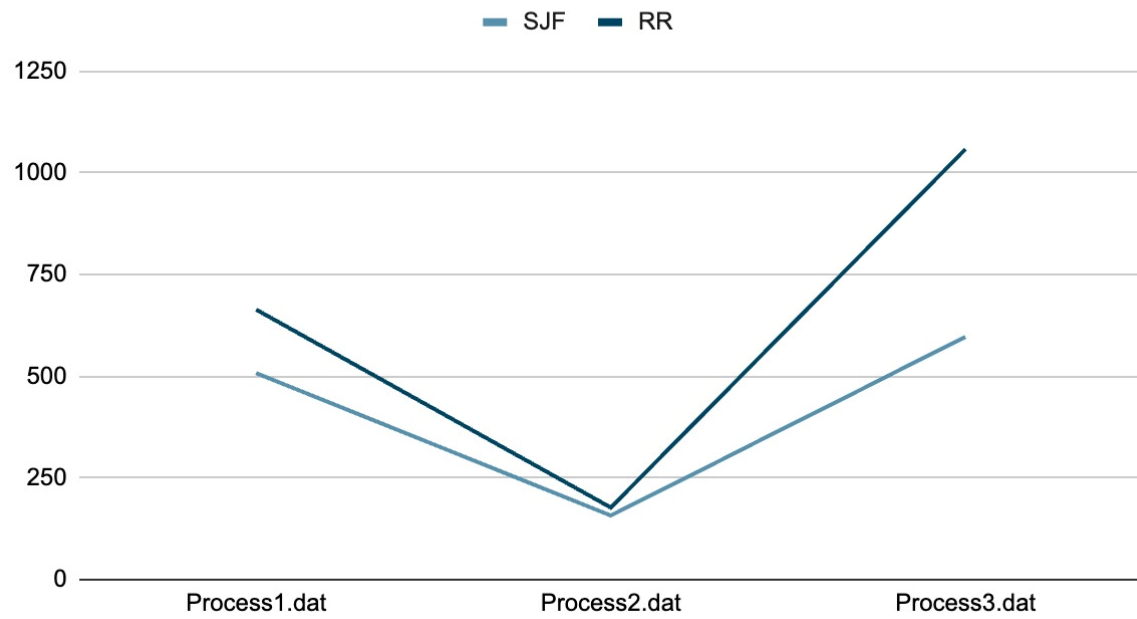
RR – process3.dat

```
Average turnaround time: 1253.75  
Average waiting time: 1058.33  
Average penalty ratio: 6.66667
```

PLOTS:



Waiting Time



Penalty Ratio

