Operating Systems Lab

Lab-4 Report

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SHORTEST JOB FIRST

Characteristics of SJF

Optimization of Waiting Time : SJF aims to minimize the total waiting time for all processes, leading to a more efficient use of resources and faster com- pletion times.

Fairness : SJF can be considered fair, as all processes are given a fair chance to run based on their CPU burst time. This means that processes with shorter CPU burst times will get to run more frequently than those with longer burst times.

Good Throughput : SJF has a good throughput, as it always selects the short- est process first and as a result, the total completion time of processes is reduced.

Suitable test data for SJF

```
0   1   -1
1   10  2  -1
11  10  2  -1
```

```
PS G:\My Drive\STUDY\Operating-Systems\LAB\Assignment 4> cd
 { .\SJF .\suitable_SJF.dat}
Process 0 is running at Time 0
Process 1 is running at Time 1
Process 2 is running at Time 11
Process Waiting Time    Turnaround Time Penalty Ratio
0       0               1               1.000000
1       0               10              1.000000
2       0               10              1.000000
Average         0.000000        7.000000        1.000000
Throughput: 0.130435
PS G:\My Drive\STUDY\Operating-Systems\LAB\Assignment 4>
```

Suitable test data for SJF output

Shortcomings test data for SJF

```
0   1000 -1
1   10    2  -1
11  10    2  -1
```

```
PS G:\My Drive\STUDY\Operating-Systems\LAB\Assignment 4> cd
 { .\SJF .\shortcoming_SJF.dat}
Process 0 is running at Time 0
Process 1 is running at Time 1000
Process 2 is running at Time 1010
Process Waiting Time    Turnaround Time Penalty Ratio
0       0               1000            1.000000
1       999             1009            100.900002
2       999             1009            100.900002
Average          666.000000      1006.000000     67.599998
Throughput: 0.002935
PS G:\My Drive\STUDY\Operating-Systems\LAB\Assignment 4>
```

Shortcomings test data for SJF output, Process 1 and 2 leads to Convoy Effect

ROBBIN ROBIN

Characteristics of RR

No Starvation: Every process is guaranteed a certain amount of time to exe- cute, preventing starvation.

Efficient utilization of CPU time: The CPU time is utilized effectively as each process gets a fair share of the CPU.

Low overhead: The overhead of context switching is low as the quantum time is usually small, making it an efficient algorithm.

Fairness: It is fair as it gives equal time slice to each and every process.

Suitable test data for RR

```
0    5 -1
5    5  2 -1
10 10 2 -1
```

```
PS G:\My Drive\STUDY\Operating-Systems\LAB\Assignment 4> cd
 .\rr .\suitable_RR.dat}
Process 0 is running at Time 0
Process 1 is running at Time 5
Process 2 is running at Time 10
Process Waiting Time    Turnaround Time Penalty Ratio
0       0               5               1.000000
1       0               5               1.000000
2       0               10              1.000000
Average         0.000000        6.666667        1.000000
Throughput: 0.136364
PS G:\My Drive\STUDY\Operating-Systems\LAB\Assignment 4>
```

Suitable test data for RR output, timeslice is 10

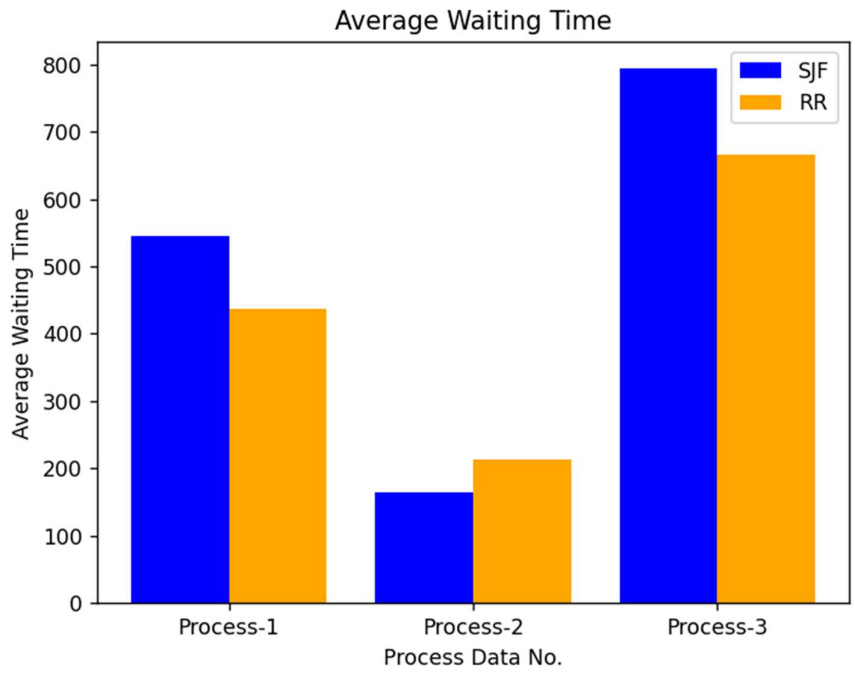
Shortcomings test data for RR

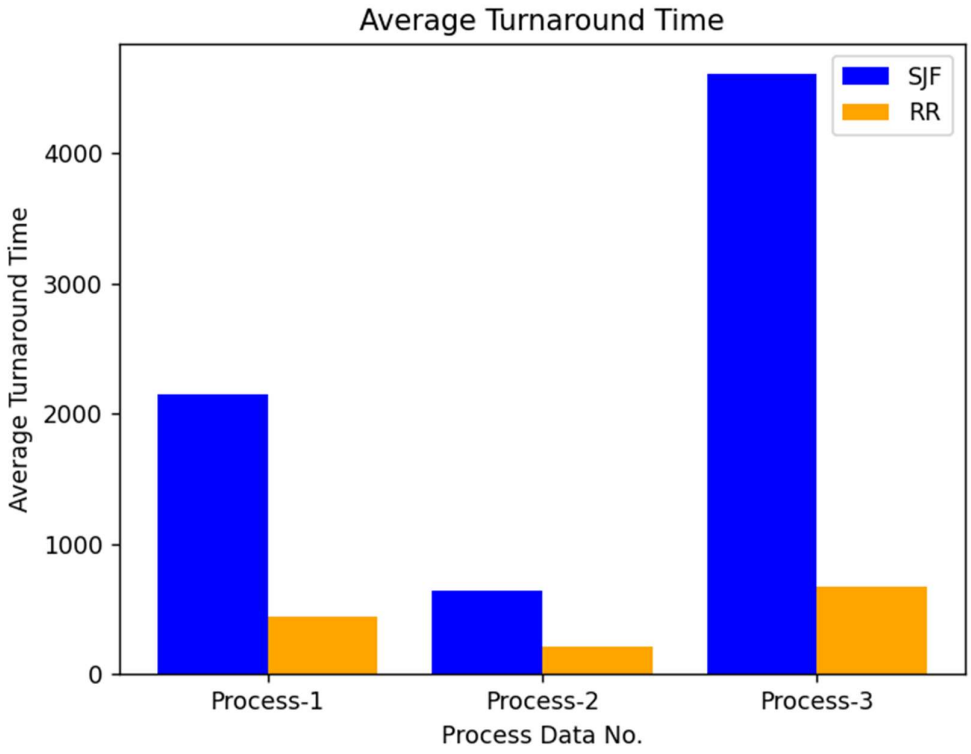
```
0  100  -1
1  100   2 -1
11 100   2 -1
```

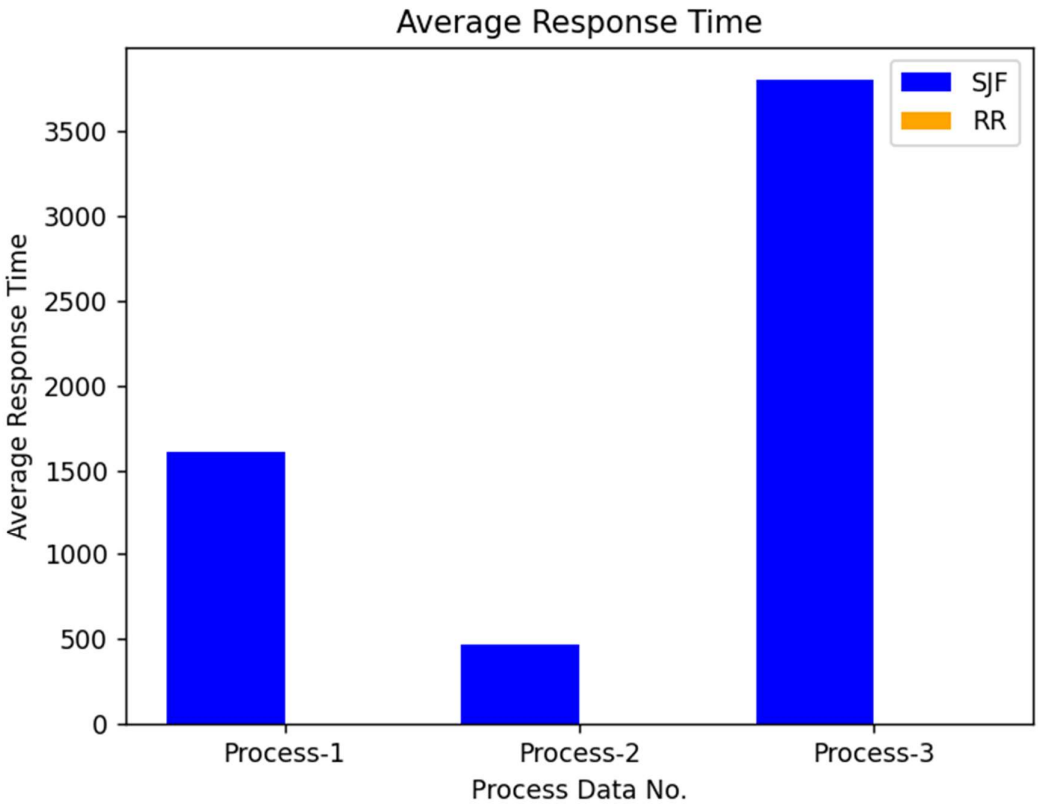
```
Process Waiting Time    Turnaround Time Penalty Ratio
0       170             180             18.000000
1       189             199             19.900000
2       189             199             19.900000
Average         182.666672      192.666672      19.266668
Throughput: 0.009119
```

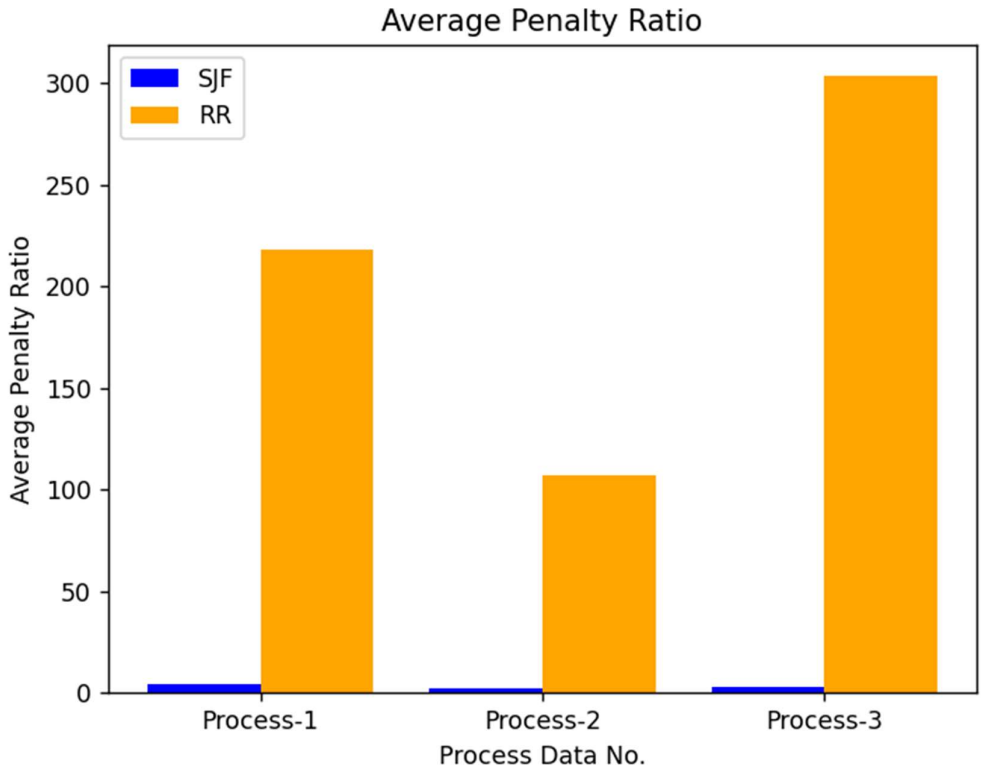
Shortcomings test data for RR output, timeslice is 10

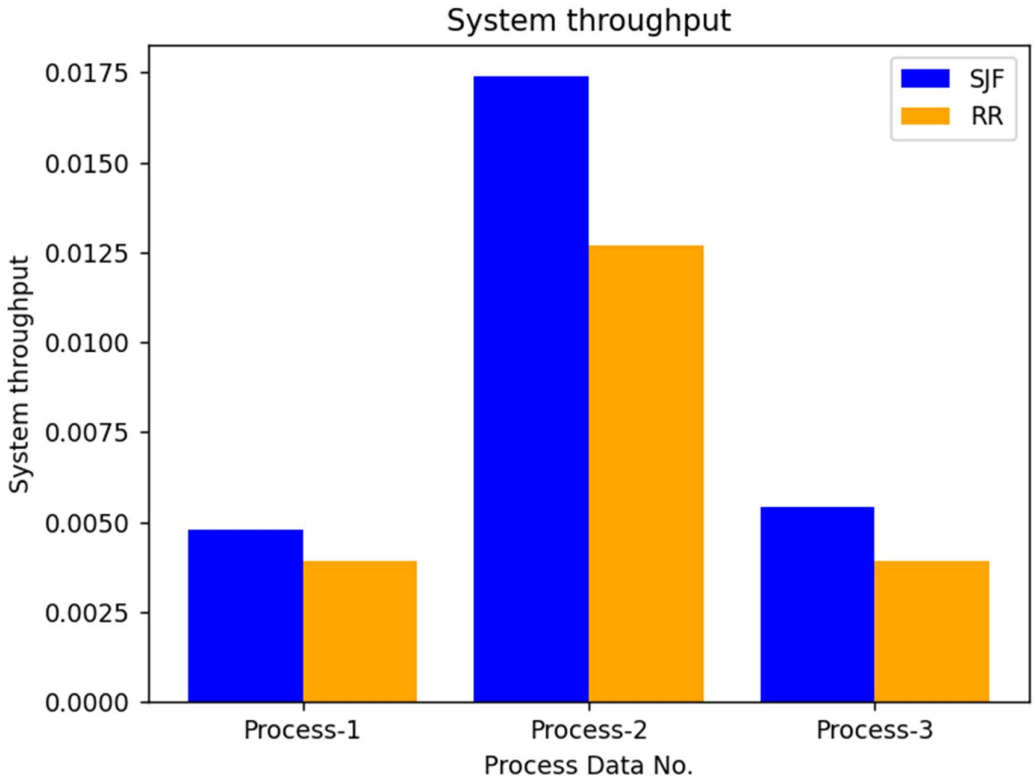
Analysis


Average Waiting Time
SJF
RR
800
700
600
500
400
300
200
100
0
Average Waiting Time
Process-1
Process-2
Process-3
Process Data No.


Average Turnaround Time
SJF
RR
4000
3000
2000
1000
0
Average Turnaround Time
Process-1
Process-2
Process-3
Process Data No.


Average Response Time
SJF
RR
3500
3000
2500
2000
1500
1000
500
0
Average Response Time
Process-1
Process-2
Process-3
Process Data No.


Average Penalty Ratio
SJF
RR
300
250
200
150
100
50
0
Average Penalty Ratio
Process-1
Process-2
Process-3
Process Data No.



From the above analysis we can infer that:

SJF scheduling has more average waiting and turnaround time compared to RR scheduler.

System throughput of SJF is better compared to RR

RR has better average response time than SJF.

SJF can lead to convoy effect for some processes sequence but there will be no starvation and Convoy effect in RR.

Average Penalty ratio of SJF is smaller than RR.

SJF can also lead to Starvation for long processes if shorter processes keep coming in.