SYSC 4001-A Lab Section: L1

Assignment 3 Report – Group Submission

Link To Repository (P1): SYSC4001_A3_P1 Repository

Link To Repository (P2): SYSC4001_A3P2 Repository

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Date: December 1, 2025

(For the purpose of the length of the report we will analyze the first 3 input files each with the 3 different simulators)

Throughput *= Total processes completed / Total simulation time*
Average Wait Time *= (Start Time - Arrival Time) / Total number of processes*
Average Turnaround Time *= Completion Time - Arrival Time / Total number of processes*
Average Response Time *= Total I/O intervals sum / total number of times process is in wait state*

Simulation of Input File 1:

EP, RR, and EP + RR (All 3 are the same since we have 1 process):

Throughput = 1 process / 7719 ms = 0.1295 processes/second
Average Wait Time = (0 – 0) / 1 = 0 ms
Average Turnaround Time = (7719 – 0) / 1 = 7719 ms
Average Response Time = 3068 / 26 = 118 ms

Simulation of Input File 2:

EP:

Throughput = 3 processes / 15641 ms = 0.1917 processes/second
Average Wait Time: (0 + 0 + 0) / 3 = 0 ms
Average Turnaround Time:

- P1: 15641 - 629 = 15012 ms
- P2: 8427 - 1693 = 6734 ms
- P3: 6826 - 2171 = 4655 ms
- Average: (15012 + 6734 + 4655) / 3 = 8800.33 ms

Average Response Time: ~118 ms

RR:

Throughput: 3 processes / 15384 ms = 0.1950 processes/second
Average Wait Time: (0 + 0 + 0) / 3 = 0 ms
Average Turnaround Time:

- P1: 15384 - 629 = 14755 ms
- P2: 9147 - 1693 = 7454 ms
- P3: 7429 - 2171 = 5258 ms
- Average: (14755 + 7454 + 5258) / 3 = 9155.67 ms

Average Response Time: ~118 ms

EP + RR:

Throughput: 3 processes / 13814 ms = 0.2172 processes/second
Average Wait Time: (0 + 0 + 0) / 3 = 0 ms
Average Turnaround Time:

- P1: 13814 - 629 = 13185 ms
- P2: 6037 - 1693 = 4344 ms
- P3: 10175 - 2171 = 8004 ms
- Average: (13185 + 4344 + 8004) / 3 = 8511 ms

Average Response Time: ~118 ms

Simulation of Input File 3:

EP:

Throughput: 2 processes / 9556 ms = 0.2093 processes/second
Average Wait Time:

- P1: 0 ms
- P2: 1046 - 730 = 316 ms
- Average: (0 + 316) / 2 = 158 ms

Average Turnaround Time:

- P1: 9556 - 722 = 8834 ms
- P2: 7976 - 730 = 7246 ms
- Average: (8834 + 7246) / 2 = 8040 ms

Average Response Time: ~118 ms

RR:

Throughput: 2 processes / 9510 ms = 0.2103 processes/second
Average Wait Time:

- P1: 0 ms
- P2: 822 - 730 = 92 ms
- Average: (0 + 92) / 2 = 46 ms

Average Turnaround Time:

- P1: 9510 - 722 = 8788 ms
- P2: 9068 - 730 = 8338 ms
- Average: (8788 + 8338) / 2 = 8563 ms

Average Response Time: ~118 ms

EP + RR:

Throughput: 2 processes / 10349 ms = 0.1933 processes/second
Average Wait Time:

- P1: 0 ms
- P2: 1046 - 730 = 316 ms
- Average: (0 + 316) / 2 = 158 ms

Average Turnaround Time:

- P1: 6531 - 722 = 5809 ms
- P2: 10349 - 730 = 9619 ms
- Average: (5809 + 9619) / 2 = 7714 ms

Average Response Time: ~118 ms

Analysis of the Results for Input File 2:

Metric	Best Overall Scheduler
Throughput	EP
Avg Wait Time	Same for All
Avg Turnaround Time	Ep + RR
Avg Response Time	Same for All

Analysis of the Results for Input File 3:

Metric	Best Overall Scheduler
Throughput	EP + RR
Avg Wait Time	RR
Avg Turnaround Time	Ep + RR
Avg Response Time	Same for All

Comparison of Schedulers:

	I/O Bound	CPU Bound	Mixed
Round Robin	Better fairness and responsiveness but high context switch overhead	High turnaround time so frequent context switches	Fair usage of both I/O & CPU processes
External Priorities	Worse performance as Low CPU utilization	Good for high priority processes and may introduce starvation	Convoy effect possible so poor fairness
External Priorities + Round Robin	Balance performance may suffer due to low priority processes having less CPU time	Balanced performance but priority inversion possible if low priority process has long CPU burst	Good throughput and fairness so best overall