

Project 3 Simulator: Process Scheduler (30 points)

The program, scheduler.py, allows you to see how different schedulers perform under scheduling metrics such as response time, turnaround time, and total wait time. See the README for details.

Questions:

- T.T. w/loads*
- FIFO = SJF*
1. Compute the response time and turnaround time when running three jobs of length 200 with the SJF and FIFO schedulers. (FIFO works the same way as FCFS.)
*./scheduler.py -p SJF -l 200,200,200
FIFO*
 2. Now do the same but with jobs of different lengths: 100, 200, and 300.
*./scheduler.py -p SJF -l 100,200,300
FIFO*
 3. Now do the same, but also with the RR scheduler and a time slice of 1.
./scheduler.py -h for T_q for RR schedule
./scheduler.py -p RR -l 100,200,300
 4. For what types of workloads does SJF deliver the same turnaround times as FIFO?
 5. For what types of workloads and quantum lengths does SJF deliver the same response times as RR?
 6. What happens to response time with SJF as job lengths increase? Can you use the simulator to demonstrate the trend?
 7. What happens to response time with RR as quantum lengths increase? Can you write an equation that gives the worst-case response time, given N jobs?

Submission:

Please answer the questions in a word file. Provide screenshots of running the simulator for questions 1~3, and 6.

①

	SJF R.T.	SJF T.T.	FIFO R.T.	FIFO T.T.
Job 0	0	200	0	200
Job 1	200	400	200	400
Job 2	400	600	400	600
Average	200	400	200	400

②

	SJF R.T.	SJF T.T.	FIFO R.T.	FIFO T.T.
Job 0	0	100	0	100
Job 1	100	300	100	300
Job 2	300	600	300	600
Average	133.33	333.33	133.33	333.33

③

	R.T.	T.T.
Job 0	0	298
Job 1	1	499
Job 2	2	600
Average	1	465.67

- ④ SJF delivers same T.T. as FIFO as long as the workloads are either all the same value, or values are arriving in ascending order (ex: 1,2,3). If there is reverse ordering SJF is faster.
- ⑤ If all workloads add to be the same or higher than RR's time quantum, RR behaves the same as SJF's response time.
- ⑥ Job length and average response time have a 1:1 linear relationship.

For example job lengths using SJF are -l 1500, 3800, 500 which had

average R.T. of 833.33 with a response breakdown being 0, 500, 2000

↳ If we double this, we get -l 3000, 7600, 1000 → R.T = 1666.67 & Response times: 0, 1000, 4000

- ④ When RR quantum lengths increase, response time goes up as a process keeps waiting until it gets to use the CPU/get a time slice. Worst case is it is maximum time, proportional to processes and take up max execution time.