

**Operating Systems (OS) – Theory**

**Assignment:01**

**Scheduling Algorithms (Simulation)**

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**Question No.01:**

Compute the response time and turnaround time when running three jobs of length 200 with the SJF and FIFO schedulers.

**Answer:**

Here arrival time of every job is considered to be 0. Since job length is same response time and turnaround time will be same in both cases.

Turnaround Time= Exit Time-Arrival Time

Response Time= Time at which the process gets the CPU-Arrival Time

**Response Time:**

**J1=**0-0=0

**J2=**200-0=200

**J3**=400-0=400

Average response time===200

**Turnaround Time:**

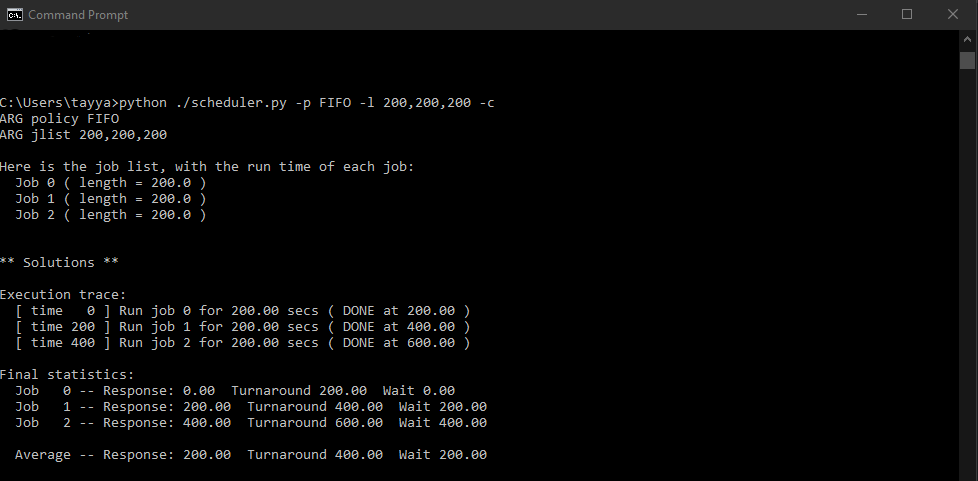
**J1=**200-0=200

**J2=**400-0=400

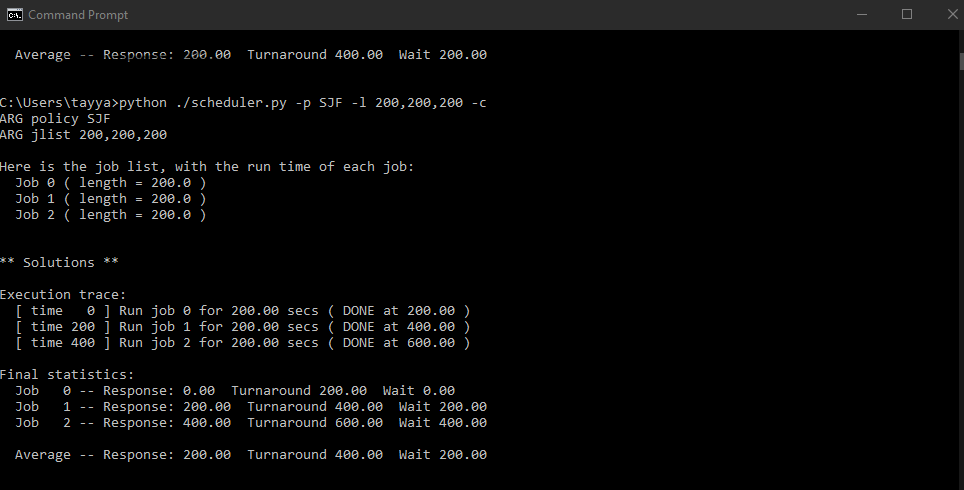
**J3**=600-0=600

Average turnaround time===400

**FIFO:**



**SJF:**

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**Question No.02:**

Now do the same but with jobs of different lengths: 200, 100, and 300.

**Answer:**

Here arrival time of every job is considered to be 0.

Turnaround Time= Exit Time-Arrival Time

Response Time= Time at which the process gets the CPU-Arrival Time

**FIFO (First In First Out):**

**Response Time:**

**J1=**0-0=0

**J2=**200-0=200

**J3**=300-0=300

Average response time===166.66

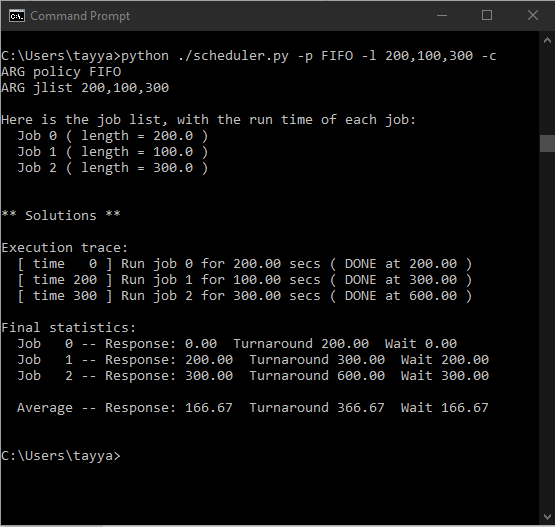
**Turnaround Time:**

**J1=**200-0=200

**J2=**300-0=300

**J3**=600-0=600

Average turnaround time===366.66



**SJF (Shortest Job First):**

**Response Time:**

**J1=**0-0=0

**J2=**100-0=100

**J3**=300-0=300

Average response time===133.3

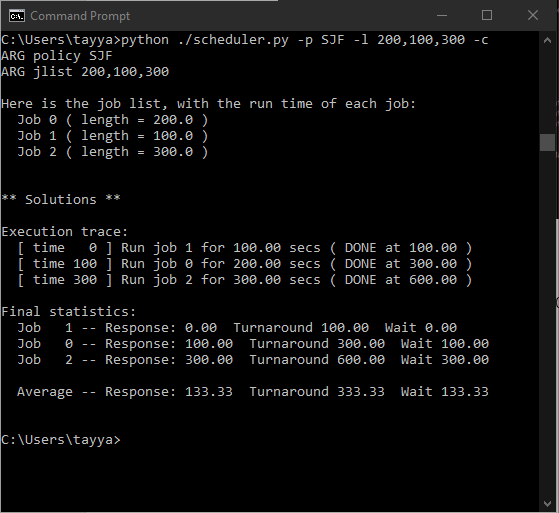
**Turnaround Time:**

**J1=**100-0=100

**J2=**300-0=300

**J3**=600-0=600

Average turnaround time===333.3



**Question No.03:**

Now do the same, but also with the RR scheduler and a time-slice of 1.

**Answer:**

Here quantum q is given as 1 so it will take so many iterations to complete the process. We can calculate response time easily but turnaround time cannot be calculated easily with small quantum.

**Response Time:**

**J1=**0-0=0

**J2=**1-0=1

**J3**=2-0=2

Average response time===1

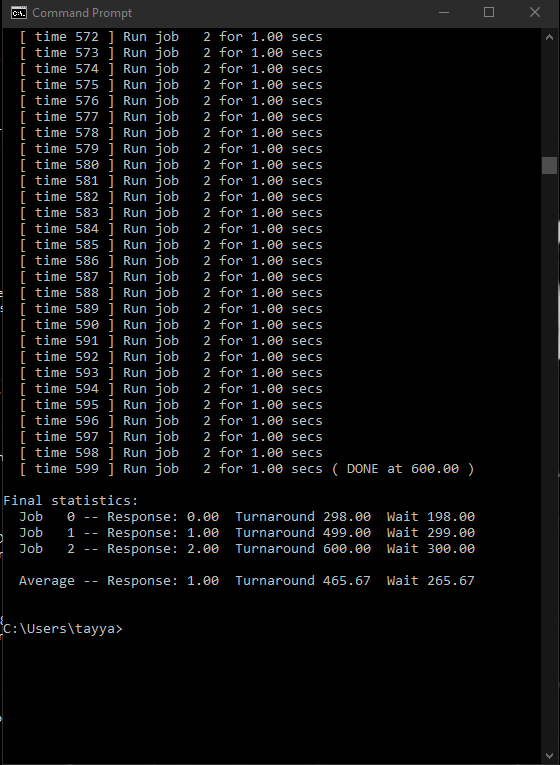
**Turnaround Time:**

**J1=**298-0=298 (Exit time is 298 because process gets CPU at 0 and in between switching there are 2 other processes)

**J2=**499-0=499 (Exit time is 499 because process gets CPU at 0 and in between switching there are 2 other processes in start and after completion of J1 only J2 and J3 are left)

**J3**=600-0=600 (Exit time is 600 because process gets CPU at 0 and in between switching there are 2 other processes in start and after completion of J1 and J2 only J3 is left)

Average turnaround time===465.66



**Question No.04:**

For what types of workloads does SJF deliver the same turnaround times as FIFO?

**Answer:**

Whenever the processes arrive at the same time and they have same length both SJF and FIFO returns the same turnaround time as shown in question number 1.

**Question No.05:**

For what types of workloads and quantum lengths does SJF deliver the same response times as RR?

**Answer:**

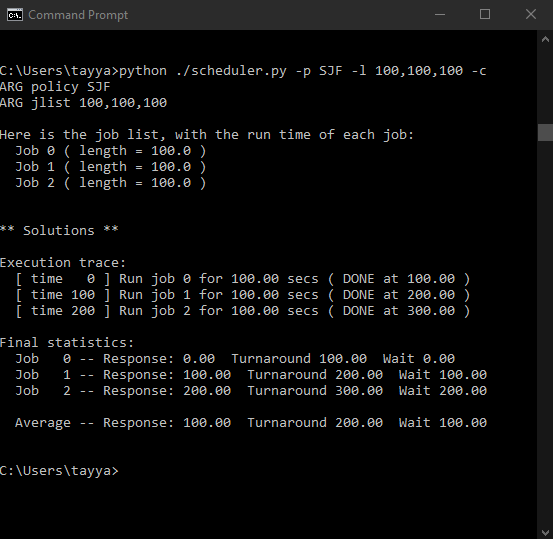
Whenever quantum ‘q’ becomes equal to the length of process SJF and RR returns the same response time.

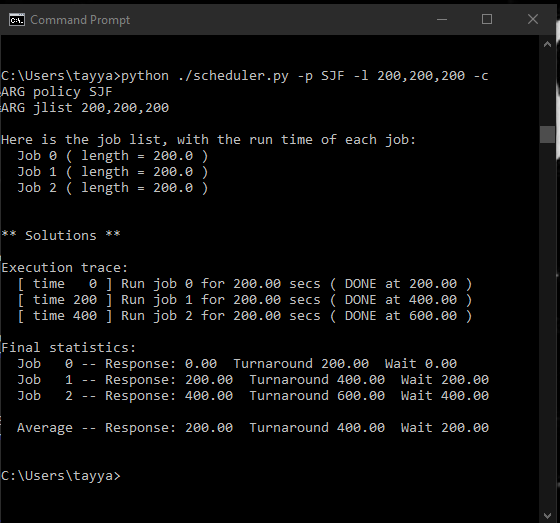
**Question No.06:**

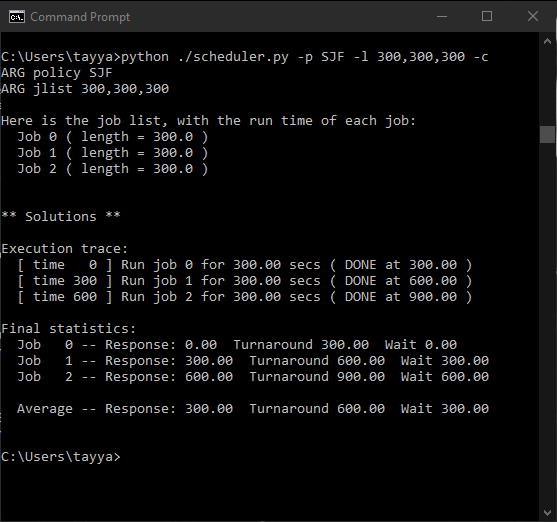
What happens to response time with SJF as job lengths increase? Can you use the simulator to demonstrate the trend?

**Answer:**

When length of the job increases, the response time also increases. This is shown in the screenshots below.







**Question No.07:**

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?

**Answer:**

When quantum length is increased, response time of Round Robin (RR) also increases. For the worst-case response time can be used.

