Turnaround Time ⇒ TT
Response Time ⇒ RT
Wait Time ⇒ WT

J1 (len = 5)
J2 (len = 3)
J3 (len = 7)

TT ⇒ $T_{Job\ finished} - T_{arrival}$

RT ⇒ $T_{first\ run} - T_{arrival}$ exec

WT ⇒ $T_{turnaround} - Burst\ time$ of J3

Assuming all jobs come at T=0

FIFO

| J1 | J2 | J3 |
0 5 8 15

$TT_{(J1)} = 5$ $RT_{J1} = 0$ $WT_{J1} =$ (same as RT, since no context switch)

$TT_{J2} = 8$ $RT_{J2} = 5$

$TT_{J3} = 15$ $RT_{J3} = 8$

SJF shortest job first

| J1 | J2 | J3 |
0 3 8 15

$TT_{J1} = 3$ $RT_{J1} = 0$

$TT_{J2} = 8$ $RT_{J2} = 3$

$TT_{J3} = 15$ $RT_{J3} = 8$

① JL = 200, Jobs = 3

| 200 | 200 | 200 |
0 200 400 600

$TT_{J1} = 200$ $RT_{J1} = 0$ $WT_{J1} = RT_{J1}$

FIFO/ $J2 = 400$ $J2 = 200$

SJF $J3 = 500$ $J3 = 400$

$TT_{av} = 400$ $RT_{av} = 200$ $WT_{av} = 200$

② $J1 = 100$, $J2 = 200$, $J3 = 300$

FIFO/ SJF

0	J1 100	160	J2 200	300	J3 300	600

$TT_{J1} = 100$ $RT_{J1} = 0$ $WT = RT$

$J2 = 300$ $J2 = 100$

$J3 = 600$ $J3 = 300$

$TT_{av} = 333.5$ $RT_{av} = 133.5$

③ RR - Round Robin time-slice = 1

$J1 = 100$, $J2 = 200$, $J3 = 300$

$TT_{J1} = 298$ $RT_{J1} = 0$ $WT_{J1} = 298 - 100$

$T_{J2} = 499$ $RT_{J2} = 1$ $WT_{J2} = 499 - 200$

$T_{J3} = 600$ $RT_{J3} = 2$ $WT_{J3} = 600 - 300$

$T_{av} = 465.67$ $RT_{av} = 1$ $WT_{av} = 265.67$

time-slice = 50

$TT_{J1} = 200$ $RT_{J1} = 0$ $WT_{J1} = 100$

$J2 = 450$ $J2 = 50$ $WT_{J2} = 250$

$J3 = 600$ $J3 = 100$ $J3 = 300$

$T_{AW} = 416.67$ $RT_{AW} = 50$ $WT_{AW} = 216.67$

(4) When job length is either same or the sequence of jobs coming in is in increasing job length.

(5) SJF delivers same response time as RR, what quantum lengths (time-slice)

Higher time-slice, like we can see above with time-slice of 50 RT_{AW} bumps to 50
To get SJF value (133.5) we should bump it further
With 100
$RT_{J1} = 0$, $J2 = 100$,

JS = 200

RR = 100

with time-slice greater than or close to finish whole job.

(6) Response time increases for SJF with increase in job lengths.

```
Here is the job list, with the run time of each job:
  Job 0 ( length = 10.0 )
  Job 1 ( length = 20.0 )
  Job 2 ( length = 30.0 )


** Solutions **

Execution trace:
  [ time   0 ] Run job 0 for 10.00 secs ( DONE at 10.00 )
  [ time  10 ] Run job 1 for 20.00 secs ( DONE at 30.00 )
  [ time  30 ] Run job 2 for 30.00 secs ( DONE at 60.00 )

Final statistics:
  Job   0 -- Response: 0.00  Turnaround 10.00  Wait 0.00
  Job   1 -- Response: 10.00  Turnaround 30.00  Wait 10.00
  Job   2 -- Response: 30.00  Turnaround 60.00  Wait 30.00

  Average -- Response: 13.33  Turnaround 33.33  Wait 13.33
```

```
Here is the job list, with the run time of each job:
  Job 0 ( length = 100.0 )
  Job 1 ( length = 200.0 )
  Job 2 ( length = 300.0 )


** Solutions **

Execution trace:
  [ time   0 ] Run job 0 for 100.00 secs ( DONE at 100.00 )
  [ time 100 ] Run job 1 for 200.00 secs ( DONE at 300.00 )
  [ time 300 ] Run job 2 for 300.00 secs ( DONE at 600.00 )

Final statistics:
  Job   0 -- Response: 0.00  Turnaround 100.00  Wait 0.00
  Job   1 -- Response: 100.00  Turnaround 300.00  Wait 100.00
  Job   2 -- Response: 300.00  Turnaround 600.00  Wait 300.00

  Average -- Response: 133.33  Turnaround 333.33  Wait 133.33
```

```
Here is the job list, with the run time of each job:
  Job 0 ( length = 400.0 )
  Job 1 ( length = 800.0 )
  Job 2 ( length = 1000.0 )


** Solutions **

Execution trace:
  [ time   0 ] Run job 0 for 400.00 secs ( DONE at 400.00 )
  [ time 400 ] Run job 1 for 800.00 secs ( DONE at 1200.00 )
  [ time 1200 ] Run job 2 for 1000.00 secs ( DONE at 2200.00 )

Final statistics:
  Job   0 -- Response: 0.00  Turnaround 400.00  Wait 0.00
  Job   1 -- Response: 400.00  Turnaround 1200.00  Wait 400.00
  Job   2 -- Response: 1200.00  Turnaround 2200.00  Wait 1200.00

  Average -- Response: 533.33  Turnaround 1266.67  Wait 533.33
```

(7) Response time increases as quantum lengths increase for RR.

Worst-case response time equation
N jobs

All jobs (N-1) are <= quantum length
then the last job response time
will be summation of job lengths (N-1)

$$RT_N = J_0 + \ldots + J_{N-1}$$

Example - J1 J2 J3 J4
200, 200, 300, 300
q = 300

$$RT_{J4} = 200 + 200 + 300 = 700$$