1 Cody Thompson Assignment 4

About this document: I made 4 inputs. The first two are from the assignment doc and are unchanged and ran through my program with the same output. They are labeled as "Input Example 1" and "Input Example 2." I also made two input files that tested different things like longer wait times for initial processes and high priority processes with long wait times.

To get to the examples, either scroll to them or click the links below in the "Table of Contents" to view them. Doing this to make it easier to find the inputs and respective outputs.

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Input Example 1

```
Enter triples: process id, time in ms, and priority:
For example:
1 12 0
3  9 1
2 99 9
process 1 needs 12 ms and has priority 0, very high,
process 3 needs  9 ms and has priority 1.
and so on ...
1 2 3
2 1 2

Process list in FCFS order as entered:
1 2 3
2 1 2
End of List

fcfs wait of p1 = 0
fcfs wait of p2 = 2
average wait for 2 procs = 985151285.500000
fcfs turn-around time for p1 = 2
fcfs turn-around time for p2 = 3
average turn-around for 2 procs = 2.500000
fcfs throughput for 2 procs = 0.666667 proc/ms
 <><> end FCFS <><>

Process list in HPF order:
2 1 2
1 2 3
End of list.

hpf wait of p2 = 0
hpf wait of p1 = 1
average wait for 2 procs = 0.500000
hpf turn-around time for p2 = 1
hpf turn-around time for p1 = 3
average turn-around for 2 procs = 2.000000
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hpf throughput for 2 procs = 0.666667 proc/ms
 <><> end HPF schedule <><>

preemptive RR schedule, quantum = 1 overhead = 0
RR TA time for finished p2 = 2, needed: 1 ms, and: 1 time slices.
RR TA time for finished p1 = 3, needed: 2 ms, and: 2 time slices.
RR Throughput, 2 p, with q: 1, o: 0, is: 0.666667 p/ms, or 666.667 p/us
Average RR TA, 2 p, with q: 1, o: 0, is: 2.5

preemptive RR schedule, quantum = 1 overhead = 1
RR TA time for finished p2 = 3, needed: 1 ms, and: 1 time slices.
RR TA time for finished p1 = 5, needed: 2 ms, and: 2 time slices.
RR Throughput, 2 p, with q: 1, o: 1, is: 0.4 p/ms, or 400 p/us
Average RR TA, 2 p, with q: 1, o: 1, is: 4

preemptive RR schedule, quantum = 2 overhead = 0
RR TA time for finished p1 = 2, needed: 2 ms, and: 1 time slices.
RR TA time for finished p2 = 3, needed: 1 ms, and: 1 time slices.
RR Throughput, 2 p, with q: 2, o: 0, is: 0.666667 p/ms, or 666.667 p/us
Average RR TA, 2 p, with q: 2, o: 0, is: 2.5

preemptive RR schedule, quantum = 2 overhead = 1
RR TA time for finished p1 = 2, needed: 2 ms, and: 1 time slices.
RR TA time for finished p2 = 4, needed: 1 ms, and: 1 time slices.
RR Throughput, 2 p, with q: 2, o: 1, is: 0.5 p/ms, or 500 p/us
Average RR TA, 2 p, with q: 2, o: 1, is: 3

preemptive RR schedule, quantum = 2 overhead = 2
RR TA time for finished p1 = 2, needed: 2 ms, and: 1 time slices.
RR TA time for finished p2 = 5, needed: 1 ms, and: 1 time slices.
RR Throughput, 2 p, with q: 2, o: 2, is: 0.4 p/ms, or 400 p/us
Average RR TA, 2 p, with q: 2, o: 2, is: 3.5

 <><> end preemptive RR schedule <><>
```

Input Example 2

```
Enter triples: process id, time in ms, and priority:
For example:
1 12 0
3  9 1
2 99 9
process 1 needs 12 ms and has priority 0, very high,
process 3 needs  9 ms and has priority 1.
and so on ...
1 10 5
2 8 1
3 12 7

Process list in FCFS order as entered:
1 10 5
2 8 1
3 12 7
End of List

fcfs wait of p1 = 0
fcfs wait of p2 = 10
fcfs wait of p3 = 18
average wait for 3 procs = 9.333333
fcfs turn-around time for p1 = 10
fcfs turn-around time for p2 = 18
fcfs turn-around time for p3 = 30
average turn-around for 3 procs = 19.333333
fcfs throughput for 3 procs = 0.100000 proc/ms
 <><> end FCFS <><>

Process list in HPF order:
2 8 1
1 10 5
3 12 7
End of list.

hpf wait of p2 = 0
hpf wait of p1 = 8
hpf wait of p3 = 18
average wait for 3 procs = 8.666667
hpf turn-around time for p2 = 8
hpf turn-around time for p1 = 18
hpf turn-around time for p3 = 30
average turn-around for 3 procs = 18.666667
hpf throughput for 3 procs = 0.100000 proc/ms
 <><> end HPF schedule <><>

preemptive RR schedule, quantum = 1 overhead = 0
RR TA time for finished p2 = 23, needed: 8 ms, and: 8 time slices.
RR TA time for finished p1 = 27, needed: 10 ms, and: 10 time slices.
RR TA time for finished p3 = 30, needed: 12 ms, and: 12 time slices.
RR Throughput, 3 p, with q: 1, o: 0, is: 0.1 p/ms, or 100 p/us
Average RR TA, 3 p, with q: 1, o: 0, is: 26.6667

preemptive RR schedule, quantum = 1 overhead = 1
RR TA time for finished p2 = 45, needed: 8 ms, and: 8 time slices.
RR TA time for finished p1 = 53, needed: 10 ms, and: 10 time slices.
RR TA time for finished p3 = 59, needed: 12 ms, and: 12 time slices.
RR Throughput, 3 p, with q: 1, o: 1, is: 0.0508475 p/ms, or 50.8475 p/us
Average RR TA, 3 p, with q: 1, o: 1, is: 52.3333

preemptive RR schedule, quantum = 2 overhead = 0
RR TA time for finished p2 = 22, needed: 8 ms, and: 4 time slices.
RR TA time for finished p1 = 26, needed: 10 ms, and: 5 time slices.
RR TA time for finished p3 = 30, needed: 12 ms, and: 6 time slices.
RR Throughput, 3 p, with q: 2, o: 0, is: 0.1 p/ms, or 100 p/us
Average RR TA, 3 p, with q: 2, o: 0, is: 26
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preemptive RR schedule, quantum = 2 overhead = 1
RR TA time for finished p2 = 32, needed: 8 ms, and: 4 time slices.
RR TA time for finished p1 = 38, needed: 10 ms, and: 5 time slices.
RR TA time for finished p3 = 44, needed: 12 ms, and: 6 time slices.
RR Throughput, 3 p, with q: 2, o: 1, is: 0.0681818 p/ms, or 68.1818 p/us
Average RR TA, 3 p, with q: 2, o: 1, is: 38

preemptive RR schedule, quantum = 2 overhead = 2
RR TA time for finished p2 = 42, needed: 8 ms, and: 4 time slices.
RR TA time for finished p1 = 50, needed: 10 ms, and: 5 time slices.
RR TA time for finished p3 = 58, needed: 12 ms, and: 6 time slices.
RR Throughput, 3 p, with q: 2, o: 2, is: 0.0517241 p/ms, or 51.7241 p/us
Average RR TA, 3 p, with q: 2, o: 2, is: 50

preemptive RR schedule, quantum = 3 overhead = 0
RR TA time for finished p2 = 23, needed: 8 ms, and: 3 time slices.
RR TA time for finished p1 = 27, needed: 10 ms, and: 4 time slices.
RR TA time for finished p3 = 30, needed: 12 ms, and: 4 time slices.
RR Throughput, 3 p, with q: 3, o: 0, is: 0.1 p/ms, or 100 p/us
Average RR TA, 3 p, with q: 3, o: 0, is: 26.6667

preemptive RR schedule, quantum = 3 overhead = 1
RR TA time for finished p2 = 30, needed: 8 ms, and: 3 time slices.
RR TA time for finished p1 = 36, needed: 10 ms, and: 4 time slices.
RR TA time for finished p3 = 40, needed: 12 ms, and: 4 time slices.
RR Throughput, 3 p, with q: 3, o: 1, is: 0.075 p/ms, or 75 p/us
Average RR TA, 3 p, with q: 3, o: 1, is: 35.3333

preemptive RR schedule, quantum = 3 overhead = 2
RR TA time for finished p2 = 37, needed: 8 ms, and: 3 time slices.
RR TA time for finished p1 = 45, needed: 10 ms, and: 4 time slices.
RR TA time for finished p3 = 50, needed: 12 ms, and: 4 time slices.
RR Throughput, 3 p, with q: 3, o: 2, is: 0.06 p/ms, or 60 p/us
Average RR TA, 3 p, with q: 3, o: 2, is: 44

preemptive RR schedule, quantum = 3 overhead = 3
RR TA time for finished p2 = 44, needed: 8 ms, and: 3 time slices.
RR TA time for finished p1 = 54, needed: 10 ms, and: 4 time slices.
RR TA time for finished p3 = 60, needed: 12 ms, and: 4 time slices.
RR Throughput, 3 p, with q: 3, o: 3, is: 0.05 p/ms, or 50 p/us
Average RR TA, 3 p, with q: 3, o: 3, is: 52.6667

preemptive RR schedule, quantum = 4 overhead = 0
RR TA time for finished p2 = 20, needed: 8 ms, and: 2 time slices.
RR TA time for finished p1 = 26, needed: 10 ms, and: 3 time slices.
RR TA time for finished p3 = 30, needed: 12 ms, and: 3 time slices.
RR Throughput, 3 p, with q: 4, o: 0, is: 0.1 p/ms, or 100 p/us
Average RR TA, 3 p, with q: 4, o: 0, is: 25.3333

preemptive RR schedule, quantum = 4 overhead = 1
RR TA time for finished p2 = 24, needed: 8 ms, and: 2 time slices.
RR TA time for finished p1 = 32, needed: 10 ms, and: 3 time slices.
RR TA time for finished p3 = 37, needed: 12 ms, and: 3 time slices.
RR Throughput, 3 p, with q: 4, o: 1, is: 0.0810811 p/ms, or 81.0811 p/us
Average RR TA, 3 p, with q: 4, o: 1, is: 31

preemptive RR schedule, quantum = 4 overhead = 2
RR TA time for finished p2 = 28, needed: 8 ms, and: 2 time slices.
RR TA time for finished p1 = 38, needed: 10 ms, and: 3 time slices.
RR TA time for finished p3 = 44, needed: 12 ms, and: 3 time slices.
RR Throughput, 3 p, with q: 4, o: 2, is: 0.0681818 p/ms, or 68.1818 p/us
Average RR TA, 3 p, with q: 4, o: 2, is: 36.6667

preemptive RR schedule, quantum = 4 overhead = 3
RR TA time for finished p2 = 32, needed: 8 ms, and: 2 time slices.
RR TA time for finished p1 = 44, needed: 10 ms, and: 3 time slices.
RR TA time for finished p3 = 51, needed: 12 ms, and: 3 time slices.
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RR Throughput, 3 p, with q: 4, o: 3, is: 0.0588235 p/ms, or 58.8235 p/us
Average RR TA, 3 p, with q: 4, o: 3, is: 42.3333

preemptive RR schedule, quantum = 4 overhead = 4
RR TA time for finished p2 = 36, needed: 8 ms, and: 2 time slices.
RR TA time for finished p1 = 50, needed: 10 ms, and: 3 time slices.
RR TA time for finished p3 = 58, needed: 12 ms, and: 3 time slices.
RR Throughput, 3 p, with q: 4, o: 4, is: 0.0517241 p/ms, or 51.7241 p/us
Average RR TA, 3 p, with q: 4, o: 4, is: 48

preemptive RR schedule, quantum = 5 overhead = 0
RR TA time for finished p1 = 20, needed: 10 ms, and: 2 time slices.
RR TA time for finished p2 = 23, needed: 8 ms, and: 2 time slices.
RR TA time for finished p3 = 30, needed: 12 ms, and: 3 time slices.
RR Throughput, 3 p, with q: 5, o: 0, is: 0.1 p/ms, or 100 p/us
Average RR TA, 3 p, with q: 5, o: 0, is: 24.3333

preemptive RR schedule, quantum = 5 overhead = 1
RR TA time for finished p1 = 23, needed: 10 ms, and: 2 time slices.
RR TA time for finished p2 = 27, needed: 8 ms, and: 2 time slices.
RR TA time for finished p3 = 36, needed: 12 ms, and: 3 time slices.
RR Throughput, 3 p, with q: 5, o: 1, is: 0.0833333 p/ms, or 83.3333 p/us
Average RR TA, 3 p, with q: 5, o: 1, is: 28.6667

preemptive RR schedule, quantum = 5 overhead = 2
RR TA time for finished p1 = 26, needed: 10 ms, and: 2 time slices.
RR TA time for finished p2 = 31, needed: 8 ms, and: 2 time slices.
RR TA time for finished p3 = 42, needed: 12 ms, and: 3 time slices.
RR Throughput, 3 p, with q: 5, o: 2, is: 0.0714286 p/ms, or 71.4286 p/us
Average RR TA, 3 p, with q: 5, o: 2, is: 33

preemptive RR schedule, quantum = 5 overhead = 3
RR TA time for finished p1 = 29, needed: 10 ms, and: 2 time slices.
RR TA time for finished p2 = 35, needed: 8 ms, and: 2 time slices.
RR TA time for finished p3 = 48, needed: 12 ms, and: 3 time slices.
RR Throughput, 3 p, with q: 5, o: 3, is: 0.0625 p/ms, or 62.5 p/us
Average RR TA, 3 p, with q: 5, o: 3, is: 37.3333

preemptive RR schedule, quantum = 5 overhead = 4
RR TA time for finished p1 = 32, needed: 10 ms, and: 2 time slices.
RR TA time for finished p2 = 39, needed: 8 ms, and: 2 time slices.
RR TA time for finished p3 = 54, needed: 12 ms, and: 3 time slices.
RR Throughput, 3 p, with q: 5, o: 4, is: 0.0555556 p/ms, or 55.5556 p/us
Average RR TA, 3 p, with q: 5, o: 4, is: 41.6667

preemptive RR schedule, quantum = 5 overhead = 5
RR TA time for finished p1 = 35, needed: 10 ms, and: 2 time slices.
RR TA time for finished p2 = 43, needed: 8 ms, and: 2 time slices.
RR TA time for finished p3 = 60, needed: 12 ms, and: 3 time slices.
RR Throughput, 3 p, with q: 5, o: 5, is: 0.05 p/ms, or 50 p/us
Average RR TA, 3 p, with q: 5, o: 5, is: 46

 <><> end preemptive RR schedule <><>
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Input — Long wait times for first processes but short wait times for last processes, multiple same priorities:

```
Enter triples: process id, time in ms, and priority:
For example:
1 12 0
3  9 1
2 99 9
process 1 needs 12 ms and has priority 0, very high,
process 3 needs  9 ms and has priority 1.
and so on ...
3 18 7
5 24 2
2 15 2
1 4 2
4 3 9

Process list in FCFS order as entered:
3 18 7
5 24 2
2 15 2
1 4 2
4 3 9
End of List

fcfs wait of p3 = 0
fcfs wait of p5 = 18
fcfs wait of p2 = 42
fcfs wait of p1 = 57
fcfs wait of p4 = 61
average wait for 5 procs = 35.600000
fcfs turn-around time for p3 = 18
fcfs turn-around time for p5 = 42
fcfs turn-around time for p2 = 57
fcfs turn-around time for p1 = 61
fcfs turn-around time for p4 = 64
average turn-around for 5 procs = 48.400000
fcfs throughput for 5 procs = 0.078125 proc/ms
 <><> end FCFS <><>

Process list in HPF order:
5 24 2
2 15 2
1 4 2
3 18 7
4 3 9
End of list.

hpf wait of p5 = 0
hpf wait of p2 = 24
hpf wait of p1 = 39
hpf wait of p3 = 43
hpf wait of p4 = 61
average wait for 5 procs = 33.400000
hpf turn-around time for p5 = 24
hpf turn-around time for p2 = 39
hpf turn-around time for p1 = 43
hpf turn-around time for p3 = 61
hpf turn-around time for p4 = 64
average turn-around for 5 procs = 46.200000
hpf throughput for 5 procs = 0.078125 proc/ms
 <><> end HPF schedule <><>

preemptive RR schedule, quantum = 1 overhead = 0
RR TA time for finished p4 = 15, needed: 3 ms, and: 3 time slices.
RR TA time for finished p1 = 19, needed: 4 ms, and: 4 time slices.
RR TA time for finished p2 = 52, needed: 15 ms, and: 15 time slices.
RR TA time for finished p3 = 57, needed: 18 ms, and: 18 time slices.
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RR TA time for finished p5 = 64, needed: 24 ms, and: 24 time slices.
RR Throughput, 5 p, with q: 1, o: 0, is: 0.078125 p/ms, or 78.125 p/us
Average RR TA, 5 p, with q: 1, o: 0, is: 41.4

preemptive RR schedule, quantum = 1 overhead = 1
RR TA time for finished p4 = 29, needed: 3 ms, and: 3 time slices.
RR TA time for finished p1 = 37, needed: 4 ms, and: 4 time slices.
RR TA time for finished p2 = 103, needed: 15 ms, and: 15 time slices.
RR TA time for finished p3 = 113, needed: 18 ms, and: 18 time slices.
RR TA time for finished p5 = 127, needed: 24 ms, and: 24 time slices.
RR Throughput, 5 p, with q: 1, o: 1, is: 0.0393701 p/ms, or 39.3701 p/us
Average RR TA, 5 p, with q: 1, o: 1, is: 81.8

preemptive RR schedule, quantum = 2 overhead = 0
RR TA time for finished p1 = 18, needed: 4 ms, and: 2 time slices.
RR TA time for finished p4 = 19, needed: 3 ms, and: 2 time slices.
RR TA time for finished p2 = 54, needed: 15 ms, and: 8 time slices.
RR TA time for finished p3 = 56, needed: 18 ms, and: 9 time slices.
RR TA time for finished p5 = 64, needed: 24 ms, and: 12 time slices.
RR Throughput, 5 p, with q: 2, o: 0, is: 0.078125 p/ms, or 78.125 p/us
Average RR TA, 5 p, with q: 2, o: 0, is: 42.2

preemptive RR schedule, quantum = 2 overhead = 1
RR TA time for finished p1 = 26, needed: 4 ms, and: 2 time slices.
RR TA time for finished p4 = 28, needed: 3 ms, and: 2 time slices.
RR TA time for finished p2 = 81, needed: 15 ms, and: 8 time slices.
RR TA time for finished p3 = 84, needed: 18 ms, and: 9 time slices.
RR TA time for finished p5 = 96, needed: 24 ms, and: 12 time slices.
RR Throughput, 5 p, with q: 2, o: 1, is: 0.0520833 p/ms, or 52.0833 p/us
Average RR TA, 5 p, with q: 2, o: 1, is: 63

preemptive RR schedule, quantum = 2 overhead = 2
RR TA time for finished p1 = 34, needed: 4 ms, and: 2 time slices.
RR TA time for finished p4 = 37, needed: 3 ms, and: 2 time slices.
RR TA time for finished p2 = 108, needed: 15 ms, and: 8 time slices.
RR TA time for finished p3 = 112, needed: 18 ms, and: 9 time slices.
RR TA time for finished p5 = 128, needed: 24 ms, and: 12 time slices.
RR Throughput, 5 p, with q: 2, o: 2, is: 0.0390625 p/ms, or 39.0625 p/us
Average RR TA, 5 p, with q: 2, o: 2, is: 83.8

preemptive RR schedule, quantum = 3 overhead = 0
RR TA time for finished p4 = 15, needed: 3 ms, and: 1 time slices.
RR TA time for finished p1 = 25, needed: 4 ms, and: 2 time slices.
RR TA time for finished p2 = 52, needed: 15 ms, and: 5 time slices.
RR TA time for finished p3 = 55, needed: 18 ms, and: 6 time slices.
RR TA time for finished p5 = 64, needed: 24 ms, and: 8 time slices.
RR Throughput, 5 p, with q: 3, o: 0, is: 0.078125 p/ms, or 78.125 p/us
Average RR TA, 5 p, with q: 3, o: 0, is: 42.2

preemptive RR schedule, quantum = 3 overhead = 1
RR TA time for finished p4 = 19, needed: 3 ms, and: 1 time slices.
RR TA time for finished p1 = 33, needed: 4 ms, and: 2 time slices.
RR TA time for finished p2 = 69, needed: 15 ms, and: 5 time slices.
RR TA time for finished p3 = 73, needed: 18 ms, and: 6 time slices.
RR TA time for finished p5 = 85, needed: 24 ms, and: 8 time slices.
RR Throughput, 5 p, with q: 3, o: 1, is: 0.0588235 p/ms, or 58.8235 p/us
Average RR TA, 5 p, with q: 3, o: 1, is: 55.8

preemptive RR schedule, quantum = 3 overhead = 2
RR TA time for finished p4 = 23, needed: 3 ms, and: 1 time slices.
RR TA time for finished p1 = 41, needed: 4 ms, and: 2 time slices.
RR TA time for finished p2 = 86, needed: 15 ms, and: 5 time slices.
RR TA time for finished p3 = 91, needed: 18 ms, and: 6 time slices.
RR TA time for finished p5 = 106, needed: 24 ms, and: 8 time slices.
RR Throughput, 5 p, with q: 3, o: 2, is: 0.0471698 p/ms, or 47.1698 p/us
Average RR TA, 5 p, with q: 3, o: 2, is: 69.4

preemptive RR schedule, quantum = 3 overhead = 3
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RR TA time for finished p4 = 27, needed: 3 ms, and: 1 time slices.
RR TA time for finished p1 = 49, needed: 4 ms, and: 2 time slices.
RR TA time for finished p2 = 103, needed: 15 ms, and: 5 time slices.
RR TA time for finished p3 = 109, needed: 18 ms, and: 6 time slices.
RR TA time for finished p5 = 127, needed: 24 ms, and: 8 time slices.
RR Throughput, 5 p, with q: 3, o: 3, is: 0.0393701 p/ms, or 39.3701 p/us
Average RR TA, 5 p, with q: 3, o: 3, is: 83

preemptive RR schedule, quantum = 4 overhead = 0
RR TA time for finished p1 = 16, needed: 4 ms, and: 1 time slices.
RR TA time for finished p4 = 19, needed: 3 ms, and: 1 time slices.
RR TA time for finished p2 = 54, needed: 15 ms, and: 4 time slices.
RR TA time for finished p3 = 56, needed: 18 ms, and: 5 time slices.
RR TA time for finished p5 = 64, needed: 24 ms, and: 6 time slices.
RR Throughput, 5 p, with q: 4, o: 0, is: 0.078125 p/ms, or 78.125 p/us
Average RR TA, 5 p, with q: 4, o: 0, is: 41.8

preemptive RR schedule, quantum = 4 overhead = 1
RR TA time for finished p1 = 19, needed: 4 ms, and: 1 time slices.
RR TA time for finished p4 = 23, needed: 3 ms, and: 1 time slices.
RR TA time for finished p2 = 67, needed: 15 ms, and: 4 time slices.
RR TA time for finished p3 = 70, needed: 18 ms, and: 5 time slices.
RR TA time for finished p5 = 80, needed: 24 ms, and: 6 time slices.
RR Throughput, 5 p, with q: 4, o: 1, is: 0.0625 p/ms, or 62.5 p/us
Average RR TA, 5 p, with q: 4, o: 1, is: 51.8

preemptive RR schedule, quantum = 4 overhead = 2
RR TA time for finished p1 = 22, needed: 4 ms, and: 1 time slices.
RR TA time for finished p4 = 27, needed: 3 ms, and: 1 time slices.
RR TA time for finished p2 = 80, needed: 15 ms, and: 4 time slices.
RR TA time for finished p3 = 84, needed: 18 ms, and: 5 time slices.
RR TA time for finished p5 = 96, needed: 24 ms, and: 6 time slices.
RR Throughput, 5 p, with q: 4, o: 2, is: 0.0520833 p/ms, or 52.0833 p/us
Average RR TA, 5 p, with q: 4, o: 2, is: 61.8

preemptive RR schedule, quantum = 4 overhead = 3
RR TA time for finished p1 = 25, needed: 4 ms, and: 1 time slices.
RR TA time for finished p4 = 31, needed: 3 ms, and: 1 time slices.
RR TA time for finished p2 = 93, needed: 15 ms, and: 4 time slices.
RR TA time for finished p3 = 98, needed: 18 ms, and: 5 time slices.
RR TA time for finished p5 = 112, needed: 24 ms, and: 6 time slices.
RR Throughput, 5 p, with q: 4, o: 3, is: 0.0446429 p/ms, or 44.6429 p/us
Average RR TA, 5 p, with q: 4, o: 3, is: 71.8

preemptive RR schedule, quantum = 4 overhead = 4
RR TA time for finished p1 = 28, needed: 4 ms, and: 1 time slices.
RR TA time for finished p4 = 35, needed: 3 ms, and: 1 time slices.
RR TA time for finished p2 = 106, needed: 15 ms, and: 4 time slices.
RR TA time for finished p3 = 112, needed: 18 ms, and: 5 time slices.
RR TA time for finished p5 = 128, needed: 24 ms, and: 6 time slices.
RR Throughput, 5 p, with q: 4, o: 4, is: 0.0390625 p/ms, or 39.0625 p/us
Average RR TA, 5 p, with q: 4, o: 4, is: 81.8

preemptive RR schedule, quantum = 5 overhead = 0
RR TA time for finished p1 = 19, needed: 4 ms, and: 1 time slices.
RR TA time for finished p4 = 22, needed: 3 ms, and: 1 time slices.
RR TA time for finished p2 = 52, needed: 15 ms, and: 3 time slices.
RR TA time for finished p3 = 55, needed: 18 ms, and: 4 time slices.
RR TA time for finished p5 = 64, needed: 24 ms, and: 5 time slices.
RR Throughput, 5 p, with q: 5, o: 0, is: 0.078125 p/ms, or 78.125 p/us
Average RR TA, 5 p, with q: 5, o: 0, is: 42.4

preemptive RR schedule, quantum = 5 overhead = 1
RR TA time for finished p1 = 22, needed: 4 ms, and: 1 time slices.
RR TA time for finished p4 = 26, needed: 3 ms, and: 1 time slices.
RR TA time for finished p2 = 62, needed: 15 ms, and: 3 time slices.
RR TA time for finished p3 = 66, needed: 18 ms, and: 4 time slices.
RR TA time for finished p5 = 77, needed: 24 ms, and: 5 time slices.
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RR Throughput, 5 p, with q: 5, o: 1, is: 0.0649351 p/ms, or 64.9351 p/us
Average RR TA, 5 p, with q: 5, o: 1, is: 50.6

preemptive RR schedule, quantum = 5 overhead = 2
RR TA time for finished p1 = 25, needed: 4 ms, and: 1 time slices.
RR TA time for finished p4 = 30, needed: 3 ms, and: 1 time slices.
RR TA time for finished p2 = 72, needed: 15 ms, and: 3 time slices.
RR TA time for finished p3 = 77, needed: 18 ms, and: 4 time slices.
RR TA time for finished p5 = 90, needed: 24 ms, and: 5 time slices.
RR Throughput, 5 p, with q: 5, o: 2, is: 0.0555556 p/ms, or 55.5556 p/us
Average RR TA, 5 p, with q: 5, o: 2, is: 58.8

preemptive RR schedule, quantum = 5 overhead = 3
RR TA time for finished p1 = 28, needed: 4 ms, and: 1 time slices.
RR TA time for finished p4 = 34, needed: 3 ms, and: 1 time slices.
RR TA time for finished p2 = 82, needed: 15 ms, and: 3 time slices.
RR TA time for finished p3 = 88, needed: 18 ms, and: 4 time slices.
RR TA time for finished p5 = 103, needed: 24 ms, and: 5 time slices.
RR Throughput, 5 p, with q: 5, o: 3, is: 0.0485437 p/ms, or 48.5437 p/us
Average RR TA, 5 p, with q: 5, o: 3, is: 67

preemptive RR schedule, quantum = 5 overhead = 4
RR TA time for finished p1 = 31, needed: 4 ms, and: 1 time slices.
RR TA time for finished p4 = 38, needed: 3 ms, and: 1 time slices.
RR TA time for finished p2 = 92, needed: 15 ms, and: 3 time slices.
RR TA time for finished p3 = 99, needed: 18 ms, and: 4 time slices.
RR TA time for finished p5 = 116, needed: 24 ms, and: 5 time slices.
RR Throughput, 5 p, with q: 5, o: 4, is: 0.0431034 p/ms, or 43.1034 p/us
Average RR TA, 5 p, with q: 5, o: 4, is: 75.2

preemptive RR schedule, quantum = 5 overhead = 5
RR TA time for finished p1 = 34, needed: 4 ms, and: 1 time slices.
RR TA time for finished p4 = 42, needed: 3 ms, and: 1 time slices.
RR TA time for finished p2 = 102, needed: 15 ms, and: 3 time slices.
RR TA time for finished p3 = 110, needed: 18 ms, and: 4 time slices.
RR TA time for finished p5 = 129, needed: 24 ms, and: 5 time slices.
RR Throughput, 5 p, with q: 5, o: 5, is: 0.0387597 p/ms, or 38.7597 p/us
Average RR TA, 5 p, with q: 5, o: 5, is: 83.4

 <><> end preemptive RR schedule <><>
```

Input – High priority values with high wait times

```
Enter triples: process id, time in ms, and priority:
For example:
1 12 0
3  9 1
2 99 9
process 1 needs 12 ms and has priority 0, very high,
process 3 needs  9 ms and has priority 1.
and so on ...
1 4 99
2 86 1
3 72 2

Process list in FCFS order as entered:
1 4 99
2 86 1
3 72 2
End of List

fcfs wait of p1 = 0
fcfs wait of p2 = 4
fcfs wait of p3 = 90
average wait for 3 procs = 31.333333
fcfs turn-around time for p1 = 4
fcfs turn-around time for p2 = 90
fcfs turn-around time for p3 = 162
average turn-around for 3 procs = 85.333333
fcfs throughput for 3 procs = 0.018519 proc/ms
 <><> end FCFS <><>

Process list in HPF order:
2 86 1
3 72 2
1 4 99
End of list.

hpf wait of p2 = 0
hpf wait of p3 = 86
hpf wait of p1 = 158
average wait for 3 procs = 81.333333
hpf turn-around time for p2 = 86
hpf turn-around time for p3 = 158
hpf turn-around time for p1 = 162
average turn-around for 3 procs = 135.333333
hpf throughput for 3 procs = 0.018519 proc/ms
 <><> end HPF schedule <><>

preemptive RR schedule, quantum = 1 overhead = 0
RR TA time for finished p1 = 10, needed: 4 ms, and: 4 time slices.
RR TA time for finished p3 = 148, needed: 72 ms, and: 72 time slices.
RR TA time for finished p2 = 162, needed: 86 ms, and: 86 time slices.
RR Throughput, 3 p, with q: 1, o: 0, is: 0.0185185 p/ms, or 18.5185 p/us
Average RR TA, 3 p, with q: 1, o: 0, is: 106.667

preemptive RR schedule, quantum = 1 overhead = 1
RR TA time for finished p1 = 19, needed: 4 ms, and: 4 time slices.
RR TA time for finished p3 = 295, needed: 72 ms, and: 72 time slices.
RR TA time for finished p2 = 323, needed: 86 ms, and: 86 time slices.
RR Throughput, 3 p, with q: 1, o: 1, is: 0.00928793 p/ms, or 9.28793 p/us
Average RR TA, 3 p, with q: 1, o: 1, is: 212.333

preemptive RR schedule, quantum = 2 overhead = 0
RR TA time for finished p1 = 8, needed: 4 ms, and: 2 time slices.
RR TA time for finished p3 = 148, needed: 72 ms, and: 36 time slices.
RR TA time for finished p2 = 162, needed: 86 ms, and: 43 time slices.
RR Throughput, 3 p, with q: 2, o: 0, is: 0.0185185 p/ms, or 18.5185 p/us
```

```
Average RR TA, 3 p, with q: 2, o: 0, is: 106

preemptive RR schedule, quantum = 2 overhead = 1
RR TA time for finished p1 = 11, needed: 4 ms, and: 2 time slices.
RR TA time for finished p3 = 221, needed: 72 ms, and: 36 time slices.
RR TA time for finished p2 = 242, needed: 86 ms, and: 43 time slices.
RR Throughput, 3 p, with q: 2, o: 1, is: 0.0123967 p/ms, or 12.3967 p/us
Average RR TA, 3 p, with q: 2, o: 1, is: 158

preemptive RR schedule, quantum = 2 overhead = 2
RR TA time for finished p1 = 14, needed: 4 ms, and: 2 time slices.
RR TA time for finished p3 = 294, needed: 72 ms, and: 36 time slices.
RR TA time for finished p2 = 322, needed: 86 ms, and: 43 time slices.
RR Throughput, 3 p, with q: 2, o: 2, is: 0.00931677 p/ms, or 9.31677 p/us
Average RR TA, 3 p, with q: 2, o: 2, is: 210

preemptive RR schedule, quantum = 3 overhead = 0
RR TA time for finished p1 = 10, needed: 4 ms, and: 2 time slices.
RR TA time for finished p3 = 148, needed: 72 ms, and: 24 time slices.
RR TA time for finished p2 = 162, needed: 86 ms, and: 29 time slices.
RR Throughput, 3 p, with q: 3, o: 0, is: 0.0185185 p/ms, or 18.5185 p/us
Average RR TA, 3 p, with q: 3, o: 0, is: 106.667

preemptive RR schedule, quantum = 3 overhead = 1
RR TA time for finished p1 = 13, needed: 4 ms, and: 2 time slices.
RR TA time for finished p3 = 197, needed: 72 ms, and: 24 time slices.
RR TA time for finished p2 = 216, needed: 86 ms, and: 29 time slices.
RR Throughput, 3 p, with q: 3, o: 1, is: 0.0138889 p/ms, or 13.8889 p/us
Average RR TA, 3 p, with q: 3, o: 1, is: 142

preemptive RR schedule, quantum = 3 overhead = 2
RR TA time for finished p1 = 16, needed: 4 ms, and: 2 time slices.
RR TA time for finished p3 = 246, needed: 72 ms, and: 24 time slices.
RR TA time for finished p2 = 270, needed: 86 ms, and: 29 time slices.
RR Throughput, 3 p, with q: 3, o: 2, is: 0.0111111 p/ms, or 11.1111 p/us
Average RR TA, 3 p, with q: 3, o: 2, is: 177.333

preemptive RR schedule, quantum = 3 overhead = 3
RR TA time for finished p1 = 19, needed: 4 ms, and: 2 time slices.
RR TA time for finished p3 = 295, needed: 72 ms, and: 24 time slices.
RR TA time for finished p2 = 324, needed: 86 ms, and: 29 time slices.
RR Throughput, 3 p, with q: 3, o: 3, is: 0.00925926 p/ms, or 9.25926 p/us
Average RR TA, 3 p, with q: 3, o: 3, is: 212.667

preemptive RR schedule, quantum = 4 overhead = 0
RR TA time for finished p1 = 4, needed: 4 ms, and: 1 time slices.
RR TA time for finished p3 = 148, needed: 72 ms, and: 18 time slices.
RR TA time for finished p2 = 162, needed: 86 ms, and: 22 time slices.
RR Throughput, 3 p, with q: 4, o: 0, is: 0.0185185 p/ms, or 18.5185 p/us
Average RR TA, 3 p, with q: 4, o: 0, is: 104.667

preemptive RR schedule, quantum = 4 overhead = 1
RR TA time for finished p1 = 5, needed: 4 ms, and: 1 time slices.
RR TA time for finished p3 = 184, needed: 72 ms, and: 18 time slices.
RR TA time for finished p2 = 202, needed: 86 ms, and: 22 time slices.
RR Throughput, 3 p, with q: 4, o: 1, is: 0.0148515 p/ms, or 14.8515 p/us
Average RR TA, 3 p, with q: 4, o: 1, is: 130.333

preemptive RR schedule, quantum = 4 overhead = 2
RR TA time for finished p1 = 6, needed: 4 ms, and: 1 time slices.
RR TA time for finished p3 = 220, needed: 72 ms, and: 18 time slices.
RR TA time for finished p2 = 242, needed: 86 ms, and: 22 time slices.
RR Throughput, 3 p, with q: 4, o: 2, is: 0.0123967 p/ms, or 12.3967 p/us
Average RR TA, 3 p, with q: 4, o: 2, is: 156

preemptive RR schedule, quantum = 4 overhead = 3
RR TA time for finished p1 = 7, needed: 4 ms, and: 1 time slices.
RR TA time for finished p3 = 256, needed: 72 ms, and: 18 time slices.
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RR TA time for finished p2 = 282, needed: 86 ms, and: 22 time slices.
RR Throughput, 3 p, with q: 4, o: 3, is: 0.0106383 p/ms, or 10.6383 p/us
Average RR TA, 3 p, with q: 4, o: 3, is: 181.667

preemptive RR schedule, quantum = 4 overhead = 4
RR TA time for finished p1 = 8, needed: 4 ms, and: 1 time slices.
RR TA time for finished p3 = 292, needed: 72 ms, and: 18 time slices.
RR TA time for finished p2 = 322, needed: 86 ms, and: 22 time slices.
RR Throughput, 3 p, with q: 4, o: 4, is: 0.00931677 p/ms, or 9.31677 p/us
Average RR TA, 3 p, with q: 4, o: 4, is: 207.333

preemptive RR schedule, quantum = 5 overhead = 0
RR TA time for finished p1 = 4, needed: 4 ms, and: 1 time slices.
RR TA time for finished p3 = 151, needed: 72 ms, and: 15 time slices.
RR TA time for finished p2 = 162, needed: 86 ms, and: 18 time slices.
RR Throughput, 3 p, with q: 5, o: 0, is: 0.0185185 p/ms, or 18.5185 p/us
Average RR TA, 3 p, with q: 5, o: 0, is: 105.667

preemptive RR schedule, quantum = 5 overhead = 1
RR TA time for finished p1 = 5, needed: 4 ms, and: 1 time slices.
RR TA time for finished p3 = 181, needed: 72 ms, and: 15 time slices.
RR TA time for finished p2 = 195, needed: 86 ms, and: 18 time slices.
RR Throughput, 3 p, with q: 5, o: 1, is: 0.0153846 p/ms, or 15.3846 p/us
Average RR TA, 3 p, with q: 5, o: 1, is: 127

preemptive RR schedule, quantum = 5 overhead = 2
RR TA time for finished p1 = 6, needed: 4 ms, and: 1 time slices.
RR TA time for finished p3 = 211, needed: 72 ms, and: 15 time slices.
RR TA time for finished p2 = 228, needed: 86 ms, and: 18 time slices.
RR Throughput, 3 p, with q: 5, o: 2, is: 0.0131579 p/ms, or 13.1579 p/us
Average RR TA, 3 p, with q: 5, o: 2, is: 148.333

preemptive RR schedule, quantum = 5 overhead = 3
RR TA time for finished p1 = 7, needed: 4 ms, and: 1 time slices.
RR TA time for finished p3 = 241, needed: 72 ms, and: 15 time slices.
RR TA time for finished p2 = 261, needed: 86 ms, and: 18 time slices.
RR Throughput, 3 p, with q: 5, o: 3, is: 0.0114943 p/ms, or 11.4943 p/us
Average RR TA, 3 p, with q: 5, o: 3, is: 169.667

preemptive RR schedule, quantum = 5 overhead = 4
RR TA time for finished p1 = 8, needed: 4 ms, and: 1 time slices.
RR TA time for finished p3 = 271, needed: 72 ms, and: 15 time slices.
RR TA time for finished p2 = 294, needed: 86 ms, and: 18 time slices.
RR Throughput, 3 p, with q: 5, o: 4, is: 0.0102041 p/ms, or 10.2041 p/us
Average RR TA, 3 p, with q: 5, o: 4, is: 191

preemptive RR schedule, quantum = 5 overhead = 5
RR TA time for finished p1 = 9, needed: 4 ms, and: 1 time slices.
RR TA time for finished p3 = 301, needed: 72 ms, and: 15 time slices.
RR TA time for finished p2 = 327, needed: 86 ms, and: 18 time slices.
RR Throughput, 3 p, with q: 5, o: 5, is: 0.00917431 p/ms, or 9.17431 p/us
Average RR TA, 3 p, with q: 5, o: 5, is: 212.333

 <><> end preemptive RR schedule <><>
```