CSci 144 Introduction to Operating Systems
Quiz 4, November 18, 2016

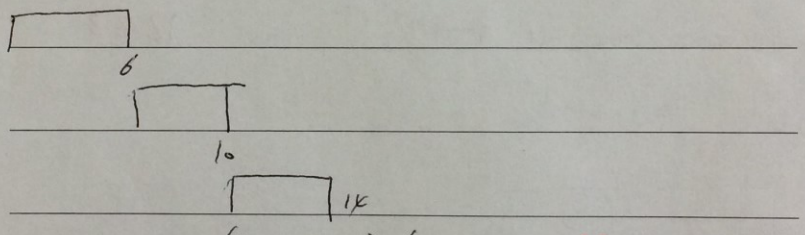
1. (0.5 points) Given *N*, the number of tasks that are either waiting in the queue or being processed by the CPU, arrival rate Y, and response time R, what is the relationship between N, Y, R in a stable system? Briefly Justify.

Relationship: $N = Y \cdot R$ 0.3

Justification: in stable system throughput $X = Y$, so apply (littles law) $N = X \cdot R$, we get $N = Y \cdot R$ 0.2

2. (1.5 point) Given three tasks A, B, C with service time of 6ms, 4ms, and 4ms, respectively. Assume that all three tasks arrive all at the same time but A comes slightly before B and B comes slightly before C. Please show the detailed schedule for the following algorithms. Then, calculate the average response time.

(1) FIFO

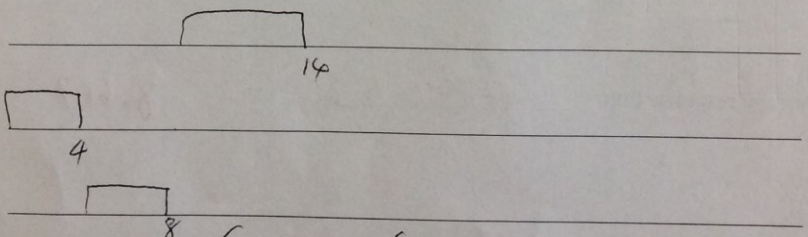


0.2

0.3 each

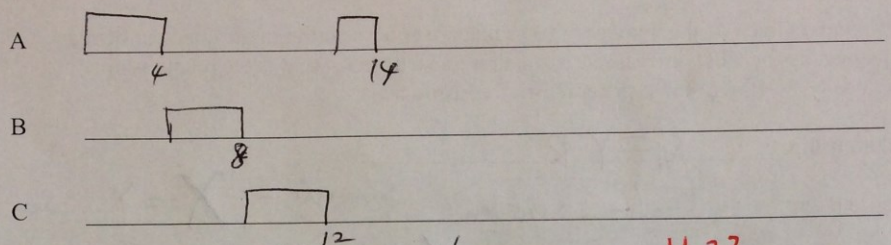
Average response time: $(6+10+14)/3$ ms. $= 10$ → 0.1

(2) SJF



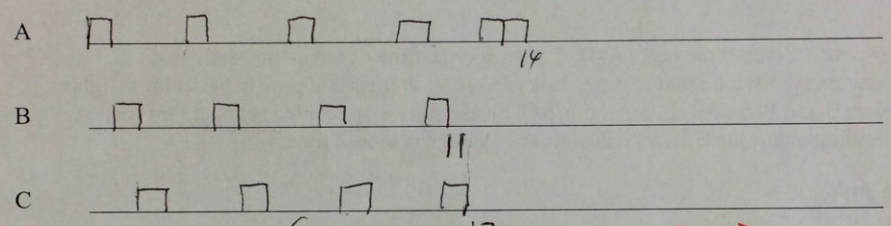
Average response time: $(4+8+14)/3$ ms. 8.667

(3) Round Robin with time slice of 4ms



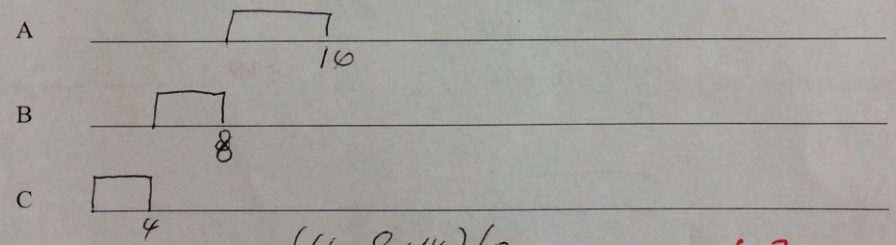
Average response time: (14+8+12)/3 ms. 11.33

(4) Round Robin with time slice of 1ms



Average response time: (11+12+14)/3 ms. 12.33

(5) LIFO



Average response time: (4+8+14)/3 ms. 8.667