

Homework 2

due in a week

1. We consider a packet scheduling scenario in which there are 3 flows (denoted as 1, 2, and 3) with equal weights. The j_{th} packet of flow i is denoted $p_{i,j}$. Its arrival time (in seconds) and length (in bits) are denoted as $a_{i,j}$ and $l_{i,j}$ respectively. Let $a_{1,1} = a_{2,1} = a_{3,1} = 0$. Let $a_{1,2} = a_{2,2} = a_{3,2} = 1$ and $a_{1,3} = a_{3,3} = 2$. Let $l_{1,1} = 2$, $l_{1,2} = 3$, $l_{1,3} = 6$, $l_{2,1} = 6$, $l_{2,2} = 3$, $l_{3,1} = 3$, $l_{3,2} = 1$, and $l_{3,3} = 6$. Suppose the service rate of the link is 1 bit per second. Then

- (a) What is the GPS finish time of all these packets?
- (b) What is the service order of these packets under WFQ ?
- (c) What is the service order of these packets under WF^2Q ?
- (d) What is the service order of these packets under DRR when the quantum size is 3 bits?

2. We consider a GPS simulation scenario in which there are 3 flows (denoted as 1, 2, and 3) with equal weights. Again, suppose the service rate of the link is 1 bit per second. Let $a_{1,1} = a_{2,1} = 0$. Let $l_{1,1} = 10$ and $l_{2,1} = 15$.

- (a) At time 0, when will the timer be set to expire?
- (b) Suppose at time 8s, a packet 5 bits in length arrives at flow 3 (i.e., $a_{3,1} = 8$ and $l_{3,1} = 5$). After the GPS simulator processes this new packet arrival, when will the timer be set to expire?
- (c) Solve problem (b) again, but with the value of $l_{3,1}$ changed to 8.