باسمه تعالی

تکلیف سری نهم درس شبکه های کامپیوتری۲

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R14. In Section 4.2, we studied FIFO, Priority, Round Robin (RR), and Weighted Fair Queueing (WFQ) packet scheduling disciplines? Which of these queuein disciplines ensure that all packets depart in the order in which they arrived?

صرفا صف FIFO تضمین میکند که بسته به ترتیبی که می رسند در صف قرار می گیرند.

R16. What is an essential different between RR and WFQ packet scheduling? Is there a case (*Hint:* Consider the WFQ weights) where RR and WFQ will behave exactly the same?

در صف RR با همه service class ها به شکل مساوی برخورد می شود.

در صف WFQ با توجه به service weight به هر کلاس سرویس دهی می شود.

در نتیجه اگر service weight های یکسانی به service class ها داده شود آنگاه WFQ و RR دقیقا یکسان عمل خواهند کرد.

P17. Consider the figure below, which shows a leaky bucket policer being fed by a stream of packets. The token buffer can hold at most two tokens, and is initially full at *t* = 0. New tokens arrive at a rate of one token per slot. The output link speed is such that if two packets obtain tokens at the beginning of a time slot, they can both go to the output link in the same slot. The timing details of the system are as follows:

1. Packets (if any) arrive at the beginning of the slot. Thus in the figure, packets 1, 2, and 3 arrive in slot 0. If there are already packets in the queue, then the arriving packets join the end of the queue. Packets proceed towards the front of the queue in a FIFO manner.
2. After the arrivals have been added to the queue, if there are any queued packets, one or two of those packets (depending on the number of available tokens) will each remove a token from the token buffer and go to the output link during that slot. Thus, packets 1 and 2 each remove a token from the buffer (since there are initially two tokens) and go to the output link during slot 0.
3. A new token is added to the token buffer if it is not full, since the token generation rate is *r* = 1 token/slot.
4. Time then advances to the next time slot, and these steps repeat. Answer the following questions:

a. For each time slot, identify the packets that are in the queue and the number of tokens in the bucket, immediately after the arrivals have been processed (step 1 above) but before any of the packets have passed through the queue and removed a token. Thus, for the *t* = 0 time slot in the example above, packets 1, 2, and 3 are in the queue, and there are two tokens in the buffer.

b. For each time slot indicate which packets appear on the output after the token(s) have been removed from the queue. Thus, for the *t* = 0 time slot in the example above, packets 1 and 2 appear on the output link from the
leaky buffer during slot 0.

Time slot	Packet in the queue	Number of tokens in bucket
0	1,2,3	2
1	3,4	1
2	4,5	1
3	5,6	1
4	6	1
5	-	1
6	7,8	2
7	9,10	1
8	10	1

Time slot	Packet in the queue
0	1,2
1	3
2	4
3	5
4	6
5	-
6	7,8
7	9
8	10

P18. Repeat P17 but assume that *r* = 2. Assume again that the bucket is initially full.

Time slot	Packet in the queue	Number of tokens in bucket
0	1,2,3	2
1	3,4	2
2	5	2
3	6	2
4	-	2
5	-	2
6	7,8	2
7	9,10	2
8	-	2

Time slot	Packet in the queue
0	1,2
1	3,4
2	5
3	6
4	-
5	-
6	7,8
7	9,10
8	-