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HS2020: 11072 Advanced Networking and Future Internet

Theoretical Exercises

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Question 1 (1 point)

Q1. Explain why a router would implement a Non-work conserving scheduler, and how applications could benefit from this strategy and what are the downsides?.
R1.

Question 2 (1 point)

Q2.1 Consider a Work-conserving scheduler, describe what does it mean to be work-conserving?
R2.1 –

Question 2

Q2.2 For said scheduler, consider the flows below sharing a 150Mbps link, before and after applying a certain scheduling policy, what is the new queue delay for flow D?

Flow	Bandwidth Utilization (Mbps)	Queue Delay
A	5	0.4
B	10	0.6
C	7	0.5
D	5	0.4

Table: Before

Flow	Bandwidth Utilization (Mbps)	Queue Delay
A	5	0.3
B	10	0.7
C	7	0.4
D	5	?

Table: After

Question 3 (2 points)

Q3. Consider a certain queue that applies a RED packet dropping scheme with the parameters below, in each moment from t_0 to t_7 a packet arrives and the router must decide if it gets dropped of not, when a probability must be calculated use the one listed:

TH_{min}	10
TH_{max}	15

Table: Parameters

Moment	t_0	t_1	t_2	t_3	t_4	t_5	t_6	t_7
Queue Length Exp. Avg.	13.3	12.7	13.8	15.4	12.2	9.6	11.8	13.9
Drop Prob.	0.59	0.33	0.8	0.4	0.06	0.84	0.02	0.29

Question 3

Q3. For each of the exponential averages listed, consider the drop probability for the packet being considered, given TH_{min} and TH_{max}, in which moments are packets dropped by the router? Explain your conclusions.
ps. Consider that a probability > 0.5 means a drop.

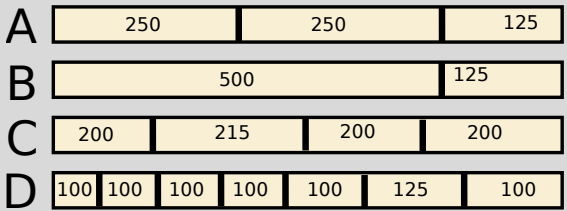
Question 4 (1 point)

Q4. Describe the advantages of using early packet dropping instead of late dropping, especially in the case of TCP connections.

Question 5 (4 points)

Q5. Consider the queues below, what is the output when considering the schedulers? Also describe which flows benefit from each scheduling policy and why.

1. RR (1pt)
2. DRR (1pt)
3. WFQ (2pt)



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