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Edit Assignment

A This assignment has been released to students. Updating questions will not affect students' existing submissions. You can use the *Regrade All Submissions* button on the **Manage Submissions** page to regrade all existing submissions.

QUESTION 1	POINTS	X Delete Question
Title	2	
PROBLEM		涵 Insert Images 🔚 Insert Field
List two explicit designed.	non-goals when the Inte	ernet was first
	►Add Subquestion	
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QUESTION 2	POINTS	X Delete Question
Title	3	
PROBLEM		🗃 Insert Images 🗮 Insert Field
Explain how the recongestion avoidated	etransmission timeout is nce and control paper.	s calculated in the
	►Add Subquestion	
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QUESTION 3	POINTS	× Delete Question
Title	2	
PROBLEM		🖬 Insert Images ≔ Insert Field

	►Add Subquestion	
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QUESTION 4	POINTS	× Delete Question
Title	2	
PROBLEM		🗀 Insert Images 🔚 Insert Field
Describe the con- queuing algorithm	cept of isolation in the ns.	context of fair
	►Add Subquestion	
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QUESTION 5	POINTS	× Delete Question
Title	2	
PROBLEM		🖬 Insert Images 🔚 Insert Field
	et a flow's round-trip ti	me and congestion in per-flow state?
Where does XCP go window from, give	en that it doesn't mainta	
Where does XCP go window from, give	en that it doesn't mainta ↦Add Subquestion	
Where does XCP go window from, give	en that it doesn't mainta ↦Add Subquestion ♣	
Where does XCP go window from, give QUESTION 6	en that it doesn't mainta →Add Subquestion + POINTS	× Delete Questior
Where does XCP go window from, give QUESTION 6 Title	Add Subquestion + POINTS 2	X Delete Question

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POINTS	× Delete Question
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k transfer function and in the context of the h	d what is the topology neader space analysis
►Add Subquestion	
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bleed vulnerability.	
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POINTS	× Delete Question
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leed paper authors have false negatives instea	e to come up with an ad of just re-running
	POINTS 3 k transfer function and in the context of the hase ontext of the hase ontext of the hase

	►Add Subquestion	n
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QUESTION 10	POINTS	X Delete Question
Title	2	
PROBLEM		🖬 Insert Images 🔚 Insert Field
What is the drawh circumvention per	back of vanilla Tor fr	om a censorship
	►Add Subquestion	n
	+	
QUESTION 11	POINTS	× Delete Question
Title	2	
PROBLEM		涵 Insert Images 🔚 Insert Field
What is the purpo paper? 	ose of the matching al	gorithm in the LTEye
	►Add Subquestion	n
	+	
QUESTION 12	POINTS	X Delete Question
Title	2	

Title 2 PROBLEM Insert Images ∷ Insert Field How is the unique user ID (i.e., the C-RNTI) extracted in the LTEye paper? ►Add Subquestion 4 **QUESTION 13** POINTS

https://www.gradescope.com/courses/253131/assignments/1232134/outline/edit

Title		
PROBLEM		🖾 Insert Images 🗮 Insert Fiel
Would Sprout work Internet? Why or w	equally well in the co why not?	ntext of the wired
	►Add Subquestion	
	+	
QUESTION 14	POINTS	🗙 Delete Questio
Title	4	
PROBLEM		涵 Insert Images 🔚 Insert Fiel
AP's antenna 1 to etc. Let's say the chan h21=2, h22=4. What that user 1 and us receive (i.e., y1	user 2 as h12, antenna nnels have the following t should x1 and x2 be m ser 2 can successfully and y2) without any in	2 to user 1 as h21, g values: h11=2, h12=4, ultiplied by in order decode what they terference?
AP's antenna 1 to etc. Let's say the chan h21=2, h22=4. What that user 1 and us receive (i.e., y1	user 2 as h12, antenna nnels have the followin t should x1 and x2 be m ser 2 can successfully and y2) without any in	2 to user 1 as h21, g values: h11=2, h12=4, ultiplied by in order decode what they terference?
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★ Delete Question

Title

PROBLEM

2

Insert Images ∷ Insert Field

Explain the attack carried out by the authors of the Tor traffic analysis paper.

► Add Subquestion

 QUESTION 17
 POINTS
 ★ Delete Question

 Title
 2

 PROBLEM
 Insert Images Imsert Field

 In the full-duplex radio paper, what is self-interference cancelation?

QUESTION 18	POINTS	X Delete Question
Title	3	
PROBLEM		🖾 Insert Images 🔚 Insert Field
What are the 3 kin full-duplex radio	nds of self-interferenc paper attempts to deal	e cancelation that the with?
What are the 3 kin full-duplex radio	nds of self-interferenc paper attempts to deal	e cancelation that the with?

+

 QUESTION 19
 POINTS
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 Title
 3
 3

 PROBLEM
 Insert Images := Insert Field

	⊢ Add Subauesti	on
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QUESTION 20	POINTS	× Delete Question
Title	2	
PROBLEM		🖾 Insert Images 🔚 Insert Field
What is perfect f event that a priv	orward secrecy and h ate key is stolen?	ow does it help in the
	⇔ Add Subquesti	on
	+	
QUESTION 21	POINTS	X Delete Question
Title	2	
PROBLEM		🖬 Insert Images 🔚 Insert Field
Give 2 examples o analysis can help	f the kinds of probl detect.	ems that header-space
	⊷ Add Subquesti	on
	+	
QUESTION 22	POINTS	✗ Delete Question
Title	2	

	►Add Subauestion	
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QUESTION 23	POINTS	X Delete Question
Title	2	
PROBLEM		🔺 Insert Images 🔚 Insert Field
Explain the differ in the context of	rence between diversity a MIMO.	and multiplexing gain
	⊳ Add Subquestion	
	+	
QUESTION 24	POINTS	× Delete Question
Title	2	
PROBLEM		Insert Images \Image Insert Field
control policies i	of implementing routing a n the Ethane system?	algorithms and access
	►Add Subquestion	
	+	
QUESTION 25	POINTS	× Delete Question
Title	1	
PROBLEM		🔺 Insert Images 🔚 Insert Field
Who is in charge c Ethane system?	of implementing packet fo	prwarding in the
	⇔ Add Subquestion	
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Inte	3	X Delete Questi
PROBLEM		涵 Insert Images 🗮 Insert Fie
Could you implem the RED algorith Why or why not? assumptions you	ent DCTCP on a switch tha m, but supports a program Please make sure to state are making.	at has no support for mmable RMT pipeline? e clearly any
	►Add Subquestion	
	+	
QUESTION 27	POINTS	🗙 Delete Questi
Title	2	
PROBLEM		🖾 Insert Images 🔚 Insert Fie
Could you implem programmable RMT state clearly an	ent weighted fair queueir pipeline? Why or why not y assumptions you are mal	ng on a switch with a t? Please make sure to king.
	►Add Subquestion	
	+	
QUESTION 28	POINTS	🗙 Delete Questi
Title	2	
PROBLEM		🗀 Insert Images 🔚 Insert Fie

►Add Subquestion

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QUESTION 29 Title	points 1	X Delete Question
PROBLEM		🖴 Insert Images ≔ Insert Field

	►Add Subquestion	
	+	
QUESTION 30	POINTS	X Delete Question
Title	3	
PROBLEM	[🛥 Insert Images ≔ Insert Field
How does BBR addr	ess the problem of buffe:	rbloat?
· ·		
	►Add Subquestion	
	+	
QUESTION 31	POINTS	🗙 Delete Questior
Title	2	
PROBLEM		🛥 Insert Images 🔚 Insert Field
In the context of does obfs3 rectif	censorship circumvention y?	n, what flaw of obfs2
	►Add Subquestion	



List two explicit non-goals when the Internet was first designed.

Q2

3 Points

Explain how the retransmission timeout is calculated in the congestion avoidance and control paper.



Q3

2 Points

Weighted Fair Queueing (or really any fair queueing algorithm) is evaluated against an idealized fair queueing algorithm. Describe this idealized fair queueing algorithm.



Q4

2 Points

Describe the concept of isolation in the context of fair queuing algorithms.





//

Where does XCP get a flow's round-trip time and congestion window from, given that it doesn't maintain per-flow state?



Q6

2 Points

If you visualize the Internet as a graph of autonomous systems, how has this graph evolved over the last few decades? Why?

Q7

3 Points

What is the network transfer function and what is the topology transfer function in the context of the header space analysis paper?

_____/

Q8

2 Points

Describe the Heartbleed vulnerability.





Why did the Heartbleed paper authors have to come up with an estimate for their false negatives instead of just re-running their experiments?



Q10



What is the drawback of vanilla Tor from a censorship circumvention perspective?

|--|--|

Q11

2 Points

What is the purpose of the matching algorithm in the LTEye paper?

//

Q12

2 Points

How is the unique user ID (i.e., the C-RNTI) extracted in the LTEye paper?

1

Q13

3 Points

Would Sprout work equally well in the context of the wired Internet? Why or why not?

Q14

4 Points

Let's say you have an AP with 2 antennas (1 and 2) sending packets x1 destined for user 1 and x2 destined for user 2---as in a classical multi-user MIMO setup. Denote the channel from AP's antenna 1 to user 2 as h12, antenna 2 to user 1 as h21, etc.

Let's say the channels have the following values: h11=2, h12=4, h21=2, h22=4. What should x1 and x2 be multiplied by in order that user 1 and user 2 can successfully decode what they receive (i.e., y1 and y2) without any interference?

1

Q15

3 Points

Explain the concept of onion routing as used in the Tor system.

4

Q16

2 Points

Explain the attack carried out by the authors of the Tor traffic analysis paper.



2 Points

In the full-duplex radio paper, what is self-interference cancelation?

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Q18

3 Points

What are the 3 kinds of self-interference cancelation that the full-duplex radio paper attempts to deal with?

//

Q19

3 Points

Explain how private keys could be stolen using the Heartbleed vulnerability.



Q20

2 Points

What is perfect forward secrecy and how does it help in the event that a private key is stolen?



2 Points

Give 2 examples of the kinds of problems that header-space analysis can help detect.

Q22

2 Points

What makes the problem solved by MegaMIMO harder than the problem solved by multi-user MIMO?

Q23

2 Points

Explain the difference between diversity and multiplexing gain in the context of MIMO.



Q24

2 Points

Who is in charge of implementing routing algorithms and access control policies in the Ethane system?

//



Who is in charge of implementing packet forwarding in the Ethane system?

Q26

3 Points

Could you implement DCTCP on a switch that has no support for the RED algorithm, but supports a programmable RMT pipeline? Why or why not? Please make sure to state clearly any assumptions you are making.

Q27

2 Points

Could you implement weighted fair queueing on a switch with a programmable RMT pipeline? Why or why not? Please make sure to state clearly any assumptions you are making.



Q28

2 Points

Give one advantage of packet switching over circuit switching. Give one advantage of circuit switching over packet switching.



1 Point

What is an Internet Exchange Point?

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 	 	1.

Q30

3 Points

How does BBR address the problem of bufferbloat?

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Q31

2 Points

In the context of censorship circumvention, what flaw of obfs2 does obfs3 rectify?