

Student ID: _____

CS457: Computer Networking

Date: 5/8/2007

Name: _____

Instructions:

1. Be sure that you have 10 questions
2. Write your Student ID (email) at the top of every page
3. Be sure to complete the honor statement after you complete the exam
4. This is a closed book exam
5. The seats on both sides of you should be empty
6. State all assumptions and be sure your answers are legible
7. Show all work; the graders will give partial credit
8. Answer each question clearly and to the point; do not define or describe concepts unless asked to do so; assume that the graders are familiar with the concepts

<i>Question</i>	<i>Points</i>	<i>Score</i>
1	10	
2	10	
3	10	
4	10	
5	10	
6	10	
7	10	
8	10	
9	10	
10	10	
total	100	

Student ID: _____

1. Answer the following True/False questions by circling either **T** or **F**.

1. 100% redundancy (ie. transmitting every bit in a packet twice) provides perfect bit error detection T F
2. Partitioning schemes (TDMA, FDMA) are better than random access schemes (Aloha, CSMA) when all nodes have packets to send T F
3. CDMA works with both wired and wireless networks T F
4. Wireless links provide a “broadcast” channel where every node hears every other node T F
5. Using “Ingress Filtering” on all routers would solve the IP spoofing problem T F
6. SSL uses both public key and symmetric key cryptography T F
7. FTP is a stateless protocol T F
8. UDP implements congestion control but not flow control or reliability T F
9. Some link layer implementations provide reliable delivery and flow control T F
10. All nodes on the Internet have a Physical Layer implementation T F

2. Random Access Protocols

a. With the Slotted Aloha protocol, how long does a node wait once it gets a new frame to transmit? Can there be collisions and, if so, what does the node do when there is a collision?

b. How is pure (unslotted) Aloha different from slotted Aloha? What effect does this have on efficiency (the long-run fraction of time with successful transmissions)?

c. How is CSMA different from unslotted Aloha?

d. How is CSMA/CD different from pure CSMA?

e. How is CSMA/CA different from CSMA/CD?

3. Hubs, switches, and routers

a. What is the difference between a hub and a switch? What effect does this have on the “collision domain”?

b. What is the difference between a switch and a router? What effect does this have on the number of times they must forward a message.

c. When **MUST** you use a switch instead of a hub?

d. When **MUST** you use a router instead of a switch?

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6. Cryptography Fundamentals

- a. With symmetric key cryptography, the encryption of a message using a key is reversible using the same key. In public key cryptography: (make an analogous statement)

- b. What authentication problem does a nonce (challenge) solve? Does this work with public key cryptography, symmetric key cryptography, or both? Why?

- c. Name two guarantees of digital signatures.

- d. All cryptographic techniques require us to identify a physical person or company based on the possession of a secret key. This is often achieved with the help of a Key Distribution Center (KDC) or Certificate Authority (CA). How does the CA or KDC first establish the identity?

8. The Application Layer

- a. Describe the difference between the client/server model and the peer-to-peer model of applications.

- b. Name one application that uses a hybrid of the client/server and peer-to-peer models.

- c. When one host sends a UDP packet to another host, what values will the receiving host use from the packet headers to direct the segment to the appropriate socket?

- d. When one host sends a TDP packet to another host, what values will the receiving host use from the packet headers to direct the segment to the appropriate socket?

10. The Routing Layer

a. A circuit switched network requires a connection to be established before two hosts can send messages to each other, and each packet is addressed by the circuit number. A packet switched network: (make an analogous statement)

b. In Link State routing, a router measures the cost of the link to all neighboring nodes and sends this information to all nodes in the network. In Distance Vector routing: (make an analogous statement)

c. Why do we have different routing algorithms for inter-AS and intra-AS routing?

Honor Code

Signature _____