

Data Communications CS420/520
Fall 2002

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Final Exam

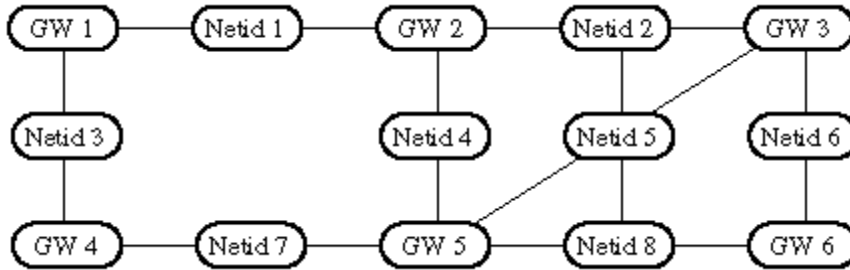
Name: _____ Student ID: _____

1. This is an *closed* book, *closed* note exam.
2. You may use a calculator but **no computers**.
3. Show **ALL** your work to get full or partial credit for the problem.
4. You have 1 hour.
5. Make sure you have **7 questions!**
6. Answer questions **briefly**, do not write long stories!

| Problem | Total | -Points |
|----------------|--------------|----------------|
| Total: | 100 | |

1. (15 pts) Circle the correct response(s). (Note that **there might be more than one correct answer** - so indicate all of them). Each part is worth 3 points.
- a) Which statements about TCP/IP are true?
- i) TCP is a datagram service
 - ii) IP is a datagram service
 - iii) UDP is a datagram service
 - iv) UDP and IP are both datagram services
 - v) Most internet traffic utilizes the TCP/IP protocol suite
- b) With respect to packet switching and routing, which statements are true?
- i) The packet size does influence the efficiency of the communication link
 - ii) The best link utilization is achieved if one maximizes the packet length
 - iii) The ARP protocol is a routing protocol implementing a spanning tree
 - iv) IP uses *intranet* fragmentation
 - v) In *internet* fragmentation only the final destination reassembles fragmented packets
- c) Which statements about ATM are true?
- i) The maximum frame size is 64k bytes
 - ii) All frames have the same size of 53 bytes
 - iii) LAN Emulation and IP over ATM support internetworking with legacy LANs
 - iv) The network switch is an integral part of the ATM design
 - v) The most common ATM data rates are 10Mbps and 100Mbps.
 - vi) None of the Above
- d) The internet architecture includes?
- i) Exterior gateways
 - ii) Interior gateways
 - iii) Subnet routers
 - iv) Networks
 - v) Subnetworks
 - vi) All of the above
- e) Which of the fields in the UDP header fields, i.e. source port, destination port, length, checksum, may be omitted (when meaningful):
- i) Source port
 - ii) Destination port
 - iii) Length
 - iv) Checksum
 - v) None of the above

2. (10 pts) Assume the following network with 6 gateways. Given the initial routing tables of all gateways (the entries in the table contain the netid, the distance and gateway), what are the entries in Gateway GW1, GW4 and GW5 after one exchange of table-updating messages? Next, what is the final table for GW4 after a second message exchange?



| Netid | D,G |
|-------|-----|
| 1 | 0,1 |
| 3 | 0,1 |

| Netid | D,G |
|-------|-----|
| 1 | 0,2 |
| 2 | 0,2 |
| 4 | 0,2 |

| Netid | D,G |
|-------|-----|
| 2 | 0,3 |
| 5 | 0,3 |
| 6 | 0,3 |

| Netid | D,G |
|-------|-----|
| 3 | 0,4 |
| 7 | 0,4 |

| Netid | D,G |
|-------|-----|
| 4 | 0,5 |
| 5 | 0,5 |
| 7 | 0,5 |
| 8 | 0,5 |

| Netid | D,G |
|-------|-----|
| 6 | 0,6 |
| 8 | 0,6 |

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3. (17 pts) Answer the following questions:

a) (3) What do TCP, UDP and IP stand for?

i) TCP

ii) UDP

iii) IP

b) (3) If both, UDP and IP offer no reliability guarantees, why is UDP needed, since it is a datagram protocol on top of another datagram protocol?

c) (1) What does ARP stand for?

d) (4) Briefly describe what the ARP protocol is used for. Include the main motivation for having ARP.

e) (2) What is the IEEE standard that defines the CSMA/CD (Ethernet)?

f) (4) How does TCP implement reliability when it is using an underlying datagram protocol, i.e. IP? Is this a contradiction or can it be done? As usual, justify your answer!

6. (15) Answer the following questions:

a) (2) Name two communication protocols that specifically address multi-media applications:

b) (2) FDDI allows for single or dual ring operation. What is the main motivation for having dual ring operation?

c) (4) How can routers help to reduce the amount of unwanted network traffic?

d) (4) In the “old days” hubs were used on the edge of the network. What is the main problems with hubs and what is done today to avoid these problems.

e) (3) What information does the file `/etc/services` contain and what is it used for?

