

# CIS 3329

## Assignment 1

40 points

### conversion problems

1. (25 points) Convert each of the following:

(a) 144 tbits = ? mbits

(a) 144000000

(b) 64 mbytes = ? mbits

(b) 512

(c) 144 gbytes = ? bits

(c) 1152000000000

(d) 160 kbits = ? bits

(d) 160000

(e) 64 tbits = ? tbytes

(e) 8

(f) 72 mbytes = ? mbits

(f) 576

(g) 160 bits = ? mbytes

(g) 0.00002

(h) 10 secs = ? nanoseconds

(h) 10000000000

(i) 72 mbytes = ? kbytes

(i) 72000

- (j) 152 bits = ? tbits  
0.000000000152  
(j) \_\_\_\_\_
- (k) 80 kbytes = ? tbytes  
0.00000008  
(k) \_\_\_\_\_
- (l) 128 bytes = ? gbits  
0.000001024  
(l) \_\_\_\_\_
- (m) 5 minutes = ? milliseconds  
300000  
(m) \_\_\_\_\_
- (n) 136 bits = ? bytes  
17  
(n) \_\_\_\_\_
- (o) 112 gbytes = ? bits  
896000000000  
(o) \_\_\_\_\_
- (p) 136 bytes = ? gbits  
0.000001088  
(p) \_\_\_\_\_
- (q) 120 tbytes = ? mbytes  
120000000  
(q) \_\_\_\_\_
- (r) 3 microseconds = ? minutes  
0.00000005  
(r) \_\_\_\_\_
- (s) 40 gbits = ? tbytes  
0.005  
(s) \_\_\_\_\_
- (t) 104 gbytes = ? gbits  
832  
(t) \_\_\_\_\_
- (u) 120 gbits = ? bytes  
15000000000  
(u) \_\_\_\_\_
- (v) 5 minutes = ? milliseconds  
300000  
(v) \_\_\_\_\_
- (w) 152 bytes = ? bits  
1216  
(w) \_\_\_\_\_

(x) 48 bytes = ? kbytes

0.048

(x) \_\_\_\_\_

(y) 10,000,000 microseconds = ? hours

1/360

(y) \_\_\_\_\_

## some end-to-end delay problems

2. Using some site that tests the speeds of network connections, determine the approximate bit rate of your network connection. It could be your home computer, a lab machine, or even your cell phone. Do not use your computer's "connection properties" utility, which tells you the rate at which the device can send on the local network, but does not test the rate of your connection to the outside world.

(a) (2 points) What is the sending rate? If the rate is asymmetric, provide both the upload and download rates?

\_\_\_\_\_  
\_\_\_\_\_

(b) (3 points) At this rate, about how long should it take to send a 200 MByte file?

$(200 \times 8) / (\text{upload rate})$

3. (5 points) Suppose that I have a 6.5 GByte movie file that's sitting on my hard drive at home. If I have cable internet service, which gets 50 Mbps down and 10 Mbps up, how long before my friend is able to get the file if he has a DSL which gets 8 Mbps down/1 Mbps up?

$$(6.5 \times 8 \times 1000) / 10 + (6.5 \times 8 \times 1000) / 8 = 3.25 \text{ hours}$$

4. (5 points) Suppose that I have 800 Gigabytes worth of movies on my hard drive at home, and I'd like to get them to a friend in Chicago. I could either send them over the Internet, or I could copy them to a thumb drive, drive to Chicago, and deliver them by hand. Assume that the specs for my cable connection are the same as in the previous problem, but the friend in Chicago has a cable connection which gets 25 Mbps down/5 Mbps up. Which would be faster? Show your work.

$$(800 \times 8 \times 1000) / 10 + (800 \times 8 \times 1000) / 25 = 249 \text{ hours}$$