

Put your name on the back in the upper right-hand corner and fold your quiz lengthwise - Thanks.

## CS 440 Quiz 3

1. You have a channel at  $10^4$  Hz. What do you have to do to get  $10^7$  bits/sec of capacity, assuming a noiseless channel?

Since noise is not a factor, we refer to Nyquist's Theorem,

$$\begin{aligned}C &= 2B \log_2 H \\10^7 &= 2 \cdot 10^4 \log_2 H \\ \log_2 H &= 5 \times 10^2 \\ H &= 2^{500}\end{aligned}$$

So you need an encoding method that supports  $2^{500}$  signal levels or 500 bits. Some of the quadrature amplitude methods might get you there, but it would be difficult.

2. What is Time Division Multiplexing? Give an example.

When the users of a network take turns using the network and get the full use of the capacity. Examples are round-robin, token passing and contention.

3. List and describe the properties of the Physical Layer?

- Signaling Method - how are the bits actually transmitted.
- Toplogy - how are the nodes are connected and organized.
- Access Method - what the nodes have to do to get a chance to send a message.
- Framing - how are the messages formatted.
- Error Control - what is done to guarantee the reliability of the messages.

4. A framing scheme uses byte-stuffing; *S* for start of frame, *F* for end of frame and *E* for escape. What is the actual message if the following is received.

S12EE34EFEEEF5EEF6F

12E34FEF5E