**CS 436 - Midterm Study guide**

Your midterm exam contains all the course material including:

1. HW assignment2 (delay and throughput): Lecture 2
2. Lab assignments1 and 2 (IP addressing): Lecture 7 and 8
3. Forwarding table (Longest prefix matching quiz): Given a forwarding table at a router, which interface is selected for each of the following destination IP addresses? (I’ll give you the table and IP addresses): Lecture 6
4. Textbook topics covered in the lecture slides 1-8. There will be 2-3 questions from the following questions.
5. Define a “network protocol” (Lecture 1).
6. What is the difference between routing and forwarding?

Forwarding is the process in which packets are moved from the router’s input to the router’s proper output; routing is the process in which a route from the source to the destination is determined.

1. Compare DSL and HFC Access Networks, which provide Internet for edge subnets. Compare DSL and HFC in different aspects: infrastructure, medium, shared or dedicated, the frequency bands used for each signal, shortcomings of each method (Lecture 3).
2. Compare Twisted-pair copper wire, Coaxial cable, and Optical fiber in 3 aspects: design (draw 3 pictures and explain the material and design for each one), the infrastructure it can be used in (Lecture 3).

Twisted-pair copper wire:

Mechanic propagation.

Coaxial cable:

Mechanic propagation.

Optical fiber:

Light propagation.

1. What are the four sources of delay in computer networks? Briefly explain each one including the formula if available (Lecture 2).

Transmission delay: time to load the data into the link.

Propagation delay: time a bit takes to cross a link.

Queuing delay: time until a packet gets to the head of the queue

Processing delay: time to process the received packet into the router.

1. Define jitter and draw 2 pictures to show positive and negative jitters and explain the pictures. What is the best value that can be achieved for jitter? Why? (I may give examples and ask you calculate jitter in different cases) (Lecture 2).
2. What are the 5 layers of TCP/IP Internet protocol stack? (Lecture 5)

Application Layer

Transport Layer

Network Layer

Link Layer

Physical Layer