CIS 777
Telecommunications
Networks

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These slides are available at:
http://www.cis.ohio-state.edu/~jain/cis777-00/
Overview

- How
- What
- When
- Why
How am I going to grade you?
What are we going to cover?
When are you going to do it?
Why you should not take this course?
Grading

- Quizzes (Best 2 of 3) 50%
- Class participation 10%
- Homeworks+Labs 40%
  - The division of grades between homeworks and labs will depend on the number of labs
  - Most likely it will be 20% for homeworks and 20% for labs.
- Labs require programming in C
Frequently Asked Questions

- Yes, I do use “curve”. Your grade depends upon the performance of the rest of the class.
- All homeworks are due at the beginning of the next Thursday class.
- All late submissions must be preapproved.
- All quizzes are open-book and extremely time limited.
- Quizzes consist of numerical as well as multiple-choice (true-false) questions.
- There is negative grading on incorrect multiple-choice questions.
- Everyone including the graduating seniors are graded the same way.
Supplementary Texts

Prerequisite: CIS677

- Protocol Layers: ISO/OSI reference model
- Physical Layer: Coding, Manchester
- Transmission Media: UTP, Cat 5, Microwave, Radio
- Data Communication: Asynchronous vs synchronous, Baud, bit, and Hz, Half-Duplex vs Full-duplex, Modulation/Demodulation
- Packet Transmissions: Framing, Bit stuffing, byte stuffing
- Flow Control: On-Off, Window
- Error Detection: Parity, Checksum, Cyclic Redundancy Check
Prerequisites (Cont)

- Error Recovery: Start and Stop, Go back $n$, Selective Reject
- LANs: Aloha, CSMA/CD, Ethernet, IEEE 802.3, Token Ring/IEEE 802.5, FDDI
- LAN Addressing: Unicast vs multicast, Local vs Global
- LAN wiring: 10Base5, 10Base2, 10Base-T, 100Base-T4, 100Base-TX, 100Base-FX
- Extended LANs: Hubs, Bridges, Routers, Switches
- Routing: Distance Vector vs Link State, Spanning tree, source routing
- Network Layer: Connectionless vs connection oriented
Schedule (Tentative)

3/30/00 Overview
3/31/00 A Review of Networking Concepts
4/6/00 Fundamentals of Telecommunications
4/7/00 X.25
4/13/00 Frame Relay
**4/14/00 Quiz 1**
4/20/00 Frame Relay Congestion Control
4/21/00 ISDN
4/27/00 SONET
4/28/00 Introduction to ATM
5/4/00 ATM Traffic Management
5/5/00 Quiz 2
5/11/00 IP Over ATM
5/12/00 PNNI: Routing in ATM Networks
5/18/00 ATM Signaling
5/19/00 Wireless Data Networking 1
5/25/00 Wireless Data Networking 2
5/26/00 Quiz 3
6/1/00 Graduating Seniors’ grades due
Office Hours

- Thursday: 2:30 to 3:00 PM
  Friday: 2:30 to 3:00 PM

- Office: 297 Dreese Lab, 2015 Neil Ave

- GTA: Arian Durresi, DL299
  Durresi@cis.ohio-state.edu
  MTW 2:30-3:00
Summary

- There will be a lot of self-reading
- Goal: To prepare you for a career in networking
- Get ready to work hard
Quiz 0: Prerequisites

True or False?

T  F

☐☐ Datalink refers to the 2nd layer in the ISO/OSI reference model
☐☐ Category 5 unshielded twisted pair cable is better than category 3 cable.
☐☐ Finding path from one node to another in a large network is a transport layer function.
☐☐ It is impossible to send 3000 bits/second through a wire which has a bandwidth of 1000 Hz.
☐☐ Bit stuffing is used so that characters used for framing do not occur in the data part of the frame.
☐☐ For long delay paths, on-off flow control is better than window flow control.
☐☐ Ethernet uses a CSMA/CD access method.
☐☐ 10Base2 runs at 2 Mbps.
☐☐ The packets sent in a connection-oriented network are called datagrams.
☐☐ Spanning tree algorithm is used to find a loop free path in a network.

Marks = Correct Answers _____ - Incorrect Answers _____ = ______
Homework 1

- From Tanenbaum’s 3rd edition, review sections 1.2, 1.3, 1.4, 2.1, 2.2, 2.3, 3.1, 3.2, 3.3, 3.4, 3.6.1, or
- From Stallings’ fifth edition, review sections 1.4, 15.2, 15.3, 2.3, 3.1, 4.1, 6.1-6.4, 9.2, or
- From Stallings’ sixth edition, review sections 1.4, 2.2, 2.3, 3.3, 4.1, 5.1, 7.1-7.4, 10.2

- Submit answers to exercises on the next slide
- Due Date: Thursday, April 6, 2000.
A system has \( n \) layer protocol hierarchy. Applications generated messages of length \( M \) bytes. At each of the layers, an \( h \)-byte header is added. What fraction of the network bandwidth is filled with headers.

If the bit string 011101111101111110 is given to HDLC transmitter, what is the output string (on wire).

Two stations communicate via a 1-Mbps satellite link with a propagation delay of 250 ms. Using HDLC frames of 1024 bits with 3-bit sequence numbers, what is the maximum possible data throughput (excluding the overhead bits)?
Homework 2

- From Tanenbaum’s 3rd edition, review sections 4.3, 4.4, 4.5, 5.2, 5.5.1, 5.5.2, 5.5.3, 6.4, or

- Submit answers to exercises on the next slide

- Due Date: Friday, April 7, 2000
Consider a baseband bus with a number of equally spaced stations with a data rate of 10 Mbps and a bus length of 1 km. What is the average time to send a frame of 2000 bits to another station, measured from the beginning of the transmission to the end of reception? Assume a propagation speed of 200 m/µs.

A class B network on the Internet has a subnet mask of 255.255.240.0. What is the maximum number of hosts per subnet?

What is the maximum payload of a TCP segment?