CSE 473s
Introduction to
Computer Networks

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These slides are available on-line at:

http://www.cse.wustl.edu/~jain/cse473-05/

Overview

❑ Why Study Computer Networking?

❑ Goal of This Course

❑ Instructor

❑ Grading

❑ Contents of the course

❑ Tentative Schedule

Why Study Computer Networking?

- ❑ Networking is the "plumbing" of computing
- ❑ Almost all areas of computing are network-based.
  - ❑ Distributed computing
  - ❑ Distributed databases
  - ❑ Distributed storage
- ❑ Fast growing field
- ❑ Good research funding

Goal of This Course

❑ First course in networking

❑ Fundamentals

❑ Broad coverage of key areas of networking

❑ Networking background for networking applications in other areas of computing

❑ This is a course on Networking <u>Architecture</u>

❑ This is <u>not</u> a course on network building or usage

❑ You will be able to understand protocols

❑ An example of the difference between architecture and implementation is the computer architecture course and a course on Intel Pentium Chip.

Goals of This Course (Continued)

❑ You will learn about networking concepts that will help you understand networking jargon:

  ❑ TCP/IP

  ❑ Window Flow Control

  ❑ Cyclic Redundancy Check

  ❑ Parity

  ❑ Start and Stop Bits

  ❑ Baud, Hertz, and Bits/sec

  ❑ Algorithms for determining packet routes

❑ This is the <u>first</u> course on networking.

❑ Basis for more advanced networking courses

Networking Courses at WUSTL

❏ CSE 473s: Introduction to Computer Networks

❏ CSE 573s: Protocols for Computer Networks

❏ CSE 574s: Advanced Topics in Networking

❏ CSE 777s: Research Seminar in Networking

| CSE 777s |
| CSE 574s |
| CSE 573s |
| CSE 473s |

Instructor
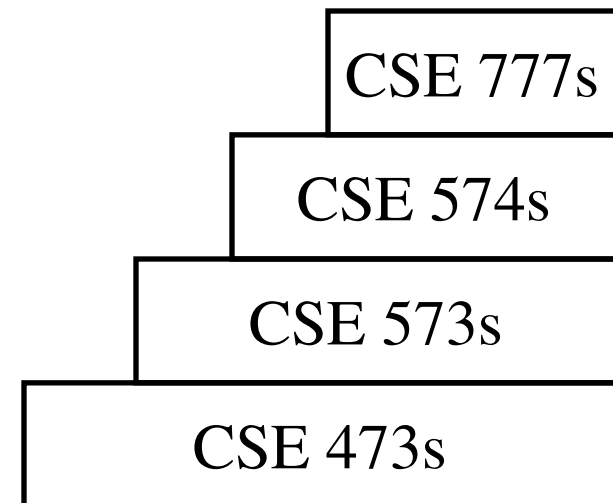
- Raj Jain
- http://www.cse.wustl.edu/~jain
- 1978: PhD in Computer Science from Harvard
- 1978-1994: Networking Architect at Digital Equipment
- 1994-2000: Professor at Ohio State University
- 2000-2005: Co-Founder and CTO of Nayna Networks (Symbol: NAYN)
- Active participation in many industry and standards forums IEEE, ATM Forum, IETF, OIF, ANSI
- Inventor of DECbit for traffic management (14 patents)

Student Questionnaire

- Name: _____
- Major: _____
- Email: _____
- Degree/Expected Year: _____
- Operating Systems/Architecture course taken:

  _____

- Computer networking courses taken:

  _____

- What do you expect to learn from this course:

  _____

  _____

  _____

  _____

Grading

❑ Exams (Best 2 of 3)   50%

❑ Class participation   10%

❑ Homeworks   20%

❑ Labs   20%

❑ Note: Labs require programming in C

❑ Academic integrity is expected in home works.

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 Monday class.

❑ All late submissions must be preapproved.

❑ All exams are open-book and extremely time limited.

❑ Exams consist of numerical as well as multiple-choice (true-false) questions.

❑ There is negative grading on incorrect multiple-choice questions. Grade: +1 for correct. -1/(n-1) for incorrect.

❑ Everyone including the graduating seniors are graded the same way.

Textbook

❑ William Stallings, "Data & Computer Communications," **Seventh Edition**, Prentice-Hall, ISBN 0-13-100681-9, **2004**. Required.

❑ Only key concepts will be covered in the class. You are expected to read the rest from the book.

❑ Feel free to ask questions in the next class about any concepts that are not clear to you

❑ Material covered in the class will include some concepts from other textbooks. Please pay attention to the class discussion and lecture.

Prerequisite

❑ CSE: Operating Systems
  - ❑ Memory
  - ❑ System bus
  - ❑ Interrupt
  - ❑ Power
  - ❑ Voltage
  - ❑ Current
  - ❑ Peak and RMS values
  - ❑ Sine curve
  - ❑ Amplitude, Frequency,. Phase

❑ CSE 422S: Operating Systems Organization

Tentative Schedule

Date	Chapter	Topic
31-Aug-05		Course Introduction
5-Sep-05		Holiday
7-Sep-05	1+2	Data Communications and Protocol Architecture:OSI and TCP/IP Reference Models
12-Sep-05	3	Data Transmission:Channel Capacity
14-Sep-05	4	Wireless Transmission
19-Sep-05	5	Modulation and Coding
21-Sep-05	6	Error Detection and Correction
26-Sep-05	7	Flow/Error Control
28-Sep-05	15	Local Area Networks
3-Oct-05		Mid Term 1

Tentative Schedule (cont)

Date	Chapter	Topic
5-Oct-05		
10-Oct-05	16	High Speed LANs
12-Oct-05	9	Spread Spectrum
17-Oct-05	17	Wireless LANs
19-Oct-05		
24-Oct-05	14	Cellular Wireless Networks
26-Oct-05		
31-Oct-05	18	Internetwork Protocols
2-Nov-05		Mid Term 2

Tentative Schedule (Cont)

| Date	Chapter	Topic
7-Nov-05	12	Routing Algorithms
9-Nov-05		
14-Nov-05	20	Transport Protocols
16-Nov-05		
21-Nov-05	21	Network Security
23-Nov-05		No Class
28-Nov-05		
30-Nov-05		
5-Dec-05	22	Distributed Applications: SNMP
7-Dec-05		
12-Dec-05		Final Exam

Why You Shouldn't take this course?

- ❑ You aren't ready for the hard work

- ❑ You don't have 12 hours/week

- ❑ You don't have the background

- ❑ You just want to sit and listen

- ❑ You are not ready to take the initiative
  Only key concepts will be covered in the class.
  Students are expected to read the rest from the book.

- ❑ This does not cover what you want

Office Hours

❑ Monday: 10:30 to 11:30 AM
  Wednesday: 10:30 to 11:30AM

❑ Office: Bryan 405D

❑ Graders:

  ❑ Sajeeva Pallemulle, sajeeva@cse.wustl.edu

  ❑ Chakchai So-in, cs5@cec.wustl.edu

Summary
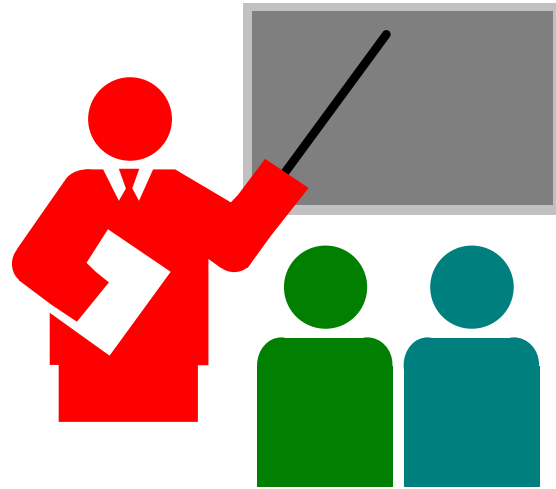
❑ Computer networking is important for all areas of computing

❑ First course in computer networking

❑ Goal: To prepare you for a career in networking

❑ Get ready to work hard

Quiz 0: Prerequisites

True or False?

T F

❏ ❏ A system with 32kB memory can hold only 16000 ASCII characters

❏ ❏ An example of an I/O bus is PCI which connects a Pentium processor with its memory.

❏ ❏ An example of a system bus is SCSI which connects a PC system with its disks.

❏ ❏ Interrupts are used by CPU to stop an ongoing I/O.

❏ ❏ A DC current of 4 Ampere at 5 Volts will require 4/5 Watts of power

❏ ❏ An RMS value of 100 Volts is equivalent to a peak value of 141.4 V.

❏ ❏ For I = A Sin (2πft+ φ), the amplitude of the current I is A

❏ ❏ For I = A Sin (2πft+ φ), the frequency is f.

❏ ❏ If x is 0, then after x++, x will be 1.

Marks = Correct Answers _____ - Incorrect Answers _____ = _____