Introduction (CSE 573S)
(aka CS 533S)

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General Information

- http://www.arl.wustl.edu/~kenw (Follow link)
  » Syllabus, latest handouts, solutions
- Textbooks (Recommended)
  » Peterson and Davie, Computer Networks
  » Donahoo and Calvert, TCP/IP Sockets in C
- Other Books
  » Stevens, Unix Network Programming
  » Stevens, TCP/IP Illustrated, Volume 1: The Protocols
  » Tannenbaum, Computer Networks
  » Partridge, Gigabit Networking
- Internet
  » www.ietf.org: Internet Engineering Task Force
  » info.internet.isi.edu/1/in-notes/rfc: RFCs at ISI

Assignment

- Read Peterson, Chapter 1
- Email to kenw@arl.wustl.edu the following in the BODY of the email in PLAIN TEXT
  » Syntax
    
    CSE573S last,first emailAddress

  » Example
    
    CSE573S wong,ken kenw@arl.wustl.edu

Main Topics

- Internetworking, Protocol Layering
- Performance
- Technologies: Ethernet, FDDI
- Packet Switching
- Internetworking (Addressing, Basic Routing, IP, ARP/RARP, ICMP)
- End-to-End Protocols (UDP, TCP)
- Congestion Control, Packet Scheduling, Resource Allocation, Router Architecture
- Security
Course Workload And Grading

- Programs (C/C++ and Unix)
  - About 2 or 3 protocol implementations
  - About 2 or 3 simulations
- 4-5 Written Exercises
- Two Exams
- One Final Project
- Grader/Consultants: To Be Announced
- Workload: Expect to spend 7-10 hours/week outside of class
- Grading:
  - 20% Homeworks
  - 45% Projects
  - 35% Exams

Example Problem (1)

- Protocol implementation 1
  - Implement using C/C++ a transmitter and receiver for evaluating a family of sliding-window protocols.
  - The transmitter and receiver are on separate hosts.
  - Your transmitter should establish a connection to your receiver through a third program called netsim that emulates packet loss and transmission delay.
  - Experimentally determine the efficiency and goodput for window sizes of 1, ..., 256 packets.
  - Compare the results with simulation results.

Example Problem (2)

- Protocol simulation
  - The course Web page contains the source code (C++) for a fluid simulation of a distributed queueing (DQ) algorithm.
  - The DQ algorithm attempts to maximize output link utilization while avoiding packet loss within a router that has a distributed architecture.
  - Design an algorithm for including the FCFS feature of output queueing.
  - Modify the fluid simulator to evaluate your algorithm.
  - Experimentally determine how well your algorithm mimics output queueing.

Example Problem (3)

- Homework
  - Suppose that two 1-persistent CSMA/CD transmitters try to transmit one minimum-size frame at the same time on a shared medium.
  - Let Z be a random variable that denotes the number of attempts before one transmitter is successful.
  - Derive an expression for E[Z] (the expectation of Z) which is an estimate of the average number of attempts required to successfully transmit a frame.
  - Evaluate E[Z] for a 10 Mbps network whose diameter is 1500 meters.
Course Myths

- I have to know something about networking
  - Graduate level maturity in science, engineering, programming, math (probability, calculus)
- This course is identical to CS423
  - CSE573S emphasizes science and implementation
- This is a course on how to write network programs
  - CS422S is a prerequisite (interprocess communication)
  - C/C++ programming is just a tool
- I will learn a lot.
  - "You get as much as you put into the course"
  - "We learn by building systems (emulated, simulated, analytic)"