Brainstorm About Computer Networks

• Take 3-4 minutes to write
  - Include your name (I’ll collect and read, but not grade)
• What are some network applications?
• What are some network protocols?
• What do users care about for good network performance?
• Trade write-ups with another student (introduce yourselves!)
• What do we have?

CS 3516
Computer Networks
Mark Claypool

Outline

• Background
• Course Materials
• Topics
• Motivation

Professor Background (Who am I?)

• Dr. Mark Claypool ("professor", "Mark")
  - Computer Science
    - Operating Systems, Distributed Computer Systems, Multimedia, Networks
  - Director of the IMGD program
    - The Game Development Process, Technical Game Development II
• Research interests
  - Networks, Multimedia, Network games, Performance evaluation

Teaching Assistants Background (Who are they?)

• Choong-Soo Lee
  - Ph.D. student
  - "CHAP - Credit-based Home Access Point for Overall Application QoS Improvement"
• Thangam Vedagiri Seenivasan
  - M.S. student
  - "CStream: Neighborhood Bandwidth Aggregation for Better Video Streaming"
• Both are excellent resources for help!
  - See them early!
  - See them often!

Student Background (Who Are You?)

• Year
  - sophomore, junior, ...
• Major
  - CS, IMGD, RBE, ECE, ...
• Programming Language of choice
  - Java, C++, Python, ...
• Programmer:
  - (noob) 1 to 5 (guru/hacker)
• Network application written? Sockets?
• Other ...
Syllabus Stuff

http://www.cs.wpi.edu/~claypool/courses/3516-B09/

- Office hours:
  - TBA (about 3 per week each)
  - See Web page
- Email:
  - {claypool, clee01, thangam} @ cs.wpi.edu
  - cs3516-staff @ cs.wpi.edu
  - cs3516-all at @ cs.wpi.edu

Course Materials

- Slides
  - On the Web
  - PPTX and PDF
  - Caution! Don’t rely upon the slides alone!
    Use them as supplementary material
  - (come to class)
- Timeline
  - Tentative planning
- Assignments
- Samples
  - Network code, links

Course Structure

- Recommended background
  - CS2303 or CS2301
  - (Systems programming)
- In-Class
  - Lecture
  - Discussion
  - Exams
  - (More on Exams, Labs, Homework and Projects, next)
- Out-of-Class
  - Reading
  - Projects
  - Labs
  - Homework
- Grading
  - Exams (40%)
  - Projects (20%)
  - Homework (20%)
  - Labs (20%)
  - Only 1 day late allowed!

Text Book

- Computer Networking - A Top-Down Approach
  - James F. Kurose and Keith W. Ross
  - 5th edition
  - Copyright Pearson, 2010
  - Unique in the presentation of networks from the user (top) down to the bottom (physical medium)
- Homework from book
- Includes registration to access Web materials

Homework

- Written questions (and answers) pertaining to class material
- Verify that you truly understand lecture material
  - And can apply it!
- Designed to get you ready for exams
- 4 total
  - 2 before mid-term, 2 before final
- 20% of your grade

Exams

- 2 exams
  - mid-term and final
  - 40% of grade
  - Non-cumulative
  - Closed
  - closed-note, closed-paper, closed-friend
  - Sample your knowledge of class material
  - 2-hour time slot, so hopefully not time-pressured
Labs
* Designed to let you learn by “seeing” actual network data
* Capture data with “sniffer” and analyze
* 4 labs
* Note, exact dates on timeline most likely to change
  - Depends upon when course material
  - 20% of your grade
(More on lab 1 shortly)

Projects
* Programming part of the course
* 2 significant projects
  - One before mid-term, one after
* Using sockets
* Done individually
* Can be done in either C++ or Java
* Must run on CCC machines!
  - (Linux)
* 20% of your grade

Outline
* Background (done)
* Course Materials (done)
* Topics (next)
* Motivation

Topics
* Network protocols
* Internet traffic
* Local area networks
* Wide area networks
* Switches and routing
* Congestion
* Physical layer issues
* Wireless networks
* Security

Why Computer Networks?
* The Network is the Computer
* Most applications today are connected
  - Games, Social Networking, Streaming Video ...
* Many devices are connected
  - PCs, Game consoles, Set-top boxes, Mobile devices...
* Tools to hook up, but how and why not so clear
* In order to design and build the next generation of devices and applications, you must have at least a basic understanding of computer networks
* Many should take more networks!

Why This Class?
* No longer 1 course (cs4514), but two (cs3516, cs4516)
  - Lots of material in Networks!
* This course → learn computer networking concepts in a broad way
  - Less programming
  - Still hands-on
* CS4516 is Advanced Computer Networks
  - In-depth, more programming
  - Most should take that, too!