CS 5480
Computer Networks

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School of Computing

My Background

- PhD - Computer Science dept, UMass Amherst (1999)
- Bell Labs research (1999 – 2003)
- research interests – computer networks (since 1989)
  - mobile and pervasive systems, wireless networks
  - network security
  - overload control
  - multicast
  - measurement, modeling, inferencing

What is this course about?

Comprehensive introduction to computer networks

- learn principles of computer networking
- learn practice of computer networking
- Internet architecture/protocols as case study

Goals:

- learn a lot (not just factoids, but principles and practice)
- have fun (well, it should be interesting, at least)

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Course Information

- Who is this course for?
  - Undergrads/Grads
- Prerequisites:
  - good programming skills, some knowledge of Unix (or Unix -like) operating system
- Course materials:
  - text: *Computer Networking: A Top Down Approach*, ***5th Edition***, Jim Kurose & Keith Ross, Addison Wesley, 2009
  - class notes (*modified version of slides provided by Jim Kurose & Keith Ross*)
  - cs6480 – additional reading material

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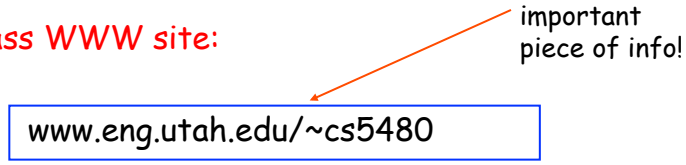
Course Information (more)

- Class WWW site:



- *everything* will be posted on this site!
  - syllabus
  - TA info
  - class notes (pdf)
  - assignments

  nothing will be handed out in class :-)

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Course Information (more)

- Mailing Lists:
  - cs5480@list.eng.utah.edu: announcements & discussions
  - join by going to http://sympa.eng.utah.edu
  - teach-cs5480: do not join, use only for questions to Prof & TA
- Workload:

Coursework	approx	approx %
written homeworks	4	25%
programming ass'n	3	25%
midterm		25%
final exam		25%

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Course Information (more)

- Cheating: read, sign, and return the CS5480 cheating policy document
- TA: Hema Bhatia
- TA's Office hours: Wednesday 11:30 AM – 1:00 PM
- Professor's office hours: Tuesday 10:30 -11:30 AM in 3408 MEB
- ask questions by sending email to the mailing lists

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Course Information (more)

- Approximate Grading guidelines:
  - 90-100 A
  - 80-89 A-
  - 70-79 B-, B, B+
  - 60-69 C-, C, C+
  - 50-59 D-, D, D+
  - < 50 (or caught cheating) E

  The ranges as well as the thresholds will be shifted/changed depending on the overall performance of the class in tests, homeworks, and programming assignments

- in-class style: interaction, questions *(please!)*
- students are not expected to read class notes in advance

Questions, comments, … ???

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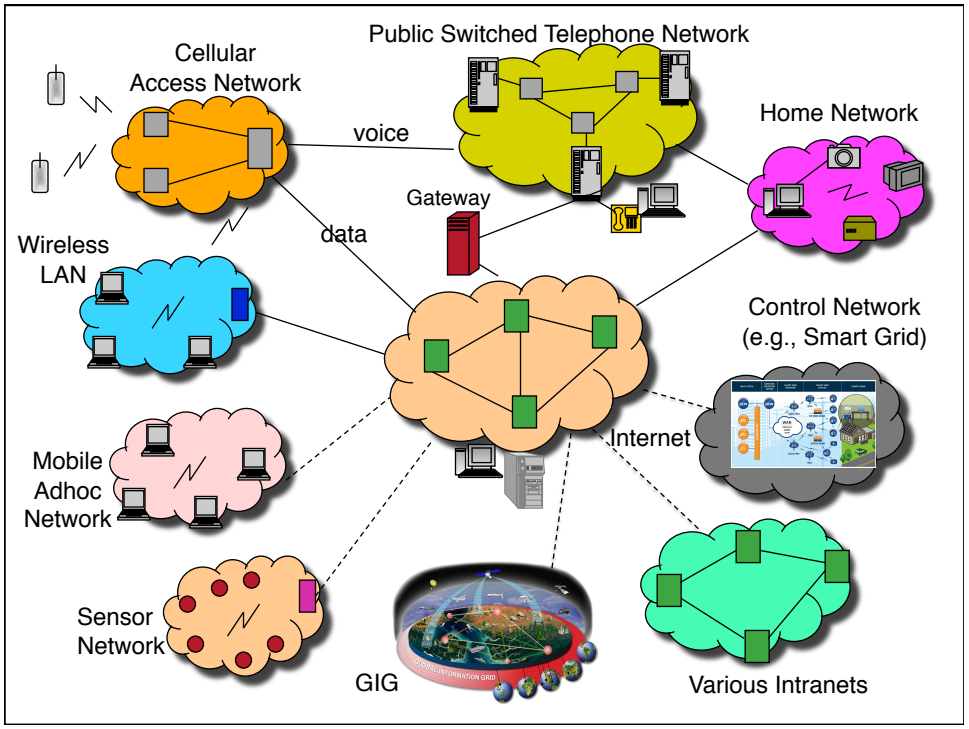


Course Overview:

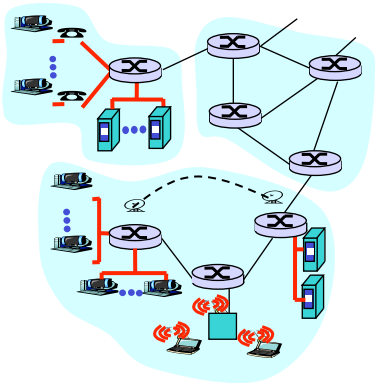
Part 1: Introduction *(2 classes, text: Chapter 1)*

- What is the Internet, what is a protocol?
- Network edge, network core, network access
- Delay, loss in packet-switched networks
- Protocol layers, service models, security

A top-down approach:

We'll cover networking top -down

- end-system applications, end-end transport
- network core: routing, hooking nets together
- link-level protocols, e.g., Ethernet
- other stuff: security, management, multimedia



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Course Overview:

Part 2: Application Layer *(2-3 classes, text: Ch. 2)*

- Principles of network applications
- Web & HTTP
- File transfer: FTP
- Electronic mail in the Internet
- The Internet's directory service: DNS
- P2P File Sharing
- Socket programming

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Course Overview:

Part 3: Transport Layer *(3 - 4 classes, text Ch. 3)*

- Transport-layer services and principles
- Multiplexing and demultiplexing applications
- Connectionless transport: UDP
- Principles of reliable data transfer
- TCP case study
- Principles of congestion control
- TCP congestion control

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Course Overview:

Part 4: Network Layer *(4 classes, text: Ch. 4)*

- Network service model
- Routing principles
- Hierarchical routing
- IP: the Internet Protocol
- Routing in the Internet
- What's inside a router?

MIDTERM EXAM

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Course Overview:

Part 5: Link Layer, LANs *(3 classes, text: Ch. 5)*

- Introduction, services
- Error detection, correction
- Multiple access protocols, LANs
- LAN addresses, ARP
- Ethernet
- Hubs, bridges, switches
- ATM networks & MPLS

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Course Overview:

Part 6: Wireless & Mobile Networks *(2 classes, text Ch. 6)*

- Wireless links, characteristics
- IEEE 802.11 wireless LANs
- Cellular Internet Access
- Mobility: Principles, addressing and routing to mobile users
- Mobile IP
- Mobility in cellular networks
- Mobility and higher layer protocols

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Course Overview:

Part 7: Network Security *(3 classes, text: Ch. 8)*

- What is network security?
- Principles of cryptography
- Authentication: Who are you?
- Integrity
- Key distribution, certification
- Firewalls
- Attacks, counter-measures
- Case studies: secure e-mail, SSL, IPsec, 802.11 WEP

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Course Overview:

Part 8: Multimedia Networking (as much as possible, text: Ch. 7)

- Multimedia Networking Applications
- Streaming Stored Audio and Video
- Making the Best of the Best-Effort Service
- Beyond Best Effort
- Scheduling and Policing Mechanisms
- Integrated & Differentiated Services
- RSVP

FINAL EXAM

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I keep six honest serving men. They taught me all I knew. Their names are What and Why and When and How and Where and Who.

-- Rudyard Kipling

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