CS 360

Lecture 1

Syllabus

http://zeus.cs.pacificu.edu/chadd/cs360f18

- Computer Networking, A Top Down Approach (6th edition), Kurose, Ross

Grades:

- Quizzes: 5%
- 2 Midterms: 15% each
- 1 Final 25% (Comprehensive)
- Projects/Labs 40%

Dates:

- Midterm 1, Oct 4
- Midterm 2, Nov 6
- Final, Tuesday Dec 11 (noon- 2:30 pm)

Policies:

- Pop Quizzes: frequent, unannounced, open-note quizzes will be given
- Late Policy: No late assignments accepted
- Grade Complaints: one paragraph summary of why the grade is wrong, within one week of receiving the graded material
- All projects are *individual* projects unless otherwise stated

Book

- Good: contains all the concepts you need to know
- Bad: mainly theory
  - lacking in detail
  - not enough pictures
- Ugly: python code.

Great Expectations

- Read the book
  - theory
  - Generally, the Review Questions and Problems at the end of the chapters are good study guides. I'll highlight particularly useful questions.
  - **bring questions to class**
- Class lecture
  - more practical
  - more up-to-date
  - ask questions
- Assignments/Labs/Homeworks
  - practical
- Office Hours
  - bring questions!

"going to his office hours
would've been beneficial for me."

-anonymous student, every semester

Some of what I know you don't know/remember

- C programming
  - arrays / pointers
  - structs
  - dynamic memory / Valgrind
  - Makefiles
  - argv/argc
- Linux command line
  - ls, cd, mkdir, cp, scp, mv, rm, &, vi/emacs/nano/pico/vim , >, <
- Eclipse
  - debugger
- Subversion or Git

Projects (tentative)

1. ping, ss, ip, dig, traceroute (network tools)
2. Introduction to Wireshark
3. HTTP (TCP)
4. HTTP (part 2: parsing, TCP)
5. SMTP (TCP, interactive, long lived connection, state machine)
6. DNS (UDP, struct overlays, bit fields)
7. Math Packet (UDP)
8. IM Client (TCP)

Networking projects have lots of moving parts, some of which you don't control.

Start early!

From OS course Evals

- "I did feel that chapter 1 of the book had way too much material and was overwhelming to read, but the lecture was a relief that it boiled down so much material in an understandable way."

Roadmap

- Chapter 1:
  - general concepts, network layout, Vocabulary
- Chapter 2:
  - how does an application use the internet?
- Chapter 3:
  - What (and how) does the internet provide to an application?
- Chapter 4:
  - How does the internet work?
- Chapter 7:
  - multimedia

Vocabulary

- Clear communication is necessary!

- Network of Networks!
- Network Edge
- host/end system
  - client/server
- router/switch
- packet
- Protocol

Physical Network

Vocabulary

- TCP
- UDP
- IP
- DNS
- RFC
  - Internet Engineering Task Force (IETF)
- End to End
- Best effort

Logical Network

History

- BITNET
- Arpanet
- CompuServe/AOL/Prodigy
- UUencoding
- UUCPNET
- UUNET
- BBN

Practical

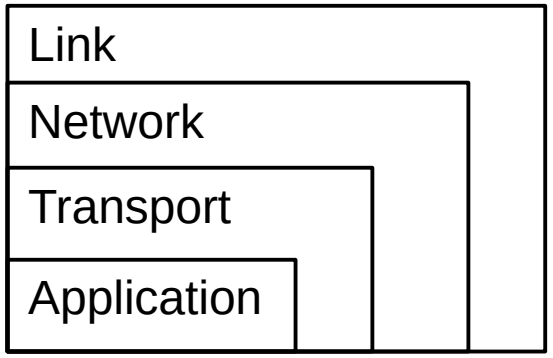
- "Rough consensus and running code" - IETF

Protocol Layers

- 4 Layer model
  - Application
  - Transport
  - Network
  - Link
- Encapsulation!
- Session/Presentation

Encapsulation/Wrapping

- Each higher layer is wrapped in the lower layer.



Switching

- Packet vs Circuit switching

Delay

- Sources of delay
  - processing
  - queuing
  - transmission
  - propagation
- Packet Loss
- End to End Delay
- Bottleneck

Delay

- Traffic Intensity

- Effect on queue length

Throughput

- Instantaneous

- Average

1.6 Networks Under Attack

- CS 435 - Spring 2020!
  - Shereen Khoja
  - Strain 203 C

Practice

- p 68
  - R1, R2, R3, R12, R16, R22, R23, R24, R25
  - R18, R19

In Class Practice

- Page 70, P1

- Define actions by each side (ATM, Bank)
- Define possible outcomes of each action

Design and describe an application-level protocol to be used between an automatic teller machine and a bank's centralized computer. Your protocol should allow a user's card and password to be verified, the account balance (which is maintained at the centralized computer) to be queried, and an account withdrawal to be made (that is, money disbursed to the user). Your protocol entities should be able to handle the all-too-common case in which there is not enough money in the account to cover the withdrawal. Specify your protocol by listing the messages exchanged and the action taken by the automatic teller machine or the bank's centralized computer on transmission and receipt of messages. Sketch the operation of your protocol for the case of a simple withdrawal with no errors, using a diagram similar to that in Figure 1.2. Explicitly state the assumptions made by your protocol about the underlying end-to-end transport service.