

# CS144 Course Intro (Winter 2024)



Keith Winstein



Wireless Communications: 1964

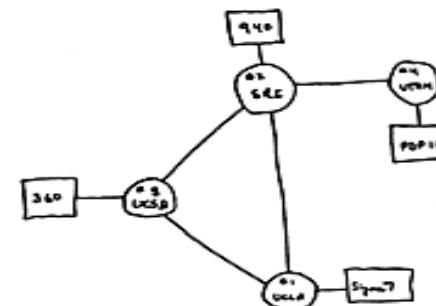
*“A network to  
survive nuclear attack.”*



Paul Baran

1<sup>st</sup> network  
connects two  
computers

Four nodes connected  
(UCLA, SRI, UCSB, Utah)



US Government  
starts “ARPANET”  
project

1964

1965

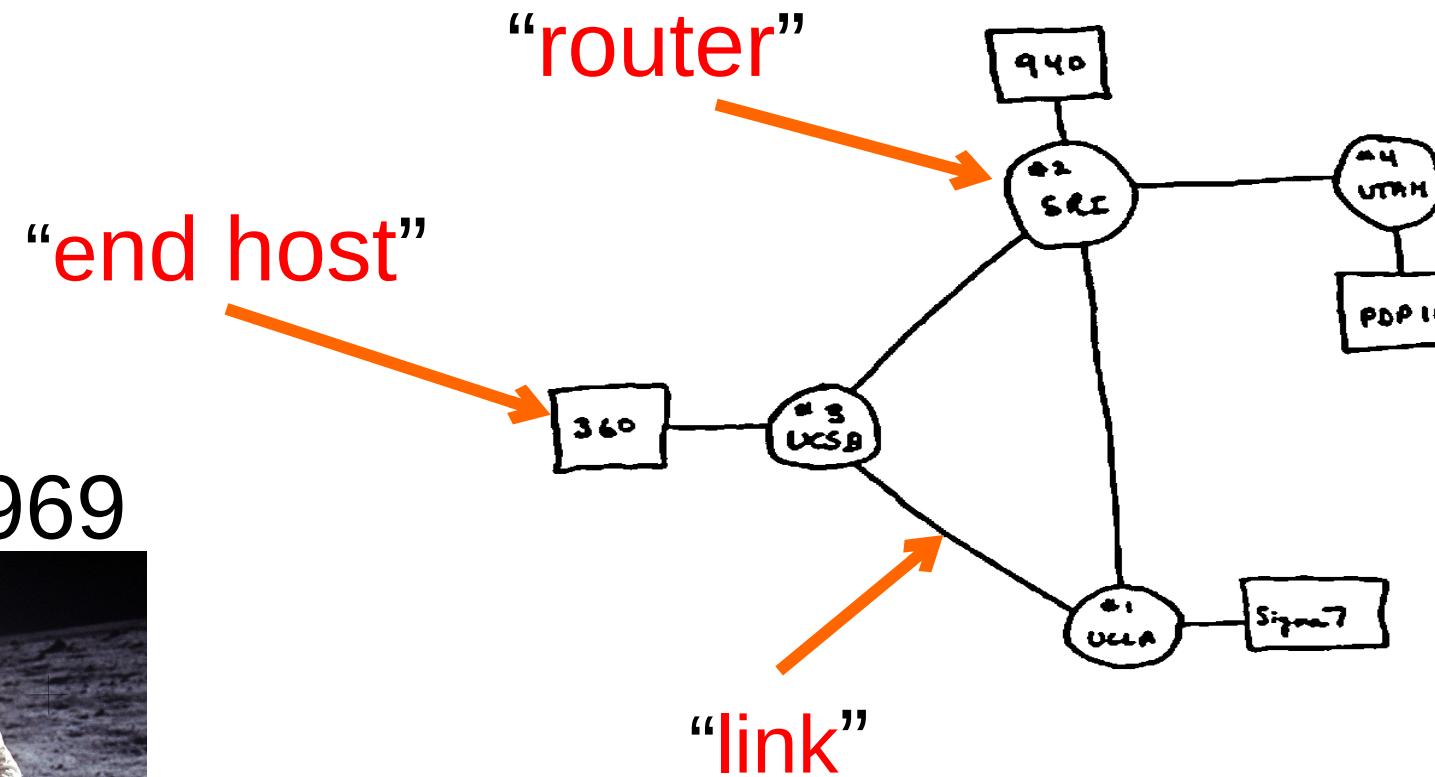
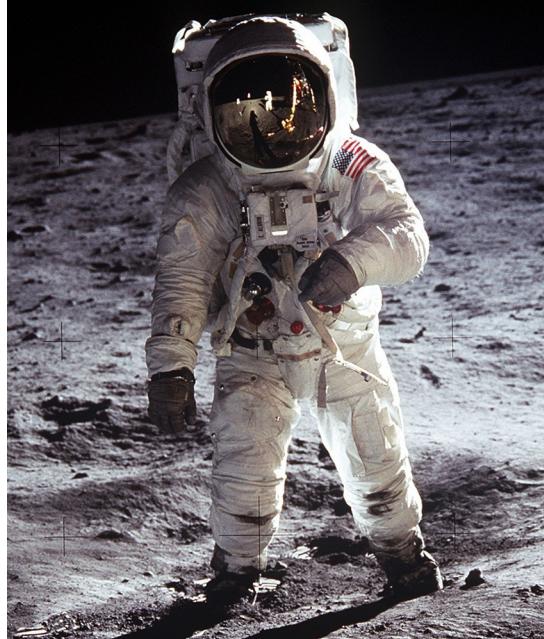
1966

1968

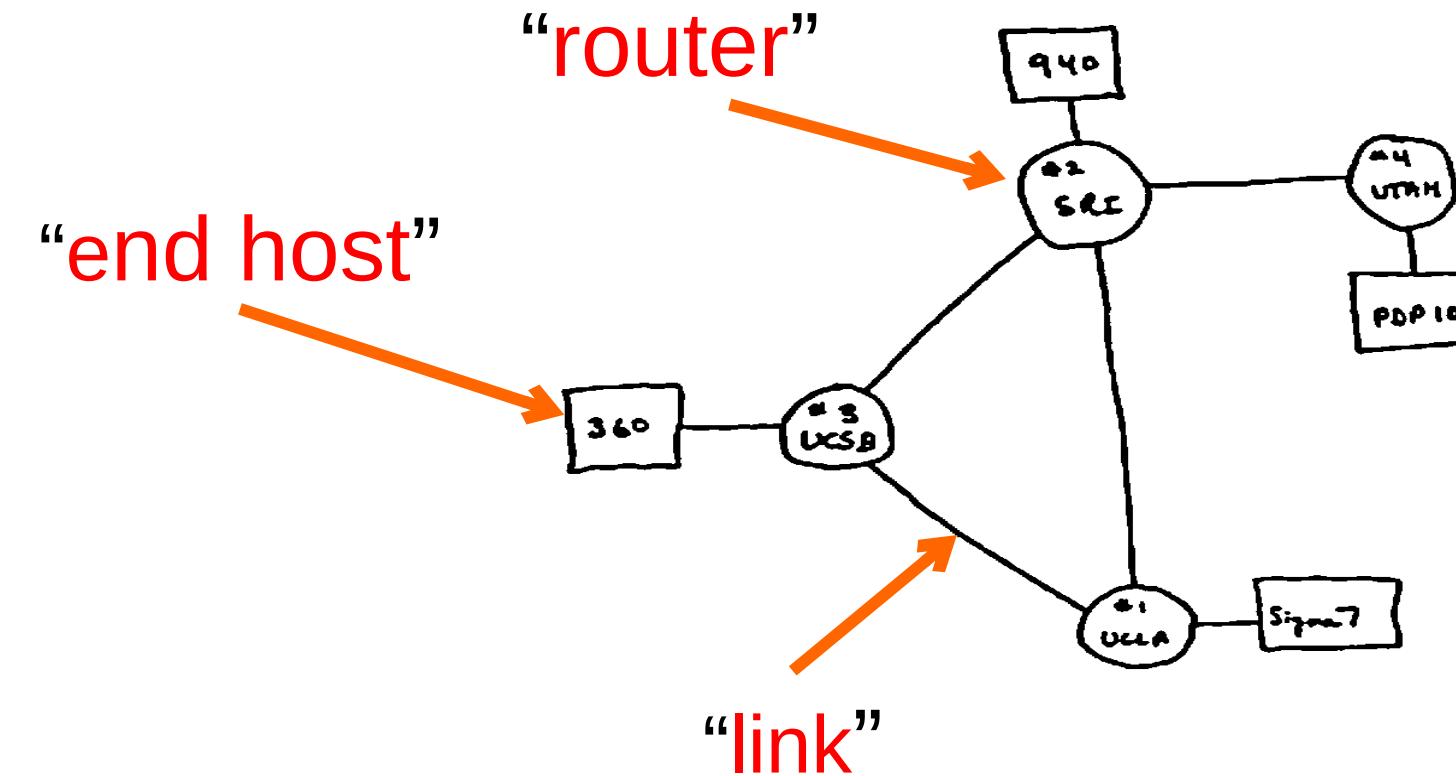
1969

# The Internet in 1969

Also in 1969



# What did they use it for?



1. Sending files between scientists: "*Here is a big file of astronomy data!*"
2. Email: "*Where shall we have lunch today?*"
3. Remote login to another computer.

1971

First email typed here

“QWERTYUIOP”

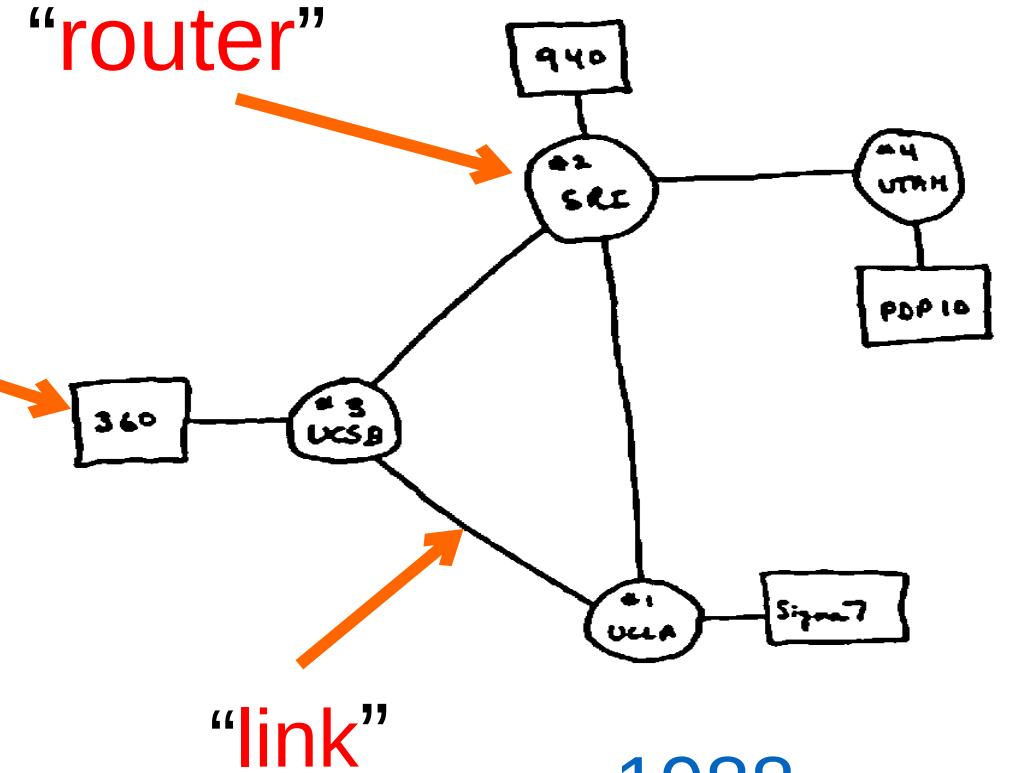
...and printed here





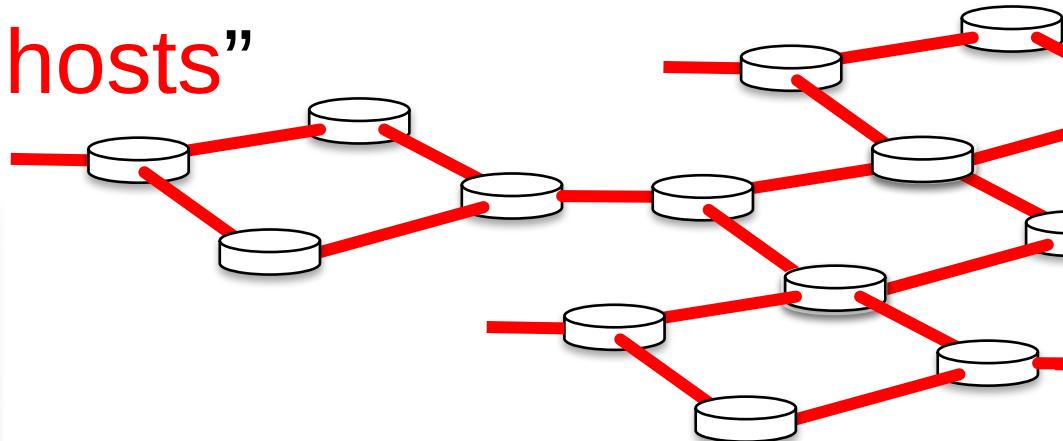
1969

4 “end hosts”



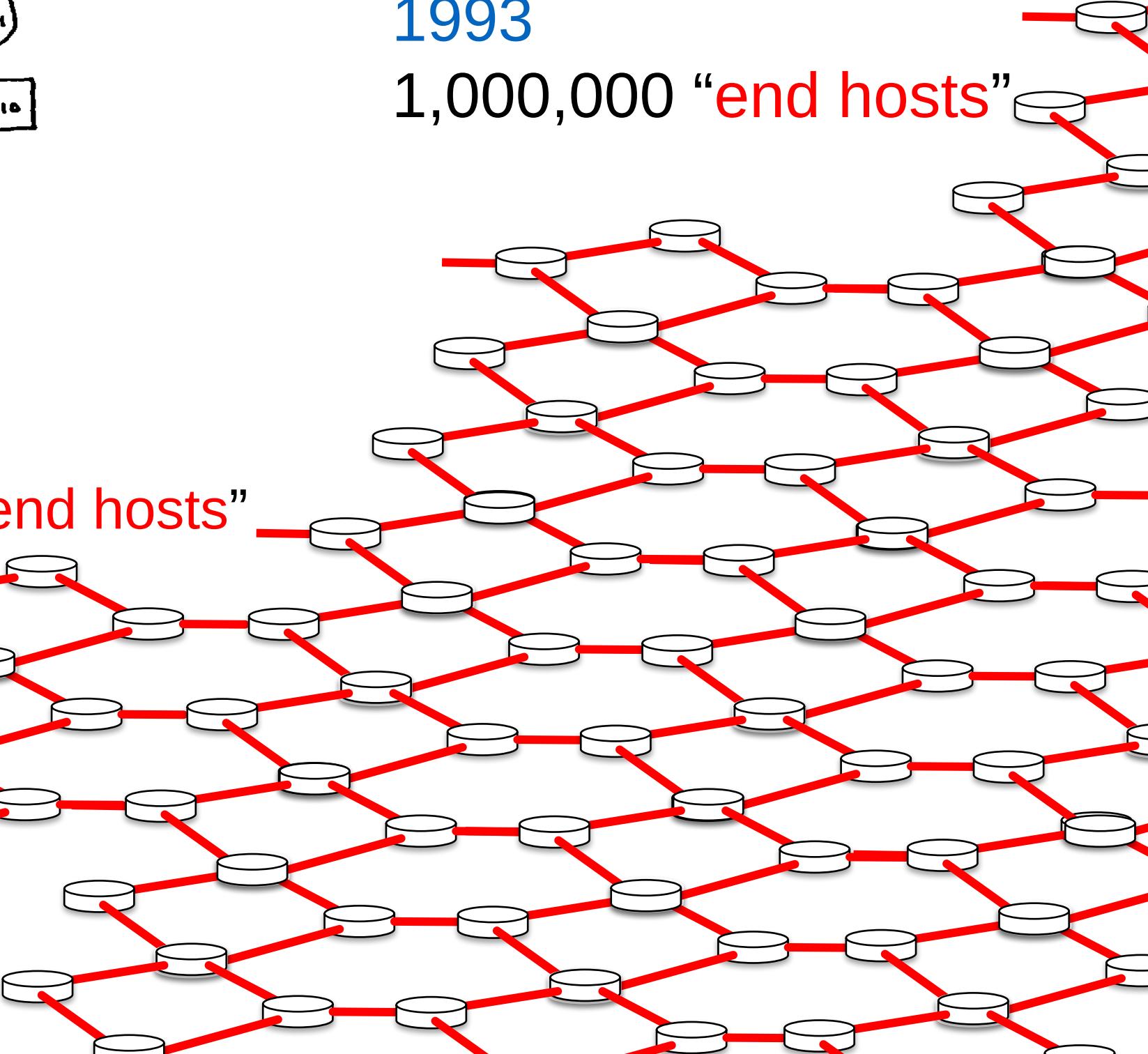
1988

10,000 “end hosts”



1993

1,000,000 “end hosts”



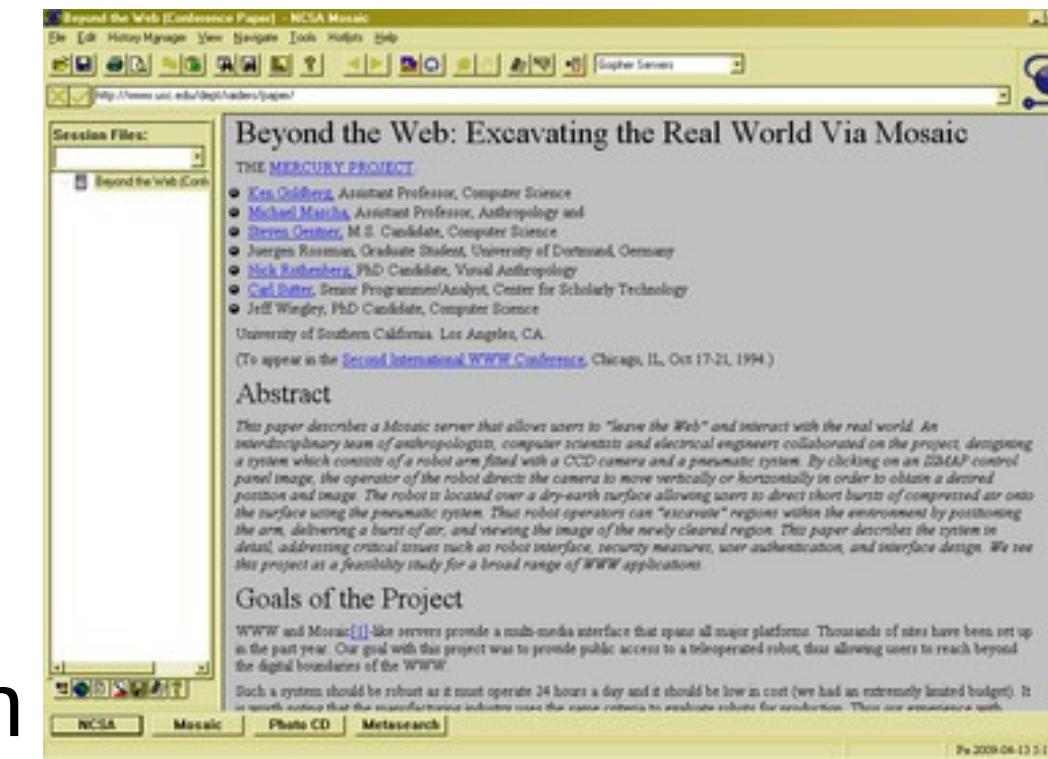
Network Systems: 1984

Then in 1993 something  
even BIGGER happened!!!

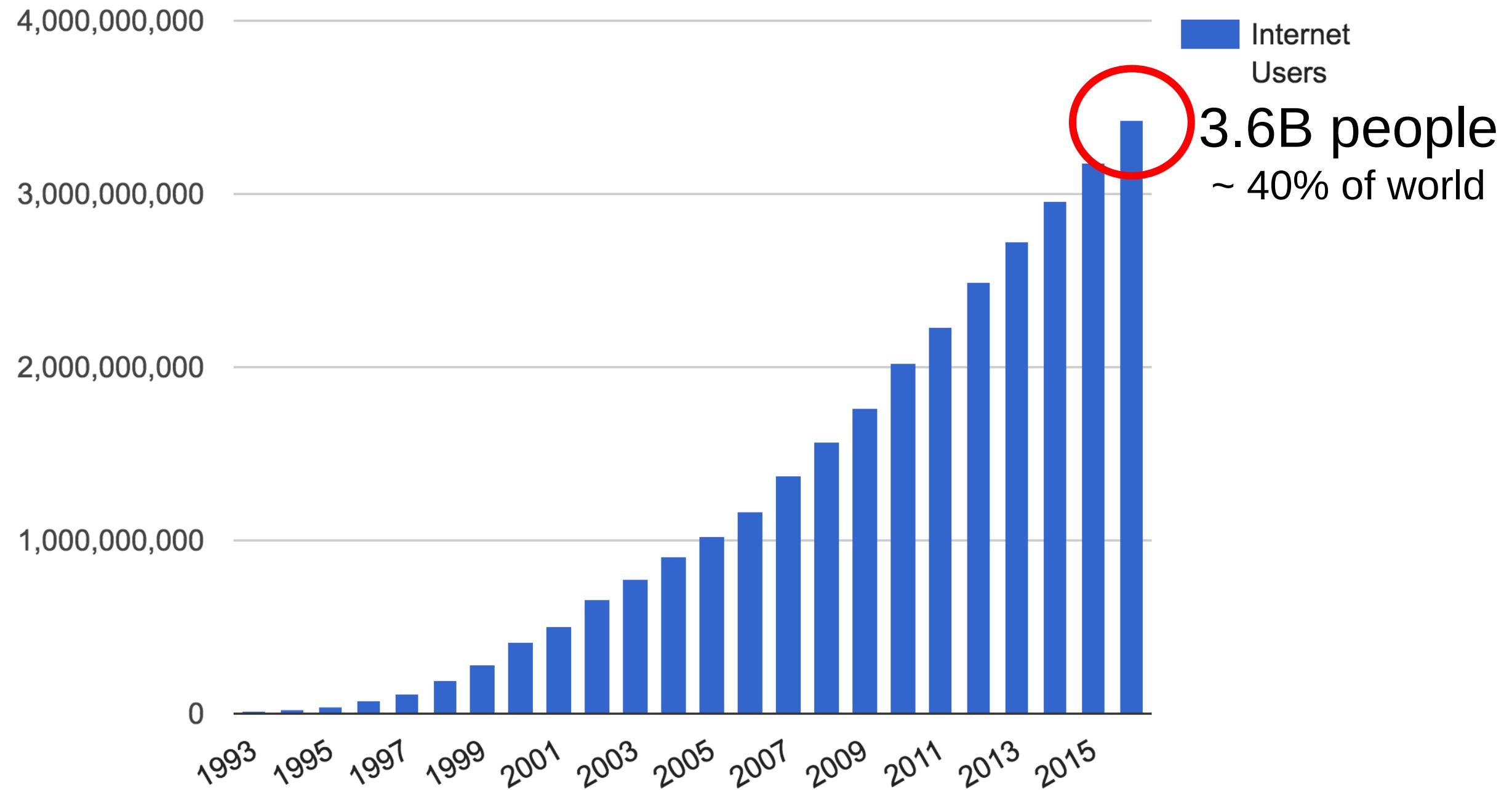
# 1993: The first web browser (Mosaic)



Marc Andreessen



# The number of Internet users in the world





How does it all work?

Why was it designed this way?

# CS144

Isn't it really difficult...?

# Goals

1. To learn how the Internet works.
2. To learn why the Internet was designed this way.
3. To learn how to use the Internet.
4. To build some significant pieces of the Internet.
5. To learn the underlying principles and technologies of networking.

# Class overview

CS144 is a fast-paced lab class.

Each week has TWO lectures and ONE lab session.

1:30-2:50 p.m. (Please no distracting laptop usage!)

The course is divided into week-long units, devoted to a particular topic.

e.g. the 1<sup>st</sup> week is about Basic Principles, then (2) Transport, (3) Packet Switching, (4) Congestion Control, (5) Routing, (6) Lower Layers, (7) Applications, ...

There is ONE BIG LAB ASSIGNMENT (“you build most of the Internet”) with 8 “checkpoints,” #0 through #7.

# Laptops

- We discourage laptop use in class, especially use that will distract others behind you.
- Except for specific in-class exercises (we will ask you to bring your laptop).



# How we calculate your grade

## 1. Participation 5%

- ~ Helping others on Ed or in the lab sessions
- ~ Credit in somebody else's lab writeup

## 2. Quizzes 10%

- ~ Best 5 out of 8: 2% each

## 3. The lab 45%

- ~ Correctness (as of end of class): 30%
- ~ Checkpoints 0-7 subjective grades, best 5 out of 8: 15% (3% each)

## 4. Exams 40%

Midterm (Feb. 15): 20% (lab slot)

Final (March 20): 20% (duration TBA)

Q: “What does it take to earn an A?”

# Exam Policy

Exams are closed-book, closed-note, closed-laptop etc.

But you may bring 2 double-sided sheets of 8.5" x 11" paper of your own design to the Midterm and Final.

# COVID

This quarter may ~~suck~~ present lousy circumstances. :-(

My job is to help you learn. I really want that to happen.

We're going to have to react to curveballs and we will do our best.

If you have to quarantine, we will be there for you (online) to help you avoid falling behind.

# Lab

- Programming is in modern C++
- CS111 is a prerequisite.
- You really want to go to the lab sessions
  - ~... and have started the lab before you go.
- Late policy:
  - Final correctness deadline is end of term (but **don't wait**)
  - Checkpoint deadline ~each week (first one: next Tuesday).
  - To receive subjective/style grade **and feedback**, need to submit checkpoint by deadline. This is for the CAs' sanity.
  - *If more than a week behind, lab attendance is mandatory.*



# Win Certificates!!!

1. Certificate for BEST checkpoint submission
2. Certificate for BEST help (credited in lab writeups)
3. Certificate for BEST help (on Ed)

# Workload



- This is a 4-unit workload, which means a workload of about 12hrs/week
- Our estimate based on previous years
  1. Class time: 3hrs/week
  2. Labs: Avg 6hrs/week
    - *wide variance between checkpoints and between students*
    - *read the whole checkpoint BEFORE coding*
  3. Average overall ~12hrs/week

# Contact

For anything non-private: **Ed**

If private: Private Ed posting, or  
email [cs144-staff@cs.stanford.edu](mailto:cs144-staff@cs.stanford.edu)

If it's personal (e.g. a medical emergency):  
email Keith [keithw@cs.stanford.edu](mailto:keithw@cs.stanford.edu)

(If it's a mega-emergency, Keith's cell phone number is on his Web page.)

# The Honor Code

- We take it seriously and we expect you to take it seriously too.
- Last year was a bad year with several CS144 students getting into a lot of trouble →
- None of them had set out to cheat: At the last minute, they copied an assignment off the web, then tried to modify it. Or they colluded on an exam. It doesn't work!
- We use special tools to compare solutions against current and previous years and solutions we find on the web.
- Please, let's have a zero-violation year.

# The Honor Code

Permitted Collaboration: The following items are encouraged and allowed at all times for all students in this class:

- Discussion of material covered during lecture, problem sessions, or in handouts
- Discussion of the requirements of an assignment
- Discussion of the use of tools or development environments
- Discussion of general approaches to solving problems
- Helping others at the lab session (**without** looking at code!)
- Discussion of general techniques of coding or debugging

# The Honor Code

Unpermitted Collaboration: All submissions must represent **original, independent work**. Some examples of activities that do not represent original work include:

- Copying solutions from others or knowingly allowing others to copy your solution.
- Use of solutions posted to websites is prohibited.
- Placing your source code in a public repository where others can copy it is unpermitted collaboration.
- Debugging code for someone else.
- Collaborating on or discussing the online graded quizzes before you have completed them.
- *Honor code exercise: can you stump the teaching staff?*

# What to do next

- Look around and get familiar with <https://cs144.stanford.edu>
- Start setting up your VM for Lab 0! It is due next Tuesday.
- See you Wednesday!

# TCP/IP Header Formats in Lego

