Announcements

- Midterms and Hw 2 will be returned in lab.
- Lab 7
  - Work with partners again (switching is fine).
  - No Prep!
Today’s Plan

- Make-believe networks
you're practically prehistoric.
The Internets

Tubes
# Ethernet Frame Format

<table>
<thead>
<tr>
<th>PREAMBLE</th>
<th>TO</th>
<th>FROM</th>
<th>LENGTH/TYPE</th>
<th>DATA</th>
<th>ERROR CHECK</th>
</tr>
</thead>
<tbody>
<tr>
<td>64</td>
<td>48</td>
<td>48</td>
<td>16</td>
<td>variable</td>
<td>32</td>
</tr>
</tbody>
</table>
802.11 (WiFi) Frame Format

<table>
<thead>
<tr>
<th></th>
<th>Ver</th>
<th>Type</th>
<th>Subtype</th>
<th>To DS</th>
<th>From DS</th>
<th>More Frags</th>
<th>Retry</th>
<th>Power mtg.</th>
<th>More data</th>
<th>WEP</th>
<th>Order</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frame Control</td>
<td>16</td>
<td>16</td>
<td>48</td>
<td>48</td>
<td>48</td>
<td>48</td>
<td>48</td>
<td>16</td>
<td>16</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td>Duration</td>
<td>16</td>
<td>16</td>
<td>48</td>
<td>48</td>
<td>48</td>
<td>48</td>
<td>48</td>
<td>16</td>
<td>Data</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Addr 1</td>
<td>16</td>
<td>16</td>
<td>48</td>
<td>48</td>
<td>48</td>
<td>48</td>
<td>48</td>
<td>16</td>
<td>Error Check</td>
<td>2312</td>
<td>bytes</td>
</tr>
</tbody>
</table>
Who invented the Internet?

"DURING MY SERVICE IN THE UNITED STATES CONGRESS, I TOOK THE INITIATIVE IN CREATING THE INTERNET."

VINT CERF + ROBERT KAHN
### IP Datagram Format

<table>
<thead>
<tr>
<th>Field</th>
<th>Length</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP version</td>
<td>4</td>
<td>IP version</td>
</tr>
<tr>
<td>Header Len</td>
<td>4</td>
<td>Header length</td>
</tr>
<tr>
<td>Service Class</td>
<td>8</td>
<td>Service class</td>
</tr>
<tr>
<td>Packet Length</td>
<td>16</td>
<td>Packet length</td>
</tr>
<tr>
<td>Packet Number</td>
<td></td>
<td>Packet number</td>
</tr>
<tr>
<td>Fragment Number</td>
<td></td>
<td>Fragment number</td>
</tr>
<tr>
<td>TTL</td>
<td></td>
<td>Time to Live</td>
</tr>
<tr>
<td>Protocol</td>
<td></td>
<td>Protocol</td>
</tr>
<tr>
<td>Error Check</td>
<td></td>
<td>Error check</td>
</tr>
<tr>
<td>From Addr</td>
<td></td>
<td>From address</td>
</tr>
<tr>
<td>To Addr</td>
<td></td>
<td>To address</td>
</tr>
<tr>
<td>DATA</td>
<td></td>
<td>DATA (up to 65516 bytes)</td>
</tr>
</tbody>
</table>
IP = ESPERANTO?
Operating System

Network Applications

Firefox

Mail

Wireless Network

WiFi
Network Applications

OPERATING SYSTEM

IP Translation

 Firefox

IP

IP Mail

Cellular

AT&T
Personal Hotspot

Now Discoverable.
Other users can look for your shared network using Wi-Fi and Bluetooth under the name “Tom M’s iPhone”.

Wi-Fi Password

TO CONNECT USING WI-FI
1 Choose “Tom M’s iPhone” from the Wi-Fi settings on your computer or other device.
2 Enter the password when prompted.

TO CONNECT USING BLUETOOTH
1 Pair iPhone with your computer.
2 On iPhone, tap Pair or enter the code displayed on your computer.
3 Connect to iPhone from computer.

TO CONNECT USING USB
1 Plug iPhone into your computer.
2 Choose iPhone from the list of network services in your settings.
Network Applications

OPERATING SYSTEM

- Firefox
- IP Forwarding Software
- IP Translation
- Cellular
  - Verizon, Sprint or AT&T
- WiFi
- IP Mail

WIRELESS NETWORK

IP Forwarding Software

IP Translation
WIRELESS NETWORK

OPERATING SYSTEM

Router

IP Forwarding Software

IP Translation

WiFi

Ethernet

ETHERNET