Various computers will be used in this class, so a quick introduction to their arrangement and networking is useful. Along the way we answer the pressing question: What is the difference between the Internet and the World Wide Web.

Computers of the Realm...

- We will discuss how computers really work later, but for now think of them as having many forms:
  - Embedded -- processor, ROM, channels to sensor/actuators; μ-wave oven
  - PDA -- processor, RAM, LCD; mobility
  - Laptop -- processor, RAM, floppy, hard disk, LCD; portability
  - Desk Top -- processor, RAM, floppy, hard disk, CD, monitor; educational and office work
  - Server -- processors (4-32), RAM, many hard disks, CD; services
  - Supercomputer -- processors (16-1K), RAM, hard disks; big science
Class Computers

- FIT100 uses
  - Laptop for lectures
  - Desktop in Labs MGH, OUGL, SUZ
  - Dante server
- An unconnected computer can only access the data stored locally on its hard disk, run the software stored locally, etc.
- The UW computers are connected, i.e. networked, together allowing us to send email and access the World Wide Web

Networks ...

- Networks connect computers, making them much more useful because
  - Access more information and software
  - Help users communicate, share information
  - Perform services for one another
- UW’s networks ship >1/2 trillion bytes of data per day
  - Half this information goes to or comes from the Internet
- How are these networks arranged?
Ethernet … It’s Like Conversation

- Ethernet, it’s like students sitting around the dorm telling stories …
  - Everyone listens while one person tells his/her story
  - When the story is finished, there is a pause
  - A person with a story to tell starts talking, listening all the while
    - If no one else started talking too, the person continues
    - If others started talking, he/she stops and waits briefly before trying again

UW Networks Connect To Internet

- The subnetworks of campus interconnect the computers of the UW domain (.washington.edu), which is connected to the Internet via a Gateway

The Internet is the totality of wires, fibers, satellite links and switches connecting named computers
How Are Computers Named Logically

- The logical way to name computers is using domains
  - All educational institutions .edu
  - U Dub .washington.edu
  - CSE .cs.washington.edu
  - Me spiff.cs.washington.edu
- This scheme is hierarchical
  - Easier to remember names
  - Names are associated with like units
  - No limit to size or organizational depth

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Country Pairs
- .ca -- Canada
- .uk -- United Kingdom
- .fr -- France
- .de -- Germany as in Deutschland
- .es -- Spain as in España
- .us -- United States

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Top Level
- .com
- .edu
- .gov
- .org
- .mil
- .net
- .xx

How Are Computers Named Physically

- The physical way to name computers is to use an Internet protocol address, or IP address
  - spiff.cs.washington.edu’s IP address is: 128.95.1.207
  - cs.washington.edu’s IP address: 128.95.1.4
  - washington.edu’s IP address: 140.142.15.163
- The domain name system (DNS) associates human readable names with the physical IP addresses for use by the computers and routers of the Internet
Logical Network … Physical Network

An important concept ...

- In computing it is common to separate the logical idea of something -- the way you think about it -- from the physical implementation -- how it’s actually built
- This is called a physical / logical separation
- In networking, the domain names make up our logical network, a hierarchical arrangement of names that tell us associations: cs.washington.edu
- The computers actually use physical addresses
- The DNS enables the separation by making the correspondence between the two

How Is Information Sent?

- Sending information over the Internet works like this:
- Imagine sending the novel you wrote from Tahiti where you live to New York City where your publisher is using only postcards

#1

It was a dark and stormy night. Rain pelted the glass as Sir Walter Lytton dozed by the dying fire.

Great Books
1830 1st Ave
NYC NY
USA
The Internet Protocol

❖ How is the information sent?
  ❖ Information -- email, web pages, phone calls, everything sent over the Internet -- is broken up into small units, called packets
  ❖ Packets contain an IP address, a sequence number and some actual information, a part of the whole message
  ❖ This scheme is called the Transmission Control Protocol and Internet Protocol, or TCP/IP
  ❖ The packets are sent independently, usually taking different routes, and reassembled at the destination to reconstruct the original message

| address | data |

Factoid: “WWW” is not short for “World Wide Web”

World Wide Web

❖ The world wide web is composed of those computers, called web servers, capable of sending information to your browser, e.g. Netscape or IE
❖ In most domains the computer that is the web server is called “www”, e.g. www.washington.edu
  But, a web server can have any name … your pages will be served by students.washington.edu
  The actual pages will be stored somewhere else, e.g. Dante
❖ There are different ways to connect to these servers
  Hyper-text transfer protocol, http for web pages
  File transfer protocol, ftp for files of information

Factoid: “WWW” is not short for “World Wide Web”
Web Pages

- Web pages are just text files containing instructions to your browser on how to lay out the web page
  - Web pages can be created with a text editor
  - Web pages can be created with special tools, e.g., Adobe Page Mill
- The Web page instructions are written in a special language, hyper-text mark-up language, HTML
- It is possible to see the HTML that is producing the page you are looking at by selecting “source” from the View menu in your browser

HTML From FIT100 Home Page

```html
<HTML>
<HEAD>
<META HTTP-EQUIV="Content-Type" CONTENT="text/html; charset=windows-1252">
<META NAME="Generator" CONTENT="Microsoft Word 97">
<TITLE>Home Page</TITLE>
</HEAD>
<BODY LINK="#0000ff" VLINK="#800080" BGCOLOR="#ffffff">
<DL>
<DT><A NAME="top"></A></DT>
</DL>
<TABLE CELLSPACING=0 BORDER=0 CELLPADDING=10 WIDTH=702>
<TR><TD WIDTH="21%" VALIGN="TOP" ROWSPAN=4 BGCOLOR="#c0c0c0">
<P><A HREF="#Announcements"><I><FONT FACE="Verdana, Helvetica" SIZE=2 COLOR="#ff0000">Announcements</I></FONT></A></P>
<P><A HREF="vision.htm"><B><FONT FACE="Verdana, Helvetica" SIZE=2>CSE100 Vision</B></FONT></A></P>
<P><A HREF="syllabus.htm"><B><FONT FACE="Verdana, Helvetica" SIZE=2>Syllabus</B></FONT></A></P>
<P><A HREF="notes.htm"><B><FONT FACE="Verdana, Helvetica" SIZE=2>Class Notes</B></FONT></A></P>
<P><A HREF="assignments.htm"><B><FONT FACE="Verdana, Helvetica" SIZE=2>Assignments</B></FONT></A></P>
<P><A HREF="exams.htm"><B><FONT FACE="Verdana, Helvetica" SIZE=2>Exams</B></FONT></A></P>
<P><A HREF="hype/"><B><FONT FACE="Verdana, Helvetica" SIZE=2>E-mail Announcement Archive</B></FONT></A></P>
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