CS 312 Internet Concepts
Fall, 2004
Dr. Stewart Shen
Professor

Syllabus

• Objectives
  – How Internet is structured
  – How Internet works
  – Using Internet tools
  – Internet related issues
  – HTML: creating and understanding web pages
  – Web design issues
    The course is intended to be both educational and fun.

• Textbooks
  – In-line/On-line: Fundamentals of the Internet and WWW, 2nd ed., by Greenlaw and Hepp
    Used where applicable
  – Online references
  – Course Website
    • Announcements
    • Slides
      Used as supplement
      Students responsible for taking own notes

• Grading
  – Homework, quizzes, participation: 10%
  – Two projects: 30%
    Late or no submission of all above: 0 point each
  – One midterm exam: 30%
  – Final exam: 30%
  – Extra credit: determined by the instructor
  – Final grading is based on weighted total score, curved
Before studying the core

• Your CS computer account
  Must have a CS account
• Browsing the Web
• Using e-mail

• Assignment 1
  – Find the Online Learning Center for our textbook
  – E-mail me, by (on or before) 9/9/2004:
    • The content:
      – The URL of that page you have found
      – Your full name, major, and year at ODU
    • The subject: CS312 Assignment 1

Some hints for Assignment 1

• Using a Web browser
• Using a search engine
• Using e-mail, not necessarily from your CS computer account

What is the Internet?

• An electronic communications network
  Connects computer networks around the world
• Utilizes the TCP/IP protocols
  – IP, Internet Protocol: how message is fragmented
    (into packets) and put back, packets identified
  – TCP, Transmission Control Protocol: how the packets
    are transmitted
• Interconnected with routers
  Routers are devices that forward packets between
  networks
• Utilizes many kinds of servers and clients
• Has become a global information and
  commercial system

Who “runs” the Internet?

• A variety of groups guide its growth
  The Internet Society, the Internet Architecture Board,
  the Internet Engineering Task Force, the World Wide
  Web Consortium(W3C)
• Private companies, called registrars, oversee
  the regulation of Internet domains
  Domain managers pay them for the service.
• Many groups and individuals provide data and
  use them.
  Numbers of both sites and users are tremendously
  large and rapidly growing.
How is a computer identified on the Internet?

- A computer is uniquely identified by the local host name and its domain name.
  - www.odu.edu: www is the local host name, edu is the top-level domain name, and odu is a sub-domain name under edu.
- Domain names are in hierarchical structure.
  - Top level domains
    - .com, .biz, .edu, .gov, .int, .mil, .net, .org, and so on.
    - Country code top level domains: e.g., .uk, .ca, .jp
  - There are (sub-)domains within domains

What is the IP address?

- A local host name and domain name is translated into a 32-bit IP address.
  - Usually an IP address is expressed as 4 byte values in dot notation, e.g., 128.121.41.15
- The address can be split into a network address and a host number.
  - The way to split is a little complicated.

Reference:
- http://wombat.doc.ic.ac.uk/foldoc/foldoc.cgi?query=iip+address
The IP address of your machine

- To find out your IP address
  Use DOS command ipconfig.

  **Example:**
  
  C:\Documents and Settings\shen\Desktop> ipconfig
  Windows IP Configuration

  Ethernet adapter Local Area Connection:
  Connection-specific DNS Suffix . . : cs.odu.edu
  IP Address . . . . . . . . . . . . : 128.82.5.183
  Subnet Mask . . . . . . . . . . . : 255.255.254.0
  Default Gateway . . . . . . . . . : 128.82.4.253

  C:\Documents and Settings\shen\Desktop>

  The IP address in bytes:
  128  82  5  183

  The IP address in bits:
  [10000000 01010010 00000101 10110111]

  The subnet mask in bytes:
  255  255  254  0

  The subnet mask in bits:
  [11111111 11111111 11111110 00000000]

  The subnet mask has ones in positions corresponding
to the network and subnet numbers and zeros in the
host number positions.

Connecting to the Internet

- **Dedicated network access**
  Typically within institutions
- **(Telephone) Dial-up**
  - Online service provider (OSP)
  - Internet service provider (ISP)
  - Least expensive
- **Broadband ISP**
  - (Telephone line) Digital Subscriber Line (DSL)
  - (Television) Cable Internet Service
- **Satellite Internet Service**
  - One-way (multicast)
  - One-way (terrestrial return)
  - Two-way
- **Wireless community network**
  Currently using 802.11b (Wi-Fi) devices to build growing clusters
  of linked, citywide networks. Some are being used to link to the
  Internet.

How your computer is typically connected
Traceroute

A TCP/IP utility which allows the user to determine the route packets are taking to a particular host.

Normally none cares. But if someone is curious, then can find it out.

Many free traceroutes can be found from:
http://www.traceroute.org/

Example: How to reach www.oca-evc.org?

• Say, use the traceroute at cyberverse.net
  http://www.cyberverse.net/query/trace/

At the site, give the query: www.oca-evc.org

Try and see what do you get.

You could use any of the many other traceroutes.

How are the packets like?

• Each packet is fewer than 1,500 characters in size
• Each packet is given a header
  packet order number, checksum, etc.
• Each packet is put into an IP envelope
  sender and destination addresses, timing info
Some Interesting Websites

• Largest, and arguably the best, search engine
  www.google.com

• Trends of the Web
  wcp.oclc.org/

• On Information discovery on the Internet
  mappa.mundi.net/

• User surveys

• Statistics on world internet users
  www.clickz.com/stats/big_picture/geographics/article.php/9911_151151