UNIT 11A
The Internet: Fundamentals
Communication technologies
ARPANET

ARPANET to Internet

2000’s Internet Map (small section)
The wires that connect the internet

- Copper
- Fiber
- Satellite
- Towers
Servers

A computer that runs services.
What kind of services?

- mail servers
- application servers
- Netflix servers

IP Address

Google.com
Facebook.com

IP Address

IP Address
IP4 Addresses

QUIZ: How many different IP4 addresses can we have?
Components of an IP address

- Each device that is connected to a network has an IP address
  - 192.168.66.5
  - 127.0.0.1
Your home network

Adhoc networks
How emails work

AOL Mail server

ISP

Gmail.com
How data is sent

Formatted, encoded

Packets
How packets work
Packet Framing

- Communication protocols
- Error detection
- Bit, byte, header, delimiters

Control Data

User data
Communication
Communication Protocols

• Digital message formats and rules for exchanging those messages
  – signaling, authentication, error detection and correction capabilities.

• Protocols have to be agreed upon by the parties involved. To reach agreement a protocol may be developed into a technical standard.

• Standards Bodies
  – International Standards Organization (ISO), Internet Society, W3C
Wireless Data Communication

• Wireless data communication using radio, microwave, and infrared signals
  – Wireless local access network: user transmits messages to a local wireless base station referred to as a wireless router. Typically used in homes, coffee shops.
  – Wireless wide area access network: user transmits messages to a remote base station provided by a telecommunications company.
Examples

In a "wireless router," the router, a switch and one access point are built into one box.

Wireless Local Access Standards

• Wi-Fi (Wireless Fidelity). Officially IEEE 802.11 wireless network standards.
  – Wireless version of a wired local area network

• Bluetooth
  – Low-power wireless standard for communication between devices close to each other
WWW
world wide web

The World Wide Web (abbreviated as WWW or W3,[2] commonly known as the Web), is a system of interlinked hypertext documents accessed via the Internet. With a web browser, one can view web pages that may contain text, images, videos, and other multimedia, and navigate between them via hyperlinks.

-source: wikipedia
Webpages

\texttt{<img src="file.jpg">}
Rest of the Week

• Closer look at the Internet protocol stack, web applications
• Security over the Internet
• Recommended reading: Blown to Bits Chapter 5 and the Appendix