CS1001

Lecture 6
Overview

- Homework 1
- Memory, Data Storage
- Architecture Comparisons
- Computer Networks
Goals

- Understand how information is stored in a variety of media
- Know tradeoffs between memory types
- Examine how computer networks affect this memory hierarchy
Goals (2)

- Learn fundamentals of networking
- Examine network security issues
Assignments

- Brookshear: Ch 2, Ch 3.5, 3.6, 3.7 (Read)
- Know factual material (bolded terms) in 3.5, 3.6, 3.7
- Read linked documents on these slides (slides will be posted in courseworks)
Memory Hierarchies

- Every type of storage has pros/cons
- All digital storage represents data as a sequence of “on” or “off” values.
  - In Electrical Storage, Electricity (hi voltage/no voltage) represents this
  - In magnetic storage, + and – polarities represent this
  - In optical storage, reflect/absorb represent this
Networks

- Local Area Networks – (LANS)
- Wide Area Networks – (WANS)
- An “Enterprise” Network
- Distributed Storage/Processing
Figure 3.10: Network topologies

a. Ring

b. Bus
Figure 3.10: Network topologies (continued)

c. Star

```
  Computer
  / \      /
Computer Computer
```

d. Irregular

```
  Computer
 /     \      /
Computer Computer Computer
```


Figure 3.12: A typical approach to connecting to the Internet

[Diagram showing a regional network of gateways connecting to the Internet cloud through routers and domains.]
**Figure 3.13: A typical URL**

<table>
<thead>
<tr>
<th>Protocol required to access the document. In this case it is hypertext transfer protocol (http).</th>
<th>Mnemonic name of host holding the document</th>
<th>Directory path indicating the location of the document within the host’s file system</th>
<th>Document name</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="http://ssenterprise.aw.com/authors/Shakespeare/Julius_Caesar.html">http://ssenterprise.aw.com/authors/Shakespeare/Julius_Caesar.html</a></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Figure 3.14: A simple Web page expressed in HTML

The Web page will appear as the text “My Web Page” presented prominently on the screen.
**Figure 3.17: Package-shipping example**

- **Origin**
  - You
  - Shipping company
  - Airline

- **Intermediate stops**
  - Airline
  - Airline

- **Final destination**
  - Friend
  - Shipping company

**Steps**:
- **You** prepares package for shipping.
- Package is placed in a container for the airline.
- Container is placed in an airplane.
- **Final destination**
  - Friend receives and opens the package.
  - Package is removed from the container and delivered to the addressee.
  - Container is sent to the shipping company.

**Notes**:
- Transfers container to another airplane.
Figure 3.18: The Internet software layers
Figure 3.19: Following a message through the Internet (continued)

At each intermediate stop the network layer assigns a new intermediate address to the packet and returns it to the link layer for transmission across another network.
Figure 3.19: Following a message through the Internet
Figure 3.20: Choosing between TCP and UDP

Application layer

Transport layer

TCP
More “reliable” but less efficient

UDP
More efficient but less “reliable”