

Chapter 16 – Part 2

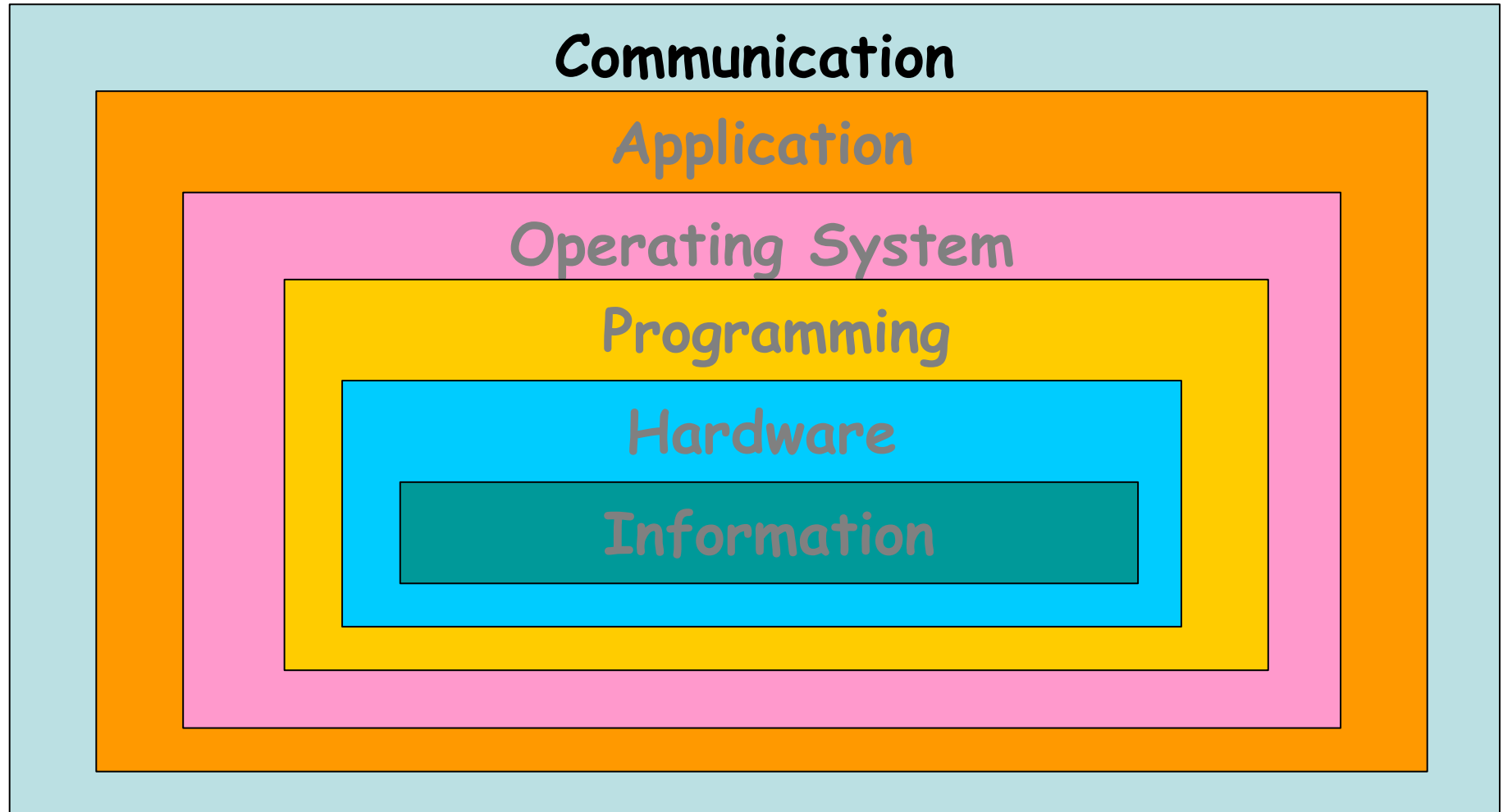
The World Wide Web



"On the Internet, nobody knows you're a dog."

The New Yorker,
Peter Steiner,
July 5, 1993

Layers of a Computing System



Chapter Goals

- Compare and contrast the **Internet** and the **World Wide Web**
- Describe general **Web processing**
- Write **basic HTML** documents
- Describe several specific **HTML tags** and their purposes

Chapter Goals

- Describe the processing of **Java applets** and **Java server pages**
- Compare and **contrast HTML** and **XML**
- Define **basic XML documents** and their corresponding DTDs
- Explain how **XML documents** are viewed
- **Hands-On HTML Coding**

Web Browser

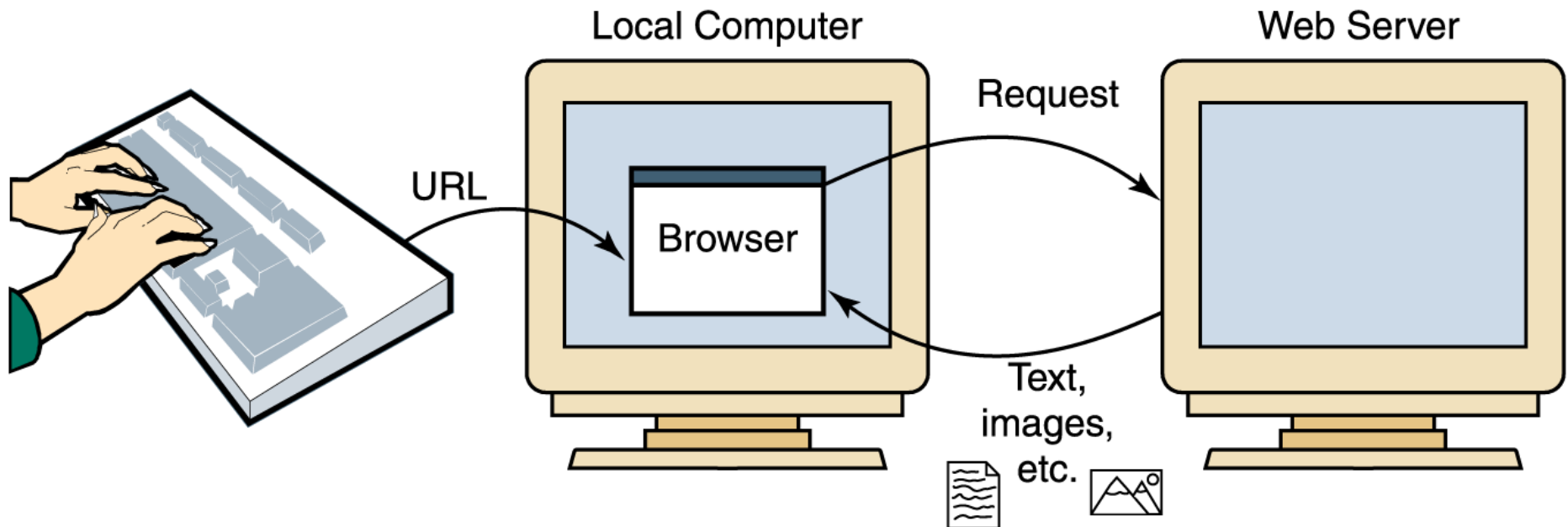


Figure 16.2 A browser retrieving a Web page

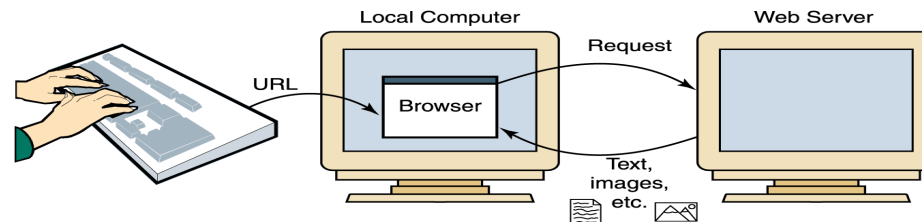
Structure of URIs

`http://www.cs.wisc.edu/~dbbook/index.html`

- URI has three parts:
 - **Naming schema** (http)
 - **Name of the host computer** (www.cs.wisc.edu)
 - **Name of the resource** (~dbbook/index.html)
- URLs are a subset of URIs

Hypertext Transfer Protocol

- ◆ What is a communication protocol?
 - Set of standards that defines the structure of messages
 - Examples: TCP, IP, **HTTP**
- ◆ What happens if you click on `www.cs.wisc.edu/~dbbook/index.html?`
 - Client (web browser) sends HTTP request to server
 - Server receives request and replies
 - Client receives reply; makes new requests



HTML

- Web pages are created (or built) using a language called the **Hypertext Markup Language**, or **HTML**
- The term **markup language** comes from the fact that the primary elements of the language take the form of **tags** that we insert into a document to annotate the information stored there

HTML Fundamentals

- `<h1>`An important heading`</h1>`
- `<h2>`A slightly less important heading`</h2>`
- `<p>`This is the first paragraph.`</p>` `<p>`This is the second paragraph.`</p>`
- This is a really ``**interesting**`` topic!

HTML Fundamentals

An important heading

A slightly less important heading

This is the first paragraph.

This is the second paragraph.

This is a really *interesting* topic!

Trees (cont'd)

- Hierarchical structures are called *trees*
- Binary trees
 - Each node has no more than two children
 - The beginning of the tree is a unique starting node called the **root**
 - The node to the left of a node, if it exists, is called its *left child*
 - The node to the right of a node, if it exists, is its *right child*
 - If a node in the tree has no children, it is called a **leaf node**

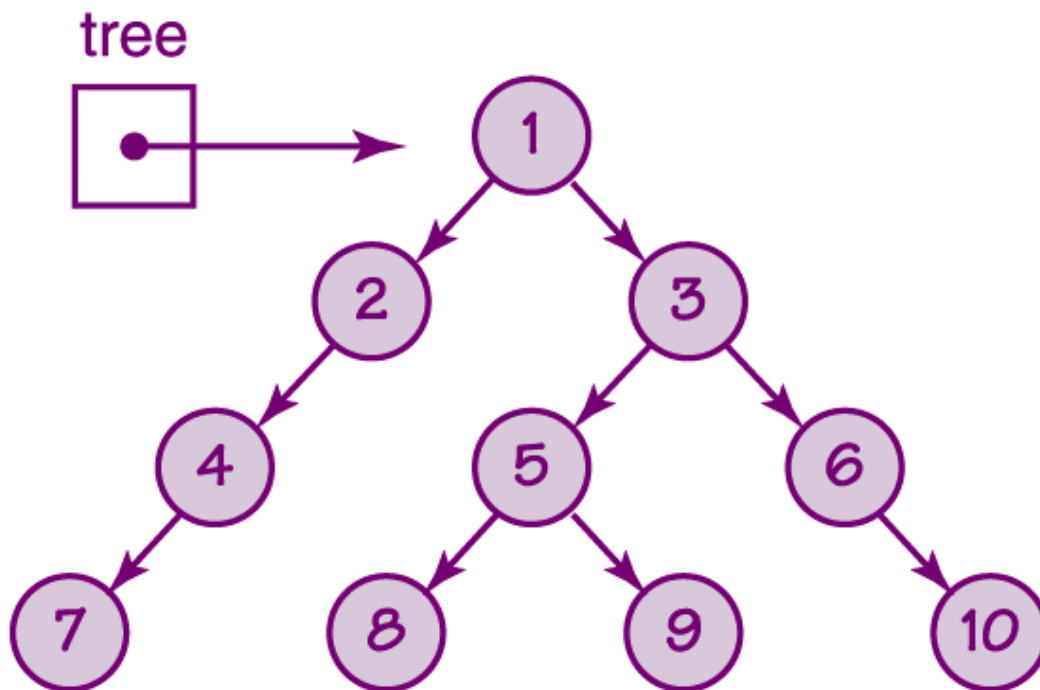


Figure 9.16 A binary tree

Linked Implementation

- **Linked implementation** An implementation based on the concept of a *node*
- A node is made up of two pieces of information
 - the item that the user wants in the list, and
 - a pointer to the next node in the list

Linked Implementation

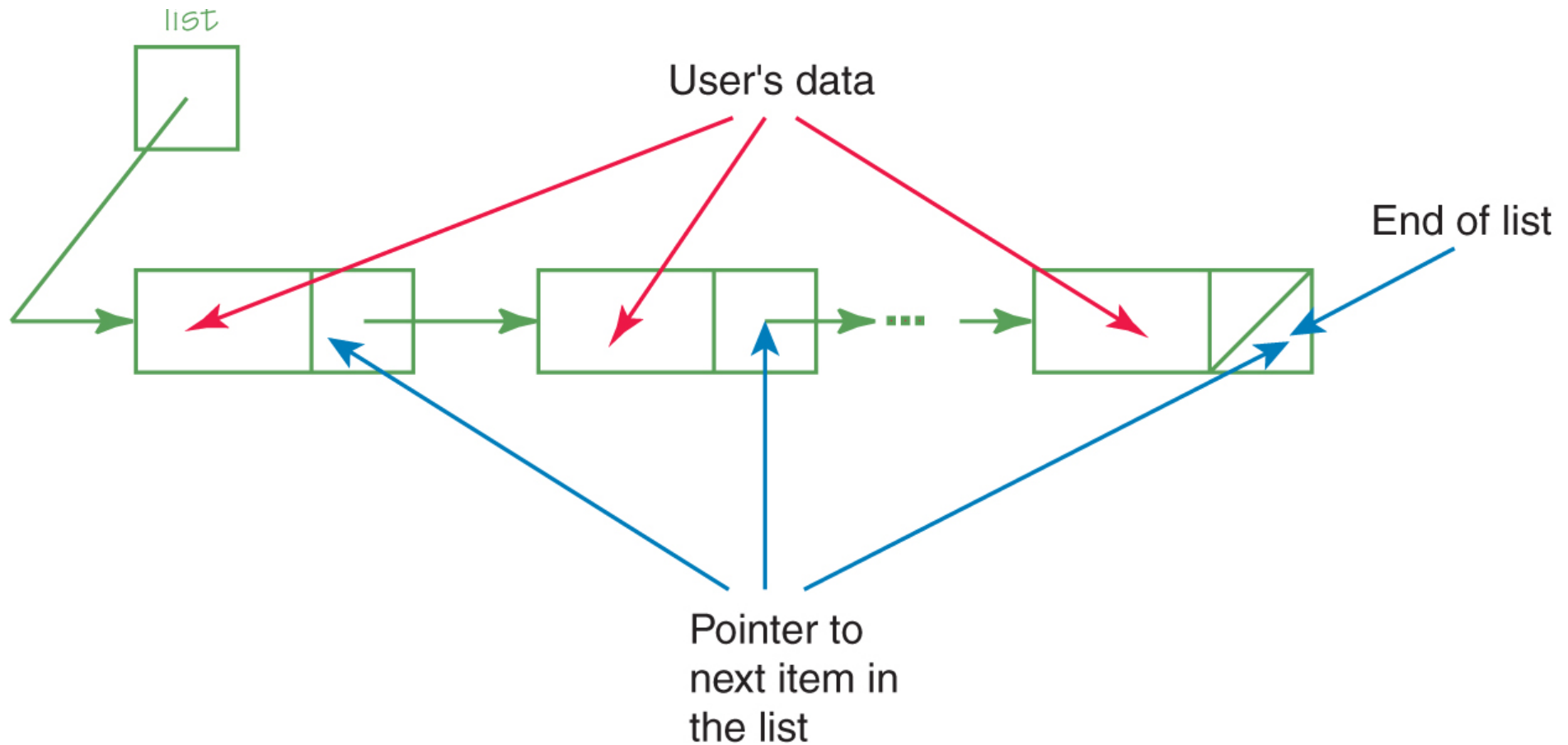


Figure 9.4 Anatomy of a linked list
9/19/06

Linked Implementation

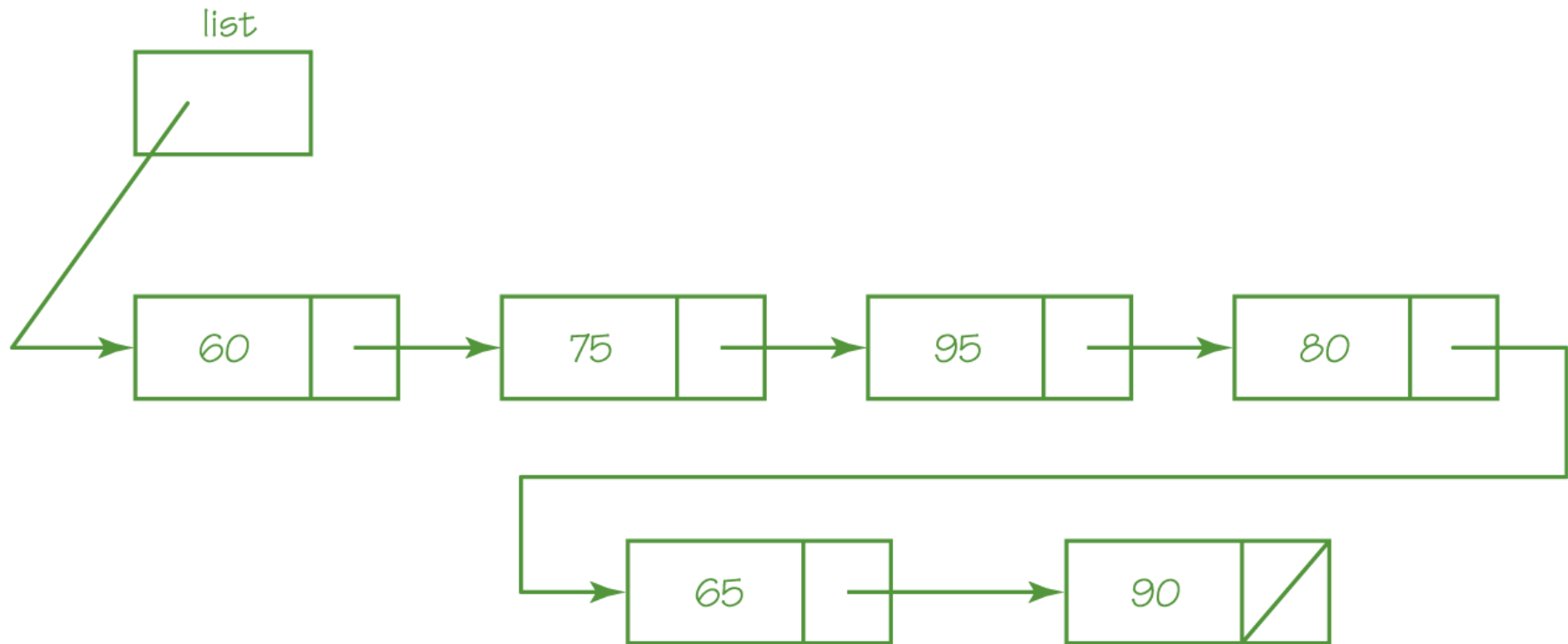


Figure 9.5 An unsorted linked list

Images and Links

- Many tags can contain attributes that indicate additional details about the information or how the enclosed information should be displayed
 - An **image** can be incorporated into a web page using the IMG element, which takes an attribute that identifies the image file to display
 - ``

Images and Links (cont.)

- A **link** is specified using the element **A**, which stands for anchor
- The tag includes an attribute called **HREF** that specifies the URL of the destination document.

For example

```
<A HREF = "http://duke.csc.villanova.edu/docs/">  
Documentation Central!</A>
```


Interactive Web Pages

- When HTML was first developed, there was **no way to interact** with the information and pictures presented in a web page
- As users have clamoured for a **more dynamic web**, new technologies were developed to accommodate these requests
- Many of the new ideas were offshoots of the newly developed **Java** programming language

Java Applets

- **Java applet** A program that is designed to be embedded into an HTML document and transferred over the Web to someone who wants to run the program

An applet is embedded into an HTML document using the APPLET tag

```
<APPLET code="MyApplet.class" width=250  
height=150 ></APPLET>
```

Java Applets

- A browser has a **built-in interpreter** that executes the applet, allowing the user to interact with it.
 - Consider the difficulties inherent in this situation
 - How can we execute a program that was written on one type of computer on possibly many other types of computers?

Java Applets

- Java programs are compiled into **Bytecode**, a low-level representation of a program that is not the machine code for any particular type of CPU
- Java applets are restricted as to what they can do
 - The Java language has a carefully constructed **security** model
 - An applet, for instance, cannot access any local files or change any system settings

Java Server Pages

- A Java Server Page, or JSP, is a web page that has **JSP scriptlets** embedded in them
- **Scriptlet** A small piece of executable code intertwined among regular HTML content
- Also called a **Servlet!**

Java Server Pages

- A JSP scriptlet is encased in **special tags** beginning with `<%` and ending with `%>`
- Imagine JSP scriptlets as having the expressive power of a full programming language

```
<H3>  
<%  
out.println ("hello there");  
%>  
</H3>
```

Java Server Pages

- Note that JSPs are **executed on the server side** where the web page resides
- By the time it arrives at your computer, all active processing has taken place, producing a static (though **dynamically created**) web page
- JSPs are particularly good for coordinating the **interaction** between a web page and an **underlying database**

XML

- **HTML** has a **predefined set of tags** and each tag has its own meaning
- There is nothing about HTML tags that describes the true content of a document
- The **Extensible Markup Language**, or **XML**, allows the creator of a document to describe its contents by **defining** his or her **own set of tags**

XML

- **Metalinguage** A language for talking about, or defining, other languages
- XML is a metalanguage

XML

```
<?xml version="1.0" ?>
<!DOCTYPE books SYSTEM "books.dtd">
<books>
  <book>
    <title>The Hobbit</title>
    <authors>
      <author>J.R.R. Tolkien</author>
    </authors>
    <publisher>Ballantine</publisher>
    <pages>287</pages>
    <isbn>0-345-27257-9</isbn>
    <price currency="USD">7.95</price>
  </book>
  <book>
    <title>A Beginner's Guide to Bass Fishing</title>
    <authors>
      <author>J. T. Angler</author>
      <author>Ross G. Clearwater</author>
    </authors>
    <publisher>Quantas Publishing</publisher>
    <pages>750</pages>
    <isbn>0-781-40211-7</isbn>
    <price currency="USD">24.00</price>
  </book>
</books>
```

- Like HTML, an XML document is made up of tagged data

Figure 16.5 An XML document containing data about books

XML

- **Document Type Definition (DTD)** A specification of the organization of the document
- The structure of a particular XML document is described by its corresponding DTD document

```
<!ELEMENT books (book*) >
<!ELEMENT book (title, authors, publisher, pages, isbn, price)>
<!ELEMENT authors (author+)>
<!ELEMENT title (#PCDATA)>
<!ELEMENT author (#PCDATA)>
<!ELEMENT publisher (#PCDATA)>
<!ELEMENT pages (#PCDATA)>
<!ELEMENT isbn (#PCDATA)>
<!ELEMENT price (#PCDATA)>
<!ATTLIST price currency CDATA #REQUIRED>
```

Figure 16.6 The DTD document corresponding to the XML books document

XML

- XML represents a standard format for organizing data without tying it to any particular type of output
- **Extensible Stylesheet Language (or XSL)** A language for defining transformations from XML documents to other output formats

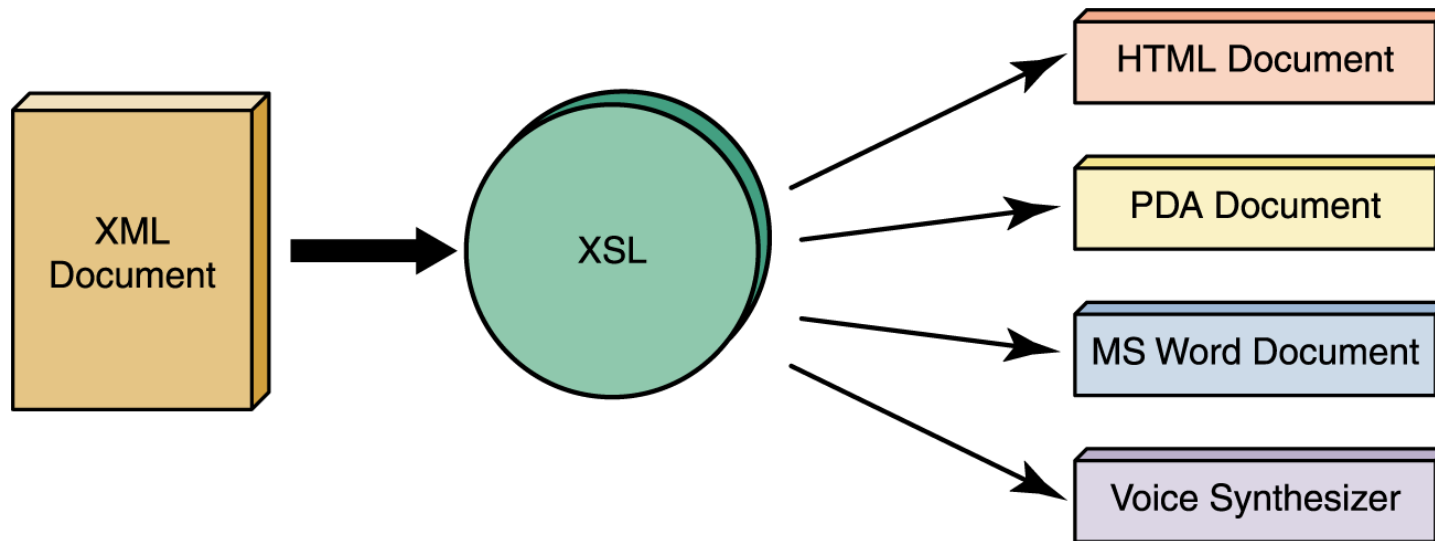


Figure 16.7
An XML document can be transformed into many output formats

AJAX

- Asynchronous JavaScript and XML
- The latest craze in interactive pages
- <http://ajaxphp.packtpub.com/ajax/quickstart>
- <http://labs.google.com/suggest>
- Gmail
- <http://maps.google.com>

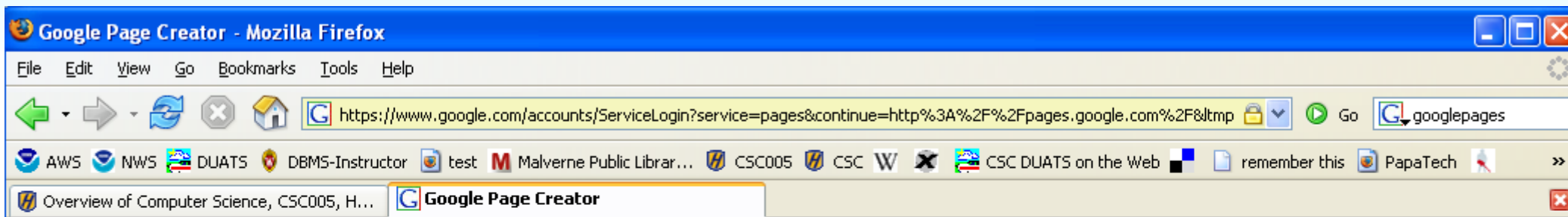
The Basics of HTML

- <http://www.w3.org/MarkUp/Guide/> - Getting started with HTML
- <http://www.w3.org/MarkUp/Guide/Advanced.html> - More advanced features
- <http://www.w3.org/MarkUp/Guide/Style.html> - Adding a touch of style
- <http://www.w3.org/People/Raggett/tidy/> - HTMLTidy
- <http://validator.w3.org/> - Ensures proper HTML code

Other Useful Websites

- <http://www.sitepoint.com/> - lots of helpful information and excellent books
- <http://www.csszengarden.com/> - css Zen Garden
- <http://www.w3.org/XML/> - everything you ever wanted to know about XML
- <http://www.w3.org/Style/XSL/> - definitive source for XSL

http://pages.google.com



Welcome to Google Page Creator

Create your own web pages, quickly and easily.

Google Page Creator is a free online tool that makes it easy for anyone to create and publish useful, attractive web pages in just minutes.

- **No technical knowledge required.**

Build high-quality web pages without having to learn HTML or use complex software.

- **What you see is what you'll get.**

Edit your pages right in your browser, seeing exactly how your finished product will look every step along the way.

- **Don't worry about hosting.**

Your web pages will live on your own site at <http://yourgmailusername.googlepages.com>

Google Page Creator is a [Google Labs](#) project, and is still in an early testing phase. If you're interested in taking it for a test drive, login with your Gmail account to begin making pages. If you don't have a Gmail account and you have a mobile phone, you can [sign up here](#). We invite you to let us know what you think by sending us your [feedback and suggestions](#).

Sign in to Google Page Creator with your

Google Account

Email:

Password:

Remember me on this computer.

[Forgot your password?](#)

[No Gmail Account? Sign up](#)

[About Google Page Creator](#)

Previous Homework

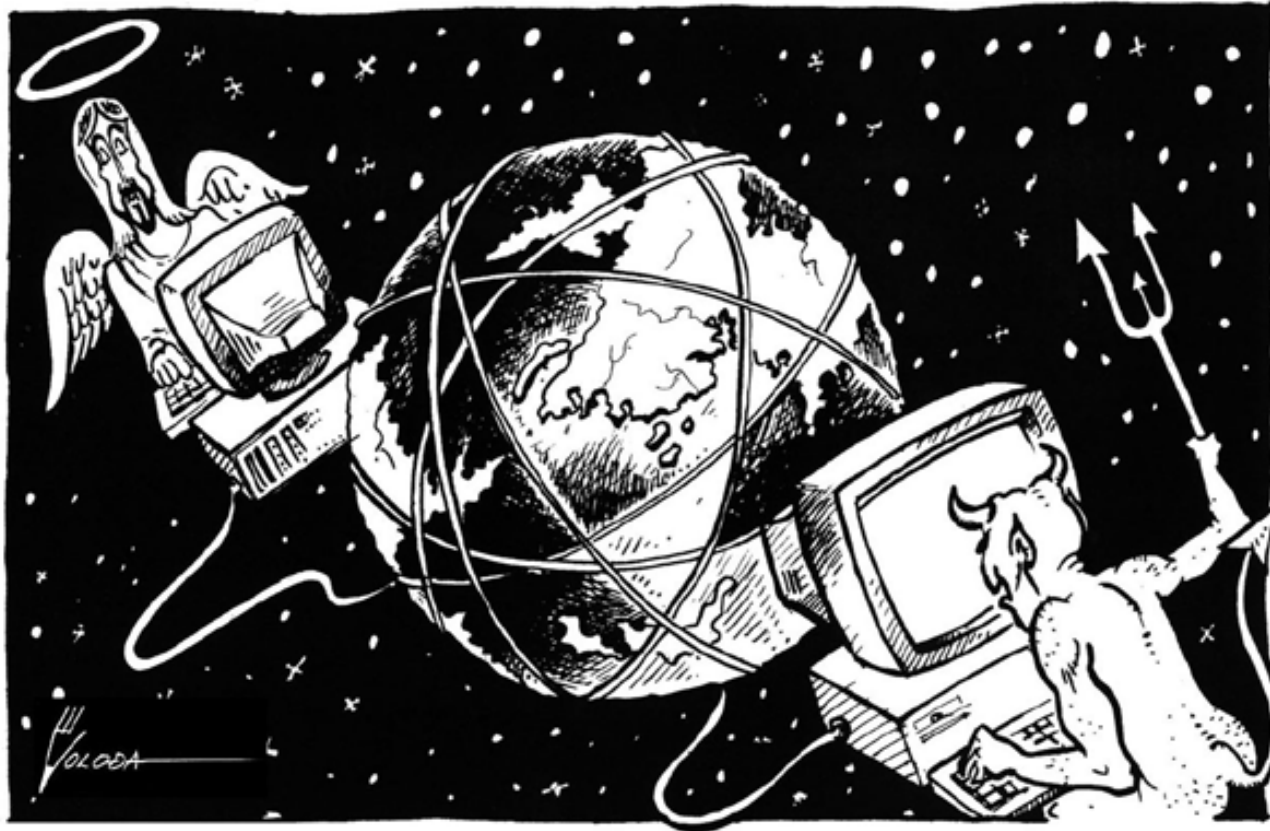
- Get a gmail account...
- ...if you don't want to use your mobile (or you don't have one), send an email to:
papacosta@gmail.com
- When you get an account, send me a message!
papacosta@gmail.com
- **This becomes our 1st Assignment!**

Assignment One

- Create A **Simple** Home Page – 6/10 pts
- Create A **Complex** Home Page – 8/10 pts
 - Links, images, color fonts, multi-column layouts
- Create A **Multilevel Site** – 10/10 pts
 - Tree structure
 - Multiple pages
- **Due Next Wednesday**
 - No lateness

Homework

- **Read Chapter Sixteen (Again!)**



...be careful on the web!