WEB DEVELOPMENT & DESIGN FOUNDATIONS WITH HTML5
7TH EDITION

Chapter 1
Key Concepts
LEARNING OUTCOMES

In this chapter, you will learn how to

- Describe the evolution of the Internet and the Web
- Explain the need for web standards
- Describe Universal Design
- Identify benefits of accessible web design
- Identify reliable resources of information on the Web
- Identify ethical use of the Web
- Describe the purpose of web browsers and web servers
- Identify networking protocols
- Define URIs and domain names
- Describe HTML, XHTML, and HTML5
- Describe popular trends in the use of the Web
REASONS FOR INTERNET GROWTH IN THE 1990S

- Removal of the ban on commercial activity
- Development of the World Wide Web by Tim Berners-Lee at CERN
- Development of Mosaic, the first graphics-based web browser at NCSA
- Personal computers were increasingly available and affordable
- Online service providers offered low-cost connections to the Internet
THE WORLD WIDE WEB

The graphical user interface to information stored on computers running web servers connected to the Internet.
INTERNET STANDARDS & COORDINATION

- The Internet Society
  - A professional organization that provides leadership in addressing issues related to the future of the Internet
- **IETF**-- Internet Engineering Task Force
  - RFC – Requests for Comments
- **IAB** – Internet Architecture Board
GROWTH OF THE INTERNET

Millions of Internet Users by Geographic Area

<table>
<thead>
<tr>
<th>Region</th>
<th>2012</th>
<th>2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oceania/Australia</td>
<td>24.3</td>
<td>7.6</td>
</tr>
<tr>
<td>South America</td>
<td>18</td>
<td>254.9</td>
</tr>
<tr>
<td>North America</td>
<td>108</td>
<td>273.8</td>
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<td>Europe</td>
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<td>Asia</td>
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<td>1,076.7</td>
</tr>
<tr>
<td>Africa</td>
<td>4.5</td>
<td>167.3</td>
</tr>
</tbody>
</table>

http://www.internetworldstats.com/stats.htm

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INTERNET STANDARDS & COORDINATION

- ICANN - The Internet Corporation for Assigned Numbers & Names
  - Non-profit organization
  - Main function is to coordinate the assignment of:
    - Internet domain names
    - IP address numbers
    - Protocol parameters
    - Protocol port numbers.
INTRANET & EXTRANETS

- **Intranet**
  - A private network contained within an organization or business used to share information and resources among coworkers.

- **Extranet**
  - A private network that securely shares part of an organization’s information or operations with external partners.
WEB STANDARDS AND THE W3C CONSORTIUM

- W3C – World Wide Web Consortium
  - Develops recommendations and prototype technologies related to the Web
  - Produces specifications, called Recommendations, in an effort to standardize web technologies
  - WAI – Web Accessibility Initiative
WEB ACCESSIBILITY

» Accessible Website
  » provides accommodations for individuals with visual, auditory, physical, and neurological disabilities

» WAI
  » W3C’s Web Accessibility Initiative
    http://www.w3.org/WAI

» WCAG
  » Web Content Accessibility Guidelines
    http://www.w3.org/WAI/WCAG20/quickref/
WEB ACCESSIBILITY & THE LAW

- Americans with Disabilities Act (ADA)
  - Prohibits discrimination against people with disabilities

- Section 508 of the Rehabilitation Act
  - Requires that government agencies must give individuals with disabilities access to information technology that is comparable to the access available to others
  - http://www.section508.gov
Universal Design

- the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design

http://www.ncsu.edu/www/ncsu/design/sod5/cud/about_ud/about_ud.htm
RELIABILITY & INFORMATION ON THE WEB

Questions to Ask:
- Is the organization credible?
- How recent is the information?
- Are there links to additional resources?
- Is it Wikipedia?
CHECKPOINT 1.1

1. Describe the difference between the Internet and the Web.

2. Explain three events that contributed to the commercialization and exponential growth of the Internet.

3. Is the concept of universal design important to web developers? Explain your answer.
Network

two or more computers connected together for the purpose of communicating and sharing resources
NETWORKS

- **LAN – Local Area Network**
  - Usually confined to a single building or group of buildings

- **WAN – Wide Area Network**
  - Usually uses some form of public or commercial communications network to connect computers in widely dispersed geographical areas.
INTERNET INFRASTRUCTURE

- **Internet Backbone**
  A high capacity communication link that carries data gathered from smaller links that interconnect with it.

- **Maps of the Internet Backbone**
THE CLIENT/SERVER MODEL

- Client/Server can describe a relationship between two computer programs – the "client" and the "server".

- **Client**
  - requests some type of service (such as a file or database access) from the server.

- **Server**
  - fulfills the request and transmits the results to the client over a network.
THE INTERNET CLIENT/SERVER MODEL

- Client – Web Browser
- Server – Web Server
WEB CLIENT

- Connected to the Internet when needed
- Usually runs web browser (client) software
  (such as Internet Explorer or Firefox)
- Uses HTTP (Hypertext Transfer Protocol)
- Requests web pages from server
- Receives web pages and files from server
WEB SERVER

- Continually connected to the Internet
- Runs web server software
  (such as Apache or Internet Information Server)
- Uses HTTP (Hypertext Transfer Protocol)
- Receives request for the web page
- Responds to request and transmits status code, web page, and associated files
Multi-Purpose Internet Mail Extension

- a set of rules that allow multimedia documents to be exchanged among many different computer systems
INTERNET PROTOCOLS

- Protocols
  - Rules that describe the methods used for clients and servers to communicate with each other over a network.
  
- There is no single protocol that makes the Internet and Web work.

- A number of protocols with specific functions are needed.
FTP

FILE TRANSFER PROTOCOL

- A set of rules that allow files to be exchanged between computers on the Internet.

- Web developers commonly use FTP to transfer web page files from their computers to web servers.

- FTP is also used to download programs and files from other servers to individual computers.
E-MAIL PROTOCOLS

► Sending E-mail
  ► SMTP Simple Mail Transfer Protocol

► Receiving E-mail
  ► POP (POP3) Post Office Protocol
  ► IMAP Internet Mail Access Protocol
HTTP - HYPERTEXT TRANSFER PROTOCOL

- A set of rules for exchanging files such as text, graphic images, sound, video, and other multimedia files on the Web.

- Web browsers send HTTP requests for web pages and their associated files.

- Web servers send HTTP responses back to the web browsers.
TCP/IP has been adopted as the official communication protocol of the Internet.

TCP and IP have different functions that work together to ensure reliable communication over the Internet.
Purpose is to ensure the integrity of communication

Breaks files and messages into individual units called packets

Header

<table>
<thead>
<tr>
<th>Source</th>
<th>Destination</th>
<th>...</th>
<th>Checksum</th>
<th>...</th>
</tr>
</thead>
</table>

Data
A set of rules that controls how data is sent between computers on the Internet.

IP routes a packet to the correct destination address.

The packet gets successively forwarded to the next closest router (a hardware device designed to move network traffic) until it reaches its destination.

http://visualroute.visualware.com/
http://www.tracert.com/cgi-bin/trace.pl
Each device connected to the Internet has a unique numeric IP address.

These addresses consist of a set of four groups of numbers, called octets.

74.125.225.78 will get you Google!

An IP address may correspond to a domain name.
DOMAIN NAME

- Locates an organization or other entity on the Internet
- Domain Name System
  - Divides the Internet into logical groups and understandable names
  - Associates unique computer IP Addresses with the text-based domain names you type into a web browser
    - Browser: http://google.com
    - IP Address: 74.125.225.78
UNIFORM RESOURCE IDENTIFIER

- **URI – Uniform Resource Identifier**
  - identifies a resource on the Internet

- **URL – Uniform Resource Locator**
  - a type of URI which represents the network location of a resource such as a web page, a graphic file, or an MP3 file.

http://www.webdevbasics.net/chapter1/index.html
A top-level domain (TLD) identifies the right-most part of the domain name.

Current generic TLDs:
.com, .org, .net, .mil, .gov, .edu, .int, .aero, .asia, .cat, .jobs, .name, .biz, .mobi, .museum, .info, .coop, .post, .pro, .tel, .travel, .xxx
COUNTY CODE TLDS

- Two character codes originally intended to indicate the geographical location (country) of the web site.

- In practice, it is fairly easy to obtain a domain name with a country code TLD that is not local to the registrant.

- Examples:
  - .tv, .ws, .au, .jp, .uk
  - See [http://www.iana.org/cctld/cctld-whois.htm](http://www.iana.org/cctld/cctld-whois.htm)
The Domain Name System (DNS) associates Domain Names with IP addresses.

- Use TPC/IP to send HTTP Request to Web Server.
- Use TCP/IP to send HTTP Responses with web page files & images.

Web Browser displays web page.
MARKUP LANGUAGES

- SGML – Standard Generalized Markup Language
  - A standard for specifying a markup language or tag set

- HTML – Hypertext Markup Language
  - The set of markup symbols or codes placed in a file intended for display on a web browser.
XML – eXtensible Markup Language

- A text-based language designed to describe, deliver, and exchange structured information.
- It is not intended to replace HTML – it is intended to extend the power of HTML by separating data from presentation.
MARKUP LANGUAGES (3)

-XHTML – eXtensible Hypertext Markup Language

-Developed by the W3C as the reformulation of HTML 4.0 as an application of XML.

-It combines the formatting strengths of HTML 4.0 and the data structure and extensibility strengths of XML.
MARKUP LANGUAGES (4)

- HTML 5
  - The next version of HTML4 and XHTML
  - http://www.w3.org/html/
CHECKPOINT 1.2

1. Describe the components of the client/server model as applied to the Internet.

2. Identify two protocols used on the Internet to convey information that use the Internet but do not use the Web.

3. Explain the similarities and differences between a URL and a domain name.
POPULAR USES OF THE INTERNET

- Continued importance of E-Commerce
- Mobile Access
- Blogs
- Wikis
- Social Networking
- RSS
- Podcasts
- Web 2.0
- Cloud Computing
This chapter provided a brief overview of Internet, Web, and introductory networking concepts.