Chapter 2
Introduction to HTML5

Internet & World Wide Web
How to Program, 5/e

PART-1

Topics

- Introduction
- Editing HTML5
- First HTML Example
- W3C HTML Validation Service
- Heading
- Linking
- Images
- Special Charecters
- List

2.1 Introduction

- HTML5 (HyperText Markup Language 5)
  - markup language that specifies
    - the *structure* and
    - *content* of documents that are displayed in web browsers

- We introduce some basics, then cover more sophisticated HTML5 techniques such as:
  - tables, which are particularly useful for structuring information from databases (i.e., software that stores structured sets of data)
  - forms for collecting information from web-page visitors
  - internal linking for easier page navigation
  - meta elements for specifying information about a document

2.2 Editing HTML5

- We'll create HTML5 documents by typing HTML5 markup text in a text editor (such as Notepad, TextEdit, vi, emacs) and saving it with the .html or .htm filename extension.

- Computers called web servers store HTML5 documents.

- Clients (such as web browsers running on your local computer or smartphone) request specific resources such as HTML5 documents from web servers.

2.3 First HTML5 Example

```
1  <!DOCTYPE html>
2
3  <!-- Fig. 2.1: main.html -->
4  <!-- First HTML5 example. -->
5  <html>
6     <head>
7        <meta charset = "utf-8">
8        <title>Welcome</title>
9     </head>
10
11    <body>
12       <p>Welcome to HTML5!</p>
13    </body>
14 </html>
```

Fig. 2.1 | First HTML5 example.

2.3 First HTML5 Example

Document Type Declaration

- The **document type declaration (DOCTYPE)** is required in HTML5 documents so that browsers render the page in standards mode.

2.3 First HTML5 Example

Comments

- Insert comments in your HTML5 markup to improve readability and describe the content of a document.

- The browser ignores comments when your document is rendered.

- Comments start with **<!-- and end with -->.**

2.3 First HTML5 Example

html, head and body Elements

- HTML5 markup contains text (and images, graphics, animations, audios and videos) that represents the content of a document and elements that specify a document's *structure* and *meaning*.
  - The html element *encloses* the head section (represented by the head element) and the body section (represented by the body element).
  - The **head section** contains information about the HTML5 document, such as the character set (UTF-8, the most popular character-encoding scheme for the web) that the page use—which helps the browser determine how to render the content—and the **title**.
  - The **head** section also can contain special document-formatting instructions called **CSS3 style sheets** and client-side programs called scripts for creating dynamic web pages.
  - The **body section** contains the page's content, which the browser displays when the user visits the web page.

2.3 First HTML5 Example (cont.)

Start Tags and End Tags

- HTML5 documents *delimit* most elements with a start tag and end tag.

- A **start tag** consists of the element name in angle brackets
  - For example, <html>
- An **end tag** consists of the element name preceded by a forward slash (/) in angle brackets
  - For example, </html>
- There are several so-called "void elements" that do not have end tags.

- Many start tags have attributes that provide additional information about an element, which browsers use to determine how to process the element.

- Each **attribute** has a **name** and a **value** separated by an equals sign (=).

Good Programming Practice 2.1

Although HTML5 element and attribute names are case insensitive (you can use uppercase and lowercase letters), it's a good practice to use only lowercase letters.

2.3 First HTML5 Example (Cont.)

Title Element

- The title element is called a **nested element**, because it's enclosed in the head element's start and end tags.
- The head element is also a nested element, because it's enclosed in the html element's start and end tags.
- The title element describes the web page.
  - Titles usually appear in the title bar at the top of the browser window, in the browser tab on which the page is displayed, and also as the text identifying a page when users add the page to their list of Favorites or Bookmarks, enabling them to return to their favorite sites.
  - Search engines use the title for indexing purposes and when displaying results

2.3 First HTML5 Example (Cont.)

Paragraph Element (...)

- All text placed between the and tags forms one paragraph.

2.4 W3C HTML5 Validation Service

- HTML5 documents that are syntactically correct are guaranteed to render properly
- HTML5 documents that contain syntax errors may not display properly
- Validation services (e.g., validator.w3.org/#validate-by-upload) ensure that an HTML5 document is syntactically correct

2.5 Headings

- HTML5 provides six heading elements (h1 through h6) for specifying the *relative importance* of information
  - Heading element **h1** is considered the most significant heading and is rendered in the largest font.
  - Each successive heading element (i.e., h2, h3, etc.) is rendered in a progressively smaller font.


```
1  <!DOCTYPE html>
2
3  <!-- Fig. 2.2: heading.html -->
4  <!-- Heading elements h1 throug
5  <html>
6     <head>
7        <meta charset = "utf-8">
8        <title>Headings</title>
9     </head>
10
11    <body>
12       <h1>Level 1 Heading</h1>
13       <h2>Level 2 heading</h2>
14       <h3>Level 3 heading</h3>
15       <h4>Level 4 heading</h4>
16       <h5>Level 5 heading</h5>
17       <h6>Level 6 heading</h6>
18    </body>
19 </html>
```

Heading elements h1 through h6. (Part 2 of 2.)

2.6 Linking

- A hyperlink references or links to other resources, such as HTML5 documents and images.
- Web browsers typically ***underline*** text hyperlinks and color them ***blue*** by default.

EXAMPLE

```
1  <!DOCTYPE html>
2
3  <!-- Fig. 2.3: links.html -->
4  <!-- Linking to other web pages. -->
5  <html>
6     <head>
7        <meta charset = "utf-8">
8        <title>Links</title>
9     </head>
10
11    <body>
12       <h1>Here are my favorite sites:</h1>
13       <p><strong>Click a name to visit that site.</strong></p>
14
15       <!-- create four text hyperlinks -->
16       <p><a href = "http://www.facebook.com">Facebook</a></p>
17       <p><a href = "http://www.twitter.com">Twitter</a></p>
18       <p><a href = "http://www.foursquare.com">Foursquare</a></p>
19       <p><a href = "http://www.google.com">Google</a></p>
20    </body>
21 </html>
```

Fig. 2.3 | Linking to other web pages. (Part 1 of 2.)

EXAMPLE-Output

Fig. 2.3 | Linking to other web pages. (Part 2 of 2.)

2.6 Linking (Cont.)

- The **strong element** indicates that the content has high importance. Browsers typically render such text in a bold font.
- Links are created using the **a** (**anchor**) **element**.
- Attribute **href (hypertext reference)** specifies a resource's location, such as
  - a web page or location within a web page
  - a file
  - an e-mail address
- When a URL does not indicate a specific document on the website, the web server returns a default web page. This page is often called index.html, but most web servers can be configured to use any file as the default web page for the site.
- If the web server cannot locate a requested document, it returns an error indication to the web browser (known as a 404 error), and the browser displays a web page containing an error message.

2.6 Linking (Cont.)

Hyperlinking to an E-Mail Address

- Anchors can link to an e-mail address using a mailto: URL
  - When a user clicks this type of anchored link, most browsers launch the default e-mail program (e.g., Mozilla Thunderbird, Microsoft Outlook or Apple Mail) to enable the user to write an e-mail message to the linked address.

EXAMPLE

```
1  <!DOCTYPE html>
2
3  <!-- Fig. 2.4: contact.html -->
4  <!-- Linking to an e-mail address. -->
5  <html>
6     <head>
7        <meta charset = "utf-8">
8        <title>Contact Page</title>
9     </head>
10
11    <body>
12       <p>
13          To write to <a href = "mailto:deitel@deitel.com">
14          Deitel & Associates, Inc.</a>, click the link and your default
15          email client will open an email message and address it to us.
16       </p>
17    </body>
18 </html>
```

Fig. 2.4 | Linking to an e-mail address. (Part 1 of 3.)

EXAMPLE-Output

Fig. 2.4 | Linking to an e-mail address. (Part 2 of 3.)

EXAMPLE-Output

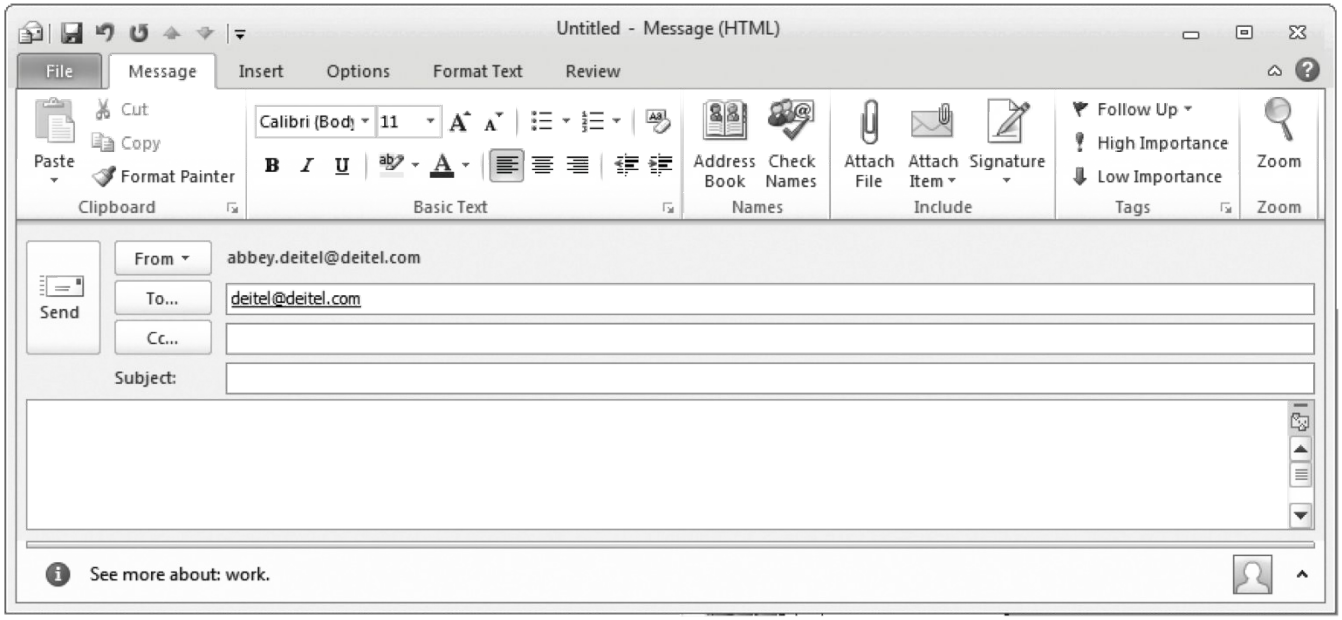


Fig. 2.4 | Linking to an e-mail address. (Part 3 of 3.)

2.7 Images

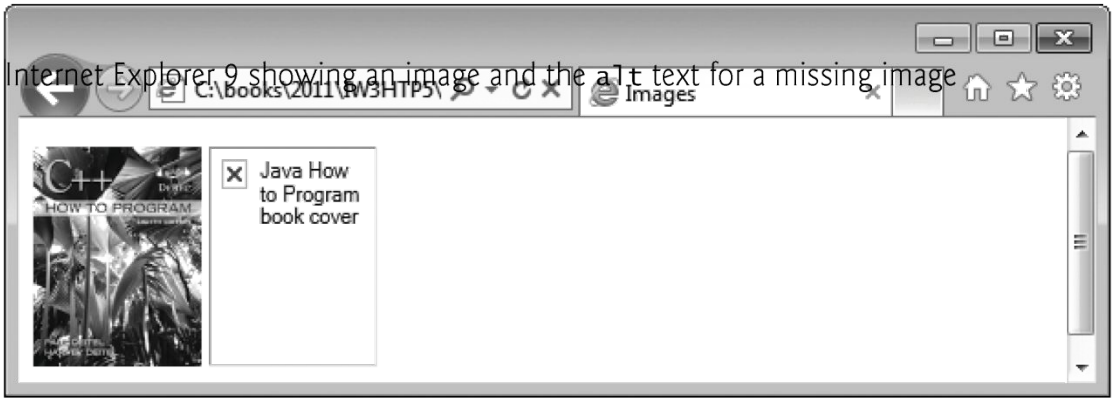
- The most popular image formats used by web developers today are PNG (Portable Network Graphics) and JPEG (Joint Photographic Experts Group).
- Users can create images using specialized software, such as Adobe Photoshop Express (www.photoshop.com), G.I.M.P. (www.gimp.org), Inkscape (www.inkscape.org) and many more.
- Images may also be acquired from various websites, many of which offer royalty-free images.

EXAMPLE

```
1  <!DOCTYPE html>
2
3  <!-- Fig. 2.6: picture.html -->
4  <!-- Including images in HTML5 files. -->
5  <html>
6     <head>
7        <meta charset = "utf-8">
8        <title>Images</title>
9     </head>
10
11    <body>
12       <p>
13          <img src = "cpphtp.png" width = "92" height = "120"
14             alt = "C++ How to Program book cover">
15          <img src = "jhtp.png" width = "92" height = "120"
16             alt = "Java How to Program book cover">
17       </p>
18    </body>
19 </html>
```

Fig. 2.6 | Including images in HTML5 files. (Part 1 of 2.)

EXAMPLE-Output



Internet Explorer 9 showing an image and the `alt` text for a missing image

Fig. 2.6 | Including images in HTML5 files. (Part 2 of 2.)

2.7 Images (cont.)

- The img element's src attribute specifies an image's location
- Every img element must have an alt attribute, which contains text that is displayed if the client cannot render the image
  - The alt attribute makes web pages more accessible to users with disabilities, especially vision impairments
  - Width and height are optional attributes
    - If omitted, the browser uses the image's actual width and height
    - Images are measured in pixels

2.7 Images (Cont.)

alt Attribute

- A browser may not be able to render an image.
- Every img element in an HTML5 document must have an alt attribute.
- If a browser cannot render an image, the browser displays the alt attribute's value.
- The alt attribute is also important for accessibility—speech synthesizer software can speak the alt attribute's value so that a visually impaired user can understand what the browser is displaying. For this reason, the alt attribute should describe the image's contents.

2.7 Images (Cont.)

Void Elements

- Some HTML5 elements (called **void elements**) contain only attributes and do not mark up text (i.e., text is not placed between a start and an end tag).
- You can terminate void elements (such as the img element) by using the forward slash character (/) inside the closing right angle bracket (>) of the start tag.
- For example, lines 15–16 of Fig. 2.6 could be written as follows:

```
<img src = "jhtp.png" width = "92" height = "120"
   alt = "Java How to Program book cover" />
```

2.7 Images (Cont.)

Using Images as Hyperlinks

- By using images as hyperlinks, you can create graphical web pages that link to other resources.
- In Fig. 2.7, we create five different image hyperlinks.
- Clicking an image in this example takes the user to a corresponding web page—one of the other examples in this chapter.

EXAMPLE

```
1  <!DOCTYPE html>
2
3  <!-- Fig. 2.7: nav.html -->
4  <!-- Images as link anchors. -->
5  <html>
6     <head>
7        <meta charset = "utf-8">
8        <title>Navigation Bar</title>
9     </head>
10
11    <body>
12       <p>
13          <a href = "links.html">
14             <img src = "buttons/links.jpg" width = "65"
15                height = "50" alt = "Links">
16          </a>
17
18          <a href = "list.html">
19             <img src = "buttons/list.jpg" width = "65"
20                height = "50" alt = "List of Features">
21          </a>
22
```

Fig. 2.7 | Images as link anchors. (Part 1 of 3.)

EXAMPLE (cont..)

```
23            <a href = "contact.html">
24               <img src = "buttons/contact.jpg" width = "65"
25                  height = "50" alt = "Contact Me">
26            </a>
27
28            <a href = "table1.html">
29               <img src = "buttons/table.jpg" width = "65"
30                  height = "50" alt = "Tables Page">
31            </a>
32
33            <a href = "form.html">
34               <img src = "buttons/form.jpg" width = "65"
35                  height = "50" alt = "Feedback Form">
36            </a>
37         </p>
38      </body>
39   </html>
```

Fig. 2.7 | Images as link anchors. (Part 2 of 3.)

EXAMPLE- Output

Fig. 2.7 | Images as link anchors. (Part 3 of 3.)

2.8 Special Characters and Horizontal Rules

- HTML5 provides **character entity references** (in the form &*code*;) for representing special characters that cannot be rendered otherwise
- The code can be:
  - Word abbreviations
  - Numbers
    - Decimal
    - Hexadecimal

EXAMPLE

Symbol	Description	Character entity reference
HTML5 character entities		
&	ampersand	`&`
'	apostrophe	`&apos;`
>	greater-than	`>`
<	less-than	`<`
"	quote	`&quot;`
Other common character entities		
non-breaking space		` `
©	copyright	`&copy;`
—	em dash	`&mdash;`
–	en dash	`&ndash;`
¼	fraction 1/4	`&frac14;`
½	fraction 1/2	`&frac12;`

Fig. 2.8 | Some common HTML character entity references.

EXAMPLE

Symbol	Description	Character entity reference
¾	fraction 3/4	`&frac34;`
…	horizontal ellipsis	`&hellip;`
®	registered trademark	`&reg;`
§	section	`&sect;`
™	trademark	`&trade;`

Fig. 2.8 | Some common HTML character entity references.

2.8 Special Characters and Horizontal Rules (Cont.)

- Figure 2.9 demonstrates how to use special characters in an HTML5 document.
- For an extensive list of character entities, see
  www.w3.org/TR/REC-html40/sgml/entities.html

EXAMPLE

```
1  <!DOCTYPE html>
2
3  <!-- Fig. 2.9: contact2.html -->
4  <!-- Inserting special characters. -->
5  <html>
6     <head>
7        <meta charset = "utf-8">
8        <title>Contact Page</title>
9     </head>
10
11    <body>
12       <p>
13          <a href = "mailto:deitel@deitel.com">Send an email to
14          Deitel &amp;amp; Associates, Inc.</a>.
15       </p>
16
17       <hr> <!-- inserts a horizontal rule -->
18
19       <!-- special characters are entered -->
20       <!-- using the form &code; -->
21       <p>All information on this site is <strong>&copy;
22          Deitel & Associates, Inc. 2012.</strong> </p>
23
24       <!-- to strike through text use <del> element -->
```

Fig. 2.9 | Inserting special characters. (Part 1 of 2.)

EXAMPLE

```
25          <!-- to subscript text use <sub> element -->
26          <!-- to superscript text use <sup> element -->
27          <!-- these elements are nested inside other elements -->
28          <p><del>You may download 3.14 x 10<sup>2</sup>
29             characters worth of information from this site.</del>
30             The first item in the series is x<sub>1</sub>.</p>
31          <p>Note: &lt; &frac14; of the information
32             presented here is updated daily.</p>
33       </body>
34    </html>
```

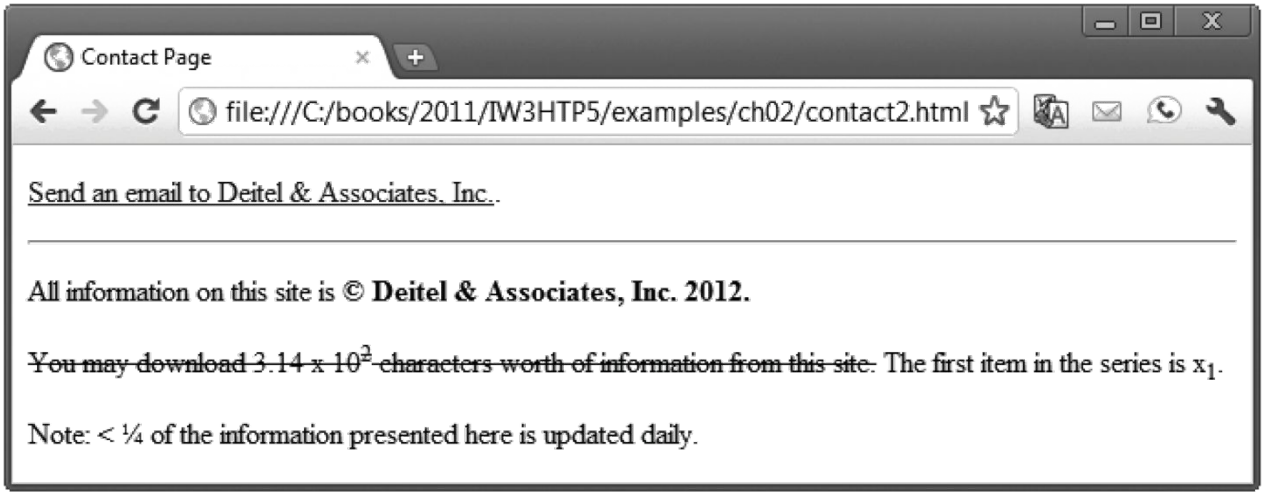


Fig. 2.9 | Inserting special characters. (Part 2 of 2.)

2.8 Special Characters and Horizontal Rules (Cont.)

- A **horizontal rule**, indicated by the **<hr>** tag renders a horizontal line with extra space above and below it in most browsers.
- The horizontal rule element should be considered a legacy element and you should avoid using it.
- CSS can be used to add horizontal rules and other formatting to documents.
- Special characters can also be represented as **numeric character references**—decimal or hexadecimal (hex) values representing special characters.
  - For example, the & character is represented in decimal and hexadecimal notation as & and &, respectively.
- Hexadecimal numbers are discussed in Appendix E, Number Systems, which is available online at www.deitel.com/books/iw3htp5/.

2.9 Lists

- Unordered list element ul
  - creates a list in which each item in the list begins with a bullet symbol (typically a disc)
  - Each entry is an li (list item) element. Most web browsers render these elements with a line break and a bullet symbol at the beginning of the line.

```
1  <!DOCTYPE html>
2
3  <!-- Fig. 2.10: links2.html -->
4  <!-- Unordered list containing hyperlinks. -->
5  <html>
6     <head>
7        <meta charset = "utf-8">
8        <title>Links</title>
9     </head>
10
11    <body>
12       <h1>Here are my favorite sites</h1>
13       <p><strong>Click on a name to go to that page</strong></p>
14
15       <!-- create an unordered list -->
16       <ul>
17          <!-- the list contains four list items -->
18          <li><a href = "http://www.youtube.com">YouTube</a></li>
19          <li><a href = "http://www.wikipedia.org">Wikipedia</a></li>
20          <li><a href = "http://www.amazon.com">Amazon</a></li>
21          <li><a href = "http://www.linkedin.com">LinkedIn</a></li>
22       </ul>
23    </body>
24 </html>
```

Fig. 2.10 | Unordered list containing hyperlinks. (Part 1 of 2.)

EXAMPLE

Fig. 2.10 | Unordered list containing hyperlinks. (Part 2 of 2.)

2.9 Lists (Cont.)

Nested Lists

- Lists may be *nested* to represent *hierarchical* relationships, as in a multi-level outline.
- Figure 2.11 demonstrates nested lists and ordered lists.
- The ordered-list element **ol** creates a list in which each item begins with a number.

EXAMPLE

```
1  <!DOCTYPE html>
2
3  <!-- Fig. 2.11: list.html -->
4  <!-- Nested lists and ordered lists. -->
5  <html>
6     <head>
7        <meta charset = "utf-8">
8        <title>Lists</title>
9     </head>
10
11    <body>
12       <h1>The Best Features of the Internet</h1>
13
```

Fig. 2.11 | Nested lists and ordered lists. (Part 1 of 4.)

EXAMPLE

```
14          <!-- create an unordered list -->
15          <ul>
16             <li>You can meet new people from countries around
17                the world.</li>
18             <li>
19                You have access to new media as it becomes public:
20
21                <!-- this starts a nested unordered list, which uses a -->
22                <!-- different bullet. The list ends when you -->
23                <!-- close the <ul> tag. -->
24                <ul>
25                   <li>New games</li>
26                   <li>New applications
27
28                      <!-- nested ordered list -->
29                      <ol>
30                         <li>For business</li>
31                         <li>For pleasure</li>
32                      </ol>
33                   </li> <!-- ends line 27 new applications li-->
34
35                   <li>Around the clock news</li>
36                   <li>Search engines</li>
37                   <li>Shopping</li>
```

Fig. 2.11 | Nested lists and ordered lists. (Part 2 of 4.)

EXAMPLE

```
38                  <li>Programming
39
40                     <!-- another nested ordered list -->
41                     <ol>
42                        <li>XML</li>
43                        <li>Java</li>
44                        <li>HTML5</li>
45                        <li>JavaScript</li>
46                        <li>New languages</li>
47                     </ol>
48                  </li> <!-- ends programming li of line 38 -->
49               </ul> <!-- ends the nested list of line 24 -->
50            </li>
51
52            <li>Links</li>
53            <li>Keeping in touch with old friends</li>
54            <li>It's the technology of the future!</li>
55         </ul> <!-- ends the unordered list of line 15 -->
56      </body>
57   </html>
```

Fig. 2.11 | Nested lists and ordered lists. (Part 3 of 4.)

EXAMPLE- Output

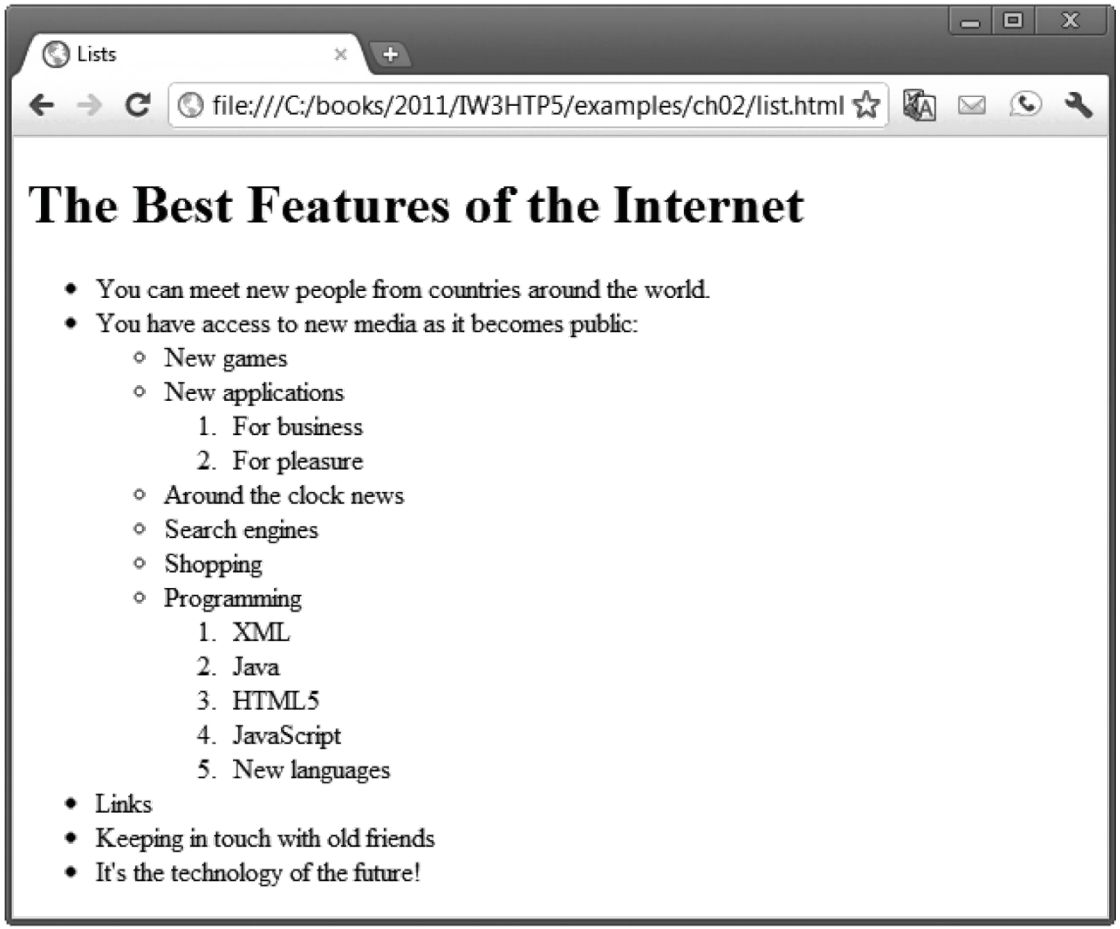


Fig. 2.11 | Nested lists and ordered lists. (Part 4 of 4.)