Chapter 2
Introduction to HTML5

OBJECTIVES

- Important components of HTMl5 documents.
- Use HTML5 to create web pages.
- Add images to web pages.
- Create and use hyperlinks to help users navigate web pages
- Mark up Lists of information.
- Create tables with rows and columns of data
- Create and use forms to get user input
- Void Elements, Headings, Hyperlinks
- Special Characters and Horizontal Rules
- Lists, Tables, Forms, internal Linking, meta Elements, Web Resources

Introduction

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

o 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

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Editing HTML5

o 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.

o Web servers store HTML5 documents.

o Clients request specific resources such as HTML5 documents from web servers.

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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.

  ▶In **full standards mode**, the behavior is (hopefully) the behavior described by the HTML and CSS specifications.

  ▶In **quirks mode**, layout emulates nonstandard behavior in Navigator 4 and Internet Explorer 5 for Windows that is required *not to break existing content on the Web*.

▶Some browsers operate in quirks mode to maintain backward compatibility with web pages that are not up-to-date with the latest standards.

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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 `-->`.

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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.

First HTML5 Example

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 (=).

▸ Although HTML5 element and attribute names are case insensitive, it's a good practice to use only lowercase letters.

▸ Indenting nested elements emphasizes a document's structure and promotes readability.

First HTML5 Example

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

Paragraph Element (`<p>...</p>`)

▶ All text placed between the `<p>` and `</p>` tags forms one paragraph.

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W3C HTML5 Validation Service

o HTML5 documents that are syntactically correct are guaranteed to render properly

o HTML5 documents that contain syntax errors may not display properly

o Validation services (e.g., `validator.w3.org/#validate-by-upload`) ensure that an HTML5 document is syntactically correct

o Most browsers attempt to render HTML documents even if they're invalid.
  ◦ Can lead to unexpected and undesirable results.
  ◦ Use a validation service, such as the W3C markup validation service, to confirm that an HTML5 document is syntactically correct.

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Headings

o 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.

o The text size used to display each heading element can vary between browsers. In Chapter 4, we use CSS to control the text size and other text propeities.

o Placing a heading at the top of each page helps viewers understand the purpose of the page. Headers also help create an outline for a document and are indexed by search engines.

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Linking

o A hyperlink references or links to other resources, such as HTML5 documents and images.

o Web browsers typically underline text hyperlinks and color them blue by default.

o The strong element indicates that the content has high importance. Browsers typically render such text in a bold font.

o Links are created using the a (anchor) element.

o 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

o 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.

o 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.

o Although not required in HTML5, enclosing attribute values in either single or double quotes is recommended.

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Linking

- 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.

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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.

- 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**

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Performance Tip 2.1

Always include the `width` and the `height` of an image in the `<img>` tag so that when the browser loads the HTML5 file, it will know how much screen space to provide and can lay out the page properly, even before it downloads the image. Including the `width` and `height` attributes in an `<img>` tag can help the browser load and render pages faster.

Look-and-Feel Observation 2.2

Entering new dimensions for an image that change its width-to-height ratio distorts the appearance of the image. To avoid distortion, if your image is 200 pixels wide and 100 pixels high, for example, any new dimensions should maintain the 2:1 width-to-height ratio.

Images

o alt Attribute

o A browser may not be able to render an image.

o Every img element in an HTML5 document must have an alt attribute.

o If a browser cannot render an image, the browser displays the alt attribute's value.

o 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.

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Void Elements

○ 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" />`

Images

○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.

Special Characters and Horizontal Rules

o HTML5 provides character entity references (in the form &code;) for representing special characters that cannot be rendered otherwise

o The code can be:
◦ Word abbreviations
◦ Numbers
  ◦ Decimal
  ◦ Hexadecimal

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

Symbol	Description	Character entity reference
¾	fraction 3/4	¾
…	horizontal ellipsis	…
®	registered trademark	®
§	section	§
TM	trademark	™

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Special Characters and Horizontal Rules

- 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/.

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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.
- 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.

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Tables

◦ Tables are frequently used to organize data into rows and columns.
◦ The table element defines an HTML5 table
◦ The summary attribute summarizes the table's contents and is used by speech devices to make the table more accessible to users with visual impairments.
◦ The caption element specifies a table's title.
◦ It's good practice to include a general description of a table's information in the table element's summary attribute—one of the many HTML5 features that make web pages more accessible to users with disabilities.
  ◦ Speech devices use this attribute to make the table more accessible to users with visual impairments.

Tables

○ A table can be split into three distinct sections:
 ◦ Head (thead element)
   ◦ Table titles
   ◦ Column headers
 ◦ Body (tbody element)
   ◦ Primary table data
 ◦ Table Foot (tfoot element)
   ◦ Calculation results
   ◦ Footnotes
   ◦ Above body section in the code, but displays at the bottom in the page

○ tr Element
 ◦ Defines individual table rows
 ◦ Element th
   ◦ Defines a header cell

○ Td Element
 ◦ Contains table data elements

Tables

- Using rowspan and colspan with Tables
- Figure 2.13 introduces two new attributes that allow you to build more complex tables.
- You can merge data cells with the rowspan and colspan attributes
  - The values of these attributes specify the number of rows or columns occupied by the cell.
  - Can be placed inside any data cell or table header cell.
- The br element is render as a line break in most browsers—any markup or text following a br element is rendered on the next line.
- Like the img element, br is an example of a void element.
- Like the hr element, br is considered a legacy formatting element that you should avoid using—in general, formatting should be specified using CSS.

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Forms

- HTML5 provides forms for collecting information from users.
- Figure 2.14 is a simple form that sends data to the web server for processing.
- method Attribute of the form Element
- A form is defined by a form element
  - Attribute method specifies how the form's data is sent to the web server.
  - Using method = "post" appends form data to the browser request, which contains the protocol (HTTP) and the requested resource's URL.
  - The other possible value, method = "get", appends the form data directly to the end of the URL of the script, where it's visible in the browser's Address field.
  - The action attribute of the form element specifies the script to which the form data will be sent

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Forms

◦ action Attribute of the form Element

◦ The action attribute of the form element specifies the script to which the form data will be sent.

◦ Since we haven't introduced server-side programming yet, we set this attribute to http://www.deitel.com for now.

◦ input elements that specify data to provide to the script that processes the form (also called the form handler).

◦ An input's type is determined by its type attribute.

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Forms

o Hidden Inputs

o Forms can contain visual and nonvisual components.

o Visual components include clickable buttons and other graphical user interface components with which users interact.

o Nonvisual components, called hidden inputs, store any data that you specify, such as e-mail addresses and HTML5 document file names that act as links.

o text input Element

o The text input inserts a text field into the form, which allows the user to input data.

o The label element provides users with information about the input element's purpose

o The size attribute specifies the number of characters visible in the text field.

o Optional attribute maxlength limits the number of characters input into a text field.

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Forms

submit and *reset input* Elements

▸ The `submit input` element is a button.
  ◦ When the submit button is pressed, the form's data is sent to the location specified in the form's action attribute.

▸ The `value` attribute sets the text displayed on the button.

▸ The `reset` input element allows a user to reset all form elements to their default values.

Additional Form Elements

▸ Figure 2.15 contains a form that solicits user feedback about a website.

▸ The `textarea` element inserts a *multiline text area* into the form.

▸ The number of rows is specified with the `rows` attribute, and the number of columns (i.e., characters per line) with the `cols` attribute.

▸ Default text can be specified in other `input` types, such as text fields, by using the `value` attribute.

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Forms

○ The password input inserts a password box into a form.
  ◦ Allows users to enter sensitive information, such as credit card numbers and passwords, by "masking" the information input with another character, usually asterisks.
  ◦ The actual value input is sent to the web server, not the asterisks that mask the input.

▸ The `checkbox` input element enables users to select and option.
  ◦ When the `checkbox` is selected, a check mark appears in the `checkbox` . Otherwise, the checkbox is empty
  ◦ `checkbox`es can be used individually and in groups. `checkbox`es that are part of the same group have the same name

▸ `radio` buttons are similar to `checkbox`es, except that only one radio button in a group can be selected at any time.
  ◦ All radio buttons in a group have the same name attribute but different value attributes.

▸ The `select` input provides a drop-down list of items.
  ◦ The `name` attribute identifies the drop-down list.
  ◦ The `option` element adds items to the drop-down list.

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Common Programming Error 2.1

When your form has several checkboxes with the same name, make sure that they have different values, or the web server scripts will not be able to distinguish them.

Common Programming Error 2.2

Not setting the name attributes of the radio buttons in a group to the same name is a logic error because it lets the user select all of the radio buttons at the same time.

Internal Linking

o The a tag can be used to link to another section of the same document by specifying the element's id as the link's href.

o To link internally to an element with its id attribute set, use the syntax #id.

meta Elements

- One way that search engines catalog pages is by reading the meta element's contents.
  - The name attribute identifies the type of meta element
  - The content attribute
    - Of a keywords meta element: provides search engines with a list of words that describe a page, which are compared with words in search requests
    - Of a description meta element: provides a three- to four-line description of a site in sentence form, used by search engines to catalog your site. This text is sometimes displayed as part of the search result

- meta elements are not visible to users. They must be placed inside the head section ofyour HTML5 document.

- Otherwise they will not be read by search engines.

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