Week 1: Web Development & World Wide Web

251514 WEB PROGRAMMING ESSENTIALS

Learning Outcomes

At the end of week 1 students should be able to:

❖ Define and understand the World Wide Web

❖ Design, develop and implement their first HTML webpage

❖ Discuss and differentiate between HTML standards over the years

❖ Identify the basic syntax, tags, attributes and rules of HTML

❖ Understand concept of a URL, protocols and the Internet

❖ Understand systems and components that enable web development

Learning Outcomes

At the end of week 1 students will learn.

❖What is the Word Wide Web?

❖How does the web works?

❖What is Hyperlink?

❖Where Does HTML fit in?

❖Invention of HTML

❖Short History of HTML

❖Creating HTML Documents.

Content Overview

❖Exploring the Internet

❖World Wide Web

❖How does the Web work?

❖Protocols

❖Web Browsers

❖What is HTML?

❖A short history of HTML

❖Understanding the Role of other Web Programming Languages

❖HTML Elements & Attributes

❖Using Web Authoring Tools

❖Test Editors

❖Creating a Basic Webpage

❖Week 1 activities

❖Week 1 Review Questions

Exploring the Internet (1/2)

- The **Internet** is a worldwide collection of computers linked together for use by organizations, and individuals using communications devices and media

- A **node** is any device, such as a computer, tablet, or smartphone, connected to a **network**

- A **network** is a collection of two or more computers linked together to share resources and information

- The **Internet of Things** describes the ever-growing number of devices connecting to a network, including televisions and appliances
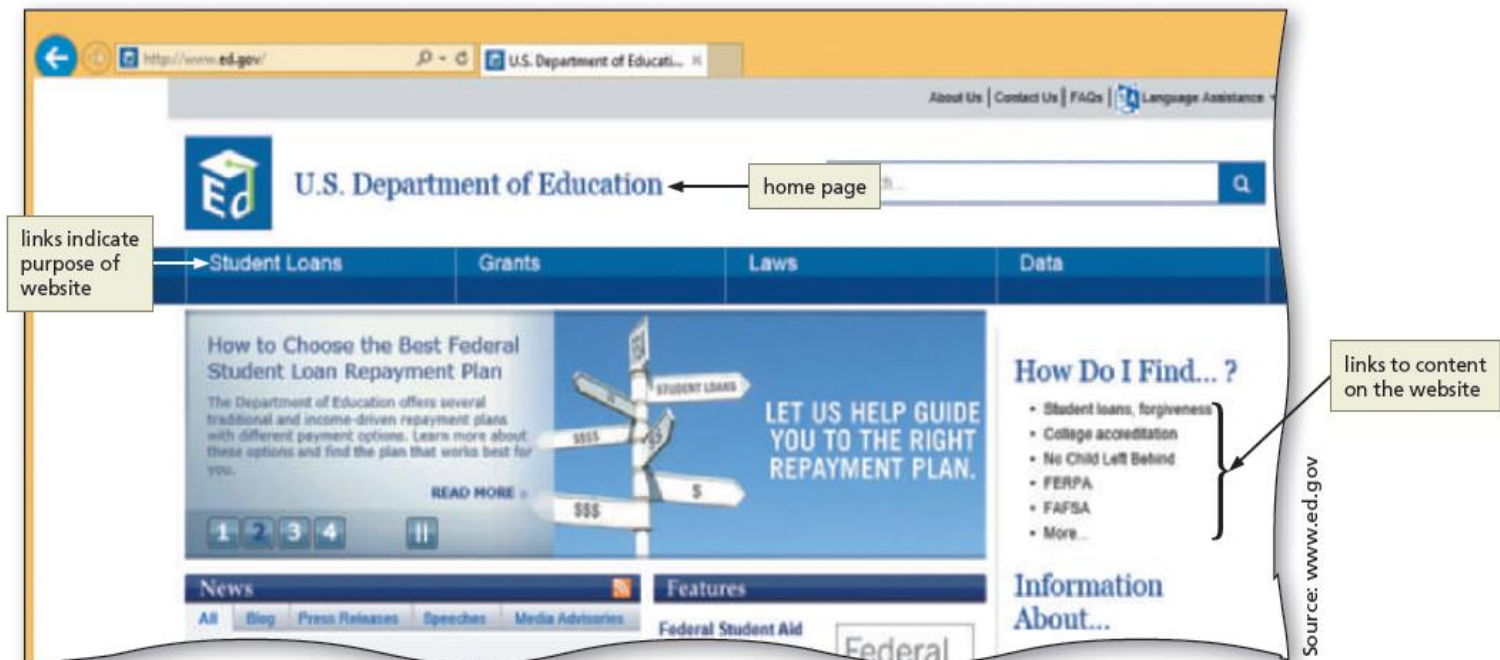
Exploring the Internet (2/2)

- **Data lines** that connect networks allow data to move from one computer to another

- The **Internet backbone** is a collection of high-speed data lines that connect major computer systems located around the world

- An **Internet Service Provider** (ISP) is a company that has a permanent connection to the Internet backbone
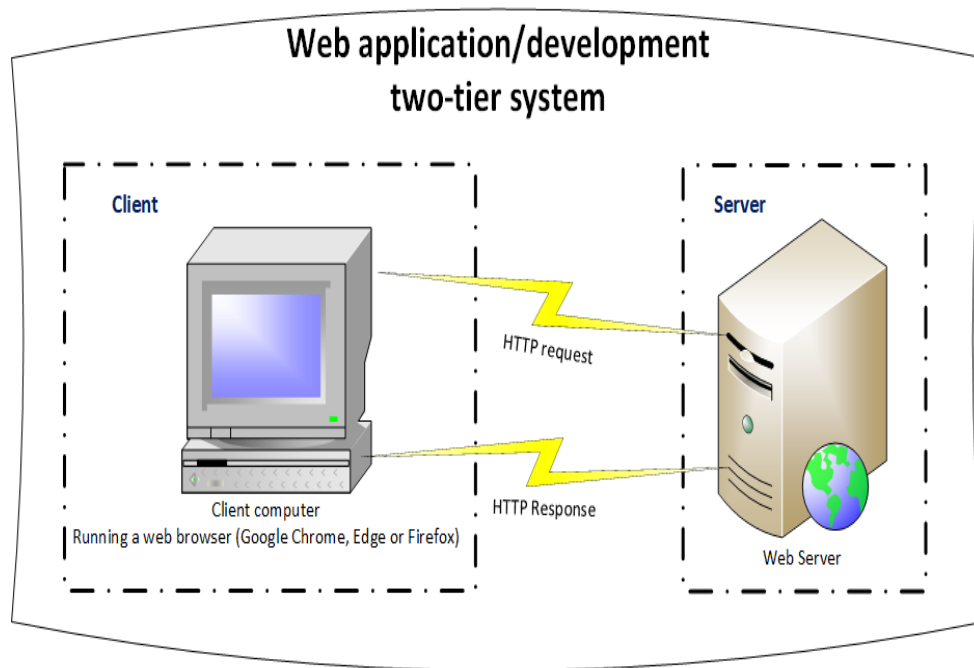
World Wide Web (1/2)

- The World Wide Web, also called the **web**, is the service that provides access to information stored on web servers

- The web consists of a collection of linked files known as **webpages**

- A **website** is a related collection of webpages created and maintained by a person, company, educational institution, or other organization

World Wide Web (2/2)

- A **home page** is the first document users see when they access a website

- A **hyperlink**, commonly called a **link**, is an element that connects one webpage to another webpage on the same server or to any other web server in the world

How does the Web work? (1/2)

Web application/development
two-tier system

Client

Client computer
Running a web browser (Google Chrome, Edge or Firefox)

HTTP request

HTTP Response

Server

Web Server

The user clicks on a hyperlink (or type the URL), the browser send an HTTP get message. The message is transferred on a TCP/IP channel. The server treats the request and returns an html page embedded into an HTTP answer/response.

The answer may consist of different content than an HTTP page (for example, an image). The "content type" is specified with a value defined by the MIME standard.

Mime : definition of content-types

How does the Web work? (2/2)

WWW works on client- server (2-tier) approach. Following steps explains how the web works:

1. User enters the URL (say, **https://www.iti.ac.pg)** in the address bar of web browser.
2. Then browser requests the Domain Name Server for the IP address corresponding to www.iti.ac.pg.
3. After receiving IP address, browser sends the request for web page to the web server using HTTP protocol which specifies the way the browser and web server communicates.
4. Then web server receives request using HTTP protocol and checks its search for the requested web page. If found it returns it back to the web browser and close the HTTP connection.
5. Now the web browser receives the web page, It interprets it and display the contents of web page in web browsers window.
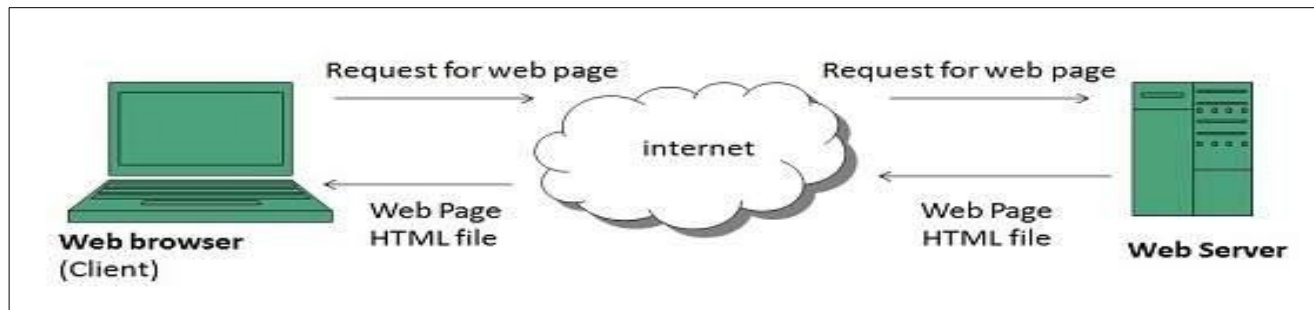
Protocols (1/2)

- A **protocol** is a set of rules that defines how a client workstation can communicate with a server

- A **server** is the host computer that stores resources and files for websites

- **Hypertext Transfer Protocol (HTTP)** is a set of rules for exchanging text, graphics, audio, video, and other multimedia files on the web

- **File Transfer Protocol (FTP)** is used to exchange files from one computer to another over the Internet
  - This protocol does not provide a way to view a webpage

Protocols (2/2)

- **Transmission Control Protocol/Internet Protocol (TCP/IP)** is a pair of protocols used to transfer data efficiently over the Internet by properly routing it to its destination

- **Internet Protocol (IP)** ensures data is sent to the correct location

- The **Domain Name System (DNS)** associates an IP address with a domain name

Web Browsers (1/2)

- A **web browser** is a program that interprets and displays Web pages and enables you to view and interact with a Web page
  - Microsoft Internet Explorer, Mozilla Firefox, Google Chrome, and Apple Safari

- A **Uniform Resource Locator** (URL) is the address of a document or other file accessible on the Internet
  - http://www.cengagebrain.com/shop/index.html

- A domain is an area of the Internet a particular organization or person manages.

Web Browsers (2/2)

What is HTML?

- **Hypertext Markup Language (HTML)** is the language used to create Web pages.

- Using HTML, you can create a Web page with text, graphics, sound, and video.

- HTML has a lot of use cases, namely:
  - **Web development.** Developers use HTML code to design how a browser displays web page elements, such as text, hyperlinks, and media files.
  - **Internet navigation**. Users can easily navigate and insert links between related pages and websites as HTML is heavily used to embed hyperlinks.
  - **Web documentation**. HTML makes it possible to organize and format documents, similarly to Microsoft Word.

- HTML is not considered a programming language as it can't create dynamic functionality, although it is now considered an official web standard.

- The **World Wide Web Consortium (W3C**) maintains and develops HTML specifications, along with providing regular updates.

A short history of HTML (1/4)

HTML1 (1993) → HTML2 (1995) → HTML3 (1997)

↓

HTML4 (1997)
- XML 1.0
- CSS 1.0 & 2.0
- XHTML 1.0

← HTML5 (2012)

The **World Wide Web Consortium (W3C)** maintains and develops HTML specifications, along with providing regular updates.
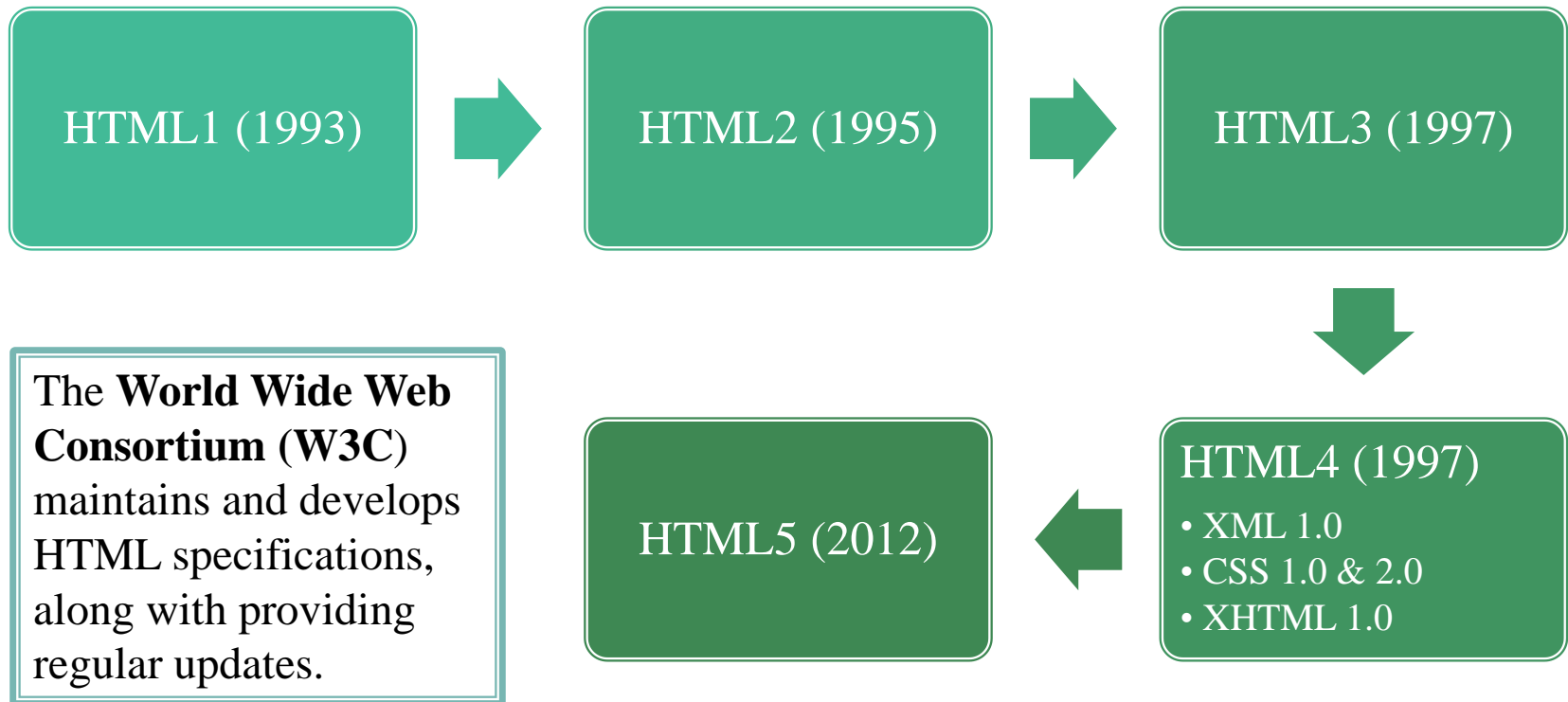
A short history of HTML (2/4)

◦ **Invented by Sir Tim Berners-Lee in 1991**, but the **first official version came out in 1995, called HTML 2.0**.

◦ **HTML** keeps improving over time with new versions. In 1999, a big upgrade called HTML 4.01 was released—it made web design more advanced.

◦ **HTML 1.0** was launched in 1993 with the goal of exchanging information that can be read and accessed via web browsers. However, few developers worked on websites. As a result, the language was stagnating.

◦ **HTML 2.0,** which was released in 1995 and included all of the features of HTML 1.0 as well as a few new ones. HTML 2.0 remained the standard markup language for designing and developing websites until January 1997, and it refined numerous basic characteristics of HTML.

A short history of HTML (3/4)

◦ **HTML 3.0** was introduced by Dave Raggett. He created a draft with new ideas and more advanced tools to help people design better websites

◦ **HTML 4.01** came after earlier versions and became one of the most widely used types of HTML. It helped make websites more organized and functional before the next big upgrade.

◦ **HTML 5** was officially released in 2012. Think of HTML5 as a much-improved version of HTML 4.01—it added many cool new features to make websites more interactive and user-friendly. It supports video, audio, animations, and works better on phones, tablets, and computers.

HTML keeps changing to match how we use the internet—and each version makes creating websites easier and more powerful.

A short history of HTML (4/4)

◦ **XML 1.0 (Extensible Markup Language)** is a standard developed by the W3C to define rules for encoding documents in a format that's both human-readable and machine-readable. It uses tags and attributes to structure data, similar to HTML, but is more flexible. It's designed to store and transport data—not display it. It enforces strict rules (like proper nesting of elements and one root element) to ensure consistency. It's widely used in web services, configuration files, and data exchange between systems.

◦ **CSS 1.0 and 2.0** are tools used to style web pages without touching the actual HTML code. Just like changing fonts or colors in Word, CSS lets you adjust how things look—like layout, colors, and spacing. The term "cascading" means you can use multiple style sheets together, and they layer over each other. CSS 2.0 adds more design features, giving web designers more control to make sites look even better.

◦ **HTML 4.01** is a version of the Hypertext Markup Language released in 1999 by the W3C. It was a major update that improved how websites are built and displayed.

◦ **XHTML 1.0 (Extensible Hypertext Markup Language)** is a web language introduced in 2000 by the W3C that blends HTML 4.01 with XML rules.

# Understanding the Role of Other Web Programming Languages

- **JavaScript** — It is a popular **client-side scripting language** used to create interactivity within a web browser

- **jQuery** — It is a library of JavaScript programs designed for easy integration onto a webpage
  - It makes it easy for web developers to add JavaScript to a webpage

- **PHP (Hypertext Preprocessor)** — It is an open-source **server-side scripting language** used for common tasks such as writing to or querying a database located on a central server
  - Pages that contain PHP scripts must have file names that end with the file extension .php

- **ASP (Active Server Pages)** — is a server-side scripting technology
  - Pages that contain ASP scripts must have file names that end with the file extension .asp

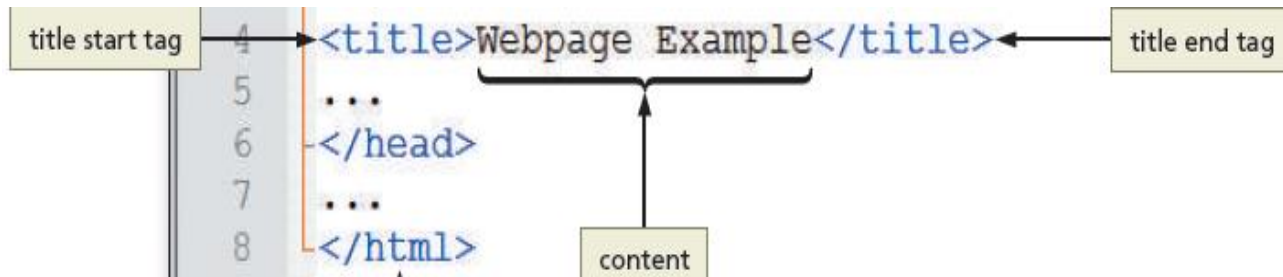# HTML Elements & Attributes (1/6)
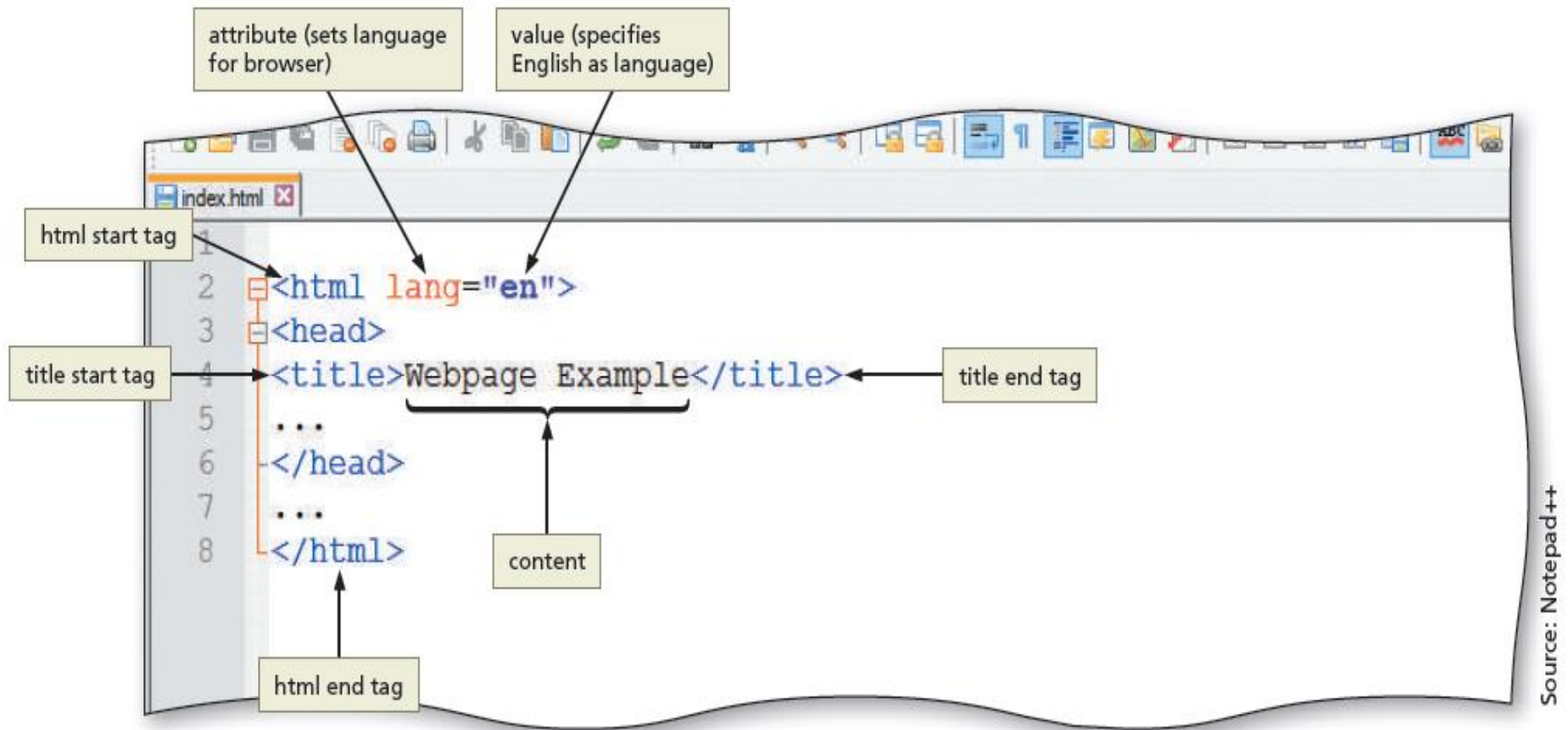
HTML Elements & Attributes (2/6)

- HTML combines tags and descriptive attributes that define how a document should appear in a web browser

- HTML elements include headings, paragraphs, hyperlinks, lists, and images

- HTML elements have a start tag and an end tag and follow the same rules, or **syntax**
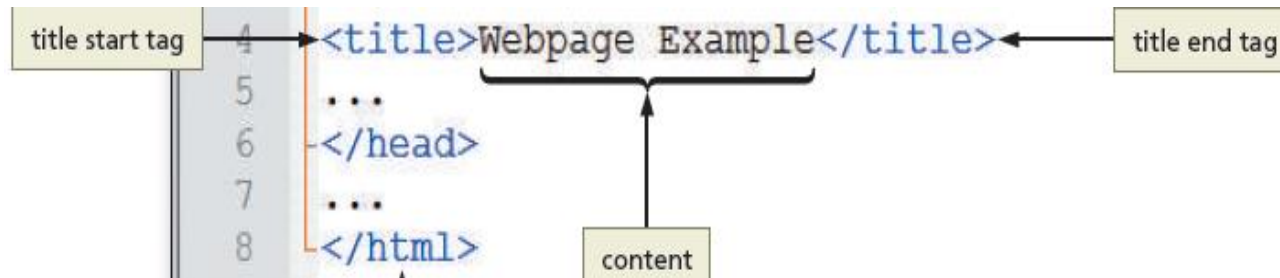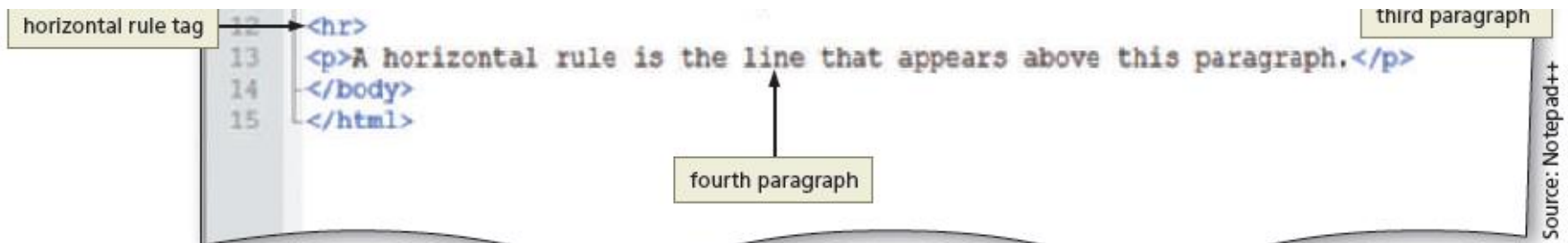
HTML Elements & Attributes (3/6)

- HTML elements are called **paired** tags and use the syntax *<start tag> content </end tag>*, which has the following meaning:
  - HTML elements begin with a start tag, or opening tag, such as <title>
  - HTML elements finish with an end tag, or closing tag, such as </title>
  - Content is inserted between the start and end tags

HTML Elements & Attributes (4/6)

- Some HTML elements are void of content. They are called **empty**, or **void**, tags

- Examples of empty tags are <br> for a line break and <hr> for a horizontal line, or rule

- The syntax for empty tags is *<tag>*

horizontal rule tag

third paragraph

```
12  <hr>
13  <p>A horizontal rule is the line that appears above this paragraph.</p>
14  </body>
15  </html>
```

fourth paragraph

Source: Notepad++

HTML Elements & Attributes (5/6)

HTML Elements & Attributes (6/6)

HTML code rendered in browser

webpage title

C:\Users\Jessica\Documents\index.html

Webpage Example

first paragraph

This webpage example uses the basic HTML tags.

This webpage example also uses paragraph tags.

second paragraph

This paragraph uses a line break after the word break to insert a new blank line.

line break inserted in third paragraph

horizontal rule

A horizontal rule is the line that appears above this paragraph.

fourth paragraph

Courtesy of Notepad++

Using Web Authoring Tools

- Webpages can be created using HTML with a simple text editor, such as Notepad, **Notepad++, Sublime,Visual Studio Code**, Programmer's Notepad, TextEdit, and TextWrangler

- A **text editor** is a program that allows one to enter, change, save, and print text, which includes HTML tags

- An **HTML editor** is a program that provides basic text-editing functions, and advanced features such as color-coding for various HTML tags, menus to insert HTML tags, and a spelling checker

- HTML is **platform independent**
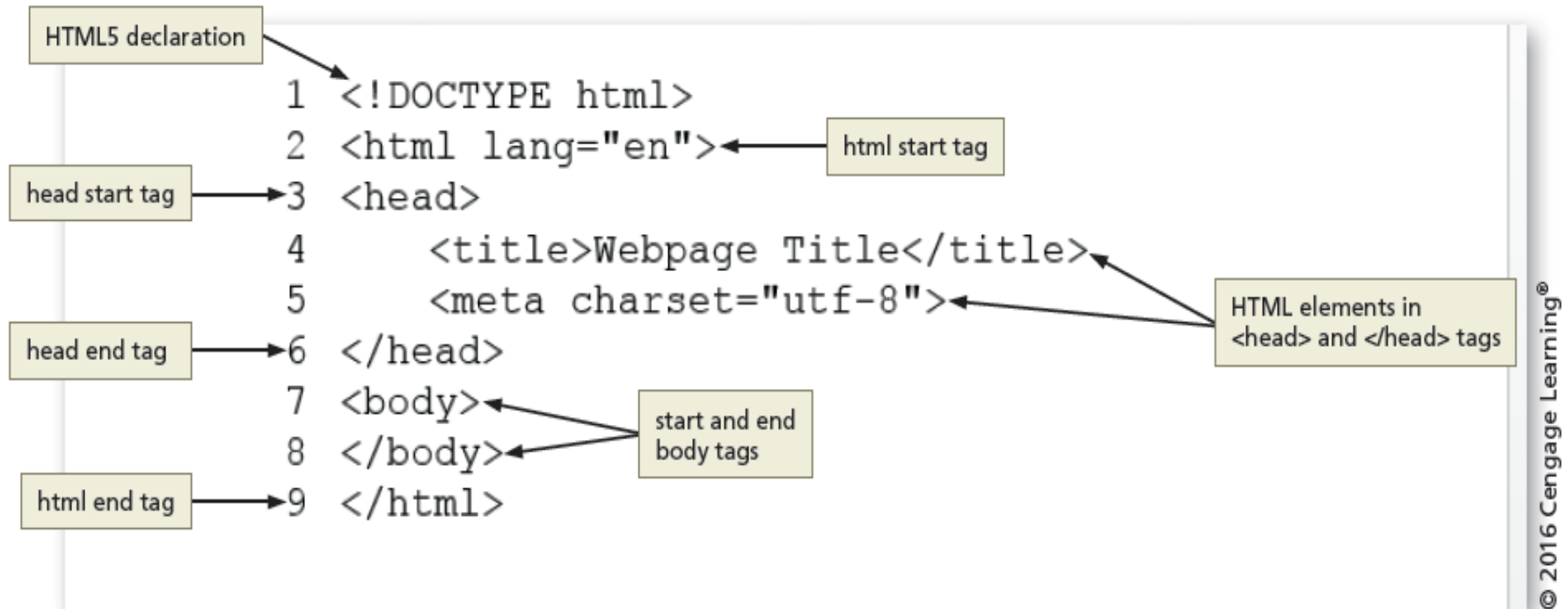
Text Editors (1/2)

- **Notepad**++ is a free, open-source text editor. It is used to create files in several markup, scripting, and programming languages, including HTML, CSS, JavaScript, PHP, Java, C#, and Visual Basic

- **Visual Studio Code (VS Code)** is a free, open-source code editor developed by Microsoft. It is known for its lightweight nature, powerful features, and extensive customization options through extensions. VS Code supports a wide range of programming languages and platforms, making it a popular choice for developers of all levels.

- **Programmer's Notepad** is a free, open-source text editor used to create webpages, and files in several markup, scripting, and programming languages as well

- **Sublime** is a cross-platform text editor

- **TextWrangler** is a free, open-source text editor. It is used to create files in many formats, including HTML and CSS

Text Editors (2/2)

- **WYSIWYG Editors –** Stands for What You See Is What You Get
  - These editors provide a graphical user interface to design a webpage
  - It allows to drag HTML elements onto the page while the editor writes the code

- **Adobe Dreamweaver** is a popular WYSIWYG editor

- **Microsoft Expression Web 4** is a WYSIWYG webpage editor from Microsoft

Creating a Basic Webpage

• Every HTML webpage includes the basic HTML tags

```
1  <!DOCTYPE html>          HTML5 declaration
2  <html lang="en">         html start tag
3  <head>                   head start tag
4      <title>Webpage Title</title>
5      <meta charset="utf-8">    HTML elements in <head> and </head> tags
6  </head>                  head end tag
7  <body>                   start and end body tags
8  </body>
9  </html>                  html end tag
```

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WPE Week 1 activities

Refer to print out materials.

◦ This week, you are required to the following

1. Open and navigate through the three software: Notepad++, Visual Studio Code & Dreamweaver
2. Using notepad, notepad++ or Visual Studio code; Create a basic webpage using syntax from slide 30 of this PPT
3. Answer all the review questions listed at the end of this PPT

Note: You can complete these activities in any order, however, make effort to complete each requirement to prepare for your assessments.

Week 1: Review Questions

1. What is the World Wide Web?

2. How does the web work?

3. What is a hyperlink?

4. Where does HTML fit in the web?

5. Who invented HTML?

6. When was HTML first introduced?

7. What was the primary purpose of HTML when it was created?

8. What is the first step in creating an HTML document?

9. What is the basic structure of an HTML document?

10. What is the role of the <body> tag in an HTML document?

11. What is the significance of the <!DOCTYPE> declaration in HTML?

12. What is the purpose of the <head> section in an HTML document?