CP1406 – Week 1
Intro to the Internet and Web Design

Subject Learning Outcomes

- apply user-centred design principles and methods;
- demonstrate best practices in creating standards-based websites;
- apply HTML, CSS and JavaScript to develop interactive websites

Assessment Items – CP1406

- Website development Part 1 - (30%) - Individual
- Website development Part 2 - (40%) - Individual
- Practical assessment/practical skills demonstration - (30%) - Individual

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Assessment Items – CP5638

- Website development Part 1 - (20%) - Individual
- Website development Part 2 - (35%) - Individual
- Practical assessment/practical skills demonstration - (20%) - Individual
- Research report - (25%) - Individual

Learning in This Subject

- Lectures: video recordings AND interactive sessions
- Practicals: practising skills and making websites
- Subject outline: get this from LearnJCU and read it
- Slack: #cp1406

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Use online (code) resources appropriately

- You must do the main things yourself – HTML & CSS
- You cannot use existing CMS software like WordPress
- You can use JavaScript libraries (like jQuery, image galleries…) for "extras" but not for the core functionality
- You may appropriately use parts of templates and examples, but you need to make them fit your design, not the other way around
  - It's OK to find existing sites, copy them to see how the code works, then repurpose parts of them for your site – but no direct copying
  - Frameworks like Bootstrap are great, but not allowed for this subject
- If in doubt, please talk to your lecturer about what is appropriate

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Exploring the Internet

- The Internet is a worldwide collection of computers

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

- Millions of people worldwide have access to the Internet
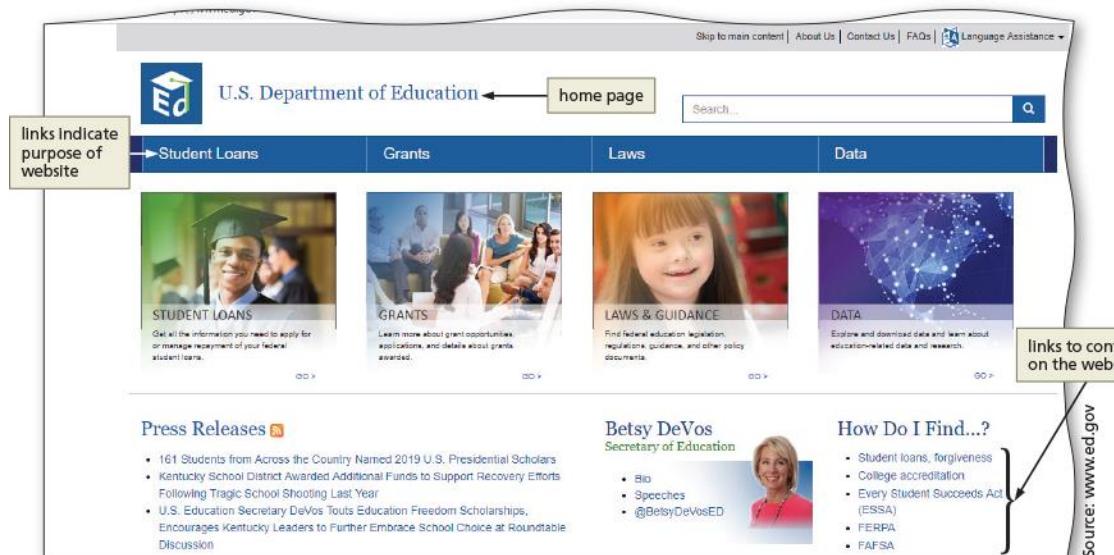
Figure 1–2

World Wide Web

- 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 organisation

World Wide Web

- 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

Protocols
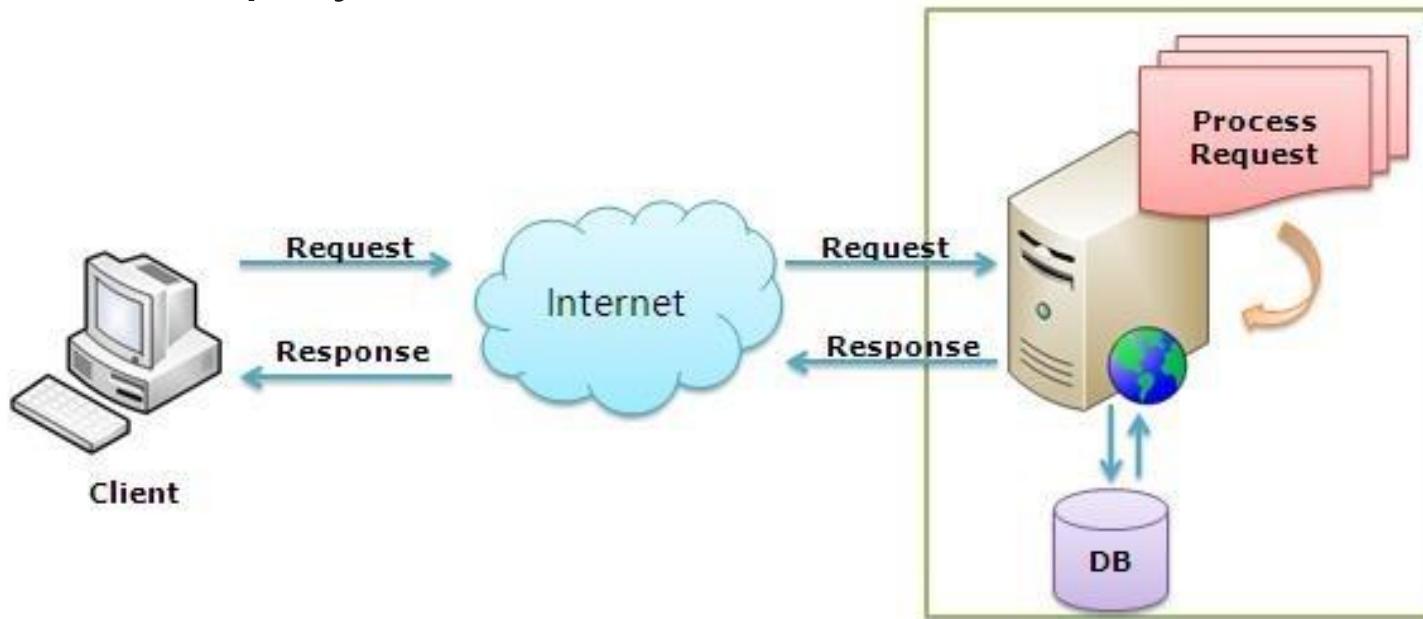
- Set of rules or standards that define how something operates
- Protocols exist for how a **client** device communicates with a **server**
  - **Internet Protocol** (IP) ensures data is sent to the correct location
  - The **Domain Name System** (DNS) associates an IP address with a domain name

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Protocols

- 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
  - Does not provide a way to view a webpage

Client-server architecture

- HTTP Request-Response Cycle
    - Client requests page via URL
    - DNS lookup converts URL to IP address
    - Server processes request, which may involve running code and accessing databases, then returns results to client
    - Client displays results in browser
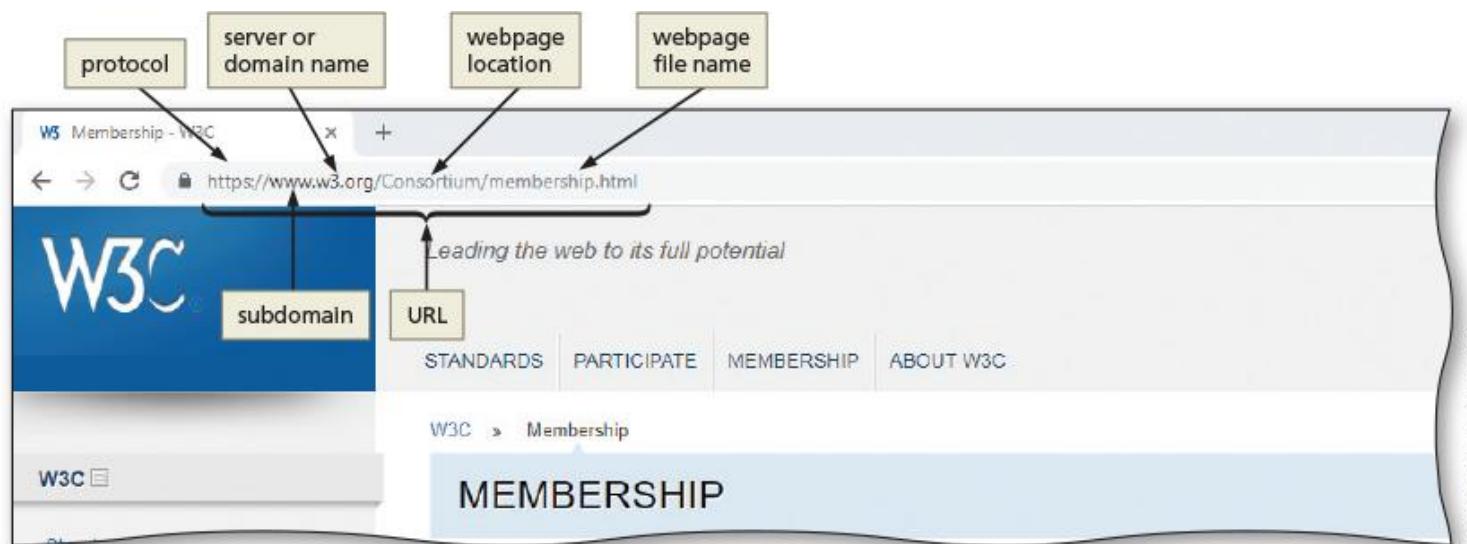
Client-side vs. Server-side

- Front-end / Client-side
  - HTML – markup language for structuring content
  - CSS – style language for styling structured content
  - JavaScript – programming code to provide functionality
  - The browser runs the JavaScript and renders the HTML+CSS

- Back-end / Server-side
  - PHP – common (Web) programming language
  - Database (MySQL, SQLite, MongoDB…)
  - many other technologies and languages can be used on Web servers - node.js, ASP.NET, Go, Ruby, Python, Java Servlets…

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Web Browsers

- Interpret and display webpages and enable you to view and interact with a webpage
  - Google Chrome, Mozilla Firefox, Apple Safari, Microsoft Edge, Opera
- A Uniform Resource Locator (URL) is the address of a document or other file accessible on the Internet
  - Such as https://www.w3.org

Planning a Website
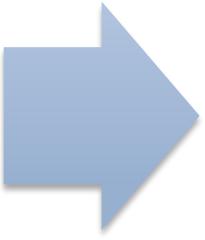
- Purpose of the website
- Target audience
- Multiplatform display

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Good websites are goal-driven

- *"does the site serve its purpose well?"*
- *"does it achieve what the client wanted (what they paid for)?"*
- Clients don't pay for a website, but for what the site can do for them.

- So you need to ask that question up front (*"what's the goal?"*) and keep it in mind right through the process.

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Why? What's the point of knowing the goal?

Goal	→	Design & Development

- The goal informs the design and the development.
- If you can build a site without knowing the goal…
  you're missing the point!
  How do you lead users to do whatever the point of the site is?

- This includes other planning details like **target audience**

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Consider these goal examples

- A sales site (goal is to sell products), needs to be focused on sales.
  - That might seem obvious, but some sales sites just present the products… they don't lead people to buy.

- An online support site for a company might have the goal of reducing phone calls to customer support (by providing online solutions)…
  - But if it puts the phone number on the site clearly, people will just keep phoning up.

- A community action site (e.g., save the whales) might have the goal to get people to contact their local government…
  - So, it can be designed to link to the ways to contact government, not just present the issues about the poor whales.

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Use calls to action – to lead people

- Goal-driven websites lead people to the goal
- At the right time and place, there will be a "call to action" (CTA)
- Usually very prominent – in the most important screen 'real estate'

What about this sign?

YOUR Planning Process

Why
- Goal

What
- Content

How
- Design & Development

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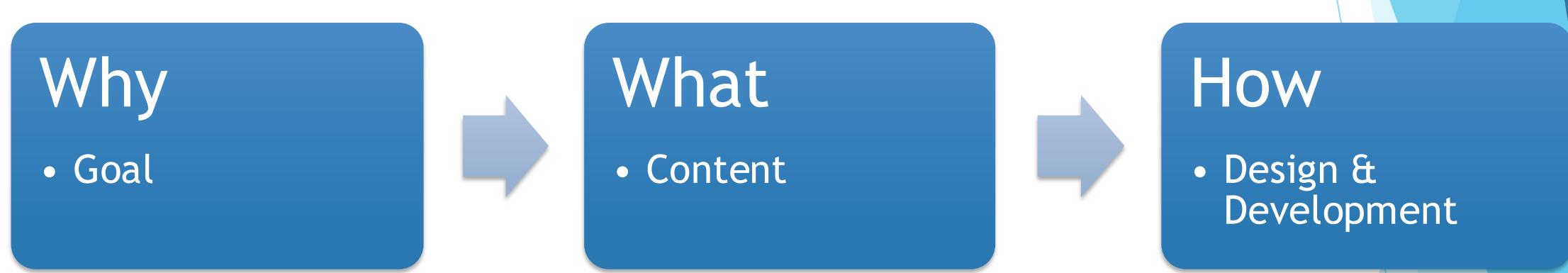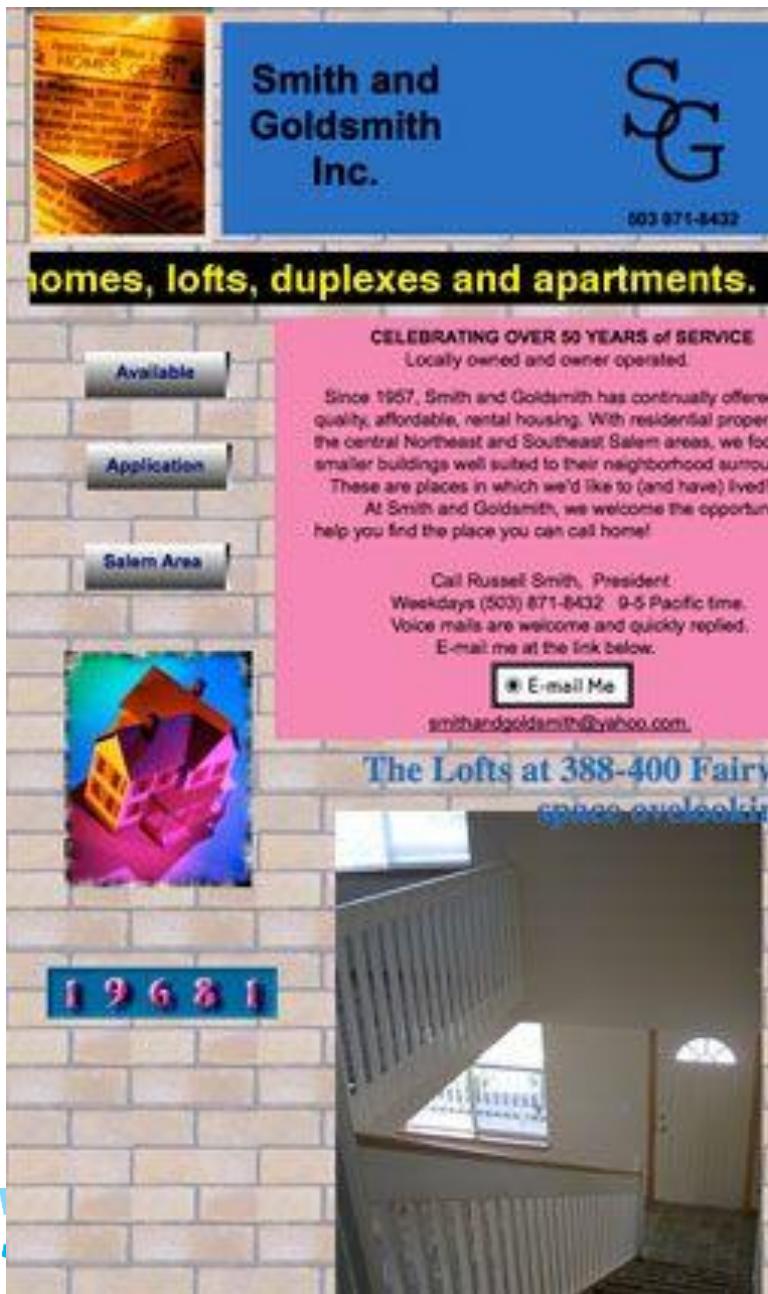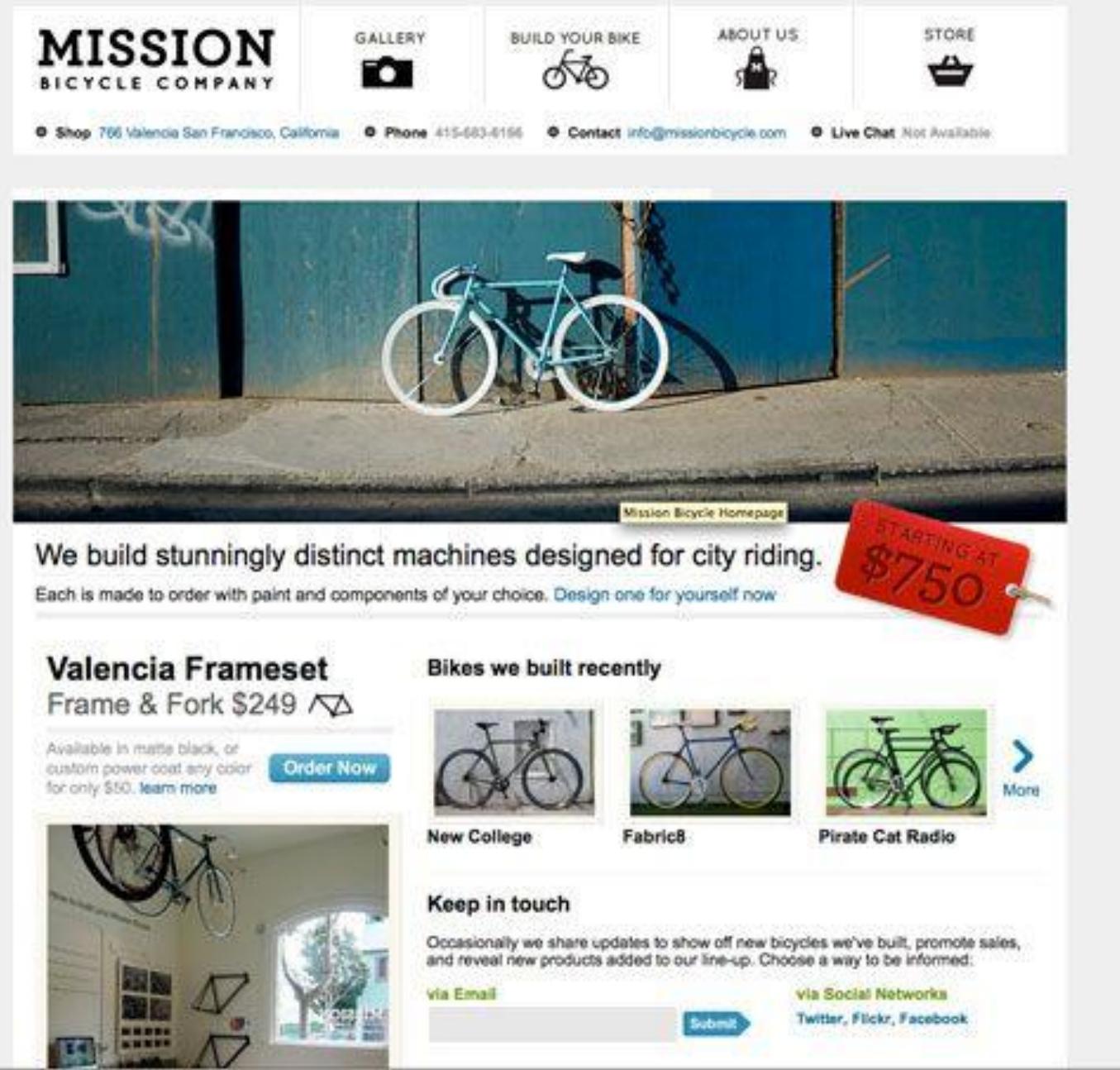
A word on "design"

- This is **not** a visual design subject,
  but we **will** teach you design **principles**
- There are clear principles for designing sites (and other things),
  which you can learn
  - You do not have to be a graphic artist
- You will be assessed based on these clear (objective)
  principles, not on subjective preferences about style

- With a little guidance, most people can identify good & bad
  design

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What do you think of these sites?

Design

Designer Luke Wroblewski says visual design can be thought of as two interwoven parts:

- Personality/look and feel
  established by choice of colour(s), typeface(s), textures, images, etc; is rather **subjective**

- Visual hierarchy
  guides users through content and tells them about the relative importance of and relationships between the elements; is much more **objective**

Design must facilitate communication by

managing attention

Visual relationships between the elements of the design must reflect their importance and their logical and functional relationships

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Wireframe

- A simple, visual guide that clearly identifies the location of main webpage elements
  - Active white space is an area on the page that is intentionally left blank
    - Helps a user **focus** on one part of the page
  - Passive white space is the space between content areas

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Wireframe

Figure 1-12

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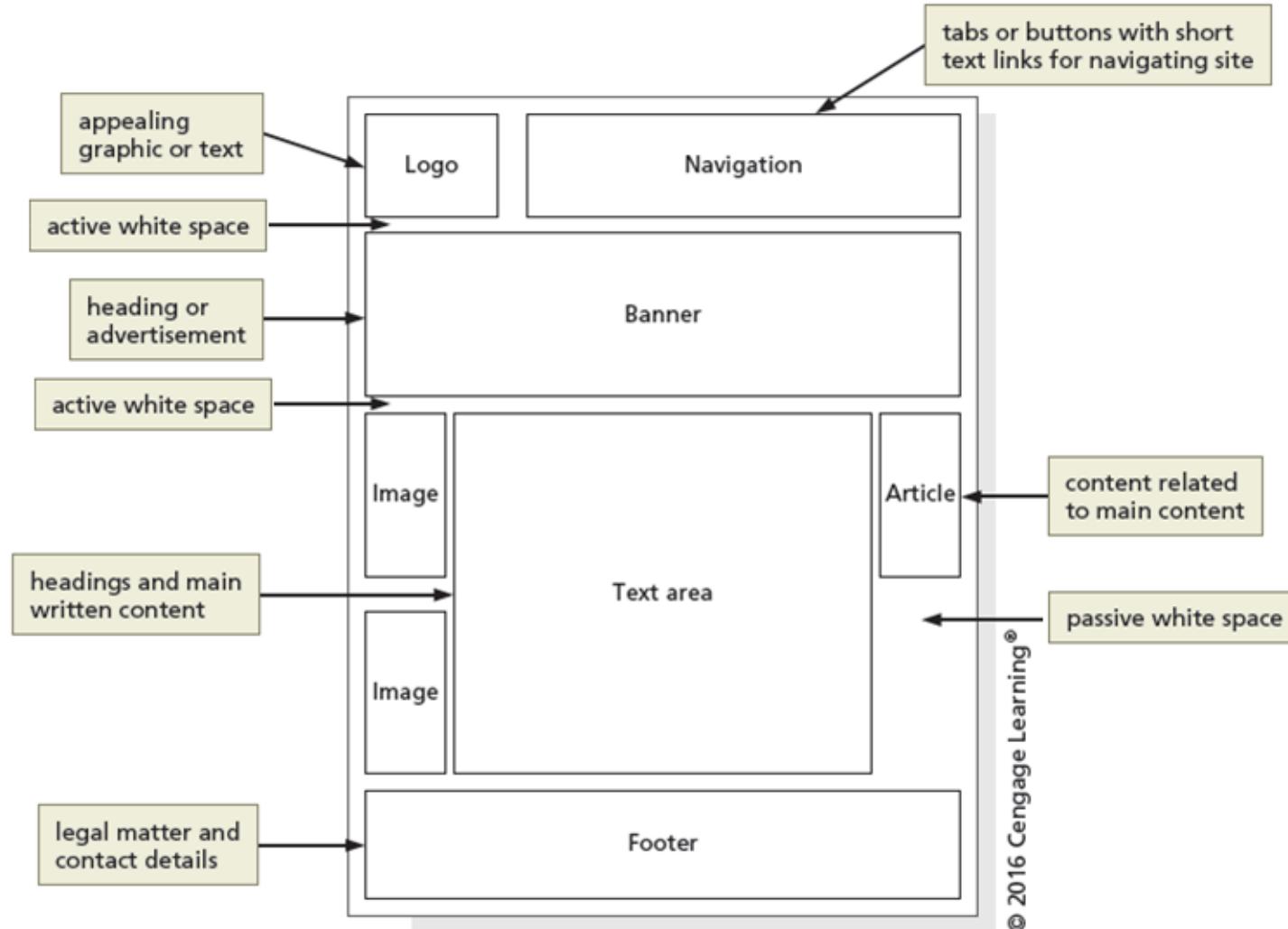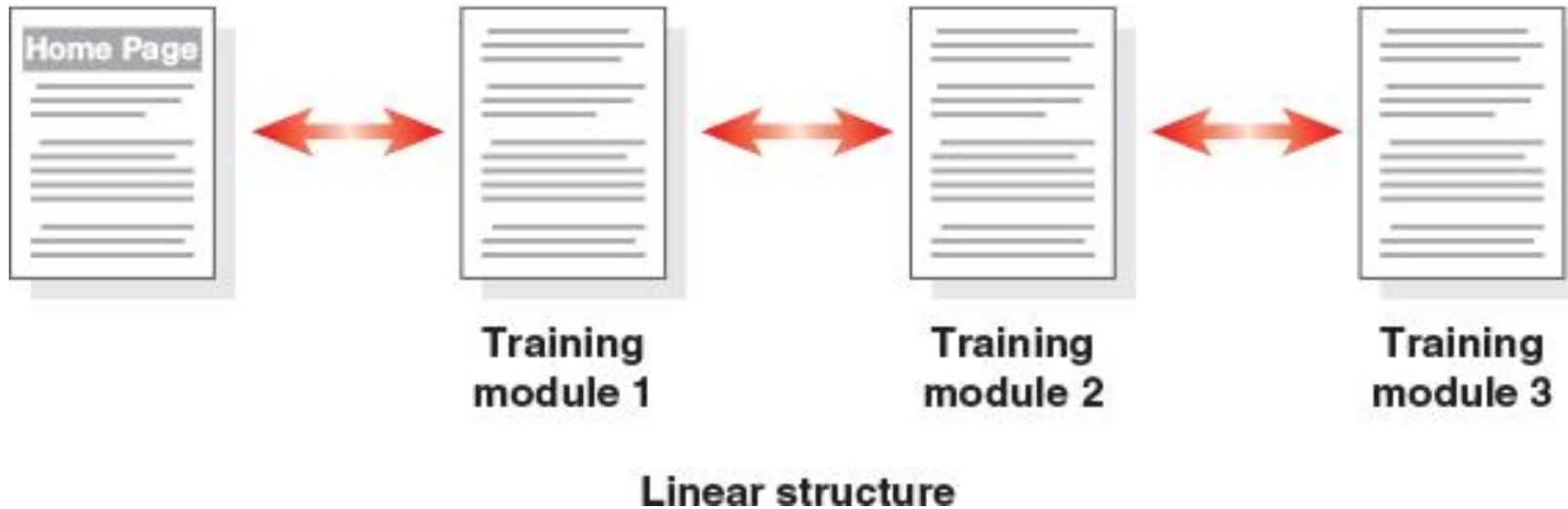
Site Map (Information Architecture)
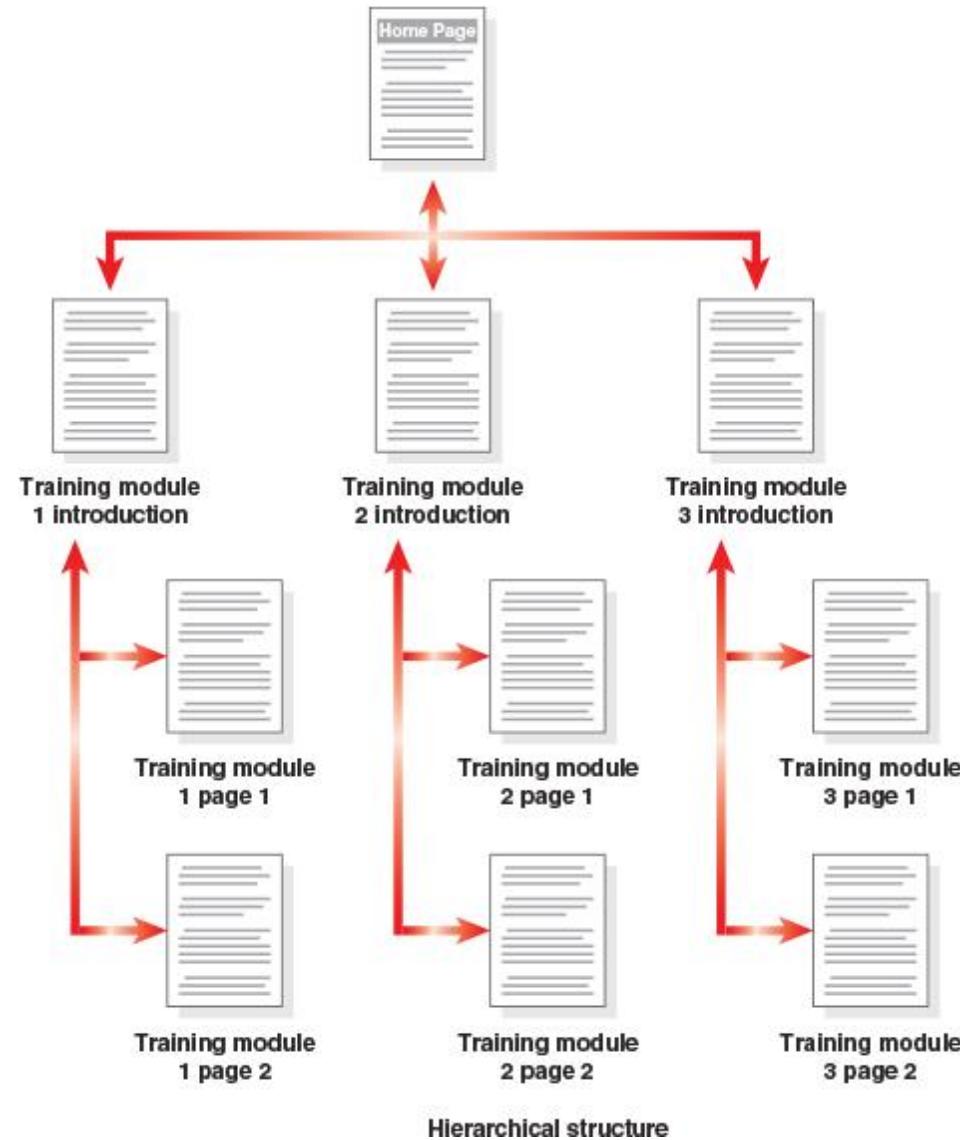
- A planning tool that lists or displays all the pages on a website

- Indicates how they are related to each other

- Shows the structure of a website
  - A linear website structure connects webpages in a straight line
    - In a variation of a linear website structure, each page can include a link to the home page of the website
  - A hierarchical website connects webpages in a treelike structure
  - A webbed website structure has no set organisation

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Site Map – Linear Structure

Figure 1-13

Home Page   Training module 1   Training module 2   Training module 3

Linear structure

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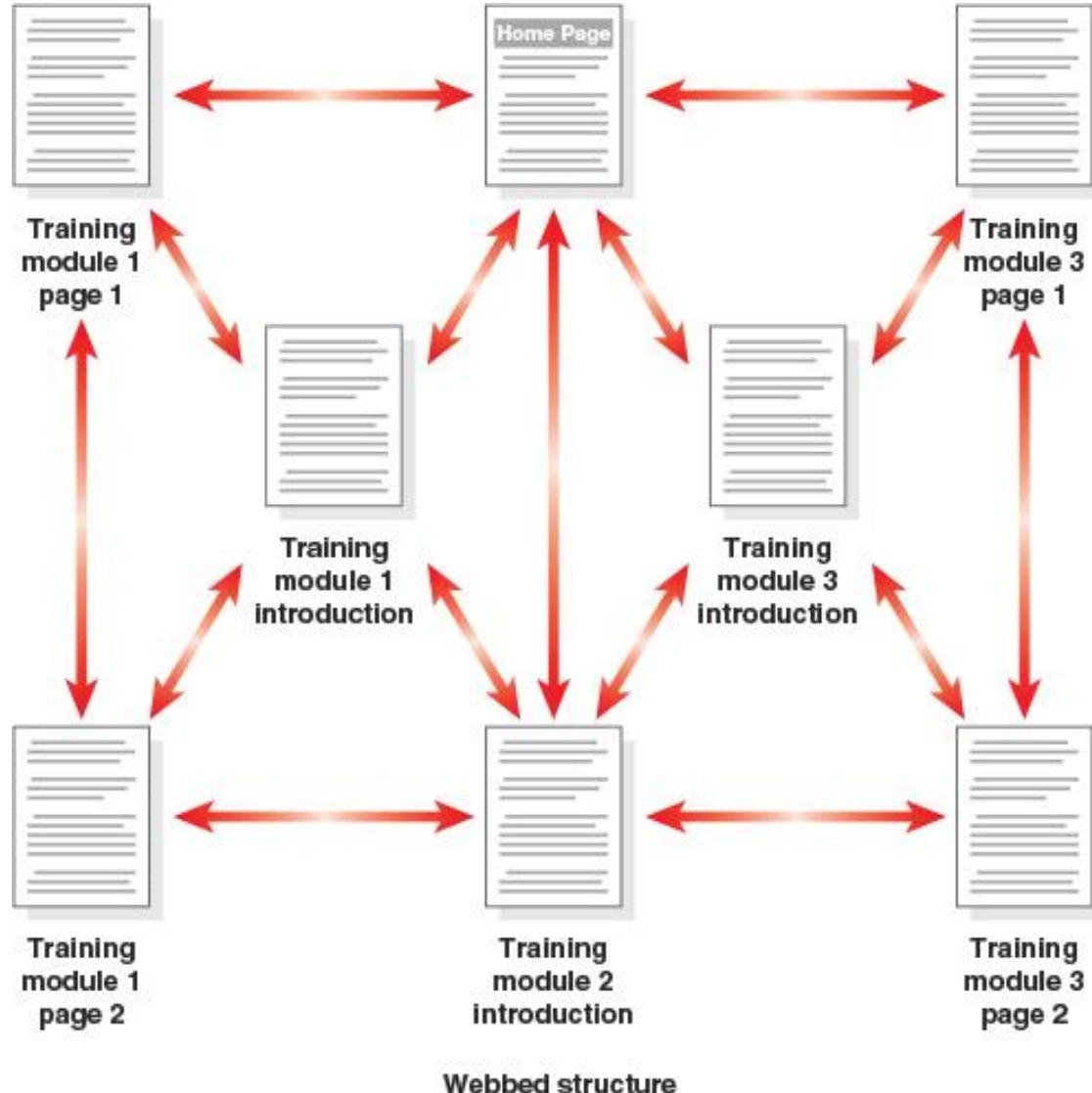
Site Map - Hierarchical Structure

Figure 1-15

Site Map - Webbed Structure

Figure 1-16

Training module 1 page 1

Home Page

Training module 3 page 1

Training module 1 introduction

Training module 3 introduction

Training module 1 page 2

Training module 2 introduction

Training module 3 page 2

Webbed structure

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Graphics

- Graphics add visual appeal to a webpage and enhance the visitor's perception of the products and services
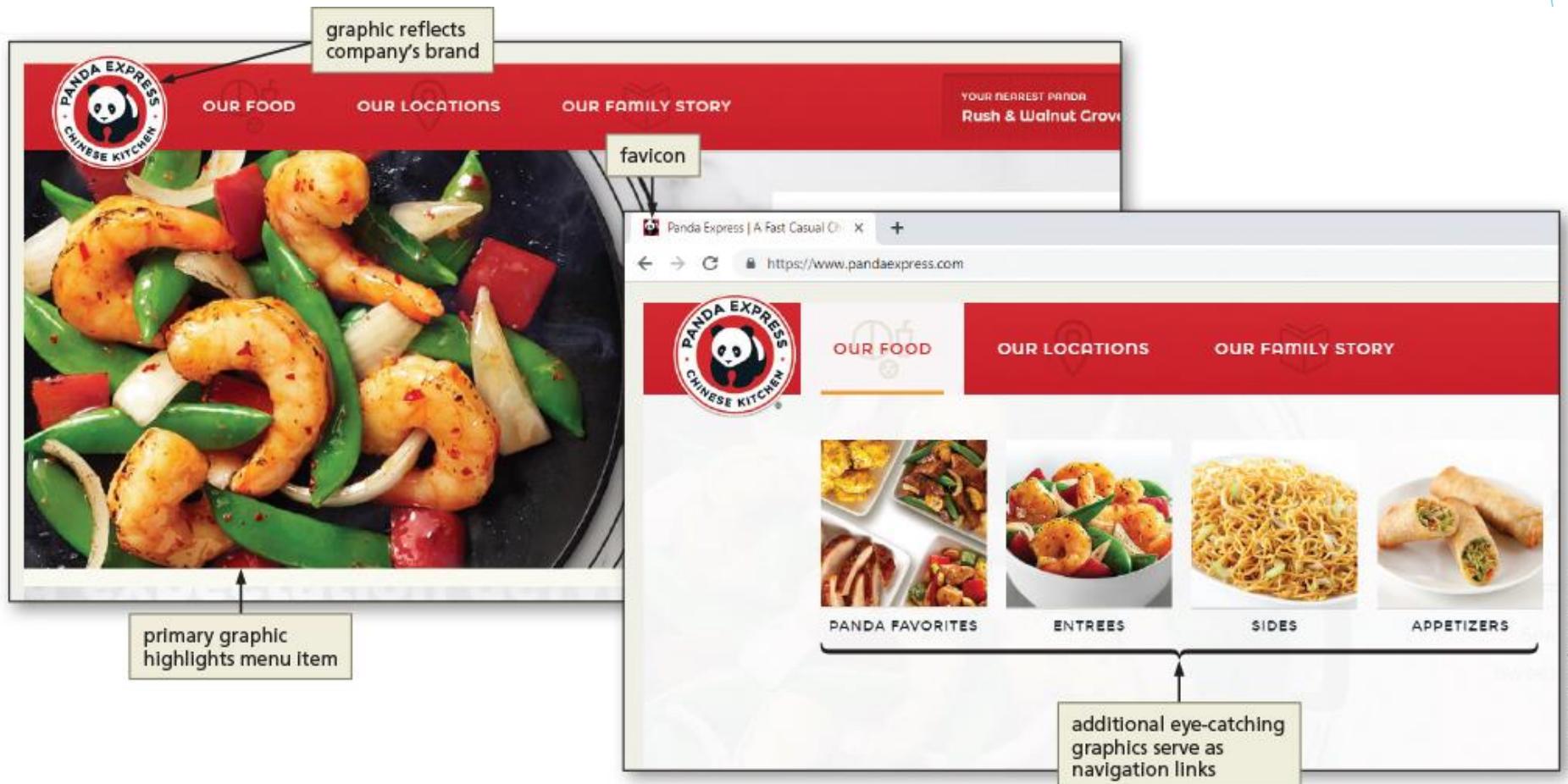
Figure 1-17

Navigation

- The navigation of a website should be clear and concise
  - Each webpage should have a designated navigation area with links to other pages in the site
  - Navigation area should be prominent and easy to use

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Typography

- The use of effective typography, or fonts and font styles, enhances the visual appeal of a website

- Typography should promote the purpose and goal of the website

- Different fonts evoke different feelings / meanings

Colour

- The combination of colours contributes to the appeal and legibility of a website

- Aim to strike a balance among the background colour, text colour, and the colour that represents a brand

- Colours convey meanings

Colour

Colour	Common Meaning
Red	Love, romance, anger, energy
Blue	Trust, loyalty, integrity, honesty, dependability
Green	Freshness, friendliness, health, safety, strength
Yellow	Warmth, cheer, joy, excitement, humour
Orange	Energy, warmth, health
Brown	Nature, wholesomeness, simplicity, friendliness
Black	Elegance, tradition, sophistication, formality
White	Purity, honesty, sincerity, cleanliness

Table 1-2: Common Colour Meanings

Accessibility

- A web designer should create pages for viewing by a diverse audience, including people with physical impairments, and global users
    - The World Wide Web Consortium (W3C) develops and maintains web standards, language specifications, and accessibility recommendations
- Making your site accessible to visitors with specific limitations enhances your site generally
    - E.g., making your text "real" instead of an image of text is better for viewers with visual impairments but *also* for robots like Google search indexing

Accessibility Standards for Web Developers

- According to W3C, the goal of the web is to be accessible to all people, including those with a disability that limits their ability to perform computer tasks
  - The Rehabilitation Act of 1973 prohibits discrimination against those with disabilities
- WCAG 2.0 and 2.1 guidelines are organised under four principles
  - Perceivable
  - Operable
  - Understandable
  - Robust

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Planning Checklist

- Navigation, typography, colour, layout and accessibility are some basic design criteria to consider when developing a website

- A sophisticated website requires additional design considerations and research of the business and its competition

Webpages are created using Hypertext Markup Language (HTML)

- HTML is an authoring language used to create documents for the web
  - Markup language, not a programming language
- Consists of a set of special instructions called elements (tags) used to define the structure and layout of content in a webpage
- An HTML file is a text file

HTML Elements and Attributes

- HTML combines tags (elements) and descriptive attributes that define how a document should appear in a web browser
  - HTML **elements** include headings, paragraphs, hyperlinks, lists, and images, have a start tag and an end tag, and follow the same rules, or syntax
  - HTML **attributes** define additional characteristics, or properties, of an element

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HTML Elements and Attributes
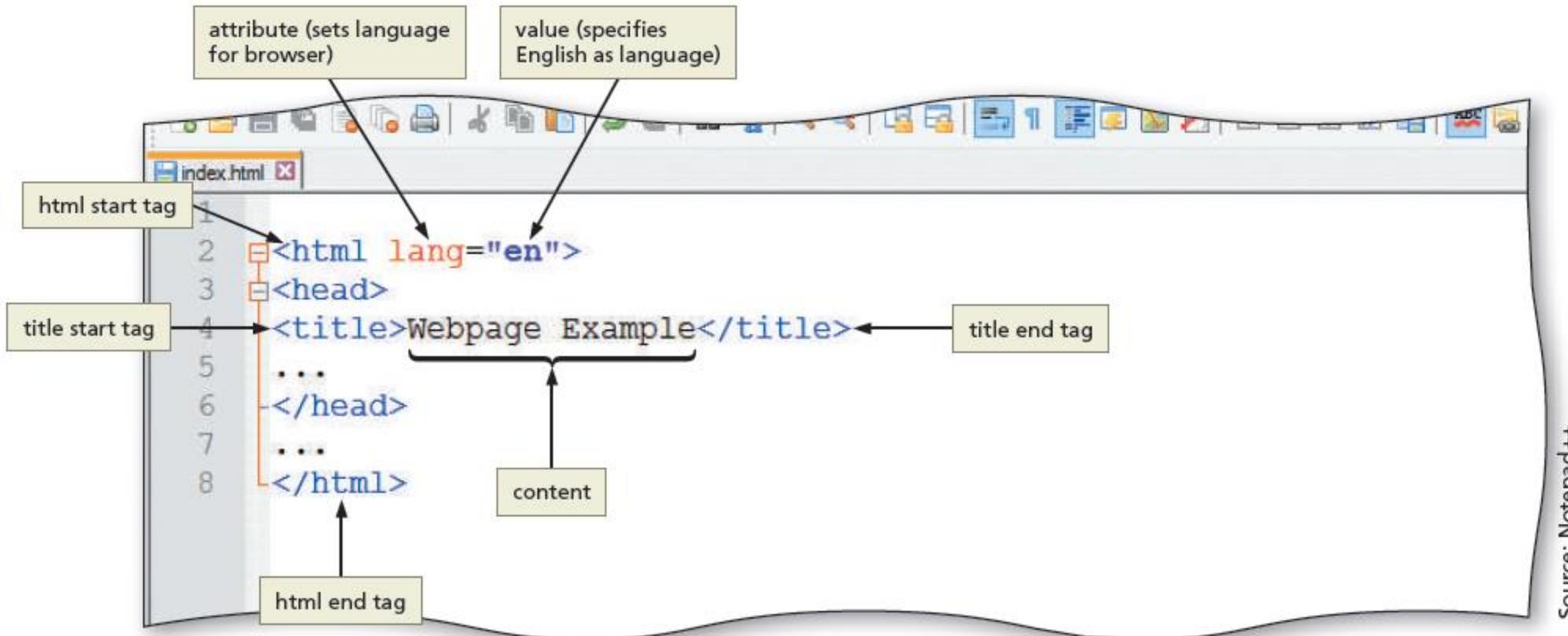
Figure 1-21

HTML Elements and Attributes

- 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

`<p>This is a paragraph</p>`

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HTML Elements and Attributes

- 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>

HTML Elements and Attributes

Figure 1-22

start paragraph tag

content of first paragraph

end paragraph tag

second paragraph

line break tag in third paragraph

horizontal rule tag

fourth paragraph

Source: Notepad++

```html
<!DOCTYPE html>
<html lang="en">
<head>
<title>Webpage Example</title>
<meta charset="utf-8">
</head>
<body>
<p>This webpage example uses the basic HTML tags.</p>
<p>This webpage example also uses paragraph tags.</p>
<p>This paragraph uses a line break after the word break<br>
to insert a new blank line.</p>
<hr>
<p>A horizontal rule is the line that appears above this paragraph.</p>
</body>
</html>
```

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HTML Elements and Attributes

webpage title

HTML code rendered in a browser

first paragraph

second paragraph

line break inserted in third paragraph

thematic break

fourth paragraph

Webpage Example

File | E:/index.html

This webpage example uses the basic HTML elements to create this page.

This webpage example also uses paragraph elements.

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

The line that appears above this paragraph is used to define a thematic break within an HTML page.

Courtesy of Google Chrome

▶ Figure 1-23

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Technologies Related to HTML

- XML: W3C introduced XML (Extensible Markup Language) in 1998 to exchange and transport data

- XHTML (eXtensible Hypertext Markup Language): rewritten version of HTML using XML that was developed in 2000 and is accepted on mobile device platforms

HTML 5

- Introduced several new elements such as header, nav, main, and footer to better define the areas of a webpage
  - Classified as structural elements because they define the structure of a webpage
  - Also known as semantic HTML elements because they provide meaning about the content of the tags

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# Understanding the Role of Other Web Programming Languages
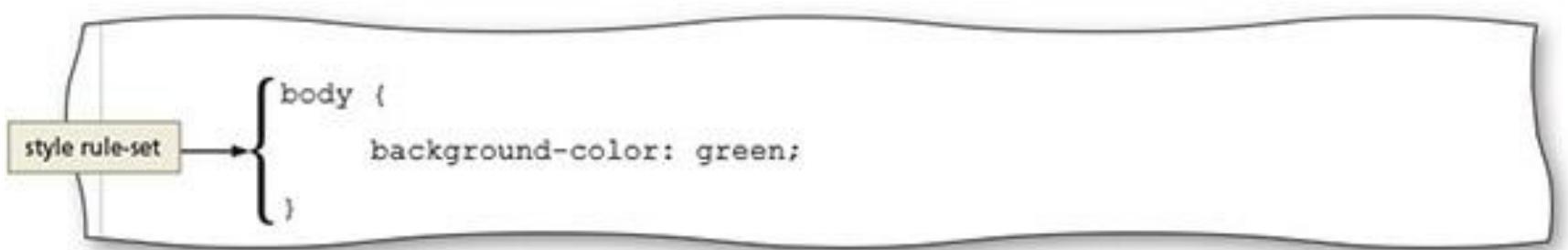
- JavaScript: popular client-side scripting language used to create interactivity within a web browser
  - The webpages that contain JavaScript are named with an .htm or .html extension
- jQuery: library of JavaScript programs designed for easy integration onto a webpage
  - Makes it easy for web developers to add JavaScript to a webpage

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Understanding the Role of Other Web Programming Languages

- PHP (PHP Hypertext Preprocessor): 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): server-side scripting technology
  - Pages that contain ASP scripts must have file names that end with the file extension .asp

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Use CSS to style your HTML/content

- CSS (Cascading Style Sheets) is the language used to change how content appears

- Style rules define the appearance of an HTML element

- Style sheet is a set of CSS style rules


```
style rule-set ──→ { body {
                       background-color: green;
                     }
```

▶ Figure 4-5

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Separate form and function
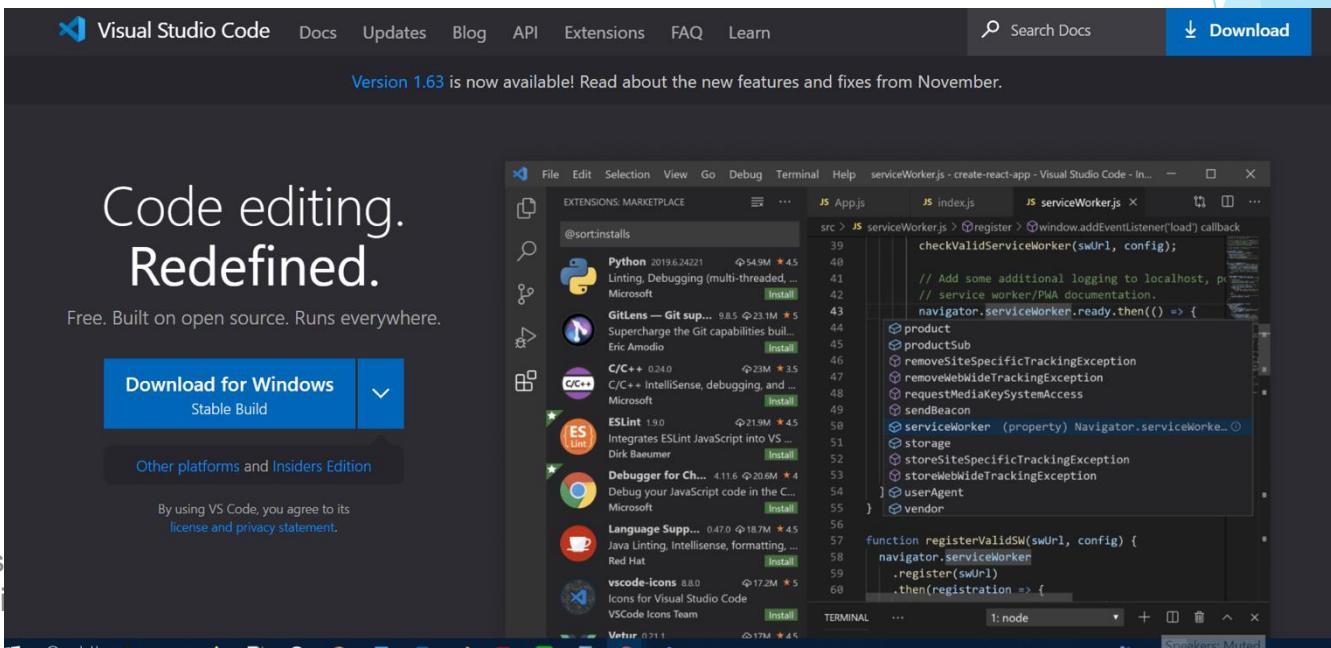
- Content & Structure = **HTML**
- Style = **CSS**
- Dynamic Functionality = **JavaScript, PHP, DB…**

- These should be used appropriately
  - don't inextricably link content and style.

- E.g. make headings headings
  - Top-level headings must be <h1>, content is structured correctly
  - **Then** change the *style* to make it look like whatever you want
    … i.e. if it's too big, don't make it <h2>… that's incorrect

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Using Web Authoring Tools

- Webpages can be created using HTML with any text editor, such as Notepad++ or Visual Studio Code
  - A text editor program 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 colour-coding for various HTML tags, menus to insert HTML tags, and a spelling checker
    - HTML is platform-independent

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Text Editors

- Notepad++ is free open-source (Windows)
  - Used to create files in several markup, scripting, and programming languages, including HTML, CSS, JavaScript, PHP, Java, C#, and Visual Basic

- Visual Studio Code is a very popular cross-platform code editor that can be extended

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WYSIWYG and Online Code Editors

- WYSIWYG editors (What You See Is What You Get)
  - These editors provide a graphical user interface to design a webpage
  - They allow users to drag HTML elements onto the page while the editor writes the code
  - Adobe Dreamweaver is a popular WYSIWYG editor

- Online code editors
  - No software installation required

Creating a Basic Webpage

- Every HTML webpage includes basic HTML tags
- Refer to the text to review the steps provided:
  - Start your editor and create a blank document
  - Add basic HTML tags to a document
  - Add a title and text to a webpage
  - Save a webpage
  - View a webpage in a browser

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Chapter Summary

- In this chapter, you learned about:
  - Internet, the web, and associated technologies, including web servers and web browsers
  - Goal-driven websites
  - Planning a website
  - Essential roles of HTML in creating webpages and tools used to create HTML documents
  - How to create a basic HTML webpage