# 10

# Web Development

## Chapter Objectives

In this chapter, you will learn how to . . .

- Describe the skills, functions, and job roles needed to develop a successful web project
- Utilize the stages in the standard System Development Life Cycle
- Identify other common system development methodologies
- Apply the System Development Life Cycle to the development of web projects
- Identify opportunities and determine goals during the Conceptualization phase
- Determine information topics and site requirements during the Analysis phase
- Create the site map, page layout, prototype, and documentation as part of the Design phase
- Complete the web pages and associated files during the Production phase
- Verify the functionality of the website and use a test plan during the Testing phase
- Obtain client approval and launch a website
- Modify and enhance the website during the Maintenance phase
- Compare the goals of the website to the results as part of the Evaluation phase
- Find the right web hosting provider for your website
- Choose a domain name for your website

**This chapter discusses the skills needed** for successful large-scale project development and introduces you to common web development methods, choosing a domain name, and options for hosting a website.

# 10.1 Successful Large-Scale Project Development

Large-scale projects are not completed by only one or two individuals. They are created by a group of people working together as a team. The job roles of project manager, information architect, marketing representative, copywriter, editor, content manager, graphic designer, database administrator, network administrator, and web developer/designer are usually needed for large projects. In smaller companies or organizations, each person can wear many hats and juggle his or her job roles. For a smaller-scale project, one of the web developers may double as the project manager, web designer, graphic designer, database administrator, and/or information architect. It is important to realize that each project is unique; each has its own needs and requirements. Choosing the right people to work on a web project team can make it or break it.

## Project Job Roles

### Project Manager

The **project manager** oversees the website development process and coordinates team activities. The project manager creates the project plan and schedule. This individual is accountable for reaching project milestones and producing results. Excellent organizational, managerial, and communication skills are required.

### Information Architect

The **information architect** clarifies the mission and goals of the site; assists in determining the functionality of the site; and is instrumental in defining the site organization, navigation, and labeling. Web developers and/or the project manager sometimes take on this role.

### User Experience Designer

User experience (UX) is the user's interaction with a product, application, or website. A **user experience designer**, referred to as a **UX designer**, focuses on the user's interaction with the website. The UX designer may be involved with prototypes, conduct usability testing, and in some cases may work with information architecture. In a small project the project manager, web developer, or web designer may also take on the role of a UX designer.

### Marketing Representative

The **marketing representative** handles the organization's marketing plan and goals. He or she works with the web designers to create a **web presence**, or a look and feel, that aligns with the marketing goals of the organization. The marketing representative also helps to coordinate the website with other media used for marketing, such as print, radio, and television marketing.

### Copywriter and Editor

The **copywriter** prepares and evaluates copy. When material from existing brochures, newsletters, and white papers will be used on the website, it must be repurposed or reworked for the web media. An **editor** may work with the copywriter to check the text for correct grammar and consistency.

### Content Manager

The **content manager** participates in the strategic and creative development and enhancement of the website. He or she oversees changes in content. The skill set of a successful

content manager includes editing, copywriting, marketing, technology, and communications. The person in this dynamic job role must be able to facilitate change.

### Graphic Designer

The **graphic designer** determines the appropriate use of color and graphics on the site, designs wireframes and page layouts, creates logos and graphic images, and optimizes images for display on the Web.

### Database Administrator

A **database administrator** is needed if the site accesses information stored in databases. Database administrators create databases, create procedures to maintain databases (including backup and recovery), and control access to databases.

### Network Administrator

The **network administrator** configures and maintains the **web server**, installs and maintains system hardware and software, and controls access security.

### Web Developer/Web Designer

The job titles of web developer and web designer are often used interchangeably, but typically a web developer has more of a coding and scripting focus and a web designer has more of a design and graphics focus. The **web designer** writes HTML and CSS code and may fulfill some graphic designer job duties, such as determining the appropriate use of color, designing wireframes and page layouts, creating logos and graphics, and optimizing images for display on the Web. The **web developer**, sometimes referred to as a **front-end web developer**, writes HTML, CSS, and client-side scripting such as JavaScript. Some web developers may specialize in writing server-side scripting with database access. Typically, there are multiple web designers and web developers assigned to a large project, each with his or her area of expertise.

## Project Staffing Criteria

Whether the project is large or small, finding the right people to work on it is crucial. When selecting staff for a project, consider each individual's work experience, portfolio, formal education, and industry certifications.

Another option for staffing a web project (or developing an entire website) is to outsource the project—that is, hire another company to do the work for you. Sometimes portions of a project are outsourced, such as graphics creation, multimedia animation, or server-side scripting. When this option is chosen, communication between the project manager and the external organization is crucial. The outsourcing team needs to be aware of the project goals and deadlines.

Large or small, developed in-house or outsourced, the success of a website project depends on planning and communication. Formal project development methodology is used to coordinate and facilitate the planning and communication needed for a successful web project.

# 10.2 The Development Process

Large corporate and commercial websites don't just happen. They are carefully built, usually by following a project development methodology. A methodology is a step-by-step plan that encompasses the life cycle of a project from start to finish. It comprises a series of **phases**,

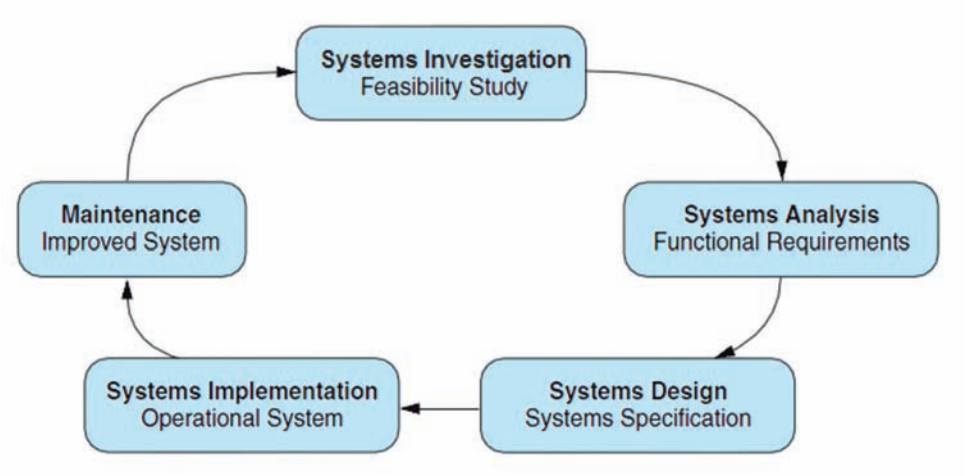



**Figure 10.1** The System Development Life Cycle (SDLC)

each having specific activities and deliverables. Most modern methodologies have their roots in the **System Development Life Cycle (SDLC)**, a process that has been used for several decades to build large-scale information systems. The SDLC comprises a set of phases, sometimes called steps or stages. Each phase is usually completed before beginning the activities in the next phase. The basic phases of the standard SDLC (see Figure 10.1) are systems investigation, systems analysis, systems design, systems implementation, and maintenance.

Websites are often developed using a variation of the SDLC that is modified to apply to web projects. Large companies and web design firms usually create their own special methodology for use on projects. The Website Development Cycle is a guide to successful web project management. Depending on the scope and complexity of a particular project, some steps can be completed in a single meeting; other steps can take weeks or months.

The Website Development Cycle, shown in Figure 10.2, usually consists of the following steps: Conceptualization, Analysis, Design, Production, Testing, Launch, Maintenance, and Evaluation.

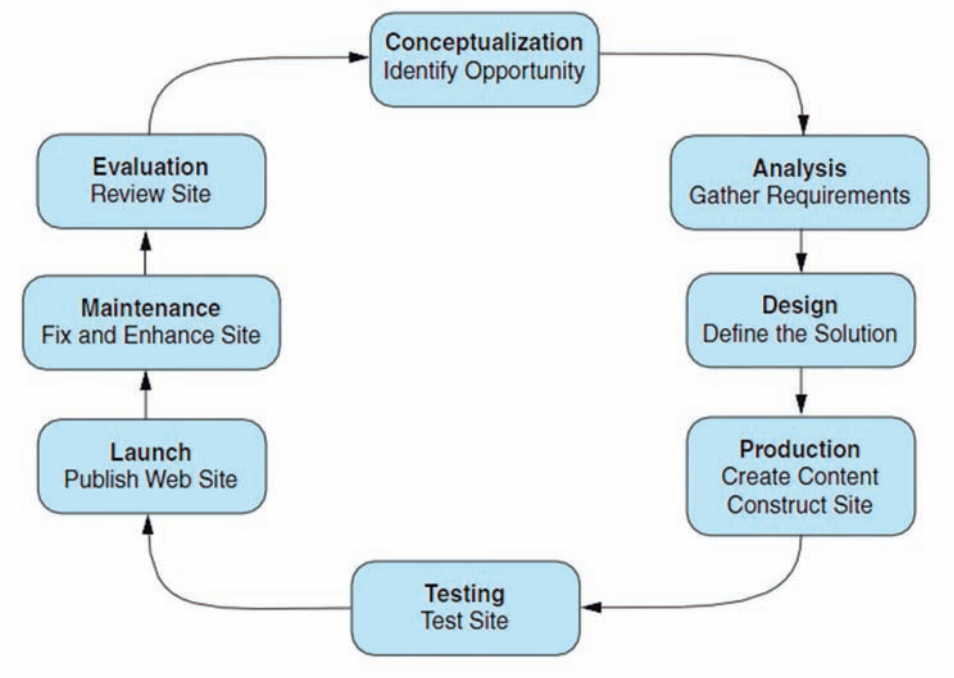



**Figure 10.2** The Website Development Cycle

### FAQ What about other development methodologies?

The development methodology presented in this chapter is a version of the traditional SDLC modified for website development. Other development methods include the following:

- **Prototyping.** A small working model is created and shown to the client. It is continually revised by the developer until it is usable for the intended purpose. This method can easily be included in the Website Development Cycle during the Design phase.
- **Spiral System Development.** This is excellent for very-large-scale or phased projects where it is important to reduce risk. Small portions of the project are completed one after another in a spiral system of development.
- **Joint Application Development (JAD).** This type of development focuses on group meetings and collaboration between the users and developers of a website or system. It is generally used only with in-house development.
- **Agile Software Development.** This development methodology is viewed as innovative in that it stresses responsiveness based on generating and sharing knowledge within a development team and with the client. The philosophy emphasizes code over documentation and results in the project being developed in many small, iterative steps.
- **Organization-Specific Development Methodologies.** Large companies and web development firms often create their own version or interpretation of a site development methodology to be used for projects.

An important aspect of website development is that you are never finished—your site needs to be kept fresh and up-to-date, there will be errors or omissions that need to be corrected, and new components and pages will be needed. The first step is to decide why the website is needed in the first place.

## Conceptualization

What opportunity or issue is the site addressing? What is the motivation for the site? Perhaps your client owns a retail store and wishes to sell products over the Internet. Perhaps your client's competitor just launched a website and your client needs to create one just to keep up. Perhaps you have a great idea that will be the next eBay!

Because the focus of your work is to make the site usable and appealing to your target audience, you must determine the site's intended audience. It is crucial to be aware of who your audience is and what their preferences are.

Another task during **conceptualization** is to determine the site's long-term and short-term goals or mission. Perhaps a short-term goal is simply to publish a home page. Perhaps a long-term goal is for 20% of a company's product sales to be made on the website or you may simply want a certain number of website visitors each month. Whatever they are, it is better if the objectives are measurable. Decide how you will measure the success (or failure) of your website.

Determining the purpose and goals of a site is usually done with the cooperation of the client, project manager, and information architect. In a formal project environment, a document that details the results of this step is created and then approved by the client before development can proceed.

## Analysis

The Analysis phase involves meetings and interviews with key client personnel. **Analysis** is usually completed by the project manager, information architect or other analyst, and the client's marketing representative and related personnel. The network administrator and database administrator may be interviewed depending on the scope of the project. Common tasks completed during the Analysis phase are as follows:

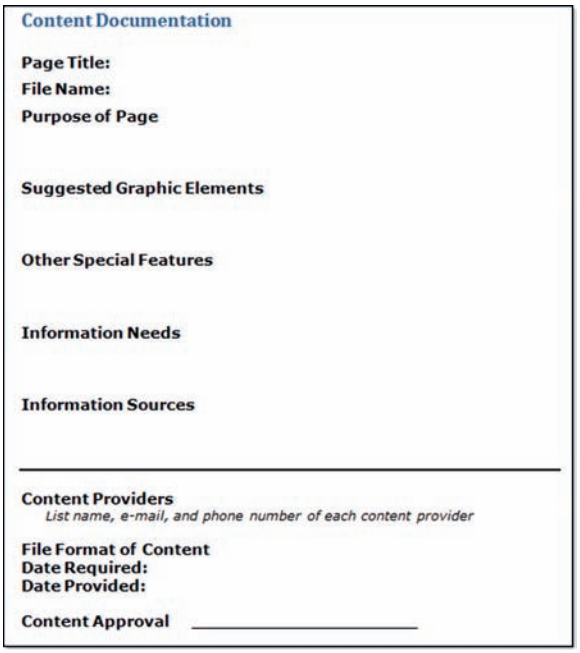
- **Determine Information Topics.** Organize the information to be presented on the site into categories and create a hierarchy. These **information topics** will be used later as a starting point for developing the site navigation.
- **Determine Functionality Requirements.** State what the site will do, not how it will do it. For example, state that "the site will accept credit card orders from customers," not "the site will perform order processing using PHP to look up each price and sales tax information in MySQL databases and use real-time credit card verification supplied by somewebsite.com." Note the difference in the level of detail in these **functionality requirements**.
- **Determine Environmental Requirements.** What **environmental requirements**, such as hardware, operating system, memory capacity, screen resolution, and bandwidth, will your site visitors use? What type of hardware and software requirements will the web server need?
- **Determine Content Requirements.** Does content already exist in another format (for example, brochures, catalogs, white papers)? Determine who is responsible for creating and repurposing the content for the site. Does the client company or marketing department have any **content requirements** that must be met? For example, is there a specific visual aesthetic or corporate branding component that must be present on the site?
- **Compare the Old Approach to the New Approach.** Perhaps you are not creating a new website, but modifying an existing one. What benefits or added value will the new version provide?
- **Review Your Competitors' Sites.** A careful review of your competitors' web presence will help you design a site that will stand out from the crowd and be more appealing to your shared customer base. Note the good and bad components of these sites.
- **Estimate Costs.** Create an estimate of the costs and time involved to create the site. A formal project plan is often created or modified at this point. Often, an application such as Microsoft Project is used to estimate costs and plan project schedules.
- **Do a Cost/Benefit Analysis.** Create a document that compares the costs and benefits of the site. Measurable benefits are the most useful and most appealing to clients. In a formal project environment, a document that details the results of this **cost/benefit analysis** must be approved by the client before the team can proceed.

## Design

Once everyone knows what is needed, it is time to determine how it can be accomplished. The Design phase involves meetings and interviews with key client personnel. **Design** tasks are usually completed by the project manager, information architect or other analyst,

graphic designer(s), senior web developer(s), and the client's marketing representative and related personnel. Common tasks during the Design phase include the following:

- **Choose a Site Organization.** As discussed in Chapter 5, common website organizational forms are hierarchical, linear, and random. Determine which is best for the project site and create a site map.
- **Design the Prototype.** As a starting point, sketch out the design on paper. Sometimes it's useful to sketch within an empty browser frame (see sketch.doc in the student files chapter10 folder). Often, a graphics application is used to create sample web page mock-ups, or wireframes. These can be shown to clients as a prototype, or working model, of the system for approval. They can also be shown to focus groups for usability testing.
- **Design a Page Layout.** Determine the visual aesthetic and layout with wireframes and sample page mock-ups. Items such as the site color scheme, the size of logo graphics, button graphics, and text should be determined. Using the page layout design and site map, create sample layouts for the home page and content pages. Use a graphic application to create mock-ups of these pages to get a good idea of how the site will function. If you use a web authoring tool at this early stage, you run the risk of your manager or client thinking that you already have the site half done and insisting on early delivery.
- **Document Each Page.** While this may seem unnecessary, lack of content is a frequent cause of website project delays. Prepare a content sheet for each page, such as the one shown in Figure 10.3 (see chapter10/contentsheet.doc in the student files), which describes the functionality of the document, text and graphic content requirements, source of content, and approver of content.


Content Documentation

Page Title:
File Name:
Purpose of Page

Suggested Graphic Elements

Other Special Features

Information Needs

Information Sources

Content Providers
*List name, e-mail, and phone number of each content provider*

File Format of Content
Date Required:
Date Provided:

Content Approval _____

**Figure 10.3**
Sample content sheet

The site map and page design prototypes are usually approved by the client before the team can progress to the Production phase.

## Production

During **production**, all the previous work comes together (hopefully) in a usable and effective website. During the Production phase, the web designers and web developers are on the critical path—their work must be completed as scheduled or the project will be late. The other project members are consulted, as needed, for clarification and approval. Common tasks of the Production phase include the following:

- **Choose a Web Authoring Tool.** The use of a web authoring tool, such as Adobe Dreamweaver, can greatly increase productivity. Specific productivity aids include designer notes, page templates, task management, and web page check-in and check-out to avoid overlapping page updates. The use of an authoring tool will serve to standardize the HTML used in the project pages. Any standards related to indentation, comments, and so on should be determined at this time.
- **Organize Your Site Files.** Consider placing images and media in their own folder. Also, place server-side scripts in a separate folder. Determine naming conventions for web pages, images, and media.
- **Develop and Individually Test Components.** During this task, the graphic designers and web developers create and individually test their contributions to the site. As the images, web pages, and server-side scripting are developed, they are individually tested. This is called **unit testing**. On some projects, a senior web developer or the project manager will review the components for quality and standards compliance.

Once all components have been created and unit tested, it's time to put them together and begin the Testing phase.

## Testing

The components should be published to a test web server. This test web server should have the same operating system and web server software that the production (actual) web server will be using. Some common site **testing** considerations follow:

- **Test on Different Browsers and Browser Versions.** It is very important to test your pages on commonly used browsers and versions of those browsers.
- **Test with Different Screen Resolutions.** Although, as a web developer, you may use a very high screen resolution, not everyone uses 2560×1440 screen resolution. The most commonly used screen resolutions at the time of this writing are 1366×768, 1920×1080, and 1024×768. Be sure to test your web pages on various resolutions—you might be surprised at the results.
- **Test Using Different Bandwidths.** If you live and work in a metropolitan area, everyone you know may have broadband access to the Internet. However, many people still use dial-up connections to access the Web. It is important to test your site on both slow and fast connections. Images that look great over your school's T3 line may load very slowly over a mobile hotspot.
- **Test from Another Location.** Be sure to test your website using a computer other than the one the website was developed on, in order to simulate the web page visitor's experience more closely.

- **Test Using Mobile Devices.** Mobile use of the Web is increasing all the time—test your site on one or more of the currently popular smartphones. See Chapter 7 for mobile web testing tools.
- **Test, Test, Test.** There is no such thing as too much testing. Humans make mistakes. It is much better for you and your team to find the errors than for your client to point them out to you when they review the website.

Does this sound like a lot to keep track of? It is. That's why it's a good idea to create a **test plan**, which is a document that describes what will be tested on each page of a website. A sample test plan for a web page, shown in Figure 10.4 (see chapter10/testplan.pdf in the student files), can help you organize your testing as you check your document in different browsers and screen resolutions. The document validation section covers content, links, and any forms or scripting that are required for the page. Search engine optimization meta tags are discussed in Chapter 13. However, at this point, you should be able to verify that the page title is descriptive and includes the company or organization's name. Testing your page using different bandwidths is important because web pages that take too long to download are often abandoned.

**Web Page Document Test Plan**

| File Name: | | | | | | | | | | Date: | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Page Title: | | | | | | | | | | Tester: | |

**Browser Compatibility**

| | 1024x768 | 1366x768 | 1920x1080 | Other | PC | Mac | Linux | Images Disabled | CSS Disabled | Other | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Internet Explorer (Version #) | | | | | | | | | | | |
| Internet Explorer (Version #) | | | | | | | | | | | |
| Firefox (Version #) | | | | | | | | | | | |
| Safari (Version #) | | | | | | | | | | | |
| Opera (Version #) | | | | | | | | | | | |
| Chrome (Version #) | | | | | | | | | | | |
| JAWS Screen Reader | | | | | | | | | | | |
| Tablet (Device Name) | | | | | | | | | | | |
| Smartphone (Device Name) | | | | | | | | | | | |
| Other | | | | | | | | | | | |

**Document Validation**

| | Pass | Fail | Notes |
|---|---|---|---|
| HTML Validation | | | |
| CSS Validation | | | |
| Check Spelling | | | |
| Check for Required Content | | | |
| Check for Required Graphics | | | |
| Check alt Attributes | | | |
| Test Hyperlinks | | | |
| Accessibility Testing | | | |
| Form Processing | | | |
| Scripting/Dynamic Effects | | | |
| Usability Testing | | | |
| Other | | | |

**Search Engine Optimization**

| | Notes |
|---|---|
| Meta tag (description) | |
| Keywords in page title | |
| Keywords in headings | |
| Keywords in content | |
| Other | |

**Download Time Check**

| | Time | Notes |
|---|---|---|
| 56.6Kbps | | |
| 128Kbps | | |
| 512Kbps | | |
| T1/DS1 (1.544Mbps) | | |
| Other | | |

**Notes**

**Figure 10.4**
Sample test plan

## Automated Testing Tools and Validators

The web authoring tool you use for your project will provide some built-in site reporting and testing features. Web authoring applications such as Adobe Dreamweaver provide functions such as spell-check, link checks, and load time calculations. Each application has unique features. Dreamweaver's reporting includes link checking, accessibility, and code validation. There are other **automated testing** tools and **validators** available. The W3C Markup Validation Service (http://validator.w3.org) can be used to validate both HTML and XHTML. Test CSS for proper syntax using the W3C CSS Validation Service

(http://jigsaw.w3.org/css-validator). Analyze the download speed of your page using the Web Page Analyzer (http://www.websiteoptimization.com/services/analyze).

## Accessibility Testing


**Accessible** web pages can be used by all individuals, including those with visual, hearing, mobility, and cognitive challenges. As you've worked through this book, accessibility has been an integral part of your web page design and coding rather than an afterthought. You've configured headings and subheadings, navigation within unordered lists, images with alternate text, and associations between text and form controls. These techniques all increase the accessibility of a web page.

### Web Accessibility Standards

**Section 508 of the Rehabilitation Act.** Section 508 (http://www.access-board.gov/sec508/guide/1194.22.htm) requires electronic and information technology, including web pages, that are used by U.S. federal agencies to be accessible to people with disabilities. At the time this was written, the Section 508 standards were undergoing revision. New proposed Section 508 requirements were aligned to WCAG 2.0 guidelines and released for comment in 2015.

**Web Content Accessibility Guidelines (WCAG 2.0).** WCAG 2.0 (http://www.w3.org/TR/WCAG20) considers an accessible web page to be perceivable, operable, and understandable for people with a wide range of abilities. The page should be robust enough to work with a variety of browsers and other user agents, such as assistive technologies (for example, screen readers) and mobile devices. The guiding principles of WCAG 2.0 are known as POUR:

1. Content must be **P**erceivable.
2. Interface components in the content must be **O**perable.
3. Content and controls must be **U**nderstandable.
4. Content should be **R**obust enough to work with current and future user agents, including assistive technologies.

Prove your compliance with accessibility standards by performing **accessibility testing** on your site. There are a variety of accessibility checkers available. WebAIM Wave (http://wave.webaim.org) and ATRC AChecker (http://www.achecker.ca/checker) are two popular free online accessibility evaluation tools. Several browser toolbars are available that can be used to assess accessibility, including the Web Developer Extension (http://chrispederick.com/work/web-developer), WAT-C Web Accessibility Toolbar (http://www.wat-c.org/tools), and the Web Accessibility Toolbar for IE (http://www.paciellogroup.com/resources/wat/ie).

It's important not to rely completely on automated tests—you'll want to review the pages yourself. For example, while an automated test can check for the presence of an alt attribute, it takes a human to critically think and decide whether the text of the alt attribute is an appropriate description for a person who cannot view the image.

## Usability Testing

**Usability** is the measure of the quality of a user's experience when interacting with a website. It's about making a website that is easy, efficient, and pleasant for your visitors.

Usability.gov (http://www.usability.gov/what-and-why/usability-evaluation.html) describes factors that affect the user's experience:

- **Intuitive Design.** How easy is it for a new visitor to understand the organization of the site? Is the navigation intuitive for a new user?
- **Ease of Learning.** How easy is it to learn to use the website? Does a new visitor consider it easy to learn to perform basic tasks on the website or is he or she frustrated?
- **Efficiency of Use.** How do experienced users perceive the website? Once they are comfortable, are they able to complete tasks efficiently and quickly or are they frustrated?
- **Memorability.** When a visitor returns to a website, does he or she remember enough to use it productively or is the visitor back at the beginning of the learning curve (and frustrated)?
- **Error Frequency and Severity.** Do website visitors make errors when navigating or filling in forms on the website? Are they serious errors? Is it easy to recover from errors or are visitors frustrated?
- **Subjective Satisfaction.** Do users like using the website? Are they satisfied? Why or why not?

Testing how actual web page visitors use a website is called **usability testing**. It can be conducted at any phase of a website's development and is often performed more than once. A usability test is conducted by asking users to complete tasks on a website, such as placing an order, looking up the phone number of a company, or finding a product. The exact tasks will vary depending on the website being tested. The users are monitored while they try to perform these tasks. They are asked to think out loud about their doubts and hesitations. The results are recorded and discussed with the web design team. Often, changes are made to the navigation and page layouts based on these tests. Perform the small-scale usability test in Hands-On Exercise 5 at the end of this chapter to become more familiar with this technique.

If usability testing is done early in the development phase of a website, it may use the paper page layouts and site map. If the development team is struggling with a design issue, sometimes a usability test can help to determine which design idea is the better choice. When usability is done during a later phase, such as the Testing phase, the actual website is tested. This can lead to confirmation that the site is easy to use and well designed, to last minute changes in the website, or to a plan for website enhancements in the near future.

## Launch

Your client—whether another company or another department in your organization—needs to review and approve the test website before the files are published to the live site. Sometimes this approval takes place at a face-to-face meeting. Other times, the test URL is given to the client and the client e-mails approval or requested changes.

Once the test website has been approved, it is published to your live production website (this is called a **launch**). If you think you are finished, think again! It is crucial to test all site components after publishing to make sure the site functions properly in its new environment. Marketing and promotional activities for the website (see Chapter 13) usually take place at this time.

## Maintenance

A website is never finished. There are always errors or omissions that were overlooked during the development process. Clients usually find many new uses for a website once they have one and request modifications, additions, and new sections (this is called site **maintenance**). At this point, the project team identifies the new opportunity or enhancement and begins another loop through the development process.

Other types of updates needed may be relatively small—perhaps a link is broken, a word is misspelled, or a graphic needs to be changed. These small changes are usually made as soon as they are noticed. The question of who makes the changes and who approves them is often a matter of company policy. If you are a freelance web developer, the situation is more straightforward—you will make the changes and your client will approve them.

## Evaluation

Remember the goals set for the website in the Conceptualization phase? During the **evaluation** phase, it's time to review them and determine whether your website meets them. If not, consider how you can enhance the site and begin another loop through the development process.

### Checkpoint 10.1

1. Describe the role of the project manager.
2. Explain why many different roles are needed on a large-scale web project.
3. List three different techniques used to test a website. Describe each technique in one or two sentences.

VideoNote
Choosing a Domain Name

# 10.3 Domain Name Overview

A crucial part of establishing an effective web presence is choosing a **domain name**; it serves to locate your website on the Internet. If your business or organization is new, then it's often convenient to select a domain name while you are deciding on a company name. If your organization is well established, choose a domain name that relates to your existing business presence. Although many domain names have already been purchased, there are still a lot of available options.

## Choosing a Domain Name

- **Describe Your Business.** Although there is a long-standing trend to use "fun" words as domain names (for example, yahoo.com, google.com, bing.com, woofoo.com, and so on), think carefully before doing so. Domain names for traditional businesses and organizations are the foundation of the organization's web presence and should include the business name or purpose.
- **Be Brief, If Possible.** While most people find new websites with search engines, some of your website visitors will type your domain name in a browser. A shorter domain name is preferable to a longer one—it's easier for your visitors to remember.

- **Avoid Hyphens (-).** Using the hyphen character (commonly called a dash) in a domain name makes it difficult to pronounce the name. Also, someone typing your domain name may forget the dash and end up at a competitor's site! If you can, avoid the use of dashes in a domain name.
- **There's More Than .com.** While the .com top-level domain name (TLD) is still the most popular for commercial and personal websites, consider also registering your domain name with other TLDs, such as .biz, .net, .us, .mobi, and so on. Commercial businesses should avoid the .org TLD, which is the first choice for nonprofit organizations. You don't have to create a website for each domain name that you register. You can arrange with your domain name registrar (for example, Register.com [http://www.register.com]) for the extra domain names to point visitors to the domain name where your website is located. This is called **domain name redirection**.
- **Brainstorm Potential Keywords.** Think about words that a potential visitor might type into a search engine when looking for your type of business or organization. This is the starting point for your list of **keywords**. If possible, work one or more keywords into your domain name (but still keep it as short as possible).
- **Avoid Trademarked Words or Phrases.** The U.S. Patent and Trademark Office (USPTO) defines a **trademark** as a word, phrase, symbol, or design, or a combination of words, phrases, symbols, or designs, that identifies and distinguishes the source of the goods of one party from those of others. A starting point in researching trademarks is the USPTO Trademark Electronic Search System (TESS); visit http://tess2.uspto.gov. See http://www.uspto.gov for more information about trademarks.
- **Know the Territory.** Explore the way your potential domain name and keywords are already used on the Web. It's a good idea to type your potential domain names (and related words) into a search engine to see what may already exist.
- **Verify Availability.** Check with one of the many **domain name registrars** to determine whether your domain name choices are available. A few of the many sites that offer domain name registration services are listed below:
  - Register.com: http://www.register.com
  - Network Solutions: http://www.networksolutions.com
  - GoDaddy.com: http://www.godaddy.com

  Each of these sites offers a search feature that provides you with a way to determine whether a potential domain name is available, and if it is owned, who owns it. Often the domain name is already taken. If that's the case, the sites listed previously will provide you with alternate suggestions that may be appropriate. Don't give up; a domain name is out there waiting for your business.

## Registering a Domain Name

Once you've found your perfect domain name, don't waste any time in registering it. The cost to register a domain name varies, but it is quite reasonable. The top rate for a .com 1-year registration is currently $35 (and there are numerous opportunities for discounts with multiyear packages or bundled web hosting services). It's perfectly okay to register a domain name even if you are not ready to publish your website immediately. There are

many companies that provide domain name registration services, as listed previously. When you register a domain name, your contact information (your name, phone number, mailing address, and e-mail address) will be entered into the WHOIS database and is available to anyone unless you choose the option for private registration. While there is usually a small annual fee for **private registration**, it shields your personal information from unwanted spam and curiosity seekers.

Obtaining a domain name is just one part of establishing a web presence. You also need to host your website somewhere. The next section introduces you to the factors involved in choosing a web host.

# 10.4 Web Hosting

Where is the appropriate place for your web project to "live"? Choosing the most appropriate web hosting provider for your business or client could be one of the most important decisions you make. A good web hosting service will provide a robust, reliable home for your website. A poor web hosting service will be a source of problems and complaints. Which would you prefer?

## Web Hosting Providers

A **web hosting provider** is an organization that offers storage for your website files along with the service of making them available on the Internet. Your domain name, such as webdevfoundations.net, is associated with an IP address that points to your website on the web server at the web hosting provider. It is common for web hosting providers to charge a setup fee in addition to the monthly hosting fee.

Hosting fees vary widely. The cheapest hosting company is not necessarily the one to use. Never consider using a free web hosting provider for a business website. These free sites are great for kids, college students, and hobbyists, but they are unprofessional. The last thing you or your client wants is to be perceived as unprofessional or not serious about the business at hand. As you consider different web hosting providers, try contacting their support phone numbers and e-mail addresses to determine just how responsive they really are. Word of mouth, web searches, and online directories such as Hosting Review (http://www.hosting-review.com) are all resources in your quest for the perfect web hosting provider.

### Types of Web Hosting

- **Virtual Hosting**, or shared hosting, is a popular choice for small websites (Figure 10.5). The web hosting provider's physical web server is divided into a number of virtual domains and multiple websites are set up on the same computer. You have the authority to update files in your own website space, while the web hosting provider maintains the web server computer and Internet connectivity.
- **Dedicated Hosting** is the rental and exclusive use of a computer and connection to the Internet that is housed on the web hosting company's premises. A dedicated server is usually needed for a website that could have a considerable amount of traffic, such as tens of millions of hits a day. The server can usually be configured and operated remotely from the client's company, or you can pay the web hosting provider to administer it for you.

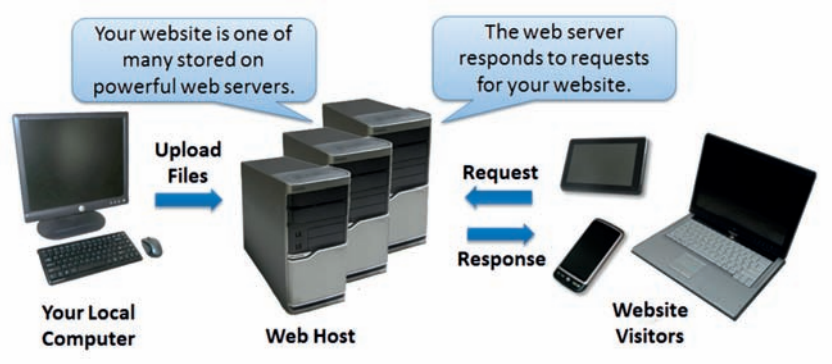



**Figure 10.5** Virtual web hosting

- **Co-Located Hosting** uses a computer that your organization has purchased and configured. Your web server is housed and connected to the Internet at the web host's physical location, but your organization typically administers this computer.

# 10.5 Choosing a Virtual Host

A number of factors to consider when choosing a web host have been discussed, including bandwidth, disk storage space, technical support, and the availability of e-commerce packages. For a handy list of these factors and others to consider in your quest for a virtual web host, review the web host checklist shown in Table 10.1.

**FAQ** **Why do I care about knowing which operating system my web hosting provider uses?**

Knowing the operating system used by your web hosting provider is important because it can help you with troubleshooting your website. Often, students' websites work great on their own PC (usually with a Windows-based operating system) but fall apart (with broken links and images that do not load) after being published on a free web server that uses a different operating system.

Some operating systems, such as Windows, treat uppercase and lowercase letters in exactly the same way. Other operating systems, such as UNIX and Linux, consider uppercase and lowercase letters to be different. This is called being **case-sensitive**. For example, when a web server running on a Windows operating system receives a request generated by an anchor tag coded as `<a href="Index.html">Home</a>`, it will return a file named with any combination of uppercase or lowercase letters. File names such as Index.html, index.html, and INDEX.HTML can all be used. However, when the request generated by the same anchor tag is received by a web server running on a UNIX system (which is case-sensitive), the file would only be found if it were really saved as Index.html. If the file were named index.html, a 404 Not Found error would result. This is a good reason to be consistent when naming files; consider always using lowercase letters for file names.

**Table 10.1** Web host checklist

| | | |
|---|---|---|
| Operating System | ❒ UNIX<br>❒ Linux<br>❒ Windows | Some web hosts offer a choice of these platforms. If you need to integrate your website with your business systems, choose the same operating system for both. |
| Web Server | ❒ Apache<br>❒ IIS | These two web server applications are the most popular. Apache usually runs on a UNIX or Linux operating system. Internet Information Services (IIS) is bundled with selected versions of Microsoft Windows. |
| Bandwidth | ❒ _____ GB per month<br>❒ _____ Charge for overage | Some web hosts carefully monitor your data transfer bandwidth and charge you for overages. While unlimited bandwidth is great, it is not always available. A typical low-traffic website may transfer between 100 and 500MB per month. A medium-traffic site should be okay with about 20GB of data transfer bandwidth per month. |
| Technical Support | ❒ E-mail<br>❒ Chat<br>❒ Forum<br>❒ Phone | Review the description of technical support on the web host's site. Is it available 24 hours a day, 7 days a week? E-mail or phone a question to test it. If the organization is not responsive to you as a prospective customer, be leery about the availability of its technical support later. |
| Service Agreement | ❒ Uptime guarantee<br>❒ Automatic monitoring | A web host that offers a **Service Level Agreement (SLA)** with an uptime guarantee shows that they value service and reliability. The use of automatic monitoring will inform the web host technical support staff when a server is not functioning. |
| Disk Space | ❒ _____ GB | Many virtual hosts routinely offer several gigabytes of disk storage space. If you have a small site that is not graphics-intensive, you may never even use 100MB of disk storage space. |
| E-mail | ❒ _____ Mailboxes | Most virtual hosts offer multiple e-mail boxes per site. These can be used to filter messages (customer service, technical support, general inquiries, and so on). |
| Uploading Files | ❒ FTP Access<br>❒ Web-based File Manager | A web host that offers FTP access will allow you the most flexibility. Others only allow updates through a web-based file manager application. Some web hosts offer both options. |
| Canned Scripts | ❒ Form processing | Many web hosts supply canned, pre-written scripts to process form information. |
| Scripting Support | ❒ PHP<br>❒ .NET<br>❒ _____ Other | If you plan to use server-side scripting on your site, determine which, if any, scripting is supported by your web host. |
| Database Support | ❒ MySQL<br>❒ MS Access<br>❒ SQL Server | If you plan to access a database with your scripting, determine which, if any, database is supported by your web host. |
| E-Commerce Packages | ❒ _____ | If you plan to enter into ecommerce (see Chapter 12), it may be easier if your web host offers a shopping cart package. Check to see if one is available. |
| Scalability | ❒ Scripting<br>❒ Database<br>❒ E-commerce | You probably will choose a basic (low-end) plan for your first website. Note the scalability of your web host: Are there other available plans with scripting, database, e-commerce packages, and additional bandwidth or disk space as your site grows? |
| Backups | ❒ Daily<br>❒ Periodic<br>❒ No backups | Most web hosts will back up your files regularly. Check to see how often the backups are made and if they are accessible to you. Be sure to make your own site backups as well. |
| Site Statistics | ❒ Raw log file<br>❒ Log reports<br>❒ No log access | The web server log contains useful information about your visitors, how they find your site, and what pages they visit. Check to see if the log is available to you. Some web hosts provide reports about the log. See Chapter 13 for more information on web server logs. |
| Domain Name | ❒ Required to register with host<br>❒ OK to register on your own | Some web hosts offer a package that includes registering your domain name. However, you will retain control of your domain name account if you register it yourself. |
| Price | ❒ $_____ setup fee<br>❒ $_____ per month | Price is last in this list for a reason. Do not choose a web host based on price alone—the old adage "you get what you pay for" is definitely true here. It is not unusual to pay a one-time setup fee and then a periodic fee—monthly, quarterly, or annually. |

## Checkpoint 10.2

1. Describe the type of web host that would meet the needs of a small company for its initial web presence.
2. What is the difference between a **dedicated web server** and a co-located web server?
3. Explain why price is not the most important consideration when choosing a web host.

# Chapter Summary

This chapter introduced the System Development Life Cycle and its application to web development projects. The job roles related to website development were discussed. The chapter also included an introduction to choosing a domain name and a website host provider. Visit the textbook website at http://www.webdevfoundations.net for examples, the links listed in this chapter, and updated information.

## Key Terms

accessibility testing
accessible
analysis
automated testing
case sensitive
co-located hosting
conceptualization
content manager
content requirements
copywriter
cost-benefit analysis
database administrator
dedicated hosting
dedicated web server
design
domain name
domain name redirection
domain name registrars
editor
environmental requirements
evaluation
front-end web developer
functionality requirements
graphic designer
information architect
information topics
keywords
launch
maintenance
marketing representative
network administrator
phases
private registration
production
project manager
Service Level Agreement (SLA)
System Development Life Cycle (SDLC)
test plan
testing
trademark
unit testing
user experience designer
usability
usability testing
UX designer
validators
virtual hosting
web designer
web developer
web hosting provider
web presence
web server

## Review Questions

### Multiple Choice

1. What do team members do during the Analysis phase of a website project?
   a. determine what the site will do—not how it will be done
   b. determine the information topics of the site
   c. determine the content requirements of the site
   d. all of the above
2. Which of the following are included in the role of an information architect?
   a. being instrumental in defining the site organization, navigation, and labeling
   b. attending all meetings and collecting all information
   c. managing the project
   d. none of the above
3. What is the purpose of private registration for a domain name?
   a. It protects the privacy of your website.
   b. It is the cheapest form of domain name registration.
   c. It protects the privacy of your contact information.
   d. none of the above
4. Which methodology is often used by web project teams?
   a. the SDLC
   b. a derivative of the SDLC that is similar to the one discussed in this chapter
   c. a methodology that is decided as the project is built
   d. no development methodology is necessary

5. Which of the following should be included when testing a website?
   a. checking all of the hyperlinks within the site
   b. viewing the site in a variety of web browsers
   c. viewing the site in a variety of screen resolutions
   d. all of the above
6. In which phase is a prototype of the website often created?
   a. Design phase
   b. Conceptualization phase
   c. Production phase
   d. Analysis phase
7. Which of the following occurs during the Production phase?
   a. A web authoring tool is often used.
   b. The graphics, web pages, and other components are created.
   c. The web pages are individually tested.
   d. all of the above
8. Which of the following occurs during the Evaluation phase?
   a. The goals for the site are reviewed.
   b. The web designers are evaluated.
   c. The competition is evaluated.
   d. none of the above
9. Which of the following is true about domain names?
   a. It is recommended to register multiple domain names that are redirected to your website.
   b. It is recommended to use long, descriptive domain names.
   c. It is recommended to use hyphens in domain names.
   d. There is no reason to check for trademarks when you are choosing a domain name.
10. Which web hosting option is appropriate for the initial web presence of an organization?
    a. dedicated hosting
    b. free web hosting
    c. virtual hosting
    d. co-located hosting

### Fill in the Blank

11. _____ can be described as testing how actual web page visitors use a website.
12. The _____ determines the appropriate use of graphics on the site and creates and edits graphics.
13. The _____ operating system(s) treat uppercase and lowercase letters differently.

### Short Answer

14. Why should the websites of competitors be reviewed when designing a website?
15. Why should you try to contact the technical support staff of a web hosting provider before you become one of its customers?

## Hands-On Exercises

1. Skip this exercise if you have completed Hands-On Practice 2.15 in Chapter 2. In this exercise, you will validate a web page. Choose one of the web pages that you have created. Launch a browser and visit the W3C Markup Validation Service (http://validator.w3.org). Click on the Validate by File Upload tab. Click the Browse button, select a file from your computer, and click the Check button to upload the file to the W3C site. Your page will be analyzed and a Results page will be generated that shows a report of violations of the doctype that is used by your web page. The error messages display the offending code along with the line number, column number, and a description of the error. Don't worry if your web page does not pass the validation the first time. Many well-known websites have pages that do not validate—even Yahoo! (http://www.yahoo.com) had validation errors at the time this was written. Modify your web page document and revalidate it until you see a message that states. "Document checking completed. No errors or warnings to show".

   You can also validate pages directly from the Web. Try validating the W3C's home page (http://www.w3.org), Yahoo! (http://www.yahoo.com), and your school's home page. Visit the W3C Markup Validation Service (http://validator.w3.org) and notice the Validate

by URI area. Enter the URL of the web page you would like to validate in the Address text box. Click the Check button and view the results. Experiment with the character encoding and doctype options. The W3C's page should pass the validation. Don't worry if the other pages do not validate. Validation is not required for web pages. However, web pages that pass the validation should display well in most browsers. (*Note:* If you have published pages to the web, try validating one of them instead of your school's home page.)

2. Run an automated accessibility test on the home page of your school's website. Use both the WebAIM Wave (http://wave.webaim.org) and ATRC AChecker (http://www.achecker.ca/checker) automated tests. Describe the differences in the way these tools report the results of the test. Did both tests find similar errors? Write a one-page report that describes the results of the tests. Include your recommendations for improving the website.
3. The Web Page Analyzer (http://www.websiteoptimization.com/services/analyze) calculates download times for a web page and associated assets, along with providing suggestions for improvement. Visit this site and test your school's home page (or a page assigned by your instructor). After the test is run, a web page speed report will display file sizes and include suggestions for improvement. Print out the browser view of this results page and write a one-page report that describes the results of the test and your own recommendations for improvement.
4. The Dr. Watson site (http://watson.addy.com) offers free web page validation. Visit this site and test your school's home page (or a page assigned by your instructor). After the test is run, a report is displayed with categories such as server response, estimated download speed, syntax and style analysis, spell-check, link verification, images, search engine compatibility (see Chapter 13), site link popularity (see Chapter 13), and source code. Print out the browser view of this results page and write a one-page report that describes the results of the test and your own recommendations for improvement.
5. Perform a small-scale usability test with a group of other students. Decide who will be the typical users, the tester, and the observer. You will perform a usability test on your school's website.

   - The typical users are the test subjects.
   - The tester oversees the usability test and emphasizes that the users are not being tested; the website is being tested.
   - The observer takes notes on the user's reactions and comments.

   **Step 1** The tester welcomes the users and introduces them to the website that they will be testing.

   **Step 2** For each of the following scenarios, the tester introduces the scenario and questions the users as they work through the task. The tester should ask the users to indicate when they are in doubt, confused, or frustrated. The observer takes notes.

   - Scenario 1: Find the phone number of the contact person for the web development program at your school.
   - Scenario 2: Determine when to register for the next semester.
   - Scenario 3: Find the requirements for earning a degree or certificate in web development or a related area.

   **Step 3** The tester and the observer organize the results and write a brief report. If this were a usability test for a website that you were developing, the development team would meet to review the results and discuss the necessary improvements to the site.

**Step 4** Hand in a report with your group's usability test results. Complete the report using a word processor. Write no more than one page about each scenario. Write one page of recommendations for improving your school's website.

*Note:* For more information on usability testing, see http://www.usability.gov/how-to-and-tools/methods/running-usability-tests.html and Keith Instone's classic presentation at http://instone.org/files/KEI-Howtotest-19990721.pdf. Another good resource is Steven Krug's book, *Don't Make Me Think*.

6. See the description of usability testing in Hands-On Exercise 5. In a small group, perform usability tests on two similar websites, such as the following:
   - Barnes and Noble (http://www.bn.com) and Powell's Books (http://powells.com)
   - AccuWeather.com (http://accuweather.com) and Weather Underground (http://www.wunderground.com)
   - Runner's World (http://www.runnersworld.com) and Cool Running (http://www.coolrunning.com)

   Select and list three scenarios to test. Decide who will be the users, the tester, and the observer. Follow the steps listed in Hands-On Exercise 5.
7. Pretend that you are on a job interview. Choose a role on a web project team that interests you. In three or four sentences, describe why you would be an excellent addition to a web development team in that role.

## Web Research

1. This chapter discussed options for hosting websites. In this research exercise, you will search for web hosting providers and report on three that meet the following criteria:
   - Support PHP and MySQL.
   - Offer e-commerce capabilities.
   - Provide at least 1GB disk space.

   Use your favorite search engine to find web hosting providers or visit web host directories such as Hosting Review (http://www.hosting-review.com) and HostIndex.com (http://www.hostindex.com). The web server survey results provided by Netcraft (http://uptime.netcraft.com/perf/reports/Hosters) may also be useful. Create a web page that presents your findings. Include links to your three web hosting providers. Your web page should include a table of information such as the setup fees, monthly fees, domain name registration costs, amount of disk space, type of e-commerce package, and cost of e-commerce package. Use color and graphics appropriately on your web page. Place your name and e-mail address at the bottom of your web page.
2. This chapter discussed the different job functions that are needed to develop large websites. Choose a job role that interests you. Search for information about available jobs in your geographical area. Search for technology jobs with your favorite search engine or visit a job site such as Monster.com (http://www.monster.com), Dice (http://www.dice.com), Indeed (http://www.indeed.com), or CareerBuilder.com (http://www.careerbuilder.com) and search for your desired location and job type. Find three possible job positions that interest you and report on them. Create a web page that includes a brief description of the job role you have chosen, a description of the three available positions, a description of the types of experience and/or educational background required for the positions, and the salary range (if available). Use color and graphics appropriately on your web page. Place your name and e-mail address at the bottom of your web page.

## Focus on Web Design

The U.S. Department of Health and Human Services offers a free online book, The *Research-Based Web Design & Usability Guidelines* (http://www.usability.gov/guidelines/guidelines_book.pdf). The book suggests guidelines for a variety of topics, including navigation, text appearance, scrolling and paging, writing content, usability testing, and accessibility. Choose one chapter topic that interests you. Read the chapter. Note four guidelines that you find intriguing or useful. In a one-page report, describe why you chose the chapter topic and the four guidelines you noted.


# WEBSITE CASE STUDY

## Testing Phase

This case study continues throughout the rest of the text. In this chapter, you will test the Web Project case study.

## Web Project

See Chapter 5 for an introduction to the Web Project. In this chapter, you will develop a test plan for the project. You will review the documents created in the previous chapters' Web Project and create a test plan.

### Hands-On Practice Case Study

**Part 1: Review the Design Documents and Completed Web Pages.** Review the Topic Approval, Site Map, and Page Layout Design documents that you created in the Chapter 5 Web Project. Review the web pages that you have created and/or modified in the Chapter 6 through Chapter 9 Web Project activities.

**Part 2: Prepare a Test Plan.** See Figure 10.4 for a sample test plan document (chapter10/testplan.pdf in the student files). Create a test plan document for your website, including CSS validation, HTML validation, and accessibility testing.

**Part 3: Test Your Website.** Implement your test plan and test each page that you have developed for your Web Project. Record the results. Create a list of suggested improvements.

**Part 4: Perform Usability Testing.** Describe three scenarios that typical visitors to your site may encounter. Using Hands-On Exercise 5 as a guide, conduct a usability test for these scenarios. Write a one-page report about your findings. What improvements would you suggest for the website?