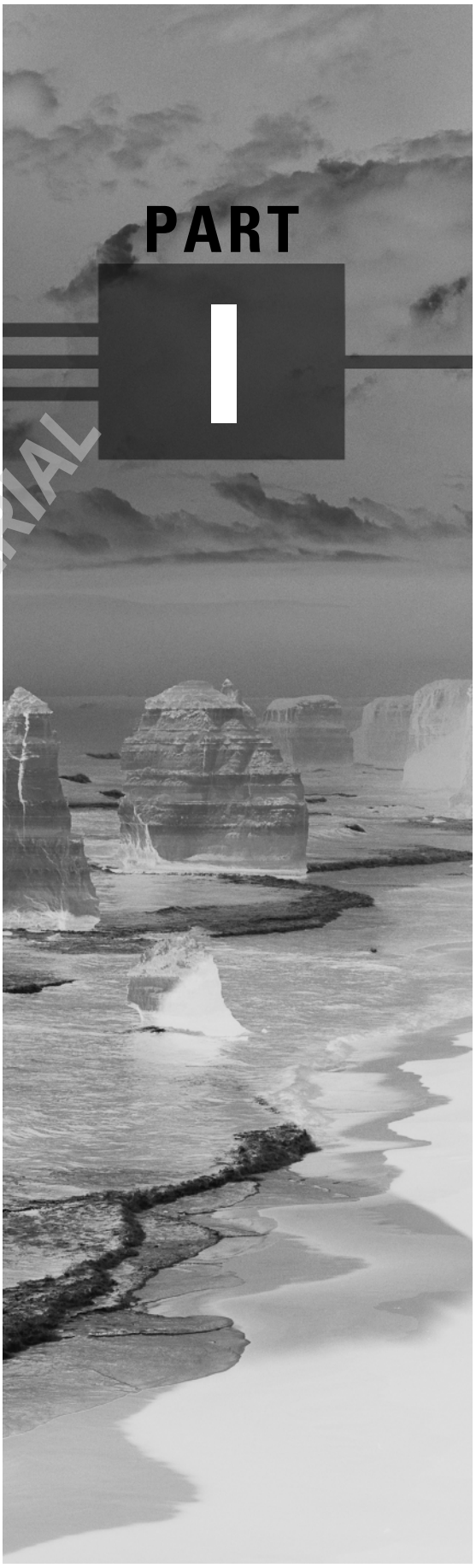
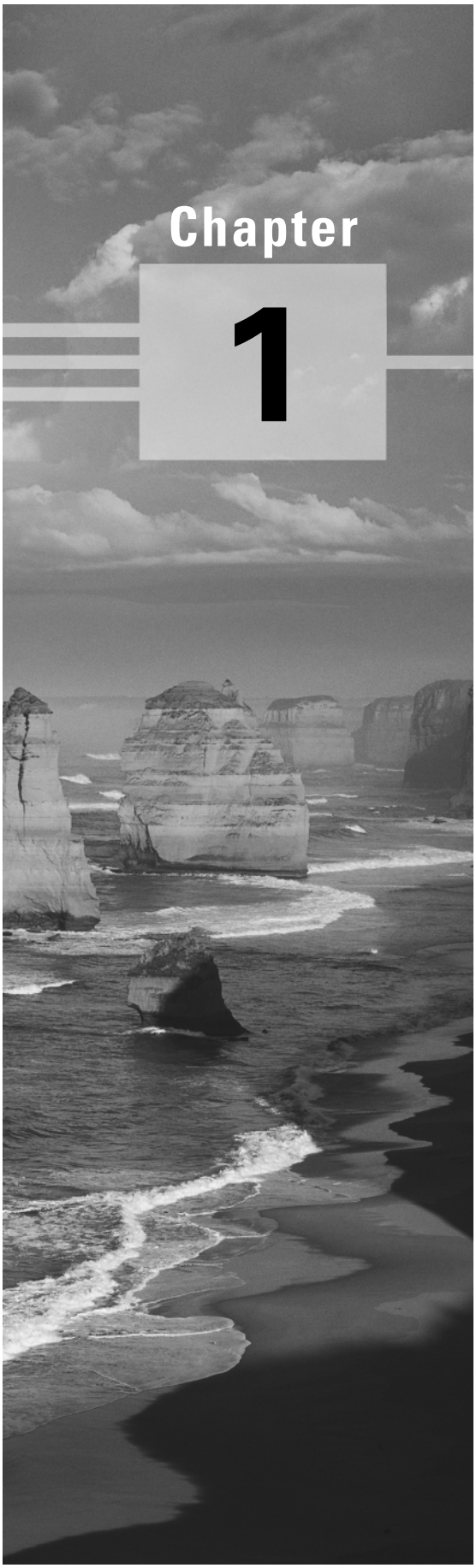
PART I

Design Methodology and Technology





Chapter 1

Overview of Web Design Concepts

THE CIW EXAM OBJECTIVE GROUP COVERED IN THIS CHAPTER:

- ✓ **Develop effective and usable corporate websites within a reasonable time frame, including but not limited to: design concepts and goals, web strategy.**

Web design has grown from simply replicating printed material on a web page to using technology that exists strictly for web development. A website designer needs to understand the vast array of web design tools and technologies available to create effective, user-friendly websites. Throughout this book, we will explore using layout and navigation for effective website design, using optimized graphics and design elements to create pages that load quickly, the importance of understanding the business process in the web design life cycle, how programming on both the client and server side affect a web user's experience, the impact of standards created by Internet governing bodies on web design, the role web authoring software plays in website design, and how to publish and maintain a website.

Although many may think that a website's design is secondary to its content, this chapter will illustrate the important role that design plays in the users' experience. Common design principles—such as color, font choice, and effective placement of elements on the page—all factor into a user-friendly website. To fully appreciate and understand the vital role design plays, we'll explore the important aspects surrounding this area: web technology, how the web differs from traditional forms of media, design concepts, and the tools and technologies used to create a website.

Web Technology

The web technology that we now enjoy is the fastest growing means of communication that humankind has ever experienced. It empowers both the message sender and the message recipient—in other words, the publisher of content and the reader of that content. Many people now turn to the Web instead of using the newspaper or other traditional means to find information. Information on the Web is available to users worldwide and can be disseminated with speed, accuracy, and detail. Web addresses are now

included in most businesses' radio, television, and print ads, offering customers immediate access to a more personalized and specific method of information retrieval that assists in learning and decision making.

It is the website designer's responsibility to convey the appropriate visual message to recipients; thus, the concepts of design are as important as the content itself. For long-time web users, the transformation of website design is clear. Early sites consisted of content that was lengthy and displayed in plain text. This trend evolved into developed design practices that rival ad media such as television and print in their complexity and sophistication.

To be competitive, everyone in the modern office environment will contribute to the development of the information infrastructure. Websites are becoming complex structures that can include information from all parts of an organization: human resources, sales and marketing, and inventory and distribution, for example. Those contributing to the content must understand what the effective forms of displaying information on the Web are because they differ from traditional forms of communication.

Tools and technologies abound to make website design easier, for both the novice and the experienced website designer. Designers must choose the tools that will give them the competitive edge for their organizations. In Chapter 18, "Applications and Tools," we will examine some of the more widely used tools for website design, such as Microsoft's FrontPage; Macromedia's Dreamweaver, Flash, and HomeSite; and Jasc's Paint Shop Pro. As you'll discover, each tool has its own unique features and benefits; based on those elements, you can choose which tool is best for the design you are trying to achieve.

The Nature of the Web

Most website designers approach development from a self-reflective point of view. They are interested in presenting information to a mass audience with the known metaphors of mass advertising. However, the Internet offers an alternative: the capability for one-to-one relationships. Users of websites respond better to information and product offerings that are tailored to their specific needs. You should understand that, by nature, the Internet is a medium that enables the user to decide what information to access and when to access it. This fact makes the Internet a *one-to-one medium* as opposed to a *broadcast medium*. Thus, the concepts and applications of mass media are not necessarily valid for the Internet.

The goal of mass media is to create in the viewer or reader interest that eventually will lead to a desired outcome. In essence, the act of reading a magazine or watching a television program is not inherently transactional. The only action required from readers or viewers is to read or watch. The information is broadcast to a passive audience. Thus, creating information for mass media requires a different strategy than creating information for the Internet.

By its nature, the Internet is transactional. The entire Internet experience, from accessing the Internet to browsing the Web, is predicated on user requests and server responses—in other words, *transactions*. Furthermore, by its nature, the Internet is nonlinear. The user constantly makes transactional decisions, first leading to the site, then staying within the site, then conducting e-commerce, and then deciding to return to the site in the future. However, users can switch to another site—and another business—anytime they choose.

Current Web Development Direction

Development for the Web has become more sophisticated in the past three years. Sophistication has increased in terms of significant multimedia advances; new types of data are now accessible via the Web. Data-driven content has become a main component of many web applications and projects. The advantage of data-driven content is that it reflects the most current information, numbers, and statistics because the data is drawn from a database at the time the user requests it.

After e-commerce, intranet development has been the second-largest growth area in web development. *Intranets* bring web-based networking in-house, supplying a network for use by employees or members of a specific organization. The result is a more efficient and productive work environment because employees have easy access to frequently used data and documents. Time-sensitive information can be accessed on an intranet in a more timely and efficient manner than it can be accessed via traditional forms of media. For outside vendors and business partners, extranets are rapidly emerging to fulfill data requirements outside the company and streamline the business process. *Extranets* are designed to provide access to selected external users to expedite the exchange of products, services, and key business information. For example, Company A supplies Company B with paper. If Company A has access to Company B's inventory status via an extranet, it will know when Company B needs another shipment. Company A can then initiate the shipment without a request from Company B.

Design Concepts

Web design concepts are always evolving. It is important to remember that the Web is not a static medium like print media. Therefore, the rules and concepts are in constant fluctuation. One of the most common misconceptions about website design is that a good site must dazzle the user with a multimedia experience and that the content of the site is of secondary importance. This assumption is false.

As a website designer, you want users to have a satisfying experience, but dazzling them is not your goal. The primary goal in website design is to give users what *they* want, not what *you* think they want. This goal can be achieved with a complex balance of well-planned design, quality content, and proper use of available media. Numerous studies confirm that the overuse of multimedia will discourage visitors because they either do not have the capabilities to support it or do not want to wait for lengthy downloads (the ideal download time for a web page is 10 seconds or less).

Ultimately, if you do not satisfy the web users' needs or desires, they will find other sites that will. Website designers who think only from their own perspective and not the users' will certainly find dissatisfied web visitors, clients, and customers.

Web Medium vs. Traditional Media

Website designers are becoming more aware of the differences between designing for the Web and designing for other media, especially print. In the early years of website design, many websites were simple HTML reproductions of printed brochures and other marketing tools. This approach resulted from companies attempting to post their information to the Web quickly. Further, the Web was new territory and did not have proven techniques or statistical data to validate its effectiveness.

Some companies learned early that posting "brochures" on the Web was not an effective use of the medium. They simply re-created their print campaigns on the Web, assuming that they would be just as successful in an electronic format as they had been in print. Print media is *linear* in nature: one line to the next, one page to the next. The Web is a *nonlinear* medium, allowing users to link (hyperlink) to different areas within the site or to websites outside of the site; a user decides where to go and does not have to follow the strict organization set forth in a book, for example. Therefore, the Web has different properties that are not exploited when used in traditional

linear format. The most distinctive is the interaction that is possible between the user and a business through its website. Traditional print media cannot personalize the user's experience. By contrast, the web medium can optimize the possibilities of interactivity and personalization for the user, creating a direct connection between the business and the visitor. This is accomplished through the new technologies, such as Dynamic HTML (DHTML), Cascading Style Sheets (CSS), Extensible Markup Language (XML), JavaScript, and Java applets.

Tools and Technology

Several years back, there was much debate about whether or not to use specialized tools to help the web development process. Now, however, many of the HTML-editing tools and WYSIWYG (What You See Is What You Get) editors are in their third and fourth generations and have become very sophisticated applications. The debate is no longer whether designers should use these tools, but rather, which tools they should use.

Ideally, a combination of manual coding and WYSIWYG functionality is the best option from today's development perspective. It simply takes too much time to develop a dynamic site by only manually coding HTML. The need for constantly updated information and design on both a corporate website and an intranet or extranet site necessitates an alliance between the two methods of site design. Two WYSIWYG design tools stand out in the marketplace today: Macromedia Dreamweaver and Microsoft FrontPage. In Chapter 18, we will discuss the tools available for creating websites and consider the features that will optimize your HTML efficiency. We will discuss the design options in these types of programs, as well as the more important features for site management. These powerful site management features give programs such as these a competitive edge in the industry.

Generally, many tools are used in unison for website development; this book focuses on the collaborative application approach to website design. For more advanced topics, such as images and animation, we'll profile applications that assist in the development of web graphics and animation. Macromedia Flash is one of these products; Flash enables media-rich content

to be delivered while also conserving bandwidth, which is a valuable commodity to the website designer. Flash is also profiled in Chapter 18.

New Technologies

Soon after you learn what tools are available for designing websites, you will need to evaluate them to determine whether they are capable of incorporating new technologies that allow you to build dynamic sites that create a more personalized experience for the user. For example, both Microsoft FrontPage and Macromedia Dreamweaver implement *Dynamic HTML (DHTML)* functions that will allow you to take advantage of this available technology.

We will discuss other recently developed technologies in this book as well, such as *Cascading Style Sheets (CSS)* and *Extensible Markup Language (XML)*, and we'll discuss the use of JavaScript and Java applets in your website design for further functionality. In addition, we will discuss the World Wide Web Consortium's advancement of the newest standards and the ways in which browser manufacturers contribute to development of new technologies.

Remember that, in this book, you will read about several tools you can use in the development of websites. The goal of this book is not to make you an expert user of any one tool, but to give you enough information about the key components of each tool that you can make educated decisions about which tool will best meet your needs.

Web Users and Site Design

How much of the text on a web page would you guess web users really read? All of it? Most of it? The truth is that users read almost none of it. Numerous surveys confirm that as many as 80 percent of web users merely scan web page content, looking for key words and phrases. Furthermore, the average person reads 25 percent more slowly from a computer monitor than from print.

So how does this fact affect web page layout? As a designer, you must create a page that allows users to quickly scan and find the information they seek. Remember that one of the misconceptions of current website design is that the web is just another form of print media. When a designer creates

a page with the same content as a brochure or newsletter, the user will likely move on to another site.

When users arrive at your site, their first impressions are important. The website may be the only window to the world for your business. If it is unappealing to the customer, you will likely lose the customer to a competitor. So, if you know that users only scan your page, why try to force them to read a lot of content that may not interest them? Keep users satisfied, give them what they want, and they will come back. Users do not want to see cluttered pages with irrelevant content and images. Content is essential; however, the layout and delivery are just as important.

The web is self-centric: Users are interested in only what they want. People who work in the retail business will agree that customers are selfish because they know they pay the bills that keep a business's doors open. Users usually visit your site because they want specific information, whether for research or purchases. The easier you make their tasks, the more likely you are to earn their business. If you understand this, you will create web pages with layout features that will earn your users' business.

Consider a website such as `www.cnn.com`. Upon arrival, you are greeted with the lead headline, a picture from that story, a paragraph summarizing the story, and a link to the full story. You know the topic of the story immediately from the picture and summary, and you can find out more if you want. Otherwise, you can scan down the page to the next headline, determining the topic of just about every story on the CNN site in about a minute. You are only one click away from any full story. The CNN site provides easy scanning, and you are more likely to return later because you got what you wanted quickly.

Design Fundamentals

As a website designer, it is exciting to think about new technology and how to implement it into the latest designs. Generally, website designers are likely to have the most recent hardware, software, and plug-ins. However, as tempting as it may be to create the most dynamic and interactive site that new hardware and software can support, the vast majority of the web audience is not seeking high-end design. A good guideline to follow when designing for the masses is to design for the *lowest common denominator*. Consider the following:

- Most users have a 15-inch or smaller monitor.
- Many users utilize a 640×480 resolution setting.

- Most users have a 28.8Kbps modem connection.
- Most users have a version 4.*x* or earlier browser.
- Very few users will take the time to download plug-ins.

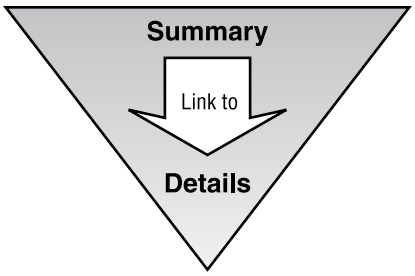
Exceptions to the rules always exist. Many users are upgrading to 56Kbps modems and are using 800×600 screen resolution settings. But observing the rules will guide you in creating websites that the majority of users can use or view.

Effective Web Page Layout

Consider how your favorite newspaper is laid out. The front page has the lead story, and it might also contain a column along one margin listing other feature stories in the paper. How does this affect your reading experience? The layout does not force you to read one story on the front page and then flip through all pages to find others that interest you. If you see a summary for a story that you want to investigate further, a page number, or a "link," directs you to the full story.

This layout style is often compared to an inverted pyramid, as depicted in Figure 1.1. This style offers the user first a list of story summaries, then links or references to the details. The Web is an ideal medium for this type of delivery.

FIGURE 1.1 Inverted pyramid style



Using hyperlinks, you can send users to any number of elaborations on subjects, stories, news, products, or services. You can also provide links to archived or related information, which is something newspapers cannot

provide because of lack of space, time, and resources. If users want further information, they can browse to it at their discretion. Otherwise, they can move on to other pursuits.

Web Page Layout Elements

Before you begin the website production process, consider the look and structure of your site. You must understand the elements that will make up the completed web page and how they interact with each other, from a visual as well as a technical standpoint. You should then carry the chosen elements throughout the website. These web page elements include layout, color, fonts, and images and other multimedia.

Page layout refers to the way in which the website designer presents information to users. The format should be logical and easy to understand. As they do in documents or reports, structured formats help categorize, simplify, and clarify information for distribution. As a website designer, you must develop a structure and adhere to it so the user's experience will be meaningful and productive.

Consider the following items when planning your web page layout:

Frameset Allows multiple pages to be displayed simultaneously

Margin Controls how close the content displays to the browser window edges

Border Provides visual boundaries for HTML tables and frames

Color Provides an overall sense of the organization of the site and enhances readability

Navigation Controls the user's movement through the site

Rule Divides the page content into related sections

White space Reduces page element clutter and separates elements on the page

Table Distributes and positions elements on a page and forms data into rows and columns

List Organizes and emphasizes certain items of information

Paragraph Groups text characters on a page

Heading level Organizes content visually through text that is a different size and style than the text used for most of the content on a page

Image Provides visual appeal, information, and navigation

Determining which of these elements your site will include helps focus the development process. If you do not address these items early in the development process, you might waste resources correcting problems that develop later.

Common Layout Format

Website designers use some common, basic elements on websites to perform certain important navigational functions. You can see these common features—page structure, buttons, text, and images—in action by browsing several sites. When users visit your site, they should know what to expect. This is not to say that they should know all about the content or products you offer, but rather that they should be able to figure out fairly easily how to use the site.

Site layout can be categorized by the way the navigational elements are placed. The type of layout that is chosen depends largely on the type and amount of content. For example, navigation elements are generally located on the left and top margins. The background for navigation elements often has a slightly different color or appearance than the rest of the page. Also, additional navigational features are frequently included at the bottom of the page. Black text on a white background is common, as are company logos in the upper-left corner of the display. Because they are used so often, these and other formatting techniques help to make navigation more intuitive for the user. Following are some samples of common layout types.

Figure 1.2 shows an example of the traditional left-margin layout. You can see the navigational elements in the left margin. Figure 1.3 shows the top-margin layout, in which navigational elements are placed along the top of the page.

Figure 1.4 shows the most commonly used layout, the distributed left- and top-margin layout. Figure 1.5 shows the less commonly used right-margin layout. And finally, Figure 1.6 shows an example of the distributed layout, which works well for sites with a great deal of content.

FIGURE 1.2 Left-margin layout (traditional)

FIGURE 1.3 Top-margin layout

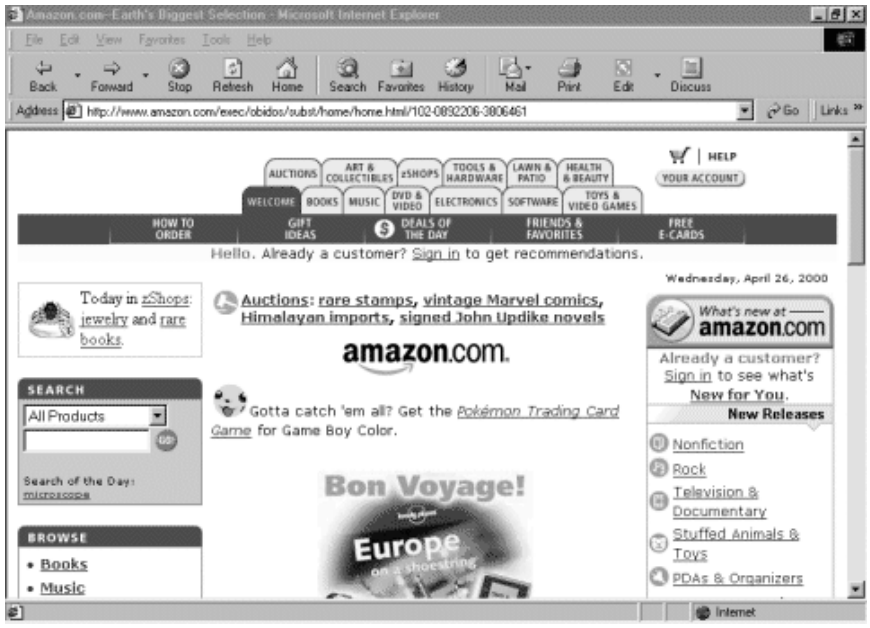


FIGURE 1.4 Distributed left- and top-margin layout

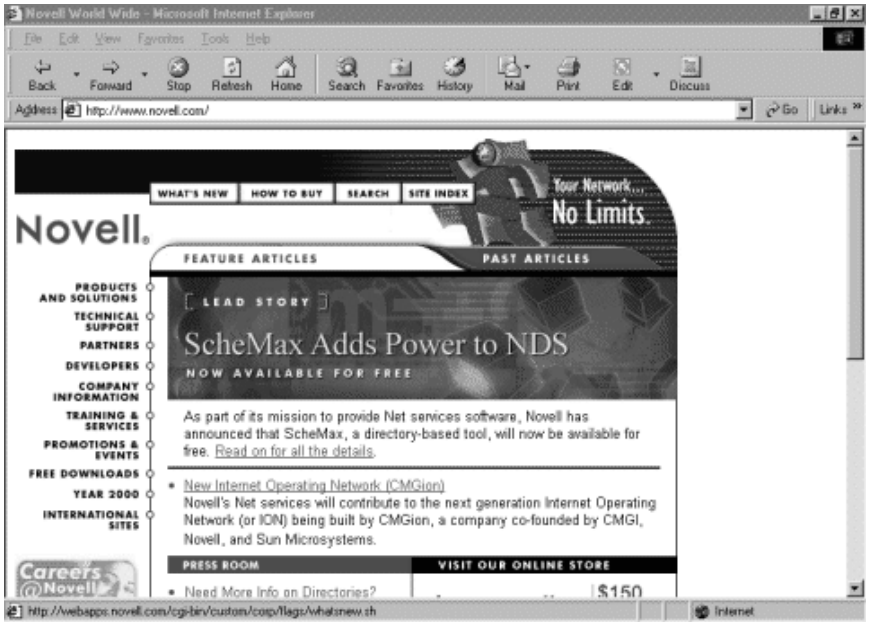


FIGURE 1.5 Right-margin layout

FIGURE 1.6 Distributed layout

White Space

Recall your web browsing experiences at various sites you have visited. When a page initially loads into your browser, you are greeted either with content on every part of the page or with limited well-distributed content resulting in less clutter. What is your initial impression of both these scenarios? If you are like most users, you prefer the page with even distribution and some blank space, known in the development community as *white space*.

Remember that users do not appreciate useless clutter and masses of content on web pages. Users quickly scan pages, and the more content they must scan through, the more information they will miss. This does not mean that you cannot provide the user with a lot of information, just not all on one page. Each web page should contain approximately 50 percent less text than a printed version of the same information would contain.

A web page should be designed to offer information concisely. Provide users with the basics and then give them links to more depth and detail. Not every user wants every piece of information; let each user choose whether to go deeper with links. Also, do not divide a page just to make it shorter unless it is at a logical breaking point. Each page should be able to stand on its own.

Developers use tables and transparent GIF images to add white space to pages. After determining what users need to know, you can lay out the page using borderless HTML tables to position content and to provide content-free areas. In some cases, a table may be all that is required.

Page Layout with Transparent GIFs

A transparent image can be inserted into the page as a blank space placeholder. *Transparent GIFs* are images are used as placeholders in web pages. They are images of varying sizes that have a transparent background, so that the background of the web page appears through the image. They are invisible to the user. You can assign height and width attributes in the <IMG> tag to create the desired white space dimensions. For example, if you want to indent a paragraph, you can insert the following tag prior to the first letter of the new paragraph:

```
<IMG SRC="transparent.gif" HEIGHT="2" WIDTH="15">
```

This value will indent the paragraph 15 pixels from the left.

The same procedure can be used to increase the line space between paragraphs; simply place the following tag between them:

```
<IMG SRC="transparent.gif" HEIGHT="20" WIDTH="2">
```

This value places 20 pixels of space between the paragraphs.

Transparent GIFs can also be placed into table data cells to control column or row size if necessary. Keep in mind that the goal is to reduce clutter on the page, enabling users to easily scan the document and select links if they choose.

Page Layout with Tables

The website designer must understand the construction and use of tables in page layout. By default, everything in HTML aligns to the left. Developers use HTML tables to distribute content over the entire browser display. A table structure can be populated with content, and table borders can be set to zero so the user never sees the table.

Cascading Style Sheets (CSS) can be used in place of tables in some circumstances in HTML layout design. Unfortunately, not all browsers support all features of CSS. Until CSS become a standard in most browsers, using tables will remain the standard way to position text on a page. Later in this book, you will practice using tables for high-quality page layout. (CSS will be discussed in detail in Chapter 10.)

Page Layout with Frames

Frames can be used for page layout, although they also play a vital role in navigation. You should decide early in the design and planning process whether to use frames because they can dramatically affect layout and navigation. Frames affect other factors in the development and deployment of the site as well. They are discussed in detail in Chapter 8.

Page Layout Using Positioning

Layered or stacked elements are becoming more popular, and more browsers are supporting them. The main disparity with layering is that Netscape Navigator uses the <LAYER> tag whereas Microsoft Internet Explorer conforms to the W3C standard on CSS positioning of all elements. Therefore, two separate scripts must be used to ensure cross-platform compliance. Fortunately, some HTML editors automatically code both versions. In Chapter 10, we will examine the difference in detail.

Speed and Scrolling

Users demand speed. You can fulfill this demand by limiting the file size of the elements you use in the pages you design. Users feel impatient after about 1 second; after 10 seconds, you are likely to lose their attention. Therefore, the website designer must use images sparingly and choose file formats carefully. Optimizing graphics is an important component to quick downloads. We will discuss file formats in detail in Chapter 3, "Web Page Graphics."

Table 1.1 shows the maximum page size allowable to produce desired response times for various connection speeds.

TABLE 1.1 Page Size and Response Time

Connection Speed	One-Second Response Time	Ten-Second Response Time
Modem (28.8Kbps)	2KB (kilobytes)	34KB
ISDN BRI (128Kbps)	8KB	150KB
T1 (1.544Mbps)	100KB	2MB (megabytes)

Page size is defined as the sum of the file sizes for all elements that make up a page, including the HTML file and all embedded objects (e.g., GIF and JPG image files).

In mid-1997, a study found that the average web page size was 44KB, more than five times too large for optimal response time for ISDN users. Thus, even when more users have mid-band connections, the Web will still be much too slow. Also note that 44KB is 30 percent larger than even the most generous size limit for modem users.

Design with Screen Resolution in Mind

It is still advisable to design for a screen resolution of 640×480 unless you know with certainty that your users will have a different resolution. By designing for 640×480 resolution, you ensure that users will not have to scroll left or right. To avoid horizontal scrolling, do not design pages wider than 600 pixels. Remember that users only scan; many do not scroll down, nor will they scroll to the right or left.

When you design for 640×480 resolution, the display is still effective at higher resolutions. Figures 1.7 through 1.9 show the same website displayed at three different resolutions. You can see that the page shown in Figure 1.7 requires no horizontal scrolling at the 640×480 resolution and that the site was designed for that resolution. Figure 1.10 shows the same site displayed on a WebTV viewer.

FIGURE 1.7 Site displayed at 640×480 resolution

FIGURE 1.8 Site displayed at 800×600 resolution

FIGURE 1.9 Site displayed at 1024×768 resolution

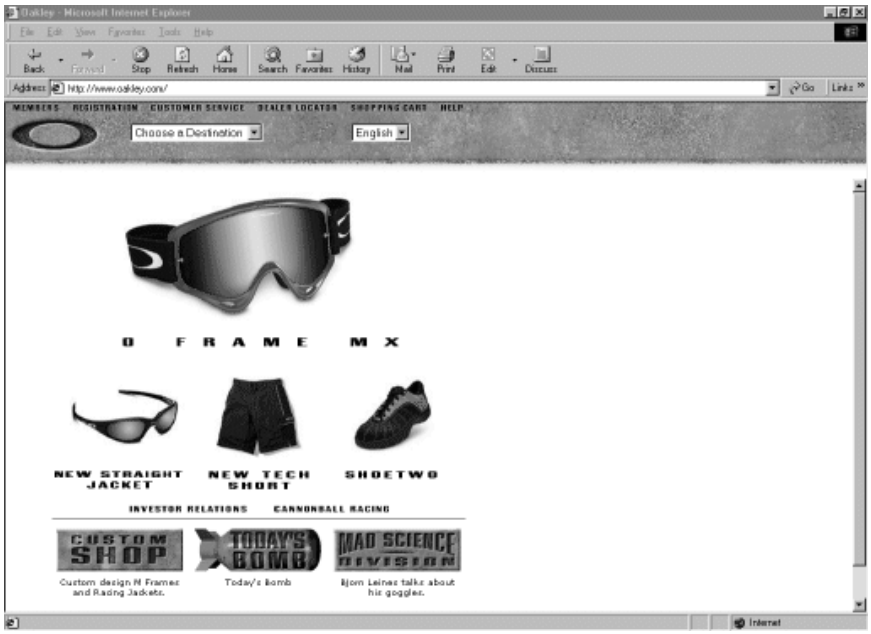


FIGURE 1.10 Site displayed on WebTV

Color and Web Design

The element of color plays a vital role in the perception and presentation of a website. A company's style, culture, and mood can be portrayed by the colors presented in the site and how they blend, coordinate, or contrast.

Color is perceived as a representation of the type of culture and industry in which a company participates. For example, a website with primarily hard, bright colors such as red, pink, yellow, and green may give the impression of a flashy, artistic type of industry and culture, such as a high-tech software design or graphic art firm. On the other hand, a site with more subdued colors such as white and soft blue or gray might be perceived as a more conservative or traditional organization, perhaps a bank or investment firm.

One of the issues you face in website development is how to address these perceptions when selecting a color scheme for a company website. Which colors are most complementary? How many colors should be present? Background design also plays a role, even after the color scheme has been chosen.

Should you use basic horizontal or vertical lines? Will you include other geometric objects, such as triangles or other polygons? These and other questions must be addressed to best represent the image a company wants to portray to the audience.

Because it's such an important element in the design of a website and can be affected by elements outside your control, there are certain aspects of working with color that you should understand:

- How color is displayed
- Color formats (RGB and hexadecimal code)
- Basic color combinations
- Browser-safe colors
- How to select color combinations
- Color transitions

Color Display

A computer monitor consists of thousands of pixels. A *pixel*, which stands for picture element, is the smallest element that can display on a screen. The screen uses pixels to display text or graphics; each pixel can display only one color at a time. When viewing an image, you see hundreds or thousands of pixels that each have a particular color and combine with the others to create the image you see.

Colors that create black when mixed together are called *subtractive colors*. In print media, all colors are a combination of cyan, magenta, yellow, and black; this color scheme is referred to as CMYK. All colors within the spectrum can be created by combining percentages of cyan, magenta, yellow, or black. Adding more of any of the these colors to the mix results in the movement of the color toward black. For example, 100% cyan, 100% yellow, 100% magenta, and 100% black results in black.

Colors that create white when mixed together are referred to as *additive colors*; this color scheme consists of red, green, and blue and is called RGB. The computer monitor displays additive colors. All colors within the spectrum can be created by combing percentages of red, green, and blue. Adding more of any of the RGB colors to the mix results in the movement of the color toward white. For example, 100% red, 100% green, and 100% blue results in white.

Color Formats

Colors are standardized in two numeric formats:

- Red, green and blue values (RGB)
- Hexadecimal code

To comply with strict HTML, a website designer should use hexadecimal values exclusively; however, for the purpose of this discussion, we will consider the use of both.

Both RGB and hexadecimal colors can produce any color in the visible spectrum when combined in various proportions. These color formats are each capable of displaying 16,777,216 colors (256 times 256 times 256). The number 256 is used in this equation because values of the colors range from 0 to 255, which equals 256.

RGB

RGB values are formatted in base-10 numbers ranging from 0 to 255. Base 10 refers to the use of the digits 0 through 9 in the decimal system; when the digit 1 is reached, the value increases from 0 to 1 (the next whole number), and so forth. Using the RGB scheme, the color white is stated as follows:

R=255

G=255

B=255

Thus, the RGB value for white is 255,255,255, which represents the maximum presence of red, green, and blue.

The RGB value for the color green is stated as follows:

R=0

G=255

B=0

Thus, the RGB value for green is 0,255,0, which represents no presence of red, maximum presence of green, and no presence of blue.

You can declare the RGB value for green in HTML code as follows:

```
<BODY BGCOLOR="0,255,0">
```

RGB color format is a 24-bit coloring scheme that forms 1 byte (8 bits) for each RGB value:

8 bits (red)+8 bits (green)+8 bits (blue)=24 bits

For a complete listing of RGB colors and their corresponding hexadecimal values, visit `www.lynda.com/hexh.html`. This listing is provided by Lynda Weinman of the Ojai Digital Arts Center.

Hexadecimal Code

Hexadecimal code values range from 00 to FF (0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F). The hex code uses base-16 numbers. It is similar to the RGB color scheme in that the lowest value (00) represents no presence of a color and the highest value (FF) represents maximum presence of a color.

The color white is represented in hexadecimal code as follows:

Red=FF

Green=FF

Blue=FF

These values represent maximum presence of red, green, and blue.

The color green is represented in hexadecimal code as follows:

Red=00

Green=FF

Blue=00

These values represent no presence of red, maximum presence of green, and no presence of blue.

Thus, hex code assigns each color a two-character code for each red, green, and blue value, whereas the RGB scheme uses digits from 0 to 255 for each red, green, and blue value. Table 1.2 shows some examples.

When hex-code values are used in HTML, they are preceded by the # symbol, which is not required but is part of the HTML 4.0 specification. In the <BODY> tag, for example, the background color green is specified as follows:

```
<BODY BGCOLOR="#00FF00">
```

Netscape 4.*x* has difficulty with the quotation marks (" ") around the attribute value. Remove the quotation marks when using hex-code values in the header section's <STYLE> tag.

TABLE 1.2 RGB and Hexadecimal Code Value Examples

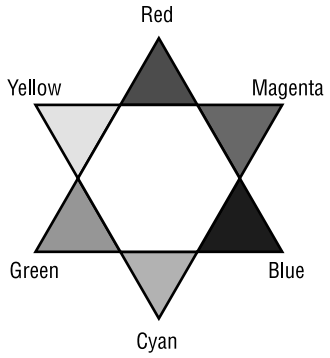
Color	RGB	Hex Code
RED	255,0,0	FF0000
GREEN	0,255,0	00FF00
BLUE	0,0,255	0000FF
WHITE	255,255,255	FFFFFF
BLACK	0,0,0	000000

Basic Color Combinations

To display color, a computer monitor uses three electron guns. Each gun is responsible for a single color: red, green, or blue. Various combinations of guns and intensities of electron streams form all the colors.

The simultaneous full-intensity firing of these guns produces white on the screen. Firing the red and green guns produces yellow. Firing the green and blue guns produces cyan. The combination of red and blue produces magenta. Figure 1.11 illustrates these color combinations and the relationships between them.

FIGURE 1.11 Basic color combinations



Several inconsistencies exist among monitor displays. These variables include monitor type and design, graphics cards, computer configurations, and even ambient room lighting.

Browser-Safe Colors

Although any of the RGB and hexadecimal code values can be used to specify colors, it is important to remember that both Netscape Navigator and Microsoft Internet Explorer guarantee only 216 colors. Each browser has a maximum of 256 colors it can display, and 40 of those colors are used by the operating system. This leaves 216 colors that can be guaranteed; all other colors will dither. *Dithering* is the process by which the browser approximates a color to the closest browser-safe color it supports. Table 1.3 lists the RGB and hexadecimal values that will render safely in multiple browsers. If values other than these are used, the browser will dither them to the nearest values it can determine.

TABLE 1.3 Browser-Safe Color Palette

RGB	Hex
0	00
51	33
102	66
153	99
204	CC
255	FF

Each of the RGB values in Table 1.3 corresponds to the matching hexcode value. For example, using a value of 51 in RGB is the same as using the value of 33 in hexadecimal code. In other words, an RGB value of 51,153,204 is the same as the hexadecimal value of #3399CC.

Using any combination of these values will result in a browser-safe color that will render consistently across platforms.

The intensity of each red, green, and blue combination determines the color to be displayed. Table 1.4 represents the intensity in percentages for each of the browser-safe color values, from least to greatest.

TABLE 1.4 Browser-Safe Color Intensities

Hex	Intensity in Percentage	RGB
00	0%	0
33	20%	51
66	40%	102
99	60%	153
CC	80%	204
FF	100%	255

A complete listing of browser-safe RGB and hex colors and their respective RGB and hexadecimal values can be found at `www.lynda.com/hexh.html`.

Color Combination Selection

Color combinations should complement each other, but more important, they should allow the user to easily discern and read any text that resides on the page. Some designers believe that black text on a white background is ideal. The reasoning is that this combination offers the highest contrast and readability and is most comfortable for users because it matches most of the text they read in other media. Usability studies show that this reasoning is accurate.

Most situations allow for the use of this black-text-on-white-background scheme, and it should be used whenever possible. Many sites have colors that represent the company, or branding colors, which will not always conform to the black-on-white scheme. Categorically, the only place that a site can venture away from black and white without compromising usability would be on the site's home page. Beyond the home page, content becomes more abundant, and the site should aim to make the user feel comfortable. Business or branding colors can be used in other page elements, such as images and borders, to give the desired look and feel.

Color Transitions

Color transitions are created when adjacently placed colors blend together or stand apart from each other. Color transitions are especially noticeable between text and background colors and can be used to help separate various parts of a web page. Transitions become more of an issue, however, when colors are introduced to the page in images. Although smooth color transitions are desirable in images, they require higher color support, which in turn requires longer download times.

Fonts and Web Design

The two fonts that have been used most often on the Web are Times New Roman (the PC equivalent of Times on the Macintosh) and Arial (the PC equivalent of Helvetica on the Macintosh). These fonts give a site a clear, attractive presence. If you have used the Web for some time, you probably don't even notice them because they are so commonly used.

However, technologies such as dynamic and embedded fonts are rapidly emerging to offer more choices. On occasion, you may see a site with a unique font that catches your eye simply because it is not widely used. Your reaction will be largely determined by how effectively the font has been used. Font usage can add interest to your web pages and can indicate to the user when transitions are made or emphasize portions of text or the page.

To use fonts effectively, you need to understand some basic things about typography, such as how serif and sans-serif fonts are used, how font size affects the presentation of your page, what a TrueType font is, how anti-aliasing affects the look of fonts, and how much type to put on the page.

One of the limitations of font usage is that the chosen font must be registered on the user's system to be rendered in the browser. If the user does not have the font, the browser will render its default font instead (typically Times New Roman on a PC and Times on a Mac). If you intend to use an obscure font, the source of the font should be made available to users so they can download it and install it on their systems. This way, you can ensure that the user has the browsing experience you intended.

Typography

Because fonts are a necessary component to any site, choose a font and color that make a visual statement along with the other elements of the page. Too much text can be overwhelming, distracting, or tedious. The font you choose and how it's laid out on the document send a clear message to users, even if they take only a quick glance. It usually signals a well-thought-out site that will be easy to view and navigate.

Serif Fonts

Serifs are the small decorative strokes added to the ends of a letter's main strokes, as shown in Figure 1.12. Times New Roman is an example of a *serif font*.

FIGURE 1.12 Letters with serifs

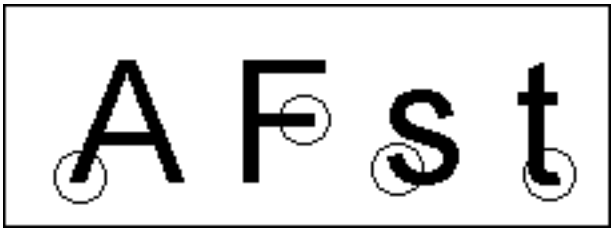
Serifs improve readability by leading the eye along the line of type. However, they are more difficult to read in small scale (smaller than 8 point) and very large sizes. Therefore, serif fonts are best suited for body text.

There are four types of serifs: Old Style, Transitional, Modern, and Slab Serif.

Sans-Serif Fonts

Sans-serif fonts do not have serifs, as shown in Figure 1.13. Arial is an example of a *sans-serif font*.

FIGURE 1.13 Sans-serif letters



The letters' appearance is reduced to the essential strokes. Sans-serif text must be read letter by letter. It is recommended that you use sans-serif fonts for small (smaller than 8 point) text such as footnotes and very large-scale text such as headlines. Generally, one serif font (used for body text) and one sans-serif font provide a good mixture on a web page.

Once you have selected a font for a certain element, it should be used consistently throughout the site. More than one font can be present in the site, but the same font should represent data or information of the same type. For example, all navigation text should look the same, and normal text within paragraphs should look the same. But text that needs to be differentiated from other text, such as numbers or facts, can be presented in a different font. Avoid using a lot of different fonts within a page, however, because it tends to make the page busy and difficult to read. Font colors should also be consistent so the user can easily determine what different text and colors represent.

Font Size

The default font size for most browsers is "size = 3" for the base font size. All other font sizes should be determined by the default size. For example, if you want to increase a font size to size = 5, you must code the font tag to read <FONT SIZE = "+2"> rather than <FONT SIZE = "5">. If the browser default is other than size = 3, the browser will still render the font with your original intended ratio.

One common problem involves the difference between how the Macintosh and the PC display fonts. Macs display fonts at 72 dots per inch (dpi), whereas PCs display fonts at 96dpi. This disparity results in the Macintosh displaying the font smaller than the PC does for any given size. If you are

designing on a PC and the font looks small, remember that it will look even smaller when displayed on a Mac.

TrueType

Many fonts are known as TrueType, which means they can be rendered in any point-size value without degradation of letter quality. TrueType is a digital technology developed by Apple Computer and now used by both Apple and Microsoft operating systems. Times New Roman is a TrueType font, as is Arial. Some relatively new TrueType fonts appearing more frequently are Verdana and Georgia. These fonts render nicely and give the page a richer look.

Anti-Aliasing

The *anti-aliasing* process maintains rich-looking letters that do not have jagged edges. Often, graphics are used to represent letters, words, or sentences. The anti-aliasing process makes the text look smooth by blurring the lines between text and background. This removes the harsh, jagged edges of the letters, which is especially noticeable with large fonts. One drawback to anti-aliasing is that it adds more colors to the image, resulting in large file sizes and longer downloading. Figure 1.14 shows an example of normal text next to text that has had the anti-aliasing process applied.

FIGURE 1.14 Plain text next to anti-aliased text

Horizontal Line Length

To make reading easy, avoid long lines of text that span the entire browser window. It is difficult to read line after line, returning to the left margin each time, if the lines are long. It is advisable to keep the lines in your paragraphs no more than 10 to 12 words long for normal reading and browsing.

Other Considerations

To find the best font to fulfill your purpose and match your general concept, you need to recognize a font's scope for variation and its range of expression. For example, does the font choice allow for italic and bold variations? You must use all techniques and materials in the best ways. The following recommendations can help you avoid common mistakes, and you will develop a personal style over time:

- Always consider how an individual font fits into your web page and how the font relates to the whole design. Do not use different fonts simply for the sake of using multiple fonts on a web page. Make sure that your chosen font flows with the overall design of the page and the site as a whole. For example, you would not use Comic Sans MS (a light-hearted, childlike font) to convey important information (such as a warning message) to a user.
- No single font can serve all purposes at once.
- Design elements such as margins, line spacing, background color, and foreground color all help determine the end result. Even a relatively neutral typeface such as a sans serif can produce a rich variety in the look and feel of your website simply through different arrangements.

Netscape Fonts

For Netscape, the Bitstream TrueDoc software development kit (SDK) records character shapes used in a page and stores them in a compressed file called a portable font resource (PFR) file. You can reference this PFR file in an HTML page or style sheet document. When the page is viewed in a browser that supports TrueDoc, the browser reads the PFR and re-creates the characters. In essence, with TrueDoc the characters used in the original document accompany that document almost anywhere. For more information on TrueDoc, follow the Font Technology link at Bitstream's site (`www.bitstream.com`).

Microsoft Fonts

The Microsoft web-font initiative is called OpenType (`www.microsoft.com/typography`), and it is a joint effort between Microsoft and Adobe Systems. From a web perspective, OpenType works like TrueDoc in that it enables character shapes to travel with a document in a compressed form. However, OpenType is a broader initiative that merges the TrueType and PostScript Type 1 font formats into a single format. It is currently in the press release/technical background stage.

Microsoft Fonts vs. Netscape Fonts

Although TrueDoc and OpenType are competing technologies, they will be able to coexist—on the same computer as well as the same web page. You will be able to make any font you choose appear on your pages whether visitors have it installed in their systems or not.

This capability is possible if visitors are using browsers that support these technologies. As always, some users have older, less-capable browsers, and as a website developer, you must balance your desire for font fidelity against the need to reach the broadest audience. Therefore, you must work harder to create pages that look good regardless of the browser used to view them. Throughout this book, we will discuss how web pages can look different in the various versions of browsers as well as between the major browsers, Internet Explorer and Netscape.

Summary

In this chapter, you were introduced to the concepts of web technology and the use of design principles in creating an attractive and usable site. It's important to keep in mind the differences between designing for traditional media and designing for the web as well as the importance of understanding and addressing the users' needs. The web is a nonlinear, one-to-one medium as opposed to more traditional forms of media, which are linear and broadcast in nature.

There are tools available—such as Microsoft FrontPage and Macromedia Dreamweaver—to help you create dynamic, interactive websites that will address the needs of the user. And throughout this book you'll learn about new technologies such as DHTML, CSS, XML, JavaScript, and Java applets.

You need to understand the elements of web page design so you can use them to your advantage. Color plays a vital role in the perception and presentation of a website. Because it's such an important element in the design of a website, there are certain aspects of working with color that you should understand, such as how it's displayed and how to use RGB and hexadecimal values to specify color. Fonts are also an important element in page design. To use them effectively, you should understand some of the basic rules of typography. For example, serif fonts are best used in body text and sans-serif fonts are best for headlines. Finally, you can use white space, tables, and frames to position elements on a page.

Exam Essentials

Know the relationship between web technology and design concepts. Web design benefits from technology not found in traditional media, such as the ability to use hyperlinks to access topics of interest. On the Web, companies cannot use the same forms of information presentation, such as the brochure or catalog, in the manner they were originally designed. Because website users can follow hyperlinks to get to areas of interest, information must be presented in a manner that works with the nonlinear nature of the Web.

Understand the current direction and application of web technology and design. Web technology and design are moving in the direction of the user experience. The Web is interactive, which allows users to have a personalized experience, unlike the one they encounter with traditional forms of media. For the exam, you should understand how and why web technology and design are changing.

Know the differences between tools and technology. Tools such as Macromedia Dreamweaver and Flash and Microsoft FrontPage allow website designers to use new technologies, such as DHTML, CSS, JavaScript, and Java applets, with ease and effectiveness to create dynamic, interactive websites.

Know common page layout formats. There are several common page layout formats used on the Web: left-margin layout (the traditional layout format), top-margin layout, distributed left- and top-margin layout, right-margin layout, and distributed layout. Know what the advantages of using each one are.

Understand layout elements and their usage. There are numerous elements you can use on your pages to aid navigation and make the site easy for the reader to use. Identify certain page elements such as framesets, margins, borders, and so on, and know how you can use them to create effective pages.

Know how color can be used to convey a company's culture and industry. The element of color plays a vital role in the perception and presentation of a website. Color is perceived as a representation of the type of culture and industry in which a company participates. Know what types of messages certain color combinations can convey.

Be able to describe color in numeric formats. Colors are standardized in two numeric formats: RBG and hexadecimal code. Both RGB and hexadecimal colors can produce any color in the visible spectrum when combined in various proportions.

Understand how to choose fonts for a website. Font choice is an important element of website design. Commonly used fonts such as Times New Roman, Times, Arial, and Helvetica give a site a clear, attractive look and feel because most browsers use these fonts as their default font choice. Unique fonts are eye-catching but cannot be rendered in a user's browser as the default font if the browser does not have the font installed in its system.

Know the importance of white space on a web page. White space is essential to website design because it distributes content and reduces clutter on a page. Your understanding of the use of white space will aid in the flow of your website and not distract visitors with cluttered pages.

Key Terms

Before you take the exam, be certain you are familiar with the following terms:

- additive colors
- anti-aliasing
- broadcast medium
- Cascading Style Sheets (CSS)
- dithering
- Dynamic HTML (DHTML)
- Extensible Markup Language (XML)
- extranets
- intranets
- linear
- lowest common denominator
- nonlinear
- one-to-one medium
- pixel
- sans-serif font
- serif font
- subtractive colors
- transactions
- transparent GIFs
- white space

Review Questions

1. Before website design practices evolved, early sites resembled HTML versions of what?
   - **A.** Maps
   - **B.** Newspapers
   - **C.** Brochures
   - **D.** Television ads

2. The Internet is which type of medium?
   - **A.** Broadcast
   - **B.** One-to-one
   - **C.** Electronic print
   - **D.** Broadband

3. Which of the following terms describe the nature of the Internet?
   - **A.** Transactional
   - **B.** Linear
   - **C.** Passive
   - **D.** Self-reflective

4. Advances in technology have provided sophisticated tools that website designers can use to create and manage websites. From today's development perspective, which is the best option for creating a dynamic site?
   - **A.** Manual HTML coding
   - **B.** WYSIWYG tool
   - **C.** A combination of manual coding and WYSIWYG functionality
   - **D.** One method or the other depending on the site, but not both

5. What does WYSIWYG stand for?

   A. What You See Is What You Get

   B. When You See It Where You Go

   C. Why You See It What You Get

   D. When You See Is While You Get

6. You are designing a website for a general public audience. Which of the following guidelines should you follow?

   A. Create a very dynamic site using high-end software.

   B. Use the newest multimedia and plug-ins available.

   C. Design for the lowest common denominator of hardware.

   D. Design for the most recent browsers but slower modems.

7. The most effective Web page layout scheme can best be compared to which of the following media types?

   A. A magazine

   B. A newspaper

   C. A television newscast

   D. A brochure

8. Which of the following basic elements of web page layout is used to control the user's movement through the site?

   A. Frameset

   B. Table

   C. Image

   D. Navigation

9. Which layout format is the most commonly used on the Web?

A. Left-margin layout

B. Top-margin layout

C. Left- and top-margin layout

D. Right-margin layout

10. Users perceive color on a website as a representation of a company's culture or industry. Which of the following color schemes would best convey a conservative law firm's style on its website?

A. Several bright colors on a dark background

B. Red and white text on a black background

C. Pinks, yellows, and reds

D. White, blues, and grays

11. Which of the following best describes the benefit a business gives the consumer by having a website available for use?

A. Temporary access to assistance in learning and decision-making

B. Immediate access to assistance in learning and decision-making

C. Person-to-person assistance 24 hours a day

D. Free service and support for all business problems

12. True or False. The concepts and applications of mass media are valid for the Internet.

A. True

B. False

13. After e-commerce, what has made up the second largest growth area in web development?

    A. Intranet

    B. Personal websites

    C. Information-only websites

    D. Chat sites

14. What use of the Internet is rapidly emerging to fulfill data requirements outside the company and streamline the business process for outside vendors and business partners?

    A. Outranets

    B. Intranets

    C. Extranets

    D. Exteriornets

15. True or False. The Internet is a static medium; therefore, rules and concepts are at a constant standstill.

    A. True

    B. False

16. What is the primary goal a website designer is looking to fulfill when creating any website?

    A. To dazzle the user with a multimedia experience

    B. To encourage buying with good design

    C. To have as much information as possible on the home page

    D. To give the user what they want, not what you think they want

17. The web medium can optimize the possibilities of _____ for users, creating a direct connection between the business and visitor?

A. Interconnectivity

B. Speed of connection

C. Interactivity and personalization

D. Multimedia

18. Why is manual coding HTML alone not the best choice for the development of websites?

A. It is too time-consuming.

B. It doesn't support enough features.

C. HTML coding is out-of-date.

D. HTML coding cannot be used for website development.

19. How much text of a web page does the majority of web users actually read?

A. Eighty percent

B. Most of the website's home page

C. Close to none; most users only scan a web page

D. Fifty percent

20. Which of the following best describes what page layout refers to?

A. How much text is on each page

B. How many pages make up the website

C. How the tree structure of pages making up the website is designed

D. How the website designer presents information to the users

Answers to Review Questions

1. C. Many companies duplicated their print advertising on the Web.
2. B. Users of websites respond better to information and product offerings that are tailored to their specific needs. By nature, the Internet is a medium that enables the user to decide what information to access and when to access it. This fact makes the Internet a one-to-one medium as opposed to a broadcast medium.
3. A. The entire Internet experience is based on user requests and server responses (transactions).
4. C. It takes too much time to create a dynamic site by only manually coding HTML. Using a WYSIWYG will allow you to make changes quickly and easily. A combination of manual coding of HTML and using a WYSIWYG tool will give the greatest control over a creating a dynamic site.
5. A. WYSIWYG stands for What You See Is What You Get. WYSIWYGs tools are tools that allow website designers to see what the page looks like as it is being designed. Designers do not need to know HTML to use a WYSIWYG program.
6. C. To ensure that the highest number of users can view your website using the hardware they commonly use, developers should design their sites for the lowest common denominator of hardware.
7. B. The most effective Web page layout scheme is compared to a newspaper; it is often called an inverted pyramid because summaries of stories are listed first.
8. D. Navigation is used to control the user's movement through the website. You should follow commonly used practices for navigation, such as placing navigation elements on the left and top margins of the page and using a different color background for them.
9. C. The left- and top-margin layout, also referred to as a distributed layout, is the most commonly used layout in website design. Navigation elements commonly are placed at the top and left side of a Web page with additional navigation elements at the bottom.

10. D. Color is perceived as a representation of the type of culture and industry in which a company participates. White, blues, and grays convey a more conservative culture or industry than would pinks, yellows, or reds, for example.

11. B. By having a website available to customers, a business is providing them with immediate access to assistance in learning and decision-making. Web addresses are now included in most businesses' radio, television, and print ads. This assistance is not limited by a time frame, but it is also not a person-to-person experience, so options A and C are incorrect. Having a website does not provide free service and support to all business problems either.

12. B. The concepts and applications of mass media are not necessarily valid for the Internet. The Internet is a medium that enables the user to decide what information to access and when to access it. Mass media is mostly passive. Its goal is to create in the viewer or reader interest that eventually will lead to a desired transaction.

13. A. After e-commerce, the intranet has been the second-largest growth area in web development. As data-driven content becomes more common, companies and industries are more often putting their in-house business processes on the Web for their employees to access. The result is a more efficient and productive work environment because employees have easy access to frequently used data and documents.

14. C. For outside vendors and business partners, extranets are rapidly emerging to fulfill data requirements outside the company and streamline the business process. Extranets give partner companies access to business information that can be used to first see a need and then supply needed parts or materials without a request from the other company.

15. B. The Internet is not a static medium like print media. Therefore, the rules and concepts are in constant fluctuation.

16. D. The primary goal in website design is to give users what they want, not what you think they want. This goal can be achieved with a complex balance of well-planned design, quality content, and proper use of available media. As a website designer, you want users to have a satisfying experience, but dazzling them is not your goal. Cramming lots of information on the home page is a bad idea and may turn users away from your site. Not all sites are merchant sites that will be looking to sell products.

17. C. The web medium can optimize the possibilities of interactivity and personalization for the user, creating a direct connection between the business and the visitor. This is accomplished through the new technologies, such as Dynamic HTML (DHTML), Cascading Style Sheets (CSS), Extensible Markup Language (XML), JavaScript, and Java applets.

18. A. It simply takes too much time to develop a dynamic site by only manually coding HTML. A combination of manual coding and WYSIWYG functionality is the best option from today's development perspective. The need for constantly updated information and design on both a corporate website and an intranet or extranet site necessitates an alliance between the two methods of site design.

19. C. The majority of users read almost none of the text on a web page. Numerous surveys confirm that as many as 80 percent of web users merely scan web page content, looking for key words and phrases. As a designer, you must create a page that allows users to quickly scan and find the information they seek.

20. D. Page layout refers to the way in which the website designer presents information to users. The format should be logical and easy to understand. As a website designer, you must develop a structure and adhere to it so the user's experience will be meaningful and productive.