# Hypermedia Design Principles and Techniques

After completing this chapter, you will be able to:

- Know when to use a flowchart, a storyboard, and a script
- Recognize the five basic multimedia design paradigms
- Understand how the linear list design lets the user move back and forth in a sequence of multimedia objects
- Understand how the menu design provides users with a choice of items, and how the hierarchical design provides levels of choices by linking menus to menus
- Realize how the multiple linking in a network design provides the richest form of interactivity
- Visualize how hybrid designs can incorporate lists, menus, hierarchies, and networks
- Define the content of a multimedia application and adopt an appropriate navigational metaphor

Now that you have completed the *History of Flight* tutorial, it is time for you to learn some techniques that will prepare you for creating more advanced applications in the future. It is not unusual for a multimedia application to contain hundreds or even thousands of multimedia screens. Your challenge is to present this material in such a way that the user will not get lost or confused. From the get-go, you must have a clear notion of how the material will be organized and how the user will navigate from screen to screen.

This chapter teaches hypermedia design techniques that will help you plan the development of a multimedia application. You will learn to visualize the flow of your application and imagine yourself running through it as a user. You will save time and money by learning to correct problems in the design before costly on-screen development begins.

# **Design Paradigms**

There are five ways to design the flow of a multimedia application: the linear list, the menu, the hierarchy, the network, and the hybrid.

#### **Linear List**

The simplest design is the **linear list** you see in Figure 32-1. As the user clicks the mouse, the application presents the information, one item after the other. Each object in the list can be a text, a graphic, an audio clip, a video, or a compound object consisting of more than one medium playing at once, such as a text overlaid on a graphic accompanied by a sound track. The user can move back and forth through the list, moving forward to new materials or backward to review.



**Figure 32-1** The linear list design lets the user move forward to see new materials or backward to review.

#### Menu

The second way to design an interaction is to create a **menu** such as the one shown in Figure 32-2. The items in the menu can appear as lines of hypertext, graphics in hyperpictures, or a combination of textual and graphical triggers. When the user chooses an item on the menu, the item linked to it appears and stays on the screen until the user clicks the mouse. Then the application returns to the menu, from which the user makes another choice. The home screen in the *History of Flight* application you created in Chapters 26 to 31 used a menu design.



Figure 32-2 The menu design presents the user with a set of choices.

#### Hierarchy

The third kind of design is the **hierarchy** shown in Figure 32-3. Each object provides the user with a menu of choices that trigger more menus with more choices. There is no limit to the size or number of menus and submenus you can have in such a hierarchy.



Figure 32-3 The hierarchy presents the user with menus of submenus.

#### Network

The most complex design is the **network** shown in Figure 32-4, in which objects can be multiply linked in any direction to any object in your application. Especially when a multimedia application is large, the network design enables the user to navigate to any screen with a minimum of mouse clicks. A tight design enables users to get where they want within three clicks.



**Figure 32-4** The network diagram contains multiply linked items that provide the richest kind of navigation.

#### Hybrid

Multimedia applications often use more than one design paradigm, employing lists, menus, hierarchies, and networks where appropriate. For example, a sophisticated network design can trigger a list of images in a slide bank with simple navigation that lets the user move back and forth through the slides. When the user gets to the end of the list, the network design returns to provide richer navigation options. Designs that combine paradigms are called hybrid. Figure 32-5 shows an example of a hybrid design.



Figure 32-5 Hybrid designs employ linear lists, menus, hierarchies, and networks where appropriate.

# **Content Definition**

To develop a good application, you must have a clear idea of what it is going to be about. **Content definition** is the act of specifying what a multimedia application is about. To define an application's content, make an outline of the topics you plan to cover. Think hard about the tasks involved and make sure you are not leaving out a topic that needs to be covered in order for the user to understand a subsequent topic. The process of hierarchically outlining an application's content is known as **task analysis**.

If you are not an expert in the content area, team with a subject matter expert (SME) who can work with you to make sure the task analysis is not missing an essential step. After you complete the task analysis, pretend you are a user: Imagine navigating through your application and ask whether anything the user needs to know is missing. A good, tight design will never skip a piece of information required to prevent the user from getting lost.

# Storyboarding

A **storyboard** is a series of sketches that describe the content of a sequence of multimedia screens. Figure 32-6 shows a sample storyboarding form, which contains a frame for sketching the screen layout and a space below the frame for making comments. To create a storyboard, you fill out such a form for each screen in an application. Inside the frame, sketch the design elements that will appear on the screen. In the space below the frame, write comments describing the screen's function and purpose.

Filename:	
Screen No of	
Images:	—
Audio:	
Video:	
NAVIGATION	—
Next:	
Back:	
Menu:	
Help:	
Notes:	

Figure 32-6 A multimedia storyboarding form.

Use the storyboard to reflect on the flow of your application. Spread out the sketches on the floor, tape them to a wall, or tack them onto a bulletin board. Arrange the sketches in their logical sequence—the order in which the user will view them. Seeing your screens

all at once can help you visualize the form of your application and help you make design changes before proceeding to the more costly and time-consuming development stage.

# **Scripting**

After you storyboard a project, you are ready to script it. A script is a complete specification of the text and narration in a multimedia application. Especially when you are using a team of people to develop an application, it is important to have a written script. Scriptwriting makes the team think through the project thoroughly. A written script helps team members communicate with each other, share comments on the design, and make adjustments prior to beginning the costly development stage. Having a script also helps you role-play the application from the viewpoint of a user and identify any missing elements.

# **Flowcharting**

Multimedia applications often require users to make decisions. A **flowchart** is a logic diagram that illustrates the steps involved in an interactive decision-making process. Flowcharts are helpful when designing conditional branching and answer judging in a multimedia application. For example, you might present a test question and ask the user to select the correct answer. Depending on how the user responds, you will either give some positive reinforcement and proceed to the next question, or you will provide remedial feedback explaining why the answer was incorrect. Drawing a flowchart can help you visualize the answer-judging process.

Figure 32-7 shows the shapes designers use to create flowcharts. The most important shapes are the rectangular "process" box and the diamond-shaped "decision" symbol. The flowchart shown in Figure 32-8 uses these symbols to diagram the answer judging in a multiple-choice question. In the process box at the top of the diagram, the user is asked a question. If the user answers correctly, positive feedback will reinforce the correct answer. If the response is incorrect, the computer will provide a hint and repeat the question. If the user fails again, remedial action will be provided.



Figure 32-7 Flowcharting shapes and symbols.



Figure 32-8 Flowchart of a multiple-choice question.

# **Navigational Metaphors and Icons**

Designers often adopt a **metaphor** that makes it easy for the user to interact with an application. For example, the multimedia CD-ROM *Exploring America's National Parks* by Multicom uses a map metaphor to provide access to more than 230 parks. Charles F. Patten Middle School in Kennett Square, Pennsylvania, uses a Monopoly game board metaphor to provide links to different places at the school's Web site. The teacher/pathfinder Web site uses a metaphor of a village. The NewMedia Invision Festival uses a flipbook. The Macintosh version of Microsoft Internet Explorer uses a notebook metaphor. Follow the *Multilit* Web site links to metaphors to see some examples in action.

It's also common for multimedia developers to create navigational icons to fit the theme or style of an application. The *Multilit* CD contains a collection of icons that you can freely use in your applications. Table 32-1 shows you where to find active, inactive, and pressed versions of these icons.

#### **Visualizing a Structure**

Successful designers are so good at visualizing what an application will be like they can actually run it through in their minds before creating a single screen. With practice, you, too, can develop this ability.

For example, consider the billboard metaphor pictured in Figure 32-9. Think of the billboard as the home screen for a multimedia application about the Internet. Imagine how the words and pictures printed on the billboard could trigger the text, graphics, audio, and video in an application about the Internet. Pause for a few moments and think about how you could design such an application. Then turn the page and study Figure 32-10.

298

Purpose	Shape	Directory	Active	Inactive	Pressed
Home	square	buttons\square\	home.bmp	ihome.bmp	phome.bmp
Done	square	buttons\square\	done.bmp	idone.bmp	pdone.bmp
Next	square	buttons\square\	next.bmp	inext.bmp	pnext.bmp
Back	square	buttons\square\	back.bmp	iback.bmp	pback.bmp
Quit	square	buttons\square\	quit.bmp	iquit.bmp	pquit.bmp
Page up	square	buttons\square\	pgup.bmp	ipgup.bmp	ppgup.bmp
Page down	square	buttons\square\	pgdown.bmp	ipgdown.bmp	ppgdown.bmp
Print	square	buttons\square\	print.bmp	iprint.bmp	pprint.bmp
Play	square	buttons\square\	play.bmp	iplay.bmp	pplay.bmp
Stop	square	buttons\square\	stop.bmp	istop.bmp	pstop.bmp
Home	round	buttons\round\	home.bmp	ihome.bmp	phome.bmp
Done	round	buttons\round\	done.bmp	idone.bmp	pdone.bmp
Next	round	buttons\round\	next.bmp	inext.bmp	pnext.bmp
Back	round	buttons\round\	back.bmp	iback.bmp	pback.bmp
Quit	round	buttons\round\	quit.bmp	iquit.bmp	pquit.bmp
Print	round	buttons\round\	print.bmp	iprint.bmp	pprint.bmp
Play	round	buttons\round\	play.bmp	iplay.bmp	pplay.bmp
Stop	round	buttons\round\	stop.bmp	istop.bmp	pstop.bmp
Calculator	square	buttons\square\	calc.bmp	icalc.bmp	pcalc.bmp
Notepad	square	buttons\square\	notepad.bmp	inotepad.bmp	pnotepad.bmp

 Table 32-1
 Button Bitmaps on the Multilit CD\*

\*Even more buttons are found in the buttons folder.



Figure 32-9 A billboard metaphor for the Information Superhighway application.



Figure 32-10 Design of the Information Superhighway application.





Did you imagine something like the structure shown in Figure 32-10? Notice how the billboard functions as a menu. The first item, "Discover the Information Superhighway," links to a screen that defines the Internet. Clicking the mouse returns the user to the billboard. This is the simplest part of the design. The second menu item, "Explore How It Serves You," launches a submenu listing the kinds of things you can do on the Internet; each submenu item triggers a screen explaining an Internet service. "Test-drive the Internet" lets the user select interesting places to visit on the Information Superhighway and, if a real Internet connection is present, takes the user to those places.

In addition to hypertext, the billboard also contains a few hyperpictures. The Weather icon launches the Weather Channel's Web site. The News icon is linked to the AJR Newslink, which provides access to thousands of online newspapers and news services. The globe icon links to the CNN newsroom. Finally, the Exit sign provides a graceful way for the user to leave the application.

You can run the *Information Superhighway* application on the *Multilit* CD. Use PowerPoint to open the presentation named *InfoHighway* in the *Highway* folder of the *Multilit* CD. Refer to the diagram in Figure 32-10 as you run the application. As you click the different buttons and hypertext options, keep track of where you are in the diagram. This will help you develop a feel for moving about the hyperspace that gets created when you trigger the links on a multimedia screen.

### **The Systems Approach**



Development projects follow a continuous cycle of design, development, and evaluation that is known as the **systems approach** to instructional design. Figure 32-11 shows

an artful depiction of the process from *Designer's Edge* by Allen Communication. *Designer's Edge* is an integrated set of preauthoring tools and wizards intended to accelerate the analysis, design, and evaluation of effective technology-based training materials. A visual, task-driven interface walks the user through the entire instructional design process from analysis to evaluation. To learn more and get a free demonstration CD, follow the links to *Designer's Edge* at the *Multilit* Web site.

**Figure 32-11** The project development cycle as depicted on the cover of *Designer's Edge* by Allen Communication.

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1. Draw a diagram showing the structure of the *History of Flight* application you created in Chapters 26 to 31.

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2. What design paradigm(s) does the *History of Flight* application use? To help answer this question, refer to the diagram you drew in response to the previous question.

