Multimedia Authoring

FOCUS:
Multimedia Authoring

Stages of Authoring
Adobe Flash 8 Drawing Tools
Adobe Flash 8 Animation
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Basic Multimedia Authoring

Multimedia is created by incorporating different elements - such as sound effects, text passages, video clips into one program. It is delivered by computer or other electronic means. It is a richly presented sensation. When we weave together the sensual elements of multimedia - dazzling pictures and animations, engaging sounds, compelling video clips, and raw textual information - we can electrify the thought and action centers of people’s minds. When the user is given interactive control of the process, they can be enchanted. Multimedia excites eyes, ears, fingertips, and most importantly - the mind.

Although the definition of multimedia is a simple one, making it work can be complicated. Not only do you need to understand how to make each multimedia element stand up and dance, but you also need to know how to use multimedia computer tools and technologies to weave them together. When you allow an end user (the viewer of a multimedia project) to control what and when the elements are delivered, it is interactive multimedia. Interactivity empowers the end users by letting them control the content and flow of information. When you provide a structure of linked elements through which the user can navigate, interactive multimedia becomes hypermedia.

A multimedia project need not be interactive to be called multimedia; users can sit back and watch a production just as they do a movie or television. In such cases a project is linear, starting at a beginning and running through to an end. When users are given navigational control and can wander through the content at will, multimedia becomes nonlinear and interactive, and it is a powerful personal gateway to information. Determining how a user will interact with and navigate through the content of a project requires great attention to the message, the scripting or storyboarding, the artwork, and the programming. You can break an entire project with a badly designed interface. You can also break a project with inadequate or inaccurate content.

Authoring a Movie

Many multimedia presentations also include ways the user can interact with them, providing a new dimension in the presentations. This whole process is known as authoring a movie and involves many stages. Movie is the authoring term for a project and will be used often in this chapter.

The “authoring” process is how a development team works through multiple stages and builds a working prototype to demonstrate how a movie will work.

Authoring Software

Most authoring software replaces the complex text-based world of programming with a graphical one where multimedia elements can be moved around on-screen, and every decision can be made by selecting from menus of simple commands. Multimedia elements are typically sewn together into a project using authoring software. These software tools are designed to manage individual multimedia elements and provide user interaction. In addition to providing a method for users to interact with the project, most authoring tools also offer facilities for creating and editing text and images. Sounds and movies are usually created with editing tools dedicated to these media, and then the elements are imported into the authoring system for playback. Many authoring programs, such as Director or Flash, use the analogy of directing a movie or a play to simplify the process.
Authoring software can be used to create sound, video, text, graphics, and sophisticated animations from scratch. This software is also capable of providing the links that join these elements and make a multimedia movie interactive.

There are four categories of interactive programs: Presentations, Catalogs, Games, and Computer-Based Training. Your information, audience, and project goals help determine the most appropriate design model.

1. **Presentations**
   At its core, the interactive presentation is show and tell. You have information to convey or a story to tell; user input is less employed than with other applications. Material can be presented in a linear or non-linear fashion. Like computer-based training programs, interactive presentations are really learning experiences for the user. Since the audience is under no obligation to absorb anything and may not be highly motivated, the material must be memorable, entertaining, and most important of all, simple to operate.

2. **Catalogs**
   A catalog format is perfect for a direct access information design. For instance, you might design a single home screen with a single set of navigational tools, a display window and text windows. Without ever leaving the home screen, users could import product specifications and prices, calling them in from the appropriate database files. The two distinctive characteristics found in an interactive catalog are a search engine and a transaction component. The search engine enables the user to access information from a text field or hypertext-linked index. The transaction component provides the user with the tool to actually select and buy items.

*The authoring process is how a development team works through multiple stages and builds a working prototype to demonstrate how a title will work.*

*Examples of Interactive Programs.*
3. Computer-Based Training (CBT)
Computer-based training covers any application that provides a very specific learning agenda for the user. Information is absorbed at the user’s own pace; advancing through new levels of information only after mastering previous levels, thereby qualifying that learning has taken place. There are two characteristics that distinguish computer-based training: simulation of real-life events and scoring. The ability to simulate real-life events is one thing that makes computer-based training so valuable. Consider programs used by doctors or pilots in training. Simulation is a risk-free way to learn; mistakes can be made, but they aren’t fatal. True CBT programs will include the ability to record user responses and measure user progress.

4. Computer Games
Computer games are the parents of today’s multimedia industry, and computer games continue to add fuel to the popularity of computers. The objective is simple for the computer game designer: extended play value. As the user becomes proficient, the game should become more challenging. Also, note the similarities between games and CBT: Both types of programs transfer skills to the user during the course of “play.” It might be wise to consider aspects of game design in the development of CBT as well as presentation projects.

Stages of Authoring a Movie
Movies are created in many stages. Most often these development stages are very specific. At times it may be hard to see any separation of the stages, but you should never leave any stage out. There are six general stages for authoring a movie, starting with the concept and finishing with the distribution and delivery. As you go through the stages, you may find yourself going back to certain stages to reevaluate certain aspects or to make decisions based on other stages.

Concept
Creation of a multimedia movie requires an idea. The concept stage is sometimes referred to as the question and answer stage. There are three things to keep in mind when creating a movie: the target audience, the purpose of the product, and the product itself.

Here are some questions you may need to ask:
- Who is the movie being created for? (Large or small audience)
- What is the level of comprehension? (Grade or grad school)
- Is the purpose to inform, entertain or educate?
- What is your end product?
- How will the product be distributed? (CD ROM, the Internet or perhaps by other means)
- What is the purpose behind creating the movie?

This is a good starting point for most movies, but is not all inclusive. With all of the possible variables, many questions must be asked and answered.

Whomever the movie is created for, the target audience, will have an influence over some aspects of the next stage, planning.
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Planning
After the idea, purpose, and target audience is established, then you begin planning the movie. Deadlines, budgets, and available resources are big drivers in how complex a project may become. Planning any project without knowledge of the budget could add up to wasted time and resources. You must also know when your customer wants the project completed. Many projects have been stopped dead in their tracks because of poor planning. If you have a short suspense but an extremely large budget, you may be able to use more resources in a shorter time. Conversely, you may have a long suspense and a limited budget forcing you to shop around for less expensive resources.

The next step in the planning stage of the movie is to gather the content. Resources needed to complete a program can include, but are not limited to: software, hardware, personnel man-hours, photo imagery, and illustration images. Additional buffer time should be figured into the schedule to cover unexpected problems. All of these are just a sample of the required resources or factors that can and will affect production. The planning of the program must be detailed and thought out carefully.

The resource aspect is heavily affected by the target audience. As mentioned before in the concept phase, “Who” you are presenting to will have a profound effect on what is put into the presentation. Finally, a script should be written detailing the scenes in the movie. The script should contain the “Who, What, Where and When” aspects of planning. Script writing is similar to writing the story of a production and leads right into the design stage of authoring a movie.

Knowing your audience will aid the Planning stage just as this illustration relies on bright colors, a cartoon-like rendering style, and images to appeal to the interests of its viewers.

Design
The next stage is to produce a design to incorporate into the program. Before work on the multimedia elements begin, the editor-designer first prepares everything on paper – detailed plans that show exactly what text, still pictures, sounds, animations, and video clips are needed - and decides exactly where they belong.

Creating a multimedia program is no simple task; it requires a number of planning and development stages within the design stage. One of the best things you can do for your multimedia program is provide yourself with a script before you begin. A script for multimedia is typically set up to provide not only the dialogue or narration, but also the action, sound and music that is to take place at the same time.

The scripting processing continues as the design team creates thumbnails, comprehensives (scamps), and storyboards, for every scene and prepares flowcharts of all the interactive connections in the movie.

Thumbnails are small, quick drawings used to work out general layout and structure of the scenes. This stage is used for brainstorming ideas. Navigational tools, usually in the form of on-screen buttons, are essential to the interactive experience. Buttons need to be conveniently located. Designs need to be consistent, familiar, and easy to recognize. One way to do this is through the use of icons. Icons are
pictorial representations that immediately convey a meaning to the user, for example, a little house button that means “return to the home screen” or arrows pointing forward and backward to indicate “Move ahead to the next page” or “Move back to the previous page.” As a test, ask yourself if the icons you’re using might be easily understood by someone who doesn’t read or speak English. Some general guidelines for button design are the following:

• Buttons should be big enough to see and easy to click on...not too small (or it will be hard to position the cursor) and not too large (or they will take up valuable screen real estate).
• Icons or graphics that appear to hover just above the screen (with those soft drop shadows) must be buttons. Computer users have come to expect buttons when they see icons that hover. If the user clicks on one and nothing happens, he’ll think the program is frozen.
• On-screen buttons should provide some visual or audible feedback when the user touches them. As you press a button, you might hear a click or see the button indent or change color.

Comprehensives, also known as scamps, are pencil layouts that show how the text and images will be positioned on every scene. Designers are going to work from these plans, so they need to be descriptive and accurate.

Flowcharts are used to organize the content. An information flowchart is simply an outline presented as a box diagram, with lines that show the access routes among its parts, a navigational blueprint. It shows how you plan to take the user through the movie. The flowchart shows links between scenes. The ideal flowchart is a clear, easy-to-follow specification of a program’s topic categories, levels, and links.

The style of this interactive interface is clear, modern, and universally international. It has illustrations (the time icon, the mail, music and work colors) to keep it from being boring.

• It’s a good strategy to group all the navigational tools in one section on the screen and keep them there throughout the entire program. This is called the navigational bar technique. Providing a consistent location for buttons allows the user to become more productive and gain speed with continued use of the program. It really doesn’t matter where the navigational bar is located, as long as its position is consistent from screen to screen.
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Storyboards are like scamps, but have a lot more information, showing the elements that appear on that scene. They are drawn to show the story and how it unfolds. Multimedia is first and foremost a visual medium, so to be successful, it’s crucial to hone your visual skills. Like any visual medium, good composition of elements and an inviting and intuitive look and feel are what work best, just as they do on a printed page. Storyboards look like comic strips. They list actions and options of each scene. Anything that happens such as an animation, moveable object, movie or sound playing needs to be identified in the storyboard. The interface, navigational controls, and the style must be considered when drawing the storyboards. When creating the interface and navigational controls, you must again look at the concept stage and keep the user in mind. The interface design and controls should be intuitive, simple, and consistent. The storyboard does not need to be elaborate, but should show progression.

• Well-developed storyboards can help the animator or media designer frame the compositional elements in the scene.

• Animators can use a key frame sequence; they may only show where an object or character starts in the frame and where those object or character completes the movement.

• Storyboards give everyone associated with the project a chance to share and understand the visual concept the director and writer are after. If a scene works on paper, chances are it will work in the program.

These are things to keep in mind when you are designing the script and storyboards. The best multimedia designs are transparent to the user, creating an environmental space where the user forgets he is relating to a machine and feels motivated to explore.

How many times have you paid for an interactive program and found it to be really cheesy? In the rush to put multimedia products on the market, many products are merely existing material converted to a CD. Books in print become books on CD. Nobody wants to read volumes of text on a computer screen.

A good design calls attention to the content of the piece, rather than calling attention to itself. Screens and graphics will appear to have a texture that can be revealed by dramatic lighting effects. Colors will be harmonious. The movement through the program will feel comfortable and users will easily, even intuitively, learn how to work their way through the program.

Production

With the design work accepted and the concept in full view, it is time to begin production.

The production stage combines all the planning and design efforts into an electronic media. Each person on the production team begins to gather the raw files and prepare them for production. The source files are brought together and placed where they can be used by all members of the team. The recording, obtaining, and creating of images, sounds or video will continue throughout the production phase. Decisions are made on file names and formats. Source files are determined along with the file structure. Many times during the authoring process you will need to refer back to the concept stage and look at the visualized final product. This will help you determine screen size, image sizes and possibly the frames per second (fps) rate of videos. Most movies will be made for show on a video or computer screen. With this in mind, you will more than likely make the screen 640x480 pixels and images no larger than 640x480 pixels at 72ppi. Videos run at 15 - 30fps. While the movie is being brought together, testing must be done to make sure it matches the designs and functions properly.
The Production stage combines all the planning and design efforts into an electronic media.

Testing
The testing of a movie is a never ending process and is done throughout every stage of development. All decisions should be tested and checked whether they are on paper or in the program. Proofreading the script, scamps and storyboards will help prevent embarrassing moments later. Find out what system will be used for the presentation and use it to test the movie. A very popular method of testing is to have an independent third party test the project. You give the tester a finished prototype and basic instructions. From this, the user should be able to understand and navigate through the movie. The third party testers are usually used to find bugs that are missed during production. If testing is successful, it is time to move to the final stage; distribution and delivery.

Distribution and Delivery
The final stage of authoring is distribution. Throughout the development of a movie, you must be aware of the process of creating the movie. During the planning stage, the target audience was determined, as well as the type of media and operating system on which the movie would be viewed. Now that the movie has been produced and tested on the required operating system(s), it is time to generate the specific movie format. Once the movie is generated, it will be distributed onto some type of medium. This medium could range from a CD-ROM, ZIP disk, saved to a Server, or incorporated into a web page.

When determining methods to distribute a movie, it helps to understand a Flash player and Flash play movies. The Flash player is a system component that can play movies and animations in Web browsers and also outside browsers as stand-alone applications. To distribute your product, save as Flash SWF, Quicktime movie, or animated GIF.

Flash Movie
SWF (Shockwave Flash, often referred to simply as Flash) is a proprietary vector graphics file format produced by the Adobe Flash software. Intended to be small enough for publication on the web, SWF files can contain animations or applets of varying degrees of interactivity and function. The Flash program produces SWF as the compressed and uneditable final product, whereas its uses the .fla format for its editable working files.

Flash SWF file will incorporate what is needed for it to be viewed independently. A movie file is viewed using a Quicktime player. SWF movies play by using an Internet browser that has the Flash Player plug-in added.

Using Linked Media
Resources used in Flash are usually embedded into the project when they are imported into the library. However, large files such as movie clips should be linked from Flash so as not to make the movie’s file size too large. When a file is linked, you must ensure these external files are included when the movie is produced and delivered.
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Cross-System Portability
Not all software products run on all computers. There are different operating systems, and most software is designed to be compatible with just one of them. Some software products are “ported” from one system to another (usually Macintosh to Windows, or vice versa), but these new versions tend to be complete ground-up rewrites that bear only a surface resemblance to the original version. Such porting can be a very costly process.

When multimedia started to come into its own as an industry, developers were in a bit of a predicament. Macintosh offers superior graphics capabilities, so it was the operating system of choice for designers and animators. But as target audiences go, the Macintosh-owning population is far outnumbered by those with Windows-compatible machines. Was it possible to combine the best of both worlds, by building multimedia on the Macintosh and then translating it into Windows-ready files?

With a minimum of headaches and hassles, Flash made this possible. Flash (.Fla) files created by one platform can be opened directly by the other and saved in a stand-alone form for either platform.

Apple HyperCard organizes information into easy-to-use “stacks” of cards through which users can navigate and search for the information they need. Simply by clicking on a button, they can view related text, see a graphic, hear a sound, watch a QuickTime movie, or listen to text spoken out loud.

IncWell SuperCard provides a rich, powerful, and easy-to-use authoring environment that will empower the user to create things we never thought possible. Whether the user’s interests lie in creating presentations or building software, SuperCard’s too easy-to-use editing environments (the ‘Project Editor’ and ‘SuperEdit’) provide comfortable tool-palette based interfaces for the construction of projects. SuperCard’s extensive built-in color graphics tools provide both paint and draw modes, and all created graphic objects are fully scriptable. SuperCard’s color environment is fast and provides familiar tools to create whatever graphic objects the project requires. You can even import a variety of graphic file formats, manually or automatically under script control. SuperCard is a true multi-window environment. Projects can have a virtual unlimited number of windows, and all of the standard Macintosh windows are available… including scrolling windows, floating palettes, dialogs, and more. SuperCard also supports up to four sound channels including sound resources, ‘.aiff’ files played from disk, text-to-speech, and QuickTime.

However, if you are going to venture forth into the world of computer-based training (CBT) - where you will need to combine diverse media objects and sounds, to include testing and scoring modules, Macromedia Authorware is the application to use.

Software Examples
Your choice here will depend on the applications you intend to develop. For example: If you are going to be doing straight presentation interactive products (like touchscreen kiosks with a limited number of interactive levels), then you could get by with an inexpensive application like Apple HyperCard or IncWell SuperCard.

Create everything from Web-based tutorials to sophisticated simulations incorporating audio and video with Macromedia Authorware, the leading rich-media authoring solution for e-learning. Deliver your applications on the Web, corporate networks or CD-ROM, and easily track student results and return on investment. This cross platform authoring program uses an icon-and-diagram approach to laying out the interface objects. In the development
of interactive training materials, this program is quite comprehensive. Authorware has the ability to combine a broad variety of multimedia objects, videos, and animations: but its real power lies in its ability to store and retrieve libraries of reusable test question models - a valuable feature for anyone involved in the ongoing production of computer based training.

As you’ll discover for yourself, Flash has enough online features to make it an essential tool for graphic designers everywhere.

**What’s so special about Flash?**
Flash may have a pioneering history as a multimedia tool, but history doesn’t count for much with today’s breakneck pace of software development and marketing. Plenty of competing authoring platforms have risen up to challenge it--and frankly, most of them, such as SuperCard, Apple Media Toolkit, and Quark/Factory’s Tropolis, haven’t made much of a dent in Flash’s dominance.

Flash is the world’s foremost animation tool for multimedia productions. Whether you’re a multimedia artist, producer, educator, engineer, or multimedia consultant, Flash is the ideal tool for creating Web sites, kiosks, entertainment and educational CD-ROM movies, simulations, visualizations, interactive presentations, and demo disks. Flash will allow integration of media from applications such as PhotoShop, Illustrator, Premiere, Extreme 3D, and sound programs to create multimedia applications.

**Principles of Animation**
Animation is a series of graphic images that are displayed fast enough to trick our eyes into believing there is movement. If done well, animation can add a great deal to a Web site. If it is improperly incorporated into a Web site, or if there is too much animation on a single page, it can be both distracting and annoying. There are many different uses for animation. Animation is often a better choice than video in education and training, because animation can be used to simplify complex concepts. Of course, animation continues to be used extensively on Web sites that are focused on entertainment and games. In addition, because it grabs attention, animation is being used extensively in advertising and e-commerce.

To effectively create the illusion of motion, the playback rate should be at least 15 frames per second. When the illusion of motion fails and the animation appears as a rapid sequence of still images instead of a fluid object in motion, the image is said to “flicker”.

Animations are good for showing changes over time, transitions and transformations of elements, and relationships among objects. If you’ve ever looked at a filmstrip, you know that the “moving pictures” we see in the theaters and on television are really just sequences of still pictures seen in rapid succession. Because the changes are relatively small, going from one picture to the next, we perceive motion. This is essentially how we create animations with Director by changing the arrangement on the stage ever so slightly from one frame to the next.
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Cell Animation
The very first filmed animations were drawn -- and filmed -- frame by frame. This meant that an artist had to draw thousands of pictures even for a short film. Consequently, drawings in the earliest cartoons are generally not very sophisticated.

Cell animation was invented in the early part of the 20th century and made it possible to create the beautifully drawn feature-length animations which the Disney studios are famous. With cell animation, a scene is separated into layers. Characters and props are painted onto clear acetate cells, which are laid over background paintings on an animation stand. A single background painting may appear for several seconds in a scene. Then, only the characters need to be redrawn from one frame to the next. Further savings may be achieved by having multiple cells for the characters and props, separating the parts that change rapidly from those that don’t. Cells may even be reused, with sequences (e.g., a “walk” sequence) appearing over different backgrounds. Although cell animation reduces the amount of drawing that must be done, it also complicates the filming process in that each frame is now an arrangement of pictures. To minimize the confusion that might arise, a timing sheet keeps track of what is on the animation stand, how the camera moves, and how the audio corresponds.

Director extends the ideas behind cell animation, allowing you to place up to 128 cells onto the stage at a time. It also provides a timing sheet known as the score, which allows you to specify what appears in each frame of your animation.

Frame-based animation is also called cell animation. Using this creation method, key frames that describe key events in the timeline of the animation are created on cells or frames. Tweening, the process of filling in the frames between the key frames, is then used to make the animation appear fluid.

The concept behind the creation of animation is the same whether the computer does the animation or it is done by hand. Before computer-generated animation, artists created all of the drawings between the primary drawings or key frames. Obviously, requiring people to manually draw each frame is an incredibly labor-intensive and time-consuming process. However, computers really shine when it comes to this type of monotonous, redundant activity. Today, the computer draws the between frames for us.

Morphing is a special technique that uses frames to create the illusion of one object changing into another. Morphing is quite common on television and in the movies. It is particularly popular in horror movies and thrillers. Morphing on the Web is generally created using a process referred to as shape tweening. Again, key frames are set and the computer generates the between frames. By displaying a series of frames that create a smooth transition, it appears that one shape actually becomes another.

Frame-based animation is also called cell animation.
Although tweening and morphing are time-consuming when done manually, creating frame-based animation is actually simple when using the computer and special software.

**Path-based animation**
Path-based animation is also called vector animation. This type of animation creates animated objects by following an object’s transition over a line or vector. More specifically, it tracks the beginning, direction, and length an object travels. The path the line takes can be straight, curved, or along a drawn path.

Most programs allow you to combine frame-based and path-based animation. Typically, the animated object is created using frame-based techniques. It is then moved along a path using path-based animation.

**Script-based animation**
Using programming languages to create animation is also quite common; it is often referred to as script-based animation. By using a sometimes elaborate set of program commands, frames can be substituted for other frames, thereby creating a sequence of movement or animation. Script-based animations are often more flexible than the others. In addition, script-based animation programs can be easily modified to include new images.

**Lingo**
Lingo is the programming language included in Macromedia Director enabling you to create script-based animation. It is one of many programming languages used to create animated objects. Lingo is an object-oriented scripting language enabling developers to write code to extend Director’s built-in capabilities.

Why is English the dominant language of international commerce? Not because it’s easy to learn, but because of its massive and growing vocabulary. It’s the same with Lingo; Director’s unique scripting language may have started out as a close cousin to Hypertalk and SmallTalk, but it’s definitely come into its own over the years.

With all of the functions Director has to offer in a graphical user interface, Lingo scripting takes it even further. You can use Lingo to control a movie in response to specific conditions or events. For example, you can use Lingo to play a sound after a specific event has occurred such as clicking a button. Once you get the basics of Director under your belt, jump into Lingo and watch the doors fly wide open to what your imagination can dream.

Director continues to add and improve Lingo and features with every update. Directors’ updates allow you to create scripts that are more like those created by object-oriented programming languages such as C++ and Java. The new dot syntax doesn’t replace the older Lingo syntax; the two coexist, and you can use either one or a combination of both—whatever feels more comfortable to you.

**Java**
Java is another programming language often used to create animation for the Web. Java was created by Sun Microsystems and it is one of the fastest growing programming languages.

Java enables developers to create tiny little applications called “applets” that are non-platform specific. Because they are usually quite small, it is easy for Java applets to travel across networks.
In addition, because these applets can function on any computer platform with any operating system, they are extremely versatile. Developers can write programs that will run on a PC, a Mac, and a high-end UNIX workstation. These features make Java ideal for use on the Web. Even nonprogrammers are learning Java because of its potential benefits and applications.

Java is also highly effective in creating advanced animation and is computational. Computational animation can react to outside forces or external input. For examples, some developers are including plug-ins with Java applets. This means the applet can be viewed on the Web even if users don’t have the proper configuration setup on their computer.

JavaScript
JavaScript is Netscape’s scripting language. Other than sharing the Java name through a licensing agreement from Sun, JavaScript and Java really don’t have much in common.

Like the other programming languages mentioned above, JavaScript can be used to create animated objects for Web pages. You may see it used to create animated text or buttons. One advantage of JavaScript is that it isn’t compiled until it is on the user’s computer. This means that just as a user can see and reuse HTML, a user can also see and reuse JavaScript code.

These are just a few of the many programming languages that can be used to create animation for the Web.

Depending on the program you plan to use, as well as on the type of animation you wish to create, you may need to create the series of still images from which the animation will be generated. Graphic software is needed to create the image(s), and animation software to animate the image(s) you create. Many different software programs can be used to create animation. As mentioned above, the animation process can be achieved by using software, programming languages, or a combination of the two.

Unless the images you wish to animate already exist, the first tool you may need is equipment to capture images or graphics software. You can use almost any commercial graphics package, which would include virtually every drawing, painting, and modeling application. In fact, many of these applications actually come with an animation engine that will compile your animation from the graphics, once they have been created.

After you have captured or created your image, you may need to edit the image with an image-editing program. This program might be the same one that is used to capture or create the image, or it might be something different. Among other things, a good image-editing utility should offer you the ability to resize the object, apply different design aspects to various parts of the image, and modify the object using paint or drawing tools. Adobe PhotoShop is the best-known image-editing program. In addition to the features mentioned in the previous paragraph, PhotoShop provides special effects and filters, as well as the capability to manipulate the color depth and resolution of each image individually. To create an animated image, each graphic image is slightly modified and then later played back together. Using this technique, the graphic appears to change or move. In addition, PhotoShop now includes ImageReady, a program that is specifically designed for working with Web graphics and for creating animated GIF files.
After your graphics are captured, created, and edited to your satisfaction, you need to animate them. Programs specifically designed to create animation are also available. These programs range from simple, animated GIF programs such as GIF Builder, to complex programs such as Macromedia Flash and Director. These programs share common features including a compiling engine allowing you to arrange still images into animated objects. Most of these animation packages also include codec (compressor/decompressor) as part of the compiler. A codec enables you to choose the amount of compression as well as the type of compression used.

### Constraints of Computer Animation

Despite the great flexibility computer animation gives us, the medium does impose some constraints. Being aware of these constraints will help you to plan better animations.

- When you zoom in on a raster image, each pixel in the image is mapped to several pixels on the screen: your picture starts to look like it’s made up of little boxes. When you zoom out, only some of the image pixels get mapped to the display. Details like thin lines can be lost.

- Like your computer display, a raster image is a fine grid that stores exactly one pure color for each grid square (pixel) in the picture. The computer displays a raster image by mapping image pixels to display pixels; that is, the color of a pixel on the screen corresponds to the color of one of the pixels in the image. A raster image contains no information about the object(s) that the picture represents.

### Projecting the Movie

The prototype multimedia movie usually includes simplified versions of all the sounds, graphics, and so on, used as placeholders. Once final versions of all the elements are ready, the designer builds them into a new version of the movie. The final stage, before the movie can be put on a CD-ROM, is to convert it into a “SWF.” A SWF is a program made up of two parts: the movie and a version of the Flash software that can play movies. This enables the audience to play and view the projector file without having to load the full Flash software on their computer.

### Preparing for Distribution

Before distribution, always make sure you test early, test often, and test on all target machines. For any type of movie you’re creating, it’s vital that YOU test the movie throughout the development process on all types of systems your users are likely to have, particularly low-end systems.

### Distributing Movies on the Internet

When distributing a movie on the Internet for playback in a web browser, all linked media and Xtras must be in their specified Uniform Resource Locator (URL) locations when the movie plays. Imported media must be in the same location from which it was imported. Xtras must be in the location specified in Xtra Downloading Properties.

Saving a movie as a SWF movie removes all the information needed to edit the movie and does not include the software that plays the movie. Flash Player movies can only be played in a web browser with the proper Flash player installed.

They can only be played. You cannot edit a SWF. You must edit the source file and then create a new movie in one of the distribution formats. Always save your source files.

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**Adobe Photoshop**

*Adobe Photoshop is the best known image-editing program.*

**The view of a .swf displayed on a computer monitor.**
Multimedia Authoring

Distributing Movies on Disk
Whenever a movie plays from disk, it accesses all external linked files the same way that it did in the authoring environment. All linked media such as bitmaps, sounds and digital videos must be in the same relative location as they were when the movie was created. The same is true for Xtras. To make sure you don’t forget any linked media or Xtras when you distribute a movie on disk, place linked files in the same folder as the FLA, or in a folder inside the project folder. If a movie distributed on disk connects to the Internet in any way, be sure to choose the proper media for distribution.

Differences: Mac vs. Windows
Memory differences between machines can affect how smoothly movies play back. Color may differ between the two platforms. Windows sometimes translates Macintosh colors to colors that are similar, but not identical. Playback speed may vary on different platforms. QuickTime movies must be in the proper format to play in Windows. Macintosh and Windows file name structures and formats are different. This may create problems in cross-referencing among movies after they’re transferred to a Windows system. Macintosh and Windows fonts and special characters (accents, bullets, and so on) may differ. In Windows, transitions may not occur at the same speed as on the Macintosh. Pixel dissolves are coarser in the Windows system.
You now have the thought processes of how to create a multimedia title. What you need next is an application that can bring it all together. Adobe Flash is one of the most popular growing authoring tools used for multimedia productions. Adobe Flash (formerly Macromedia Flash and before that FutureSplash), refers to both the Adobe Flash Player and to a multimedia authoring program used to create content which includes animation, gaming, and various web applications. The Flash Player, developed and distributed by Adobe Systems (which bought Macromedia), is an application available in most dominant web browsers and allows users to play and view flash content. Adobe Flash supports vector and raster graphics, a timeline for object animation, as well as a scripting language called ActionScript which allows for dynamic user interactivity.

File Types
The two main file types associated with and used in Adobe Flash are the Flash working document (.fla) and the Shockwave File format (.swf) which is published from the working document for viewing on the web. Other file types commonly associated with and used in Flash are the Flash projector (PC or Mac), which is a stand alone executable file created for viewing flash files on a particular platform; and the ActionScript File (.as) which is an external ActionScript file for creating custom ActionScript classes.

Drawing in Flash
Adobe Flash offers several drawing tools for creating the objects used in animation and web development. Each tool differs from the other and yields different stylistic results. The main frustration of most beginning Flash designers and developers stem from the interaction of objects on the stage that were drawn using Flash’s drawing tools. Object Interaction in Flash refers to the objects drawn on stage that overlap and therefore interact with cutting and dissecting the overlapping parts. This is referred to many as ‘Merge Drawing’ mode. To get around this interaction, Adobe Flash offers the ability to create objects on multiple layers as well as the ability to group objects on a single layer, preventing it from interacting with other objects. Grouped objects by default are automatically arranged in front of ungrouped ones when placed on a single layer. This sometimes creates confusion and frustration for Flash beginners as well.

Object Drawing
A new feature in Flash 8 called Object Drawing is a mode which enables you to draw shapes as individual objects that remain independent of each other. With this new feature selected, the worries and hassles associated with drawing each shape on a separate layer or grouping objects goes right out the window. With Flash 8, you can simply turn Object Drawing mode on or off as an option of the Brush, Pencil, Pen, Oval, and Rectangle tool.

Stroke & Fill
When drawing objects in Adobe Flash, you need to be mindful of certain properties associated with the objects drawn. The two main properties to be aware of are the object Stroke and Fill. The Stroke of the object represents the objects outline. This can be a regular line (path) drawn with the pencil or pen tool or a line which closes itself creating a shape and thus creating an object outline. The Fill of an object represents the area inside of the object that can be filled by a color. The colors for the Stroke & Fill can be pre-selected or changed using the bottom of the Tools panel below the hand and zoom tool.
Multimedia Authoring

You can even specify no color for the stroke or fill by selecting the square with the red diagonal line through it. These properties can also be changed or selected in the Property Inspector which houses various properties for objects created within Flash.

Brush Tool

The Brush tool is probably the most versatile of all the tools within Flash, especially when combined with a pressure-sensitive tablet. Drawing with the brush tools allow for a free-flowing creation of lines and shapes varying in degrees of thickness that best resembles the act of painting with a brush.

The Brush tool offers several options for creating objects in Flash that help to alleviate the frustration associated with the interaction of those objects as they are drawn.

Options include-
- **Paint Normal**: Paints over lines and fills on the same layer.
- **Paint Fills**: Paints inside a fill color and outside of a shape (on the Stage).
- **Paint Behind**: Paints behind existing fills and strokes
- **Paint Selection**: Enables you to paint inside a selected fill only.
- **Paint Inside**: Keeps you from going outside the lines after you start painting inside a fill.

Pencil Tool

The Pencil tool is the perfect tool if you want a consistent line weight throughout your image and if you need to keep the file size small. Lines drawn with the Pencil tool consist of fewer vector points. The Pencil Tool also offers several line drawing options:

- **Straighten**: This is a great option if you want to draw very straight lines by freehand. Even with a shaky hand, your lines will “snap” straight after you finish drawing your stroke.

- **Smooth**: If you use this option, your lines will automatically be smoothed while retaining the basic shape you intended to create.

- **Ink**: This option leaves your line quality unaffected. This is great for freehand or loose-style drawings.
Shape Tools
The shape tools-Oval and Rectangle-create primitive fills and strokes. Holding down the Shift key in combination with a shape tool creates a perfect circle or square. You can select the fill and stroke color through the Property Inspector or the bottom of the Tools panel. You can even specify no color for the stroke or fill by selecting the square with the red diagonal line through it.

Pen Tool
To draw precise paths as straight lines or smooth, flowing curves, you use the Pen tool. The Pen tool enables you to create straight or curved line segments and adjust the angle and length of straight segments and slope of curved segments. With the Pen tool, you click to create points on straight line segments, and click and drag to create points on curved line segments. You adjust straight and curved line segments by adjusting points on the line. You can convert curves to straight lines and the reverse. When creating curved lines, notice that Flash creates tangent handles for each anchor point. The lines can be edited later with the Subselection Tool (White Arrow) by selecting an anchor and dragging the tangent handles. Moving the handles in relation to the anchor point reshapes the curve.

Importing Graphics
Importing graphics into Adobe Flash is quite easy. Under the File Menu within Flash you will find the option Import and Import to Library. Importing graphics into Adobe Flash places graphics directly onto the document stage and in some cases places the graphic in the Flash document library as well. The shortcut for importing graphics is Command (Apple)+R or Ctrl+R for PC. Selecting Import to Library places graphics directly into the internal document library also known as the Library panel. The Library panel is one of the most important panels within the Flash interface. It allows you to store various types of media for use in your Flash document. These media types can be sound files (.mp3 & .wav), bitmap graphics (.PNG, .GIF, .JPEG, .TGA, and .TIFF), vector graphics (.EPS), or symbols. Once placed into the library, the items can be used throughout your document at will as many times as necessary.

Working With Symbols and The Library
Symbols are the very essence of what makes Flash. You can convert anything you draw or import into a symbol, and in almost all cases you should. Here’s why. When an object is converted into a symbol, it automatically becomes an item in the Flash document library. Every Flash document has it’s own library from which you can drag a symbol to the Stage. When you do, the object on the Stage is now referred to as an “instance”. No matter how many instances of a symbol reside on the Stage, Flash only needs to load it once. This is how Flash delivers streaming animations while maintaining small file sizes. It’s extremely efficient to reuse symbols as many times as possible. You can also apply effects to instances such as Scale, Tint, Alpha, and Brightness, and apply Motion Tweens in combination with one or more effects.

To convert an object into a symbol, simply select the object and go to the Modify Menu within Flash and select “Convert to Symbol”. You can also use the shortcut key of F8 to convert to symbol. This opens the Convert to Symbol dialog box where you can enter a name for your symbol and choose a symbol type. You can also define the symbols registration point.
Explanations of the symbol types are as follows:

**Graphic**
Graphic symbols are very similar to movie clips with the exception that they are not dynamic and cannot be targeted with ActionScript. However, you can place a graphic symbol inside a movie clip symbol. Graphic symbols can have any number of frames and layers. The most important feature is that they will always be in sync with the main Timeline and each other. This is very important when trying to create time-based animations.

**Button**
Buttons have four states: Over, Up, Down, and Hit. These are represented as keyframes in a button symbol. You can place graphics in any of these states and then apply ActionScript to the instance of a button to add interactivity to your Flash movie.

**MovieClip**
Movie clips are dynamic, which means they can be targeted with ActionScript, the Flash programming language. They can have any number of layers and frames, but their timelines are independent of all other timelines. Think of a solar system: Each planet is a movieclip, looping endlessly and independently around the sun, which is your main Timeline.

**Animation in Flash**
Adobe Flash 8 offers several ways to create animation and special effects in your document. For example, you can create tween animations using the document timeline, automated timeline effects (by making selections in a dialog box), or animate using ActionScript code.

**Types of Animation in Flash**
When creating animation using the document Timeline, you have the ability to create animation in a frame-by-frame based sequence of images or you can use tweening (Motion tweening or Shape tweening).
Frame-by-Frame Animation

Frame-by-frame animation follows more of the method used in Traditional Animation. Traditional animation is created by placing a series of images in a sequence that when played gives the illusion of movement, just like a flip book. Flash is able to achieve this same process through the use of sequential frames. The frames used in Adobe Flash are housed within the document timeline and are used to represent a single sheet or cell like in the old days of traditional animation. The frames within the document timeline are empty frames at first and placed side by side along with a playhead and area for creating layers. The playhead is a red marker that moves across the timeline at a set time rate and plays each frame to create animation. This process of animation is normally used in character animation and can be seen in cartoons and Flash character animated movies.

Motion Tweens and Shape Tweens

To create tween animations, establish starting and ending frames and let Flash create the animation for the frames in between. Flash varies the object’s size, rotation, color, or other attributes between the starting and ending keyframes to create the appearance of movement. This process of animation is a lot easier than changing contents of successive frames as in Frame-by-Frame animation, yet offers less control when it comes to character animation. In tween animations, you can make an object move across the Stage, increase or decrease its size, change its color or shape, rotate it, and even fade in or out. You see this process of animation a lot on websites with animated text.

Vector Effects

“Timeline Effects” include animated vector effects such as blur, expand, and explode. This feature makes it easy to animate an object: you can simply select the object and then select an effect through a dialog box and specify its parameters. With Timeline effects, you can accomplish in a few easy steps a previously time-consuming task requiring advanced knowledge of animation.

Scripted Animation

You can also create an animation by writing ActionScript code, which is sometimes called scripted animation. There are different ways you can script animation: you can write ActionScript to handle all aspects of the animation or you can use pre-built classes and simpler code to create an animation. Using pre-built classes makes animating with code a little easier. Using code to create animations and effects often reduces the file size of your finished application, and can also improve the performance and consistency of the animation itself.

Frame Rate in Animation

The frame rate (the speed at which an animation is played) is measured in number of frames per second. A frame rate that’s too slow causes the animation to appear jerky; a frame rate that’s too fast might negatively affect the animation or use too much of the user’s computer processing power. The complexity of the animation and the speed of the computer on which the animation is being played affects the smoothness of the playback. Test your animations on a variety of machines to determine optimum frame rates.
You need to think about frame rate when working with animations because it can affect the performance of your SWF file and the computer that plays it. Setting a frame rate too high can lead to processor problems, especially when you use many assets or use ActionScript to create your animation. However, you also need to consider the frame rate setting because it affects how smoothly your animation will play. For example, an animation set to 12 frames per second (fps) in the Property Inspector plays 12 frames each second. If the document’s frame rate is set to 24 fps, the animation appears to animate more smoothly than if it ran at 12 fps. Your animation at 24 fps also plays much faster than it does at 12 fps, so the total production (in seconds) is shorter. Therefore, if you need to make a five-second animation using a higher frame rate, it means you need to insert additional frames to fill those five seconds than at a lower frame rate, which raises the total file size of your animation.

Keyframes in Animation
A Keyframe is a frame in which you define changes in the animation. When you create a Frame-by-Frame animation, most frames are keyframes. In a tween animation, you define keyframes at significant points in the animation and let Flash create the contents of the frames in between. Flash displays the interpolated frames of a tween animation as light blue or light green and with an arrow drawn between keyframes. Because Flash documents save the shapes in each keyframe, you should create keyframes only at those points in the artwork where something changes.

Keyframes are indicated in the Timeline: A keyframe with content in it is represented by an empty circle within the frame. Subsequent frames added to the same layer have the same content as the keyframe.

To create a keyframe, do one of the following:
1. Select a frame in the Timeline.
2. Go to the menu bar, select Insert > Timeline > Keyframe.
Or:
1. Right-click (Windows) or Control-click (Mac) a frame in the Timeline.
2. Select Insert Keyframe.
Or:

Timeline Indications
Motion Tweens are indicated by a black dot at the beginning keyframe; intermediate tween frames have a black arrow with a light blue background.

Shape Tweens are indicated by a black dot at the beginning keyframe; intermediate frames have a black arrow with a light green background.

A dashed line indicates that the tween is broken or incomplete, such as when the final keyframe is missing or an improper tween is being used.

Example: Flash timeline with starting keyframes.
A single keyframe is indicated by a black dot. Light gray frames after a single keyframe contain the same content with no changes and show a black line with a hollow rectangle at the last frame of the span.

A hollow circle within a frame represents a blank keyframe, and white frames represent frames with no content (empty frames).

An ‘a’ within a keyframe indicates that the frame has ActionScript assigned to it.

A series of keyframes with a light gray background could indicate a frame-by-frame animation.

**Motion Tweening**
In motion tweening, you define properties such as position, size, and rotation for an instance, group, or text block at one point in time, and then change those properties at another point in time. Motion tweens can only be applied to Grouped Objects or MovieClip symbols.

**Shape Tweening**
In Shape tweening, you draw a shape at one point in time, and then change that shape or draw another shape at another point in time. Flash interpolates the values or shapes for the frames in between, thus creating the animation. The shape morphs from the first shape into the second shape. Shape tweens can only be used on non-grouped objects or ‘raw’ objects as I like to refer to them.

**Creating a Tween**
Create the starting and ending keyframes for the animation and select the starting frame. Go to the Property Inspector and click the drop down menu next to ‘Tween’ to select Motion or Shape depending on your desired results.

**Conclusion**
After going through this chapter, you have learned a lot of information on the basics of Multimedia Authoring. The process of Authoring will assist you when putting together a movie in this case using Flash. Multimedia Authoring is a process of combining different elements of multimedia such as text, graphics, audio, video to create a movie.

The stages of authoring: Concept, Planning, Design, Production, Testing and Delivery. These stages are your guide to a successful movie production. Skipping one or another is not in the best interest of the designer and will result to delays, unnecessary cost to resources. Planning and Design may overlap at one point or another to smooth the production process and eliminate unclear ideas that was not identified prior to production.

And finally, learning Multimedia Authoring and Flash will make you an effective multimedia illustrator. You are now equip to develop and create movies, training videos, and incorporate animation to your projects.
Glossary

**Authoring** - Process of combining elements of multimedia with authoring software.

**Authoring Software** - Multimedia elements are typically sewn together into a project using authoring software.

**Categories of Authoring** - Presentations, catalogs, games, and computer-based training.

**Comprehensives** - Also known as scamps are pencil layouts that show how the text and images will be positioned on every scene.

**Flowcharts** - Used to organize the content. An information flowchart is simply an outline presented as a box diagram, with lines that show the access routes among its parts, a navigational blueprint.

**Lingo** - Programming language used to perform different functions and commands within Director.

**Movie** - Authoring term for a project and will be used often in this chapter.

**Stage** - Where the movie is played or previewed.

**Stages of Authoring a Movie** - Concept, planning, design, production, testing, distribution/delivery.

**Storyboards** - Like scamps, but have a lot more information, showing the elements that appear on that scene.

**Thumbnails** - Small, quick drawings used to work out general layout and structure of the scenes.
References


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