The Illusion of Life: Disney Animation
Interactive Edition

By

Michelle L. Walsh

Submitted to
the Faculty of the Information Technology Program
in Partial Fulfillment of the Requirements for
the Degree of Bachelor of Science
in Information Technology

University of Cincinnati
College of Applied Science

June 2006

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Michelle L. Walsh	Date
Sam Geonetta, Faculty Advisor	Date
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Acknowledgements

A great many people helped me with support and guidance over the course of this project. I would like to give special thanks to Sam Geonetta and Russ McMahon for working with me to complete this project via distance learning due to an unexpected job transfer at the beginning of my final year before completing my Bachelor's degree. Additionally, the encouragement of my family, friends and coworkers was instrumental in keeping my motivation levels high. Specific thanks to my uncle, Keith Anderson, for the resources he provided that allowed me to complete the project.

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Abstract

Few people would disagree that the Disney Studios had enormous impact on the the art of animation coinciding with the development of motion pictures. While entertaining to their audience, the earliest drawn animations tended to be unrealistic. The study and adjustments made in the techniques of producing animations at the Disney Studios happened over many years and resulted in some of our most revered animated full-length motion pictures. Walt Disney coined the title for his "Nine Old Men," to refer to the premier animators that headed the productions during the classical period of Disney animation. Two of these men, Frank Thomas and Ollie Johnston co-authored a book about the development of the techniques used by the Disney Studios, *The Illusion of Life: Disney Animation*, that has been frequently referred to as the "bible" of animation. The book is an excellent resource for animation, art and design students and professionals, but is limited by the two-dimensional static medium in which the content is presented. Animation, being the illusion of movement, needs to be seen in its final form to show the effectiveness or in-effectiveness of a particular method of production or drawing. This paper discusses a project in which the content of one chapter of Thomas' and Johnston's book was presented in an interactive multimedia format. The project could be expanded to include the entire content of the book as well as additional media (such as video and sound) that cannot be included in a book with simple type and illustrations. The paper covers development of the scope of the project including the intended audience, rationale for the tools used, and an alternate sequence of presentation of the full content. Additionally, conclusions reached and lessons learned during the development are discussed.

The Illusion of Life: Disney Animation
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1. Statement of the Problem

Arguably the most influential producer of animation in the United States, the Disney Studios have dominated the medium of cel animation until now because of good business sense and a strong "commitment to aesthetic integrity." (2, p. 24) Film jargon such as the terms "Mickey Mousing" (synchronization of a character's motion with the film soundtrack) and "storyboarding" demonstrate the profound impact that the Disney Studios have had on American filmmaking.

Frank Thomas and Ollie Johnston detail the techniques developed for character animation during the "classical era" of the Disney Studios in their 1981 book, *The Illusion of Life: Disney Animation*. Cited in the bibliographies of many of the works I consulted for this project and listed as the number one reference on animation at the Animation-Books.com Web site, this book has been hailed as the "animation bible" by many animators and animation fans. (1) Both authors became members of the Disney animation team in the mid-1930s and their careers spanned over 40 years of character animation. After retiring in 1978, they began writing *The Illusion of Life*, publishing it in 1981. When the book went out of print and was not readily available in the early 1990s, the cost of a used copy of this book is said to have been hundreds of dollars. (1) The great demand for this book led to its re-release in 1995 by Hyperion and it is that copy of the book that is the primary source of content for the multimedia presentation being developed.

The Illusion of Life is a valuable resource in its present form, but when it was written was limited by the two-dimensional linear narrative in the media in which it was published. Because animation itself is the illusion of movement, the description of animation techniques is less effective than the demonstration of the complete animated production. Frank Thomas and Ollie Johnston attempted to remedy this problem by including several animation sequences in the upper right-hand corner of each page throughout *The Illusion of Life* which can be viewed as a flipbook. To demonstrate the differences in early methods and the advanced techniques, however, they had to show each frame of the selected example animations next to each other on the same page and could not easily show what each finished animation would look like and the difference that the new techniques made. Seeing each individual drawing has its advantages however, since solid drawing is listed as one of the twelve principles of animation detailed in this book. The reader is left to imagine the final products after reading the descriptions and seeing the illustrations or to conduct their own further analysis of the films by viewing them.

2. Description of the Solution

To facilitate the illustration of the topics covered in *The Illusion of Life*, an interactive multimedia representation of the work done by Thomas and Johnston has been created to more effectively explain the principles of Disney cel animation. Resolution to the limitations of the medium in which the content was originally presented (a book) is provided in the conversion from linear to non-linear narrative and from simple text and static graphics to the inclusion of video, sound and animation in the presentation of this material.

As seen in the synopsis in Section 2.2.1.1, the content of the book covers a very extensive range of topics. Therefore, the scope of this project was limited to the completion of the chapter that benefits most from the change in media: Chapter 3, The Principles of Animation. The range of content in the book includes a history of the Disney Studios, biographical information on many animators, and procedures used in the production of a Disney animated film. An introductory animation was completed as well as a main Table of Contents page in order to show how users would link to different sections of the book in a multimedia format.

2.1 User Profiles

The Interactive Edition of *The Illusion of Life* has been designed for animation and film students, art and design students, and animation fans. These groups are the most likely to be interested in the topics presented and the adaptation for interactive media will be directed toward their needs. The user only needs a minimal level of IT competency to use the program:

- ability to use a Web browser
- knowledge of standard navigation methods (i.e., drop down menus, forward and back buttons, playback controls)

2.1.1 Animation and Film Students

Animation and film students are classified as either beginners learning the techniques of film and animation production or advanced professionals brushing-up on their techniques and knowledge of the art of animation. The newest generation of animators grew up watching animated cartoons in the movies and on Saturday morning television. They developed, without realizing it, a highly sophisticated visual acuity, as have all of us living in the "Information Age." Because of this, it is especially important

for the creators of new media to understand what makes animations effective. Animators are creating images for a more sophisticated audience and must know the basics in order to see continued advancements in their unique art.

2.1.2 Art and Design Students

With the increasing popularity of the computer as a medium for communication, use of animation to convey a message or tell a story is no longer as prohibitive as it has been in the past. Computers are now able to do much of the work that was previously reserved for large staffs of animators in well-funded movie and television studios. As a result, more and more people are creating animation outside the realm of film and entertainment. Computerized animation of objects and drawings has greatly enhanced the variety of communication tools (the written and spoken word for storytelling and instruction) by enabling the contents of an author's wildest imaginings to be illustrated. With the expansion of animation, new styles and production techniques are being developed and experimented with and the classical methods of animating objects and drawings are being enhanced. Art and design students may study animation as a form of 20^{th} century art as well as an alternate medium of expression.

2.1.3 Animation Fans

The final user type encompasses almost anyone who has ever seen an animation and wondered how it works. Since Disney is probably the most well known studio, it is reasonable that anyone who would want to learn about animation would look to the creators of the animations that came from this company for information.

2.2 Design Protocols

2.2.1 Flow Chart

The following section describes the process used to arrive at a final development flow chart. I created an outline synopsis of the original flow of content and then evaluated it to arrive at several overall categories that would encompass each topic:

2.2.1.1 Synopsis of The Illusion of Life: Disney Animation

Chapter 1: "An Art Form Is Born"
Covers the earliest attempts at animation, the creation of motion pictures, early animators such as Winsor McCay, Max Fleischer and Otto Messmer. Discussion of Walt Disney's entry into animation, early techniques used by Disney animators.

Chapter 2: "The Early Days 1923-1933"
More history on Walt Disney's early animations, artistic influences. Discussion of problems noted in early animation and discussion of widely used early techniques. Technical developments during this time period.

- The Cycle
- Repeat Action
- The Cross-over
- Ripple Action
- Rubber Hose Animation

Chapter 3: "The Principles of Animation"
Primary source of content for portion to be completed

- Squash & Stretch
- Anticipation
- Staging
- Straight Ahead Action and Pose to Pose
  - Straight Ahead – Animator works straight from first drawing in scene; advantage: Spontaneity
  - Pose to Pose – Animator plans action, figures out key drawings & gives to assistant to complete; advantage: Clarity and strength
- Follow-Through and Overlapping Action
  - Explanation – intertwined definitions
  - Five categories: appendages continue to move after rest of figure has stopped (coats, long ears, etc.); body itself doesn't move all at once; loose flesh on a figure (cheeks) move at slower speed than skeletal parts; way an action is completed tells more about the character than the movement itself; moving hold–-allows audience to absorb attitude
- Slow In and Slow Out– Timing of in-betweens close to key frames
- Arcs– Discovery that movements of most living things follows slightly circular path; major problems of in-betweeners
- Secondary Action– Subsidiary action to support the primary action; make unified statement through drawing; sometimes Secondary Action is the expression itself; Building Block technique (Bill Tytla)
- Timing
- Exaggeration
- Solid Drawing–what to look for
- Appeal–charm, pleasing design, simplicity, communication, magnetism of characters

Chapter 4: "Discovery 1934-1936"
Time of explosive growth, discussion of a lot of exploration and experimentation with techniques discussed in Chapter 3. More learning, action analysis classes. Re-design of Mickey Mouse, growth of studio, delegation of responsibility to storymen. Initial discussion of Snow White development.

Chapter 5: "Cartoon Comes of Age: Norm Ferguson and Ham Luske"
Biographical discussions of several animators. Discussion of Speed Lines, Staggers & Vibrations

Chapter 6: "Appeal and Dynamics: Fred Moore and Bill Tytla"
Fred Moore and Bill Tytla biographies and description of work and strengths of each. Fred's 14 pts of animation

Chapter 7: "Hyperion: The Explosion"
Move to Hyperion Avenue, mostly discussion of the people involved in Disney animation at this time. How roles delegated, Walt's interaction with the various animators.

Chapter 8: "Burbank and The Nine Old Men"
Creation of the Animation Board: Les Clark, Woolie Reitherman, Eric Larson, Ward Kimball, Milt Kahl, John Lounsbery, Marc Davis, Frank Thomas, Ollie Johnston. Refining of techniques under new leadership structure.

Chapter 9: "Our Procedures"
Methods used to create most successful films; The Team: Stylist, Storyman, Story Sketch, Director, Recording, Assistant Director, Cutter, Character Mode Department, The Story Reel, Layout, The Handout, Supervising Animator, The Animator, Assistant Animator, Post Test, The Work Reel; Seven Steps in Animating a Scene

Chapter 10: "How to Get It on the Screen"
Modeling of props/scenery; Backgrounds: four styles of background painting; Effects Department; Special Effects; The Ingredients of a Scene; Horizontal Multiplane Crane; Color; Ink and Paint

Chapter 11: "The Disney Sounds"
Music; Bar Sheets; Timing, Spacing, and the Metronome; Prescoring; Music Not Prescored; Surprise Accents; Songs; Sound Effects

Chapter 12: "The Follow-up Functions"
Checking; Blue Sketch; Camera; The Multiplane Camera; Dubbing; Answer Print; Foreign Versions

Chapter 13: "The Uses of Live Action in Drawing Humans and Animals"
- Actors
- Animals
- Walks
  - The Importance of Weight
  - The Rhythm Walk
  - Four Footed Friends
  - Acting and Attitudes
  - Other Walks that Show Character Personality
  - Group Movement

Chapter 14: "Story"
Preparing for Animation; Sequences; Walt and the Storymen; Example 1: Meeting on Snow White and the Huntsman; Example 2: 2nd meeting on Snow White & the Huntsman; Four Rules for Writing Dialogue

Chapter 15: "Character Development"
Personalities; Costumes; The Appealing Villain

Chapter 16: "Animating Expressions and Dialogue"
More content for Animation section: Tips for Staging Expressions: the eyes; eye blinks; the face; dialogue; Lip Syncing

Chapter 17: "Acting and Emotions"
Questions to Ask; Story—Structure; Graphic Presentation; Nine Economical Ways that Animation can build Emotions in the Imaginations of the Audience; Animation—Acting; The Illusion of Life; Points to Remember when Animating Emotions

Chapter 18: "Other Types of Animation—and the Future"
Still Pictures and Limited Animation; Animated Designs; Strong Design with Animated Characters; Styled Animation; Imagination Unlimited; Strong Personalities with a Different Type of Life; Combination Live Action and Cartoon; Educational Films; Audio-Animatronics; The Future

Appendices
- General Outline of Animation Theory and Practice
- Class on Action Analysis: Conducted by Don Grahm, Speaker: Bill Tytla
- Character Handling (Ham Luske)
- Analysis of Mickey Mouse
- Analysis of Donald Duck
- Analysis of Pluto
- Analysis of the Goof

2.2.1.2 Reorganization of Content into Encompassing Categories

To suit the parameters of a multimedia presentation, I decided that it was appropriate to categorize the content under different headings. The following shows the alternative representation of each chapter under its own heading and is the basis for the flow chart that was developed for the final production:

History
An Art Form Is Born
The Early Days 1923–1933
Discovery 1934–1936
Hyperion: The Explosion
Burbank and The Nine Old Men

Animation
The Principles of Animation
The Uses of Live Action in Drawing Humans and Animals
Character Development
Animating Expressions and Dialogue
Acting and Emotions
Other Types of Animation–-and the Future

People
Cartoon Comes of Age: Norm Ferguson and Ham Luske
Appeal and Dynamics: Fred Moore and Bill Tytla

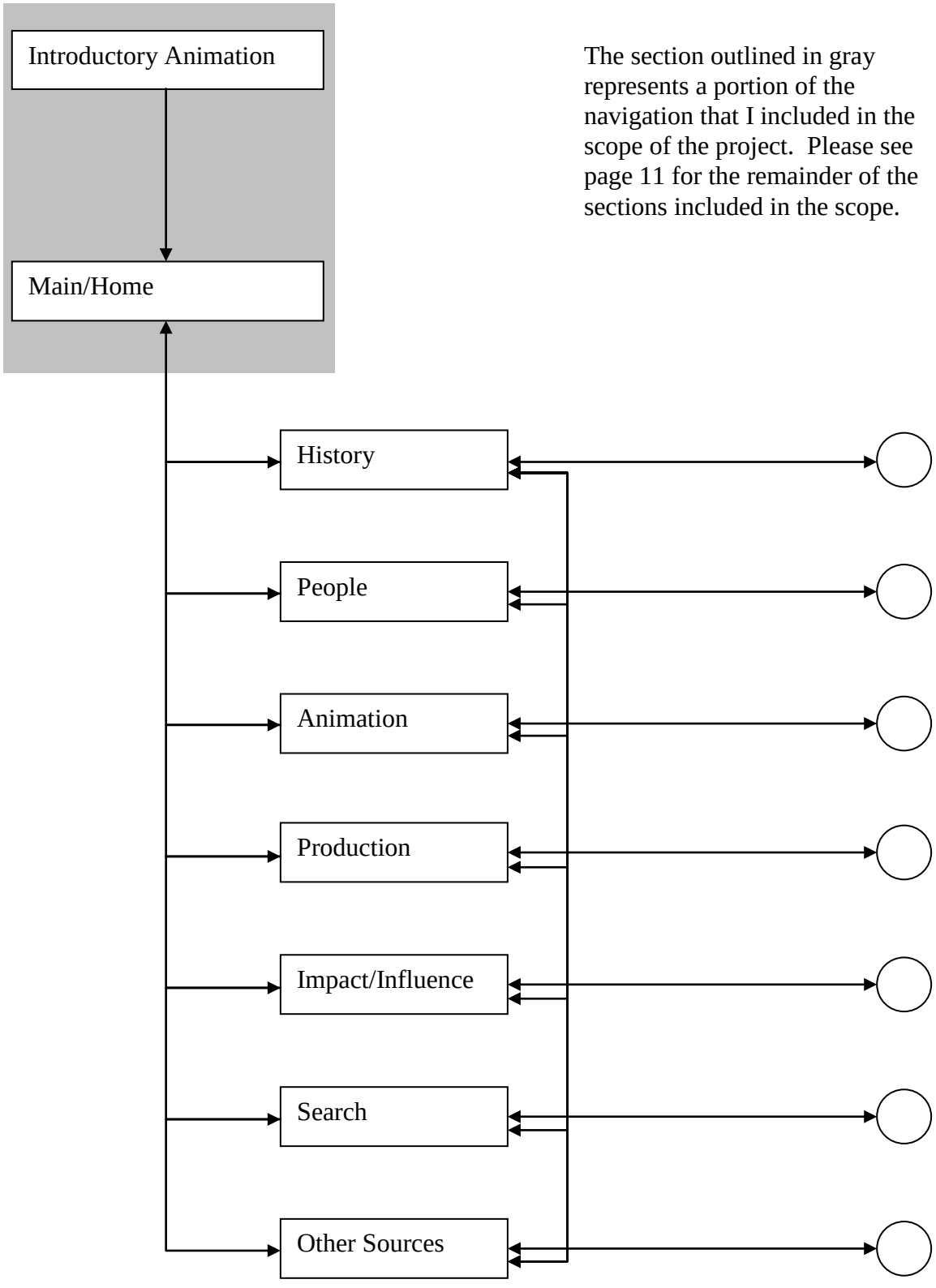
Production
Our Procedures
Story
How to Get It on the Screen
The Disney Sounds
The Follow-up Functions

Impact/Influence

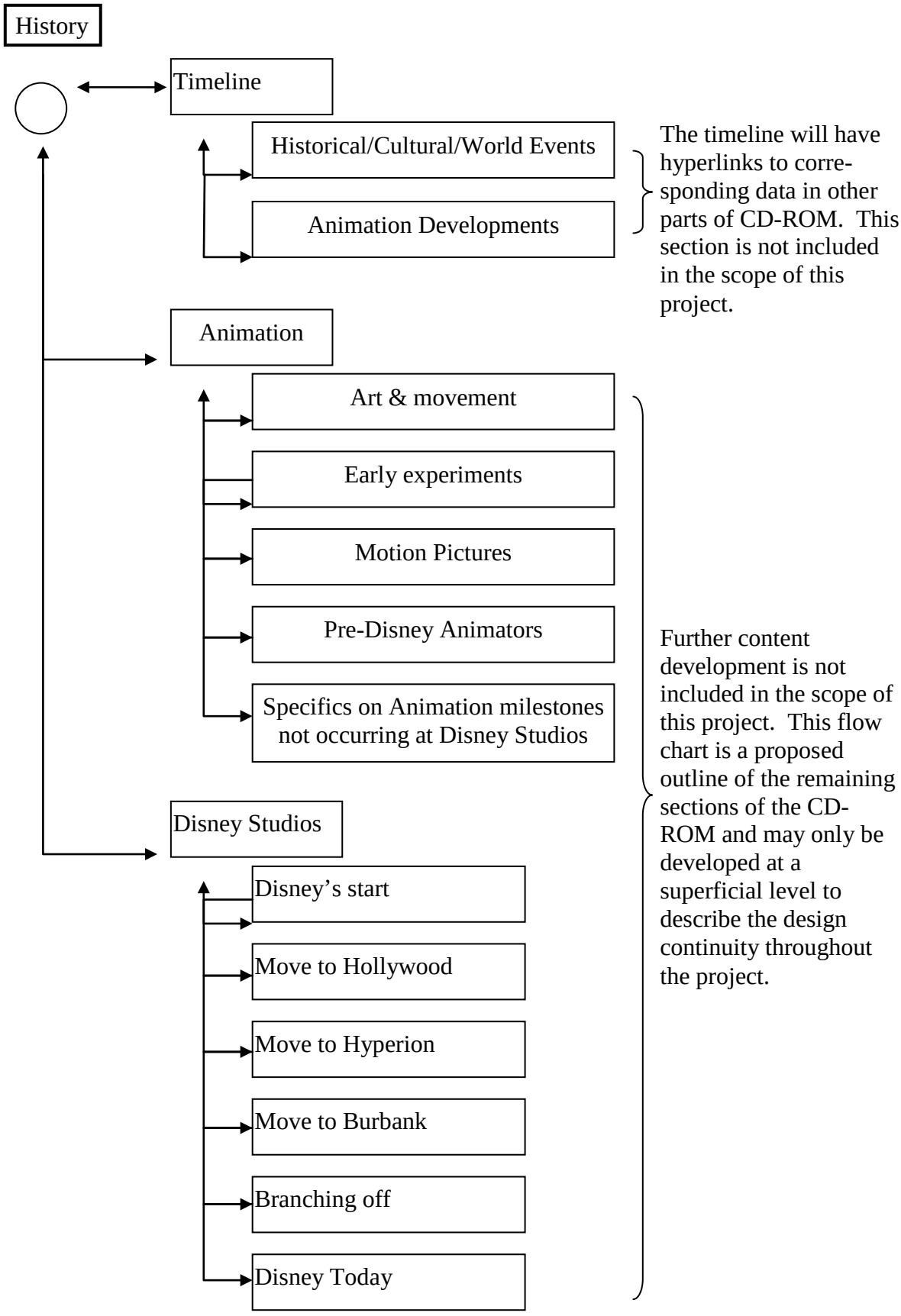
Appendices

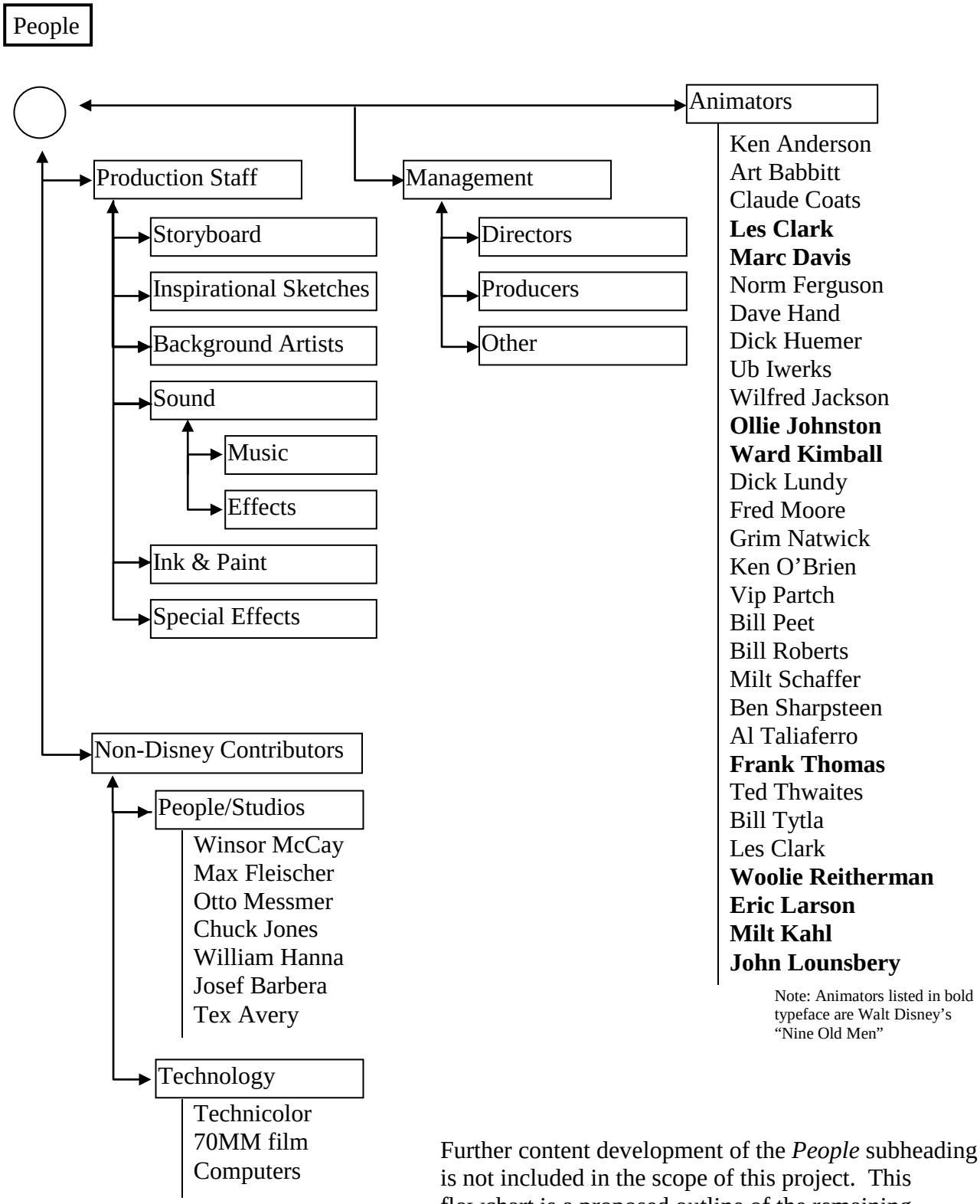
Figure 1. Categorization of Chapter Content

2.2.1.3 Final Flow Chart



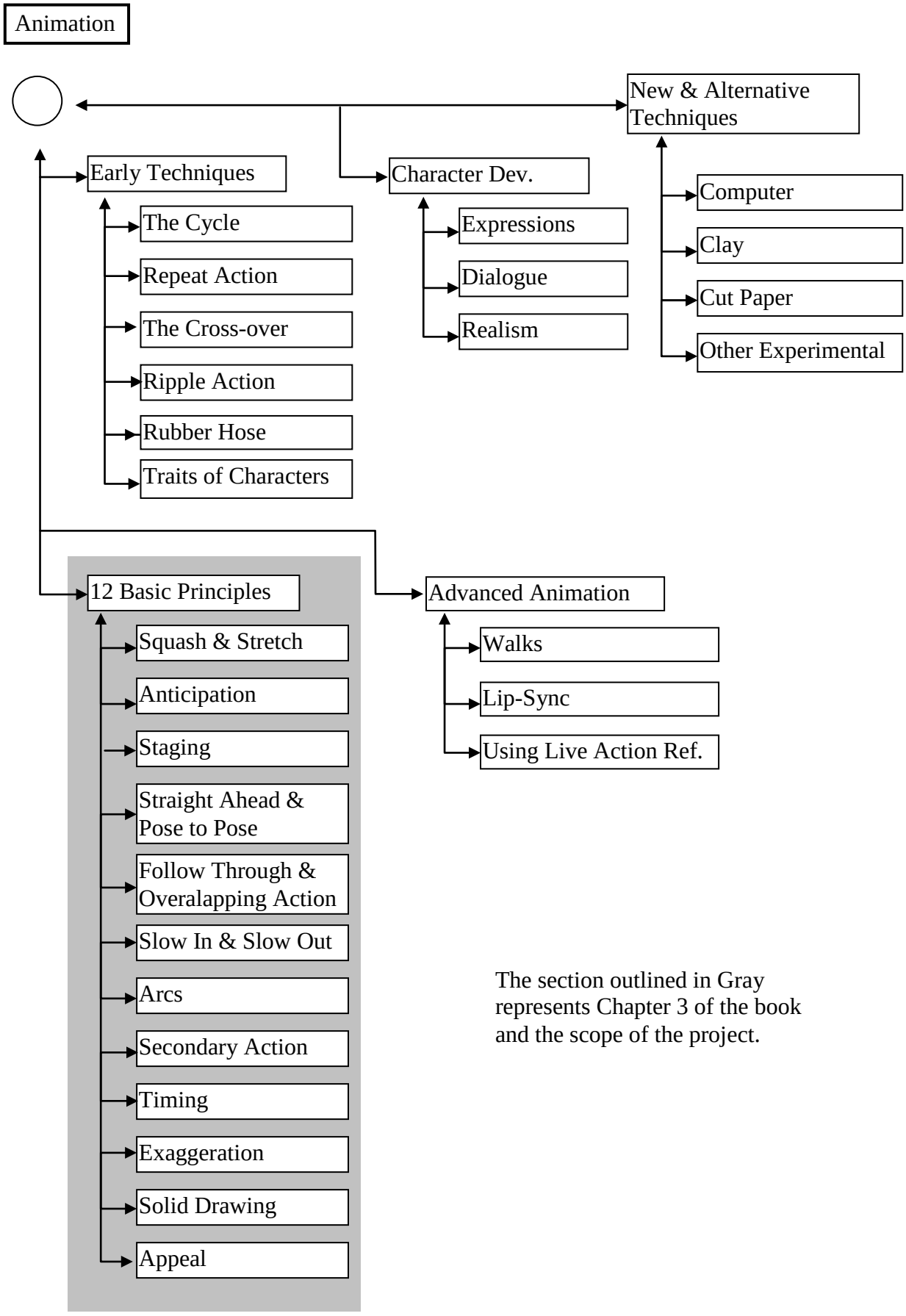
The section outlined in gray represents a portion of the navigation that I included in the scope of the project. Please see page 11 for the remainder of the sections included in the scope.


History
Timeline
Historical/Cultural/World Events
Animation Developments
The timeline will have hyperlinks to corresponding data in other parts of CD-ROM. This section is not included in the scope of this project.
Animation
Art & movement
Early experiments
Motion Pictures
Pre-Disney Animators
Specifics on Animation milestones not occurring at Disney Studios
Disney Studios
Disney's start
Move to Hollywood
Move to Hyperion
Move to Burbank
Branching off
Disney Today
Further content development is not included in the scope of this project. This flow chart is a proposed outline of the remaining sections of the CD-ROM and may only be developed at a superficial level to describe the design continuity throughout the project.

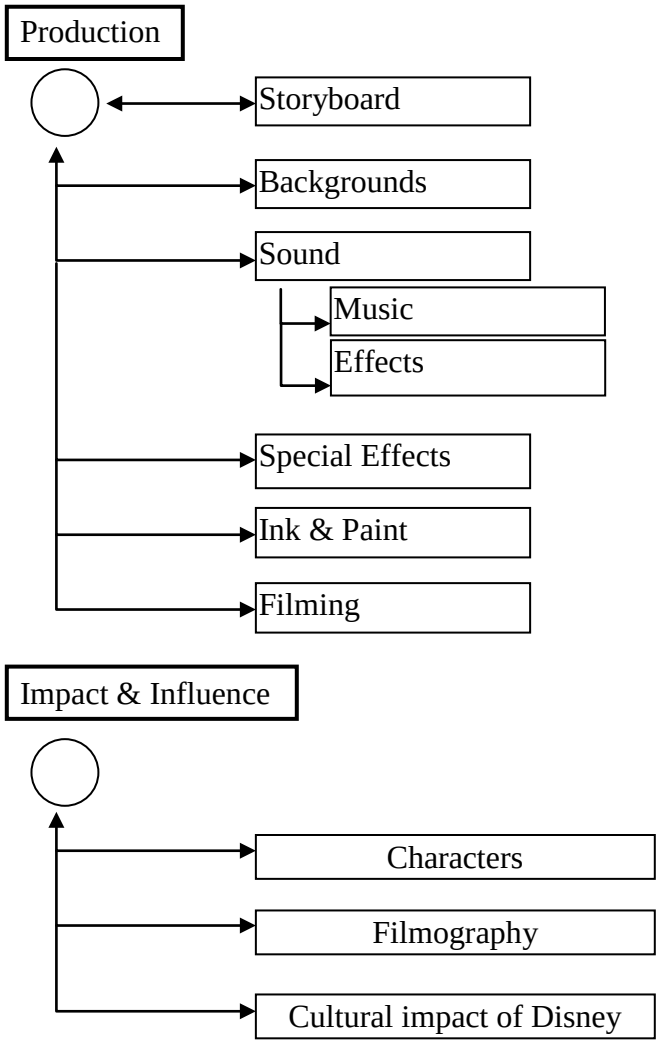


Note: Animators listed in bold typeface are Walt Disney's "Nine Old Men"

Further content development of the *People* subheading is not included in the scope of this project. This flowchart is a proposed outline of the remaining sections of the CD-ROM and may only be developed at a superficial level to describe the design continuity throughout the project.



The section outlined in Gray represents Chapter 3 of the book and the scope of the project.



Further content development of the following subheadings is not included in the scope of this project. This flowchart is a proposed outline of the remaining sections of the CD-ROM and may only be developed at a superficial level to describe the design continuity throughout the piece.

Search

Searchable list of keywords and links to the appropriate section.

Other Sources

A list of other reference books, videos and hyperlinks to Web sites on animation.

2.2.2 User Interface

2.2.2.1 Interface design/navigation

The interface uses basic shapes so as not to interfere with the complexity of the animated shapes and video being viewed as examples. The screen is sized based on the common screen resolution of 1024x768 and fits within that size without altering the default resolution used on most computers. Black borders at the top and bottom of the screen contain the navigation and create the effect of a widescreen format for the text and graphics being presented.

Top navigation is a series of three drop-down menus that allow the user to navigate fully through each of the seven primary categories, each of their chapter subcategories and finally, the topic subheadings. This allows the user to view the content in a non-linear order, similar to looking in the table of contents for a particular topic and turning the page to that topic and then turning to a completely new chapter that may have relevant information. The navigation links the user to the content within the scope of the project but displays the other sections that could be included as described in the flow chart.

The navigation in the lower black border includes simple “next” and “back” buttons that enable the user to move from one topic to the next in a strictly linear fashion, emulating the turning of a page (though in this case, the page is a topic subheading).

Within the primary content frame, the “widescreen,” the backgrounds are images from of the static drawings in the book that were used as the facer pages of chapter headings or space fillers and had no specific purpose to demonstrate the animation principles and are not specifically referenced by the text. A scrolling text box is available in approximately 1/3 of the width of each topic subheading to allow the user to read the

description provided by the authors. The remaining space is filled with sample animations that can be played at the speed desired by the user.

2.2.2.2 Icons/graphical symbols

The "next" and "back" buttons in the lower navigation bar are simple pointed arrowheads. Similarly, arrowheads are used at the ends of the text scrollbar to provide design continuity. Other navigation is accomplished using text links. Within the animation samples and movie clips, common text links for control of the clips are available for each element.

2.2.2.3 Color scheme

I kept the color scheme simple because of the complexity of the graphics presented by the interface. Basic black backgrounds with white text allow for the greatest color contrast and visibility on screen. A black and white color scheme also coordinates with any color and a variety of colors are used in the graphics scanned from the book in addition to the black and white animation sketches.

3. Objectives/Deliverables

Following are the specific goals that were set for the completion of the project:

1. An interactive multimedia presentation of Chapter 3 of *The Illusion of Life: Disney Animation* will be created using Macromedia Flash MX 2004.

2. Linear and non-linear navigation will be available to the user so that the chapter's content is navigable in its original order as well as in an interactive form to emulate the user's ability to flip the book's multiple physical pages at once to reference a previous section.

3. Navigation will be of a design that creates an easy method of expanding content to include the entire book. ActionScript will be used to create all navigation.

4. The text of the book will be available in each section in a scrolling interface.

5. The user interface will include other images from the book that were used as chapter heading pages in order to maintain a consistent look and feel with the book.

6. The drawn animations referenced by the text of the book will be available to the user as static drawings or playable animations. Images will be scanned and edited in Adobe Photoshop and Illustrator.

7. Animation playback speed will be controllable by the user within the parameters of the frame rate of the project. ActionScript will be used to create custom controls.

8. Clips of Disney animated movies that demonstrate particular principles of animation (as they are covered in each section) will be available where appropriate and text content needs enhancing. (i.e., the "Bambi meets Thumper" scene from *Bambi* for a good example of the use of "Arcs" in realistic movement).

9. Sound and animation will be used to enhance the navigation experience and provide feedback to the user.

10. An animated introductory "splash" screen will be created.

4. Design and Development

4.1 Project Budget

Laptop Computer	$2,000.00
All-in-one Scanner/Copier/Printer	500.00
High-Speed Internet Connection ($50/mo, 6 mos.)	300.00
Macromedia Studio MX 2004	300.00
Adobe Creative Suite 2 Premium	400.00
	$3,500.00

4.2 Project Schedule

Winter Quarter - Senior Design II

	Milestone	Time (hrs)	Phase
January 03 (Tuesday)	Schedule for completion		Planning
January 04 (Wednesday)			
January 05 (Thursday)			
January 06 (Friday)	Draw more detailed flowchart, plan navigation	9	
January 07 (Saturday)			
January 08 (Sunday)			
January 09 (Monday)	Determine screens needed (at least 13, 12		
January 10 (Tuesday)	principles of animation, plus 1 intro)		
January 11 (Wednesday)	Draw interface in Illustrator		Interface
January 12 (Thursday)	Ensure each screen type is accounted for/draw		Development
January 13 (Friday)	additional screen types	9	
January 14 (Saturday)			
January 15 (Sunday)			
January 16 (Monday)	Write Design Protocols		
January 17 (Tuesday)			
January 18 (Wednesday)	Write Deliverables		
January 19 (Thursday)			
January 20 (Friday)		9	
January 21 (Saturday)			
January 22 (Sunday)			
January 23 (Monday)	Find/scan background images and sample animation		Development
January 24 (Tuesday)	Modification of images (size, colors, file format)		Preparation
January 25 (Wednesday)			
January 26 (Thursday)	Tutorials		
January 27 (Friday)		9	
January 28 (Saturday)			
January 29 (Sunday)			
January 30 (Monday)	Tutorials		
January 31 (Tuesday)			
February 01 (Wednesday)	Type in text or use OCR scan		
February 02 (Thursday)	Set up framework in Flash		
February 03 (Friday)	Table of Contents	9	
February 04 (Saturday)			
February 05 (Sunday)			
February 06 (Monday)	Import images into Flash		
February 07 (Tuesday)	Individual content screens		Development
February 08 (Wednesday)	Develop scroll boxes		
February 09 (Thursday)			
February 10 (Friday)	Set up links between pages	9	
February 11 (Saturday)			
February 12 (Sunday)			
February 13 (Monday)	Develop drop down menus		
February 14 (Tuesday)			
February 15 (Wednesday)	Forward & back buttons		
February 16 (Thursday)			
February 17 (Friday)	Develop single keyframe animation for demonstration	9	
February 18 (Saturday)			
February 19 (Sunday)			
February 20 (Monday)			
February 21 (Tuesday)			
February 22 (Wednesday)			
February 23 (Thursday)	Develop thumbnail size-increase demo		
February 24 (Friday)		9	
February 25 (Saturday)			
February 26 (Sunday)			
February 27 (Monday)	Animate splash screen intro		
February 28 (Tuesday)			
March 01 (Wednesday)			
March 02 (Thursday)	Place holders for more advanced programming		Completion
March 03 (Friday)		9	
March 04 (Saturday)			
March 05 (Sunday)			
March 06 (Monday)	Write Proof of Concept section		
March 07 (Tuesday)	Finalize paper		
March 08 (Wednesday)			
March 09 (Thursday)	Present prototype		
March 10 (Friday)		9	
March 11 (Saturday)	Classes end		
		90	

Spring Quarter - Senior Design III

	Milestone	Time (hrs)	Phase
March 27 (Monday)	Tutorials		Intermediate
March 28 (Tuesday)			Development
March 29 (Wednesday)			
March 30 (Thursday)	Develop functionality of animation playbox		
March 31 (Friday)		11.25	
April 01 (Saturday)			
April 02 (Sunday)			
April 03 (Monday)			
April 04 (Tuesday)	Scan animation frame images		
April 05 (Wednesday)			
April 06 (Thursday)	Modification of images (size, transparency, color)		
April 07 (Friday)		11.25	
April 08 (Saturday)			
April 09 (Sunday)			
April 10 (Monday)			
April 11 (Tuesday)			
April 12 (Wednesday)	Create animation play-boxes for all animations		
April 13 (Thursday)	Develop functionality of video samples		
April 14 (Friday)		11.25	
April 15 (Saturday)			
April 16 (Sunday)			
April 17 (Monday)	Import images into Flash		
April 18 (Tuesday)			
April 19 (Wednesday)	Find video demonstrating principles without as		
April 20 (Thursday)	many visual aids (i.e., Timing, Arcs, Secondary		
April 21 (Friday)	Action)	11.25	
April 22 (Saturday)			
April 23 (Sunday)			
April 24 (Monday)	Capture video		
April 25 (Tuesday)			
April 26 (Wednesday)	Modify video clip for Flash		
April 27 (Thursday)			
April 28 (Friday)		11.25	
April 29 (Saturday)			
April 30 (Sunday)			
May 01 (Monday)	Find sounds for button clicks		
May 02 (Tuesday)	Import sounds into flash		
May 03 (Wednesday)	Attach sounds to buttons		
May 04 (Thursday)			
May 05 (Friday)		11.25	
May 06 (Saturday)			
May 07 (Sunday)			
May 08 (Monday)			
May 09 (Tuesday)	Create animation for splash screen (with secondary		
May 10 (Wednesday)	actions, differing timing, exaggeration, and other		
May 11 (Thursday)	principles)		
May 12 (Friday)		11.25	
May 13 (Saturday)			
May 14 (Sunday)			
May 15 (Monday)	Modify Table of Contents to include animation		
May 16 (Tuesday)			
May 17 (Wednesday)	User Testing		
May 18 (Thursday)			
May 19 (Friday)	Complete project	11.25	
May 20 (Saturday)			
May 21 (Sunday)			
May 22 (Monday)	Write paper		
May 23 (Tuesday)			
May 24 (Wednesday)			
May 25 (Thursday)	Revisions		
May 26 (Friday)			
May 27 (Saturday)			
May 28 (Sunday)			
May 29 (Monday)			
May 30 (Tuesday)			
May 31 (Wednesday)			
June 01 (Thursday)	Present final project		
June 02 (Friday)	Classes end		
		90	

4.3 Software

I used Macromedia Studio MX (specifically Flash), and the Adobe Design Suite (specifically Photoshop and Illustrator) in the production of this project. I selected Flash MX 2004 over Macromedia Director as the development tool for this project because its recent release seems to be more inherently object-oriented. Lingo has been in use with Macromedia Director for a significantly longer time and has gone through more iterations and therefore maintains many of its original syntaxes. Since I am more familiar with object-oriented languages because of prior knowledge of C#, C++ and Visual Basic for Applications, the learning curve was likely to be less challenging using another object-oriented language in the development of this project. This did prove to be true and I was able to learn to use Flash MX 2004 and ActionScript basics with the aid of a tutorial program.

4.4 Hardware

According to the Macromedia and Adobe Web sites, the minimum requirements to run the software I used for this project includes:

- 800 MHz Intel Pentium III processor (or equivalent) and later
- Microsoft® Windows® 2000 with Service Pack 4, or Windows XP with Service Pack 1 or 2
- 512 MB to 1 GB RAM recommended to run more than one product simultaneously
- 1024 x 768, 16-bit display (32-bit recommended)
- 4.8 GB of available hard-disk space to install all applications
- CD-ROM drive
- For Adobe PostScript® printers: PostScript Level 2 or PostScript 3™
- QuickTime 6.5 required for multimedia features
- Broadband Internet connection required for Adobe Stock Photos and additional services

Since most new computers come standard with most of the requirements above, no problems arose in meeting these system demands. Additional RAM was added to a standard laptop configuration.

5. Proof of Design

Figure 2. is the final image of an opening animation welcoming the user to the Interactive Edition of the book. I developed the opening animation that resolves to this screen by scanning and editing the images from the dustcover of the book. After pressing the "enter" button in the lower left corner, the user is directed to the "Table of Contents." An audio file is played as the animation is played and continues until the user enters the Table of Contents. This meets deliverables 9 and 10.

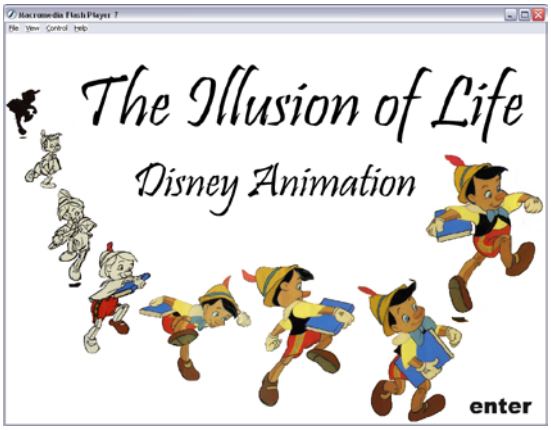


Figure 2. Introductory screen

Figure 3. is an image of the primary navigation screen the user will see after entering the program. The image is the same one that was chosen by the authors for the Table of Contents in the book. Only a section of the "Animation" category was completed, so other categories are "grayed-out". This meets deliverable number 3 by providing a location for links to other sections of the flow chart that was developed for the complete content.

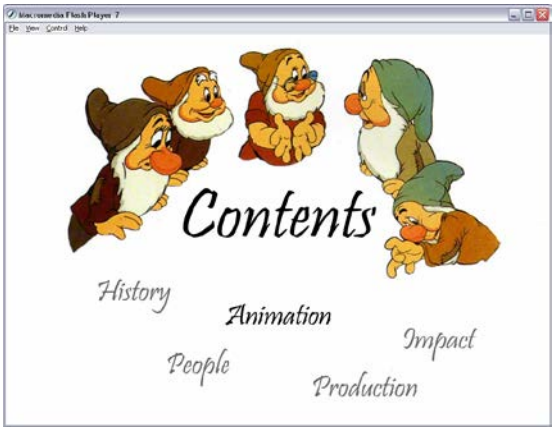


Figure 3. Table of Contents screen

Figure 4. is a sample of a screen without animation clip content. Note the scrolling text box to the left that contains the content from the book. At the top, three drop down menus are available for navigation through each category and sub-category. At the bottom, the arrows provide linear navigation to the next subheading of content. The navigation bars and the scrolling text box shown in Figure 4. meet the goals set by deliverables 2 and 4. The background images in Figure 4. and the remaining figures in this section provide evidence of meeting deliverable number 5.

Figure 4. Screen with text only

Figure 5. shows a sample of an expanded drop-down menu with the mouse over "Straight Ahead and Pose to Pose". As the user rolls over the navigation bar at the top of the screen, the bar expands to a menu of items that can be selected to open different sections. A swishing sound is heard as the cursor is passed over this menu bar to provide additional feedback to the user that an action has occurred. Additionally, when the user places the mouse cursor over each item, the text enlarges and changes color to indicate the selection. These features fulfill deliverable number 9.

Figure 5. Drop-down Menu

Figure 6. is a sample of a screen with supporting graphical content. In the right section of the screen, a box with instructions to the user is surrounded by thumbnail images of the sample animations and illustrations that can be opened to show examples of the techniques in this section (Squash and Stretch).

Figure 6. Screen with Samples and Active Content Box

When the user clicks on one of the samples, as shown in Figure 7., the illustration is shown larger with its own controls, if applicable. The sample shown in Figure 7. is an animation demonstrating the Principle of Animation being discussed and may viewed as a looped animation or one frame at a time.

Figure 7. Screen with Sample Open

This sample is enlarged in Figure 8. to show its control buttons as easily understood text instructions. When the close button is clicked, the animation will return to its original location with the other thumbnail images. These features provide deliverables 6 and 7. The custom controls at the bottom of Figure 8. are programmed with ActionScript to advance the playhead of the Flash movie. The user can click the "next" and "previous" buttons quickly or slowly to control

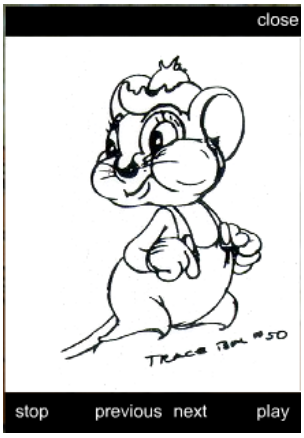


Figure 8. Detail of Animation Sample

the speed of the animation, the “play” button to loop the animation, and the “stop” button to stop the animation. Each image can be analyzed at length for as long as the user chooses to leave the sample open.

In Figure 9., a different section is shown that did not have as many illustrations available in the book to demonstrate the concepts to the user. I selected a video clip from “The Making of Lady and the Tramp” in which current Disney animators describe the exaggeration techniques used by Milt Kahl in animating the character, Tramp. In order to distinguish video clips from drawn animation clips and illustrations, I put the thumbnail images in a black border. Some of the video clips are full color and tended to get “lost” in the full color backgrounds. The black border helps them to stand apart, just as the predominantly white backgrounds of the drawn animations and illustrations provide the separation from the background for those images. The black and white backgrounds coordinate with the color scheme set out in the design protocols.

Figure 9. Screen with Video Clip Thumbnail

Figure 10. is a detail image of the controls associated with the video clip in Figure 9. Figure 9. and Figure 10. illustrate the fulfillment of deliverable number 8.

Figure 10. Detail of Video Clip Controls

The previous descriptions and figures all fulfill the primary goal of the project: to create an interactive multimedia presentation of *The Illusion of Life: Disney Animation*.

5.1 Testing Plan

A "Test Movie" function is integrated into Macromedia Flash MX 2004. This function was used extensively during development to ensure that changes made resulted in the desired result when the working Flash file was published to the final output or ".swf" file. Additionally, as ActionScript is added to the project, I tested each function in steps. After each function worked correctly, I tested each function that built upon it before adding any additional functionality. This method proved ideal, as no significant bugs were found by any of the users that tested the project on different computers.

The time-based nature of animation presents the possibility of variations between computer systems, so I tested the project in different computer environments. I asked several friends and family members to use the program to test usability of the navigation and features. Feedback was positive. Some suggestions were made that I decided not to implement due to them being beyond the scope of the project.

6. Conclusions and Recommendations

6.1 Conclusions

An interactive multimedia presentation of the content provided in Chapter 3 of the book *The Illusion of Life: Disney Animation* was completed to respond to the limitations of a static medium in presenting active content. The images provided by the authors as illustrations of the concepts they wrote about were used to create completed animations that could also be viewed as static drawings. Additional illustrations in the book were used to supplement the interface, keeping a consistent design with the original

publication. To prepare the final project, I primarily used Macromedia Flash MX 2004, Adobe Photoshop CS, and Adobe Illustrator CS2. The project fulfills all the Design Freeze deliverables as presented in the second quarter of the Senior Design class sequence.

6.2 Recommendations

I encountered various challenges in the development of this project and will cover them and the lessons I learned in this section. Given enough time, the resources to overcome most of these challenges are available.

The primary intent of this project was to show the viability of presenting Frank Thomas' and Ollie Johnston's content in an interactive multimedia setting. Therefore, creating a more robustly animated interface became a secondary focus. Having looked at a wide variety of websites created in Flash, I know that more animations and sounds can be used to add depth and interest to the interface itself. Each element of this project was created as a custom control. I think that creating the illusion of three-dimensional menus, buttons and animation playback functions would add interest and make a more "Disney-like" feel to the project. The additional time and manpower would contribute to this aspect of the project greatly.

I also ran into some difficulty with using the book as the source of the illustrations. The pages have a level of transparency that was detected by the scanner when digitizing the images. Additionally, some of the drawings rolled into the binding of the book and created a distorted image. Because of the different drawing styles of the animators that created some of the samples, the heaviness of the lines varied from very faint, lightly sketched pencil lines to dark, nearly final images. The lightest sketches

were not used in the project because the combination of the transparency of the paper and having certain images in the sequence rolled into the binding created too much interference with the drawing. I used a variety of methods to try to keep these images included in the project, but could not find one that was viable for completion within the time constraints. Figure 11. is an example of one of these images.

Figure 11. Un-retouched scan of one animation series

For the drawings that were dark enough to withstand the adjustment of the contrast levels, I primarily used Photoshop's "burn" tool to remove the evidence of the previous page. A before and after image are shown below in Figure 12. and Figure 13.

Figure 12. Un-retouched Donald

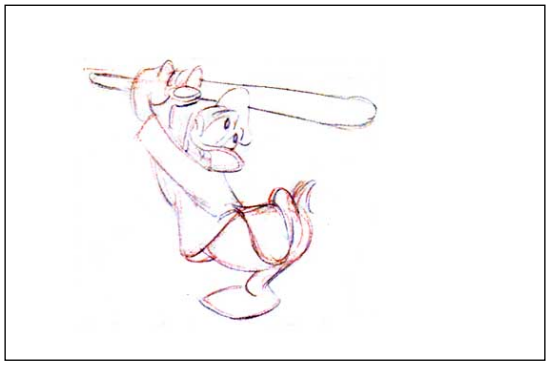


Figure 13. Retouched Donald

If I had access to the original drawings, as a professional production of this content would have, these problems could have been minimized, if not eliminated.

Another lesson that I learned during the image manipulation phase of the project was that rather than treating each image as an individual, it was better to relate the image to the entire sequence before beginning to adjust the location of the drawing within the frame. To create the animations, I copied the images into layers on top of each other in Photoshop. The drawings were originally placed next to each other in the book in relation to the size of the image itself, rather than in relation to the background that would be behind the drawing in a final animation. This saved space in the page layouts of the book, but was not exactly the correct location of each image in the full sequence. During the first few attempts at creating the frame-by-frame animations that would be playable by the user, I found that I needed to increase the canvas size to adjust for the changing shape and locations of the images within the entire sequence. An example of this is that in Figure 13. shown on the previous page, Donald is lining up to bat the ball facing one direction. In Figure 14., Donald is facing the opposite direction at the end of the animation sequence. To create the final animation, Donald needs to remain in approximately the same location within the image, but the bat swings around. After I gained experience with adjusting the first few animations, I found that when I determined the maximum size of the animation first and then related all the individual drawings to that frame, the work moved along much more quickly.

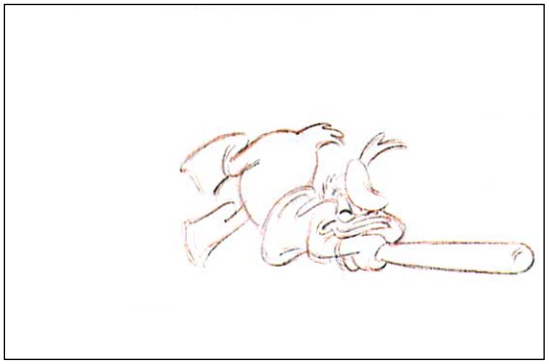


Figure 14. Final image in Donald sequence

A final recommendation for a novice Flash user is to acquire a good tutorial program for learning how to use this program. I was able to borrow a CD-ROM titled "Learning Macromedia Flash MX 2004" from a relative that works with digital media for a living. (20) This tutorial took approximately 14 hours of the scheduled time, but was invaluable as I worked through this project. Other resources for learning Flash MX 2004 were available online on various websites, but these were generally geared toward people who already had an intimate working knowledge of the software. Learning how to work in the Flash MX interface is only one level of knowledge needed to create a final product with this program. Flash MX is a timeline-based program and therefore works quite differently when creating a user interface than a program that is simply compiled and run. Several levels of objects can be layered inside each other and knowing which level is being worked on as well as how it interacts with its child and/or parent layer is integral to working in Flash MX. A second and very important level of knowledge is gaining a sense of how to combine the tools available to create unique functionality with ActionScript. This type of experience can only be gained after working with the program for a while and using its tools.

Notes

The content used to create this project is copyrighted by the authors, Frank Thomas and Ollie Johnston. The multimedia adaptation of that content was created for educational use only and will not be reproduced for commercial purposes.

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Figure 15. Screen with Sample Open

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