How to Build and Maintain a Saltwater Aquarium

By

Paul Dozier

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

University of Cincinnati
College of Applied Science

May 2001

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Acknowledgements/Dedication

The project would not have existed without the personal and professional support of family, friends and colleagues. In preparing this project, I have been thankful every day for the skillful and thorough research assistance of Dr. Sam Geonetta, Associate Dean Cheryll A. Dunn, 465 Productions and the IET Faculty for their experience and insight.

Table of Contents

Abstract

This document records the information about the conception, progress, procedures, and conclusions of my Senior Design project. This includes a statement of the perceived problem, the solution to this problem, the design objectives for this solution, process for meeting these objectives and the conclusions and recommendations.

How to Build and Maintain a Saltwater Aquarium is a multimedia project submitted to satisfy the Senior Design criteria established by the Information Engineering Technology faculty. *How to Build and Maintain a Saltwater Aquarium* is an interactive CD- ROM.

The design features digital movies accompanied by sound, and images describing the characteristics of fish and coral. The intended user is a novice or an intermediate hobbyist interested in building a healthy saltwater aquarium. The user interface simulates a combination of an electronic book and a PowerPoint presentation; both media are familiar to the user. Interactive pages inform the user about the origin of each species and its characteristics.

List of Figures

1. Problem

The pet industry does not have any electronic media for hobbyists to view and learn about saltwater aquariums. The hobbyists can only get information in books and magazines. This way of learning can be expensive and time consuming. The pet industry has not taken advantage of electronic media. If the pet industry would use electronic media to communicate information to help hobbyists many questions would be answered and many problems would be solved. To help solve one problem, I produced an interactive CD-ROM on how to build and maintain a saltwater aquarium.

2. Review of Literature

The literature for this project can be categorized in three main groups. The first group contains information about CD-ROMs. The second group provides information about using multimedia. The third group discusses of the rise of technology in education.

2.1 CD-ROM Literature

In *Using CD-ROMs to Develop Automaticity and Fluency in Reading*, Mary Jane Ford states that the technology of CD-ROMs is being used to teach content in science and social studies, to provide reference resources, and to supply sources for graphics and sounds. It is not surprising that CD-ROMs have also found their way into reading instruction. Since the appearance of the Discis Books series in the 1990s, books for various levels have appeared on CD-ROM. These books are entertaining and delightful, including sound, graphics, and, on some, animation. Children and adults alike enjoy these programs. (1)

In *A Study of the market for financial CD-ROMs in Hong Kong*, Rachel J Mark states that CD-ROMs are becoming more popular in the office place and Hong Kong is not any different. This high storage medium is considered to be an important player in Information Technology. Similarly, more and more offices are delivering information electronically. Extel and Wardley Data Services have jointly produced a company and financial information CD-ROM, the first of this kind in Asia. Market research using a three-page questionnaire about the use of Wardley Data cards and the hardcopy version of the CD-ROM, focused on views of online services, CD-ROMs and hardcopies. The investigation into the potential market in the new product resulted in a surprising 50% who were interested in them. There has been disappointment in the sense that CD-ROMs have met people's expectations since they are not as up-to-date as the hardcopy version. CD-ROM and its related technologies are also discussed and a comparison of its alternatives is made. (2)

2.2 Multimedia Literature

Using multimedia - Information gathering from CD-ROMs Case studies for SEN states that a group of eighth grade pupils was asked if they preferred to use books or CD-ROMs for topic work. They came up with 10 advantages of CD-ROM. These included:

- It's more fun.
- It prints out so we don't have to write.
- It speaks to us.
- It's got good pictures.
- I work harder.
- It's easy to use.
- It's big and it's got more in it than a book. (3)

2.3 Rise of Technology Literature

In *Paradigms for On-Line Learning*, John R. Bourne, Eric McMaster, Jennifer Rieger and J. Olin Campbell state that Asynchronous Learning Networks (ALNs) provide the capability to learn anywhere at any time. The acronym ALN might just as well be used for the term Anywhere/Anytime Learning Networks. Both interpretations reflect and emphasize that ALNs are different from traditional distance learning methods (e.g., video broadcasting) because the learner can be anywhere and can learn at any time. While an ALN might be a correspondence course or a course offered by recording messages on answering machines, most modern interpretations link ALN with on-line or world-wide-web-based learning. The key ingredient of an ALN is the ability of learners to learn anywhere at anytime and to be part of a community of learners. Modern implementations of ALN systems utilize conferencing systems and on-line reading materials and exercises. Networks are not the only means of Anytime/Anyplace learning. By understanding this, CD-ROMs are in the same category. With a CD-ROM a learner can use it any time and any place also. (4)

3. Description of the Solution

How to Build and Maintain A Saltwater Aquarium has the potential to save the hobbyist money, give answers to questions the user may have and explain situations the user may face. Since all of the information is located in one place the user will save money. Also, there is a troubleshooting selection located on the CD ROM (see **Figure 12. Troubleshooting**). This Interactive CD-ROM will help a novice or an intermediate hobbyist learn how to build a saltwater aquarium, by movies and detailed step-by-step instructions (see **Figure 13. Building the Aquarium**). It will also show and describe the

wide variety of fish and corals that can be in the aquarium (see **Figure 4. Fish List Page** and **Figure 5. Coral List Page).**

3.1 User Profile

This CD is intended for someone who is interested in building and maintaining a healthy saltwater aquarium. The education level of the user should be at least the ninth grade, because the user should be able to understand and implement the information in the CD. This project is targeted to some with an average level of computer experience, who has:

- The ability to turn on the computer
- The ability to insert a CD into the proper drive
- The ability to open the proper drive to access the project if "auto run" does not execute

The user needs average IT Literacy, and needs to know how to find the executable icon after opening the CD drive if the "auto run" does not execute.

3.2 Design Protocols

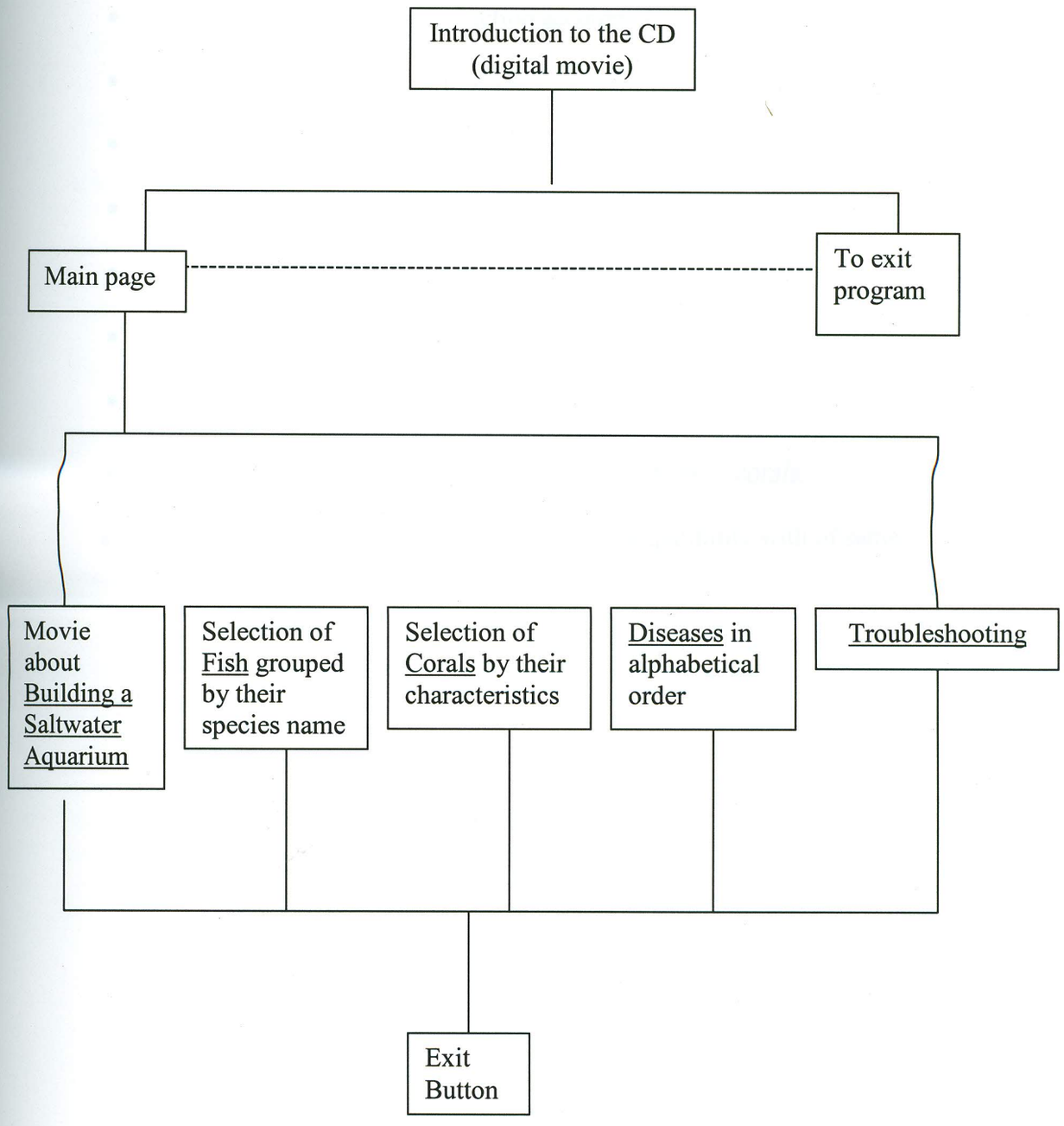

Figure 1. Flowchart

4. Objectives of the project

- A digital movie for the introduction accompanied with music.
- Main page with the title of project.
- Main page with hotspots to the specific topics.
- Ability to search the pages on the CD by typing in topic.
- Logical navigation throughout the project.
- Digital movies with instruction and sound.
- List of what is available after selecting a certain topic.
- Images about the species of fish and the assortment of corals.
- Information about the fish such as species, compatibility with of same characteristics.

5. Design and Development

5.1 Budget

Microsoft Office	$	819.95
Authorware 5.1	$	2,699.00
Microsoft Windows 98	$	120.95
Computer	$	1,800.00
Paint Shop Pro.7.0	$	100.00
Flash 5.0	$	99.00
Books and materials	$	80.00
MPEG converter	$	25.00
Sound Forge 4.5	$	99.00
Ulead Visual Studio 4.0	$	99.00
Cannon Digital Camcorder	$	1,200.00
Total	$	7,141.90

5.2 Timeline

Senior Design I	September	December	
Subject	Start Date	Ending Date	Time Allowed
Research topic	08/01/00	08/3100	29 days
Proposal	11/03/00	12/03/00	30 days
Oral presentation	11/24/00	12/05/00	11 days
Senior Design II	January	March	
Work on prototype	12/15/00	02/25/01	40 days
Prototype complete	12/15/00	3/5/01	80 days
Senior Design III	March	June	
Working on final project	3/15/01	5/19/01	64 days
Rough draft for final paper	3/20/01	5/01/01	51 days
Talk with Dr. Geonetta on what is expected in the paper and help with project	4/05/01	5/05/01	30 days
Tested final project	05/15/01	02/20/01	5 days
Completed final paper	04/20/01	06/5/01	45 days
Prepare for final presentation	05/27/01	6/5/01	8 days

5.3 Software

The user must have Window Media Player installed on his/her computer. This will allow the customer to view the digital movies that are installed on the CD.

5.4 Hardware

The user's computer must have at least a Pentium II and 64MB of RAM running Windows 95 or above.

6. Proof of Design

The user will enter the program by selecting the executable file or letting the CD "auto start". An introductory Flash movie is the first screen the user sees (see **Figure 2. Opening movie for CD**). After the movie plays or during the movie the user has the choice to go to the Main Page or Exit.

The Main Page consists of a title and icons that link to specific topics. Throughout the program the User has the option to exit .The user can search the contents of the CD by selecting the "Find" icon button and typing in the search field what they want to view (see **Figure 8. Search Window**).

There are the five topics on the Main Page. The user can select the desired topic and view its contents (see **Figure 3. Main Page**).

Also located on the Main page is a Help button. When the user clicks the Help button. The user will view the information about all of the buttons located on the CD (see **Figure 9. Help Screen**).

After selecting on the desired topic the user is prompted with a list page grouping its contents in alphabetical order or characteristics (see **Figure 4. Fish List, Figure 5. Coral List, Figure 6. Disease List, Figure 11. Coral Overview**).

After selecting the topic the user can navigate either by clicking the Next or Previous button located on the bottom of the page. After the user views the content in a category he/she will return to the List Page (see **Figure 10. Coral Page**), (**Figure 7. Fish Description**).

The color scheme throughout the program uses black and yellow or gold. Black is for the background, with yellow or gold for the font color. A black background provides a better field that makes it easier for the user to read text and view images. The font color of yellow or gold makes the user more comfortable reading and the color doesn't distract the reader from the image. The icons are related to the topics and the navigation.

7. Conclusions and Recommendations

While working on this project I encountered many obstacles. These problems were primarily related to programming the navigation. I noticed that I could not exit from a layer and move to another layer without the proper navigational call. The Authorware 5.1 Attain book doesn't mention this problem at all. After researching the problem, I retrieved information (see **Figure 15. Building the Aquarium Second Layer**).

Installing MPEGs into the project was extremely difficult because, Flash would not recognize them. I overcame this obstacle by installing the MPEGs in Authorware in frames, then creating a Flash movie for the text (see **Figure 14. Authoring Structure of the First Layer**).

A person who making an Interactive CD-ROM or any project dealing with multimedia should gather all of the software first. When gathering the software they should pay close attention to chat rooms and user groups. They have a lot of information about the product and also helpful hints.

Appendix A. User's Interface

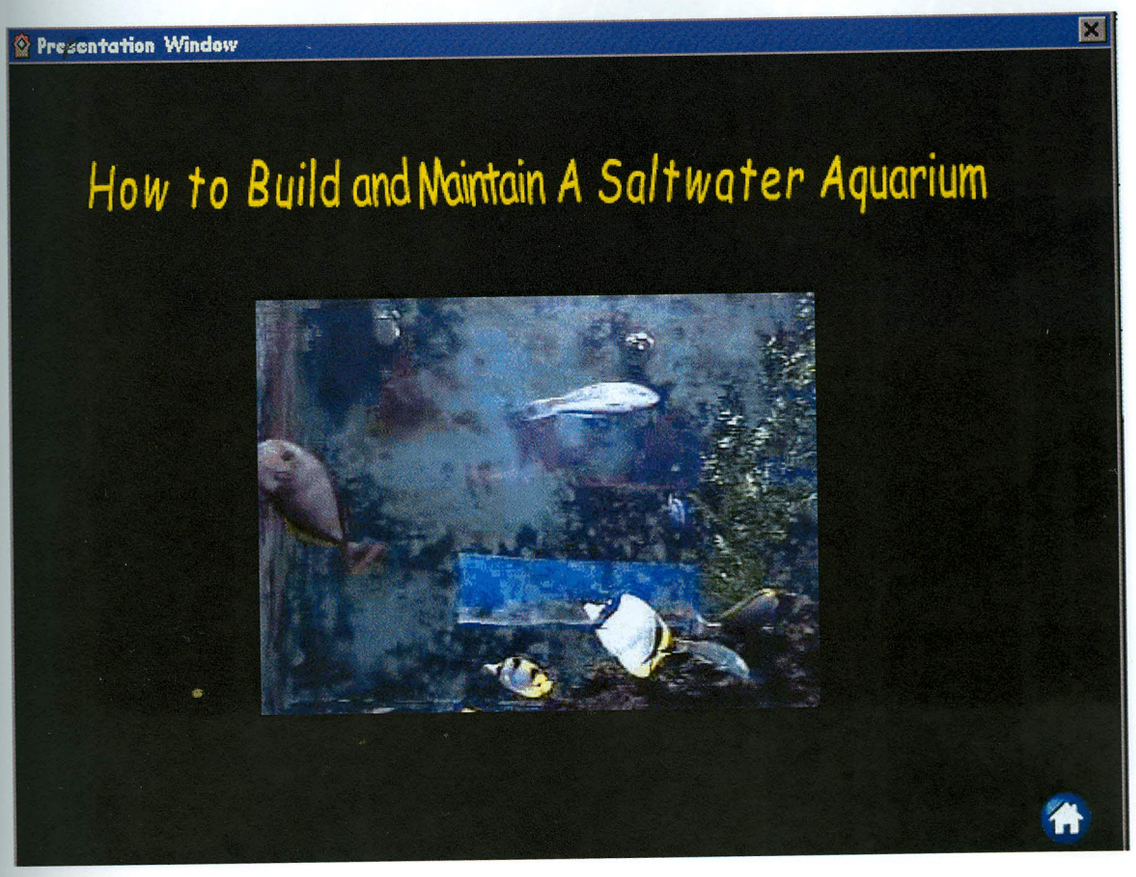

Figure 2. Opening movie for CD

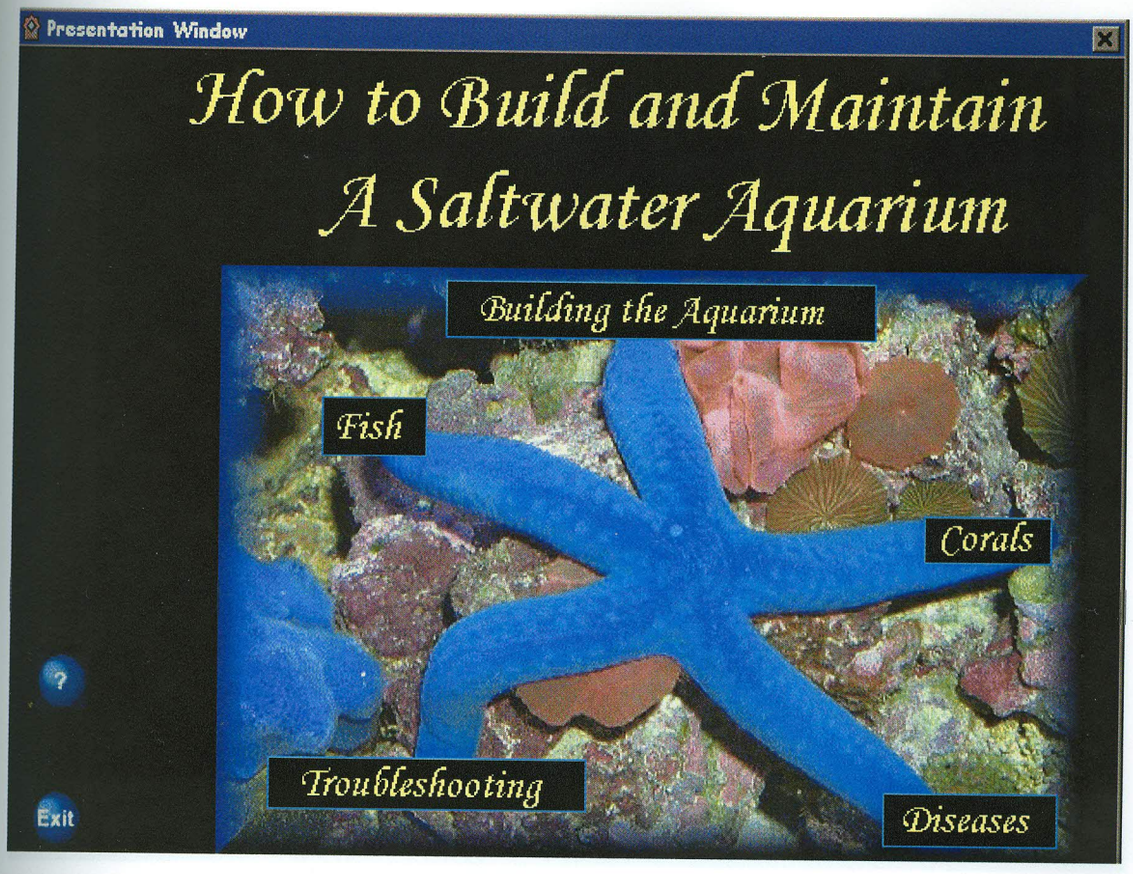

Figure 3. Main Menu

Figure 4. Fish List

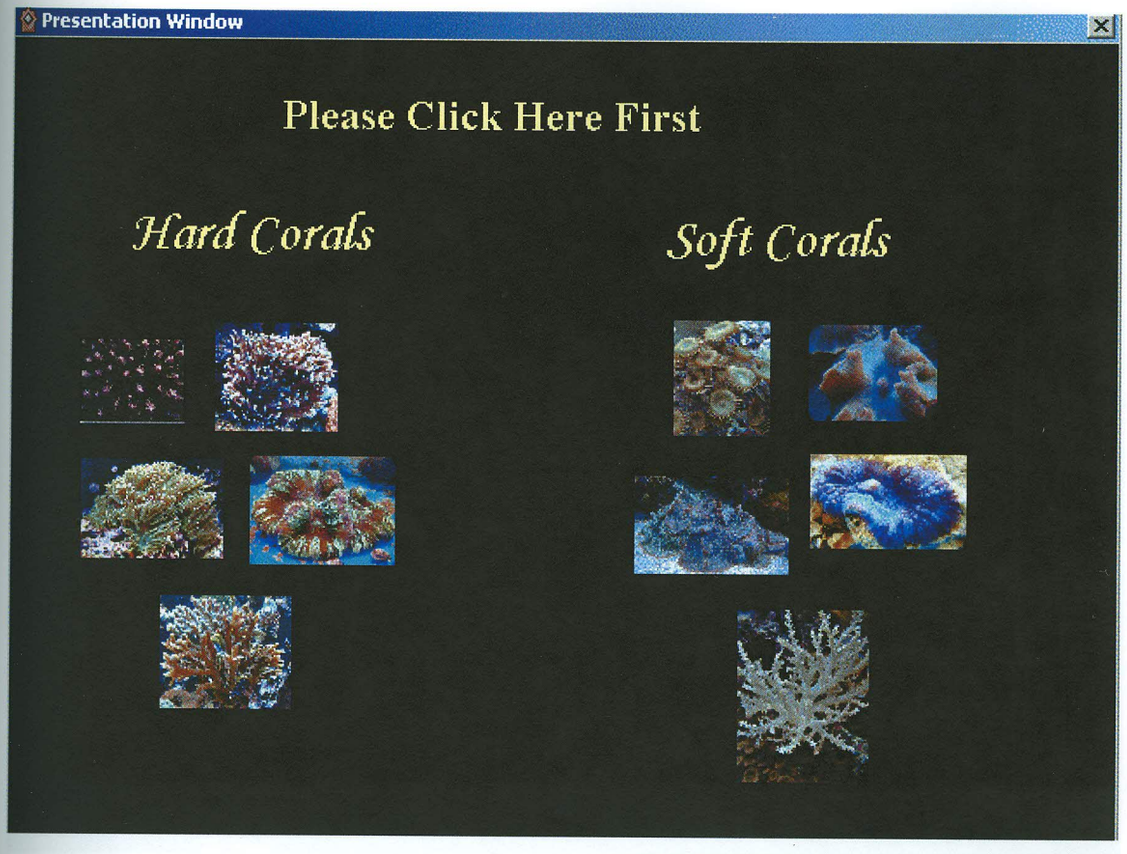

Figure 5. Coral List

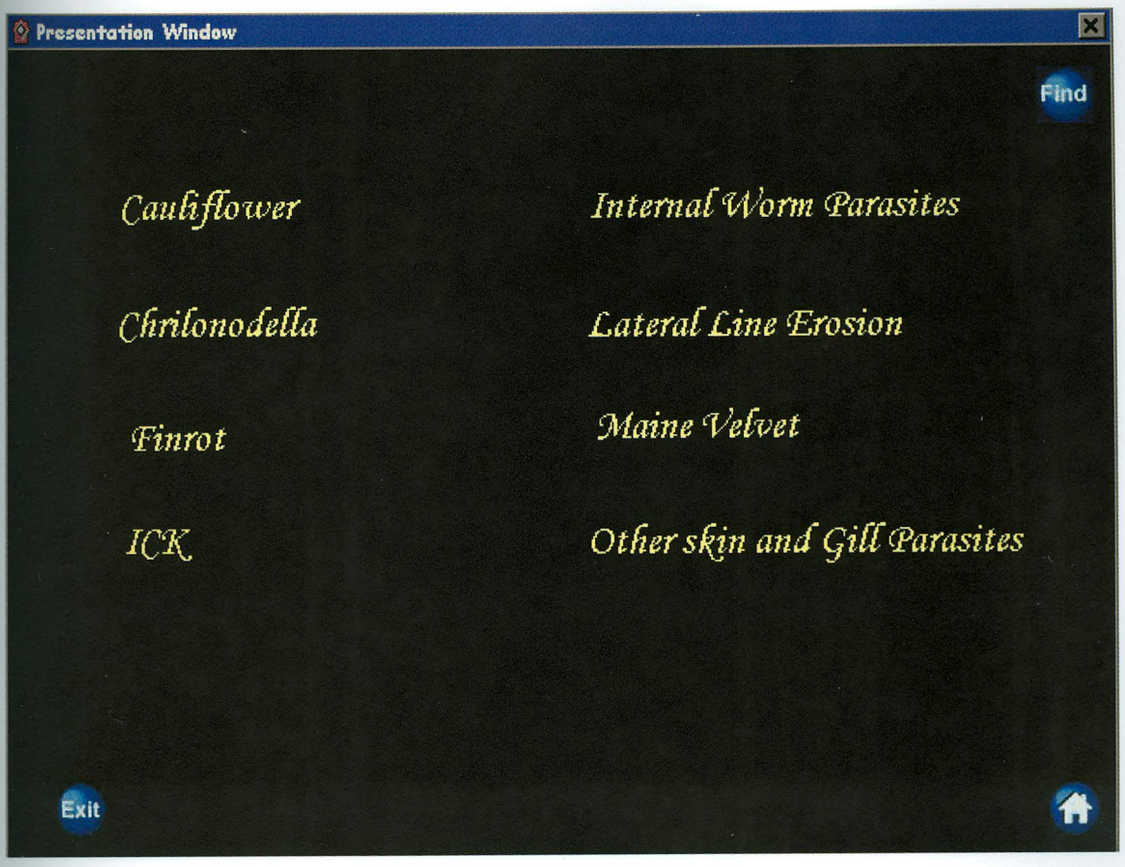

Figure 6. Disease List

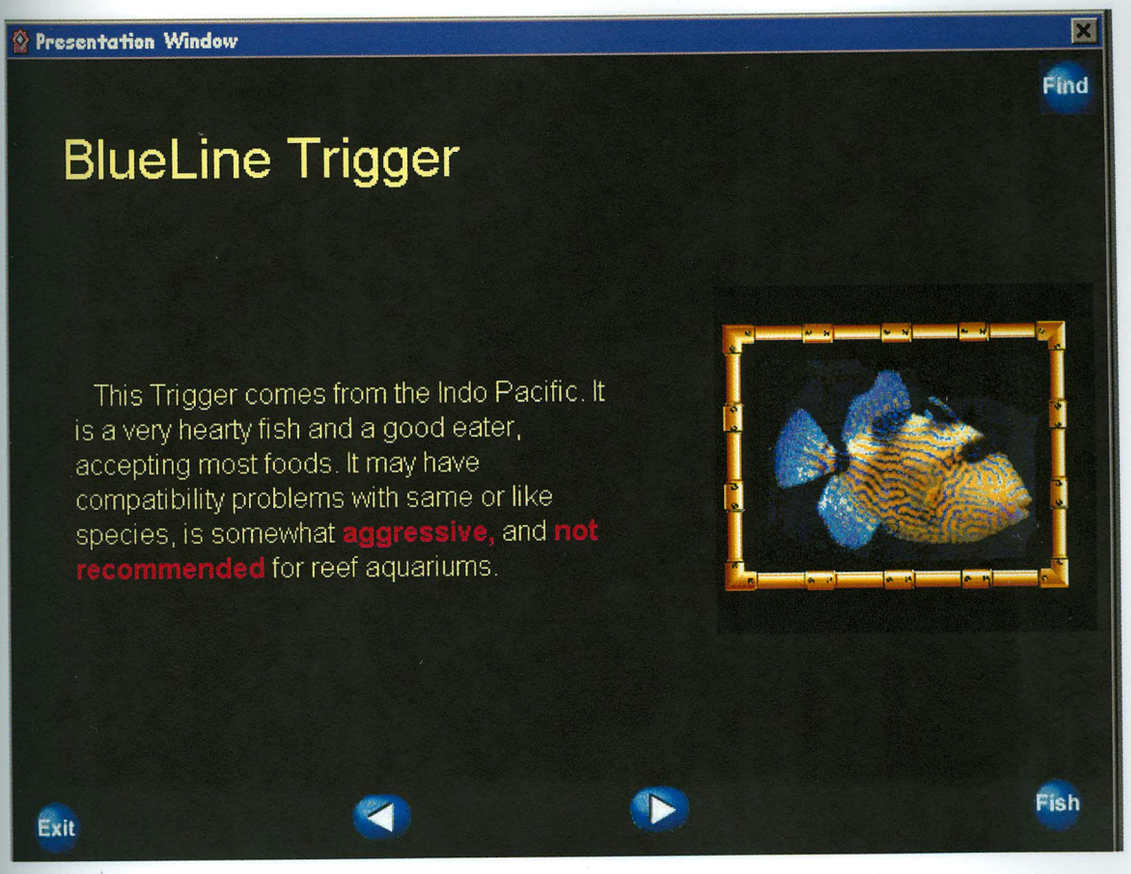

Figure 7. Fish Description

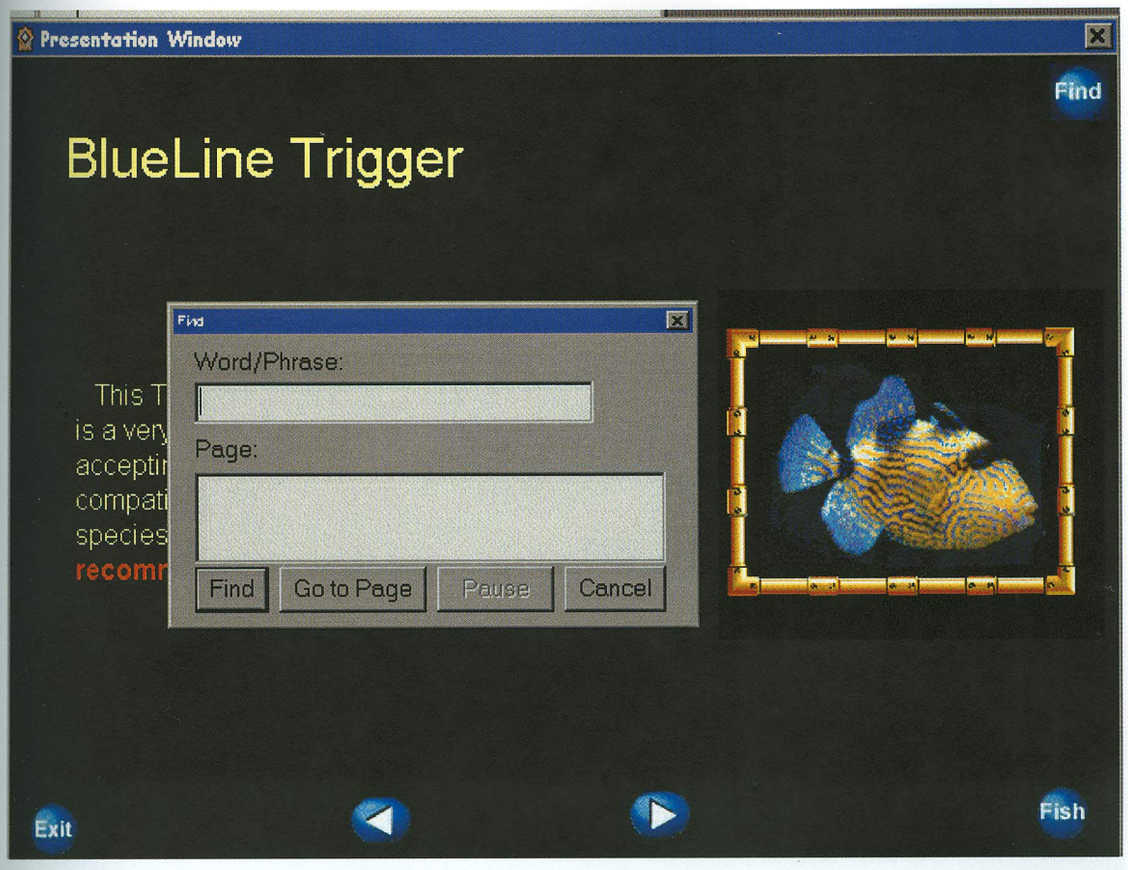

Figure 8. Search Window

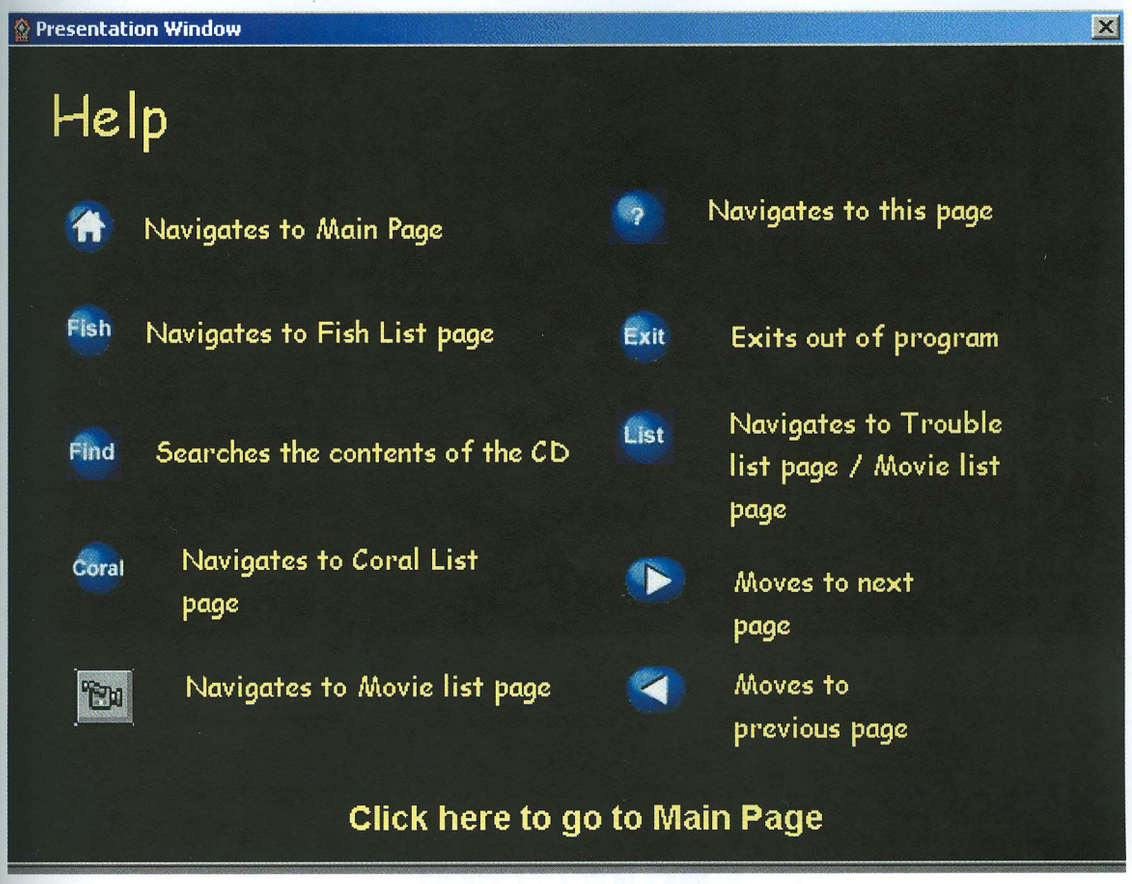

Figure 9. Help Screen

Figure 10. Coral Page

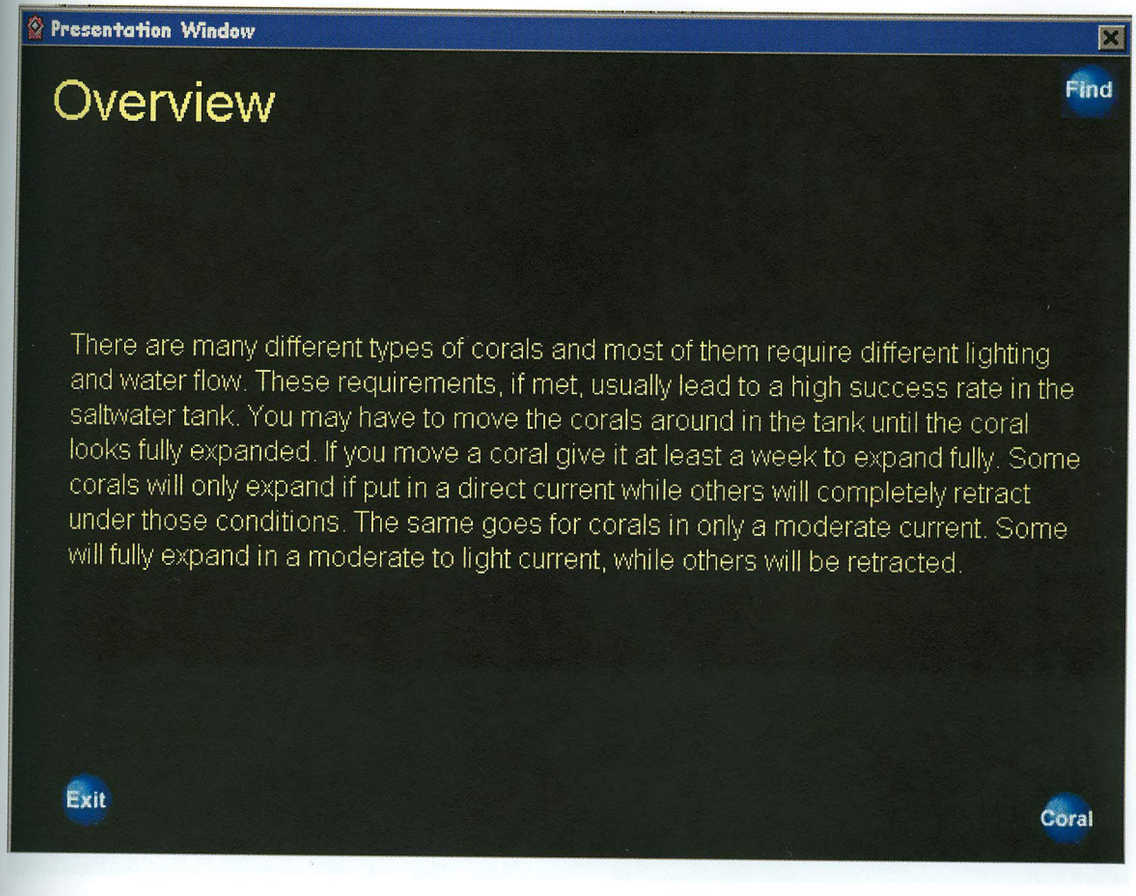

Figure 11. Coral Overview

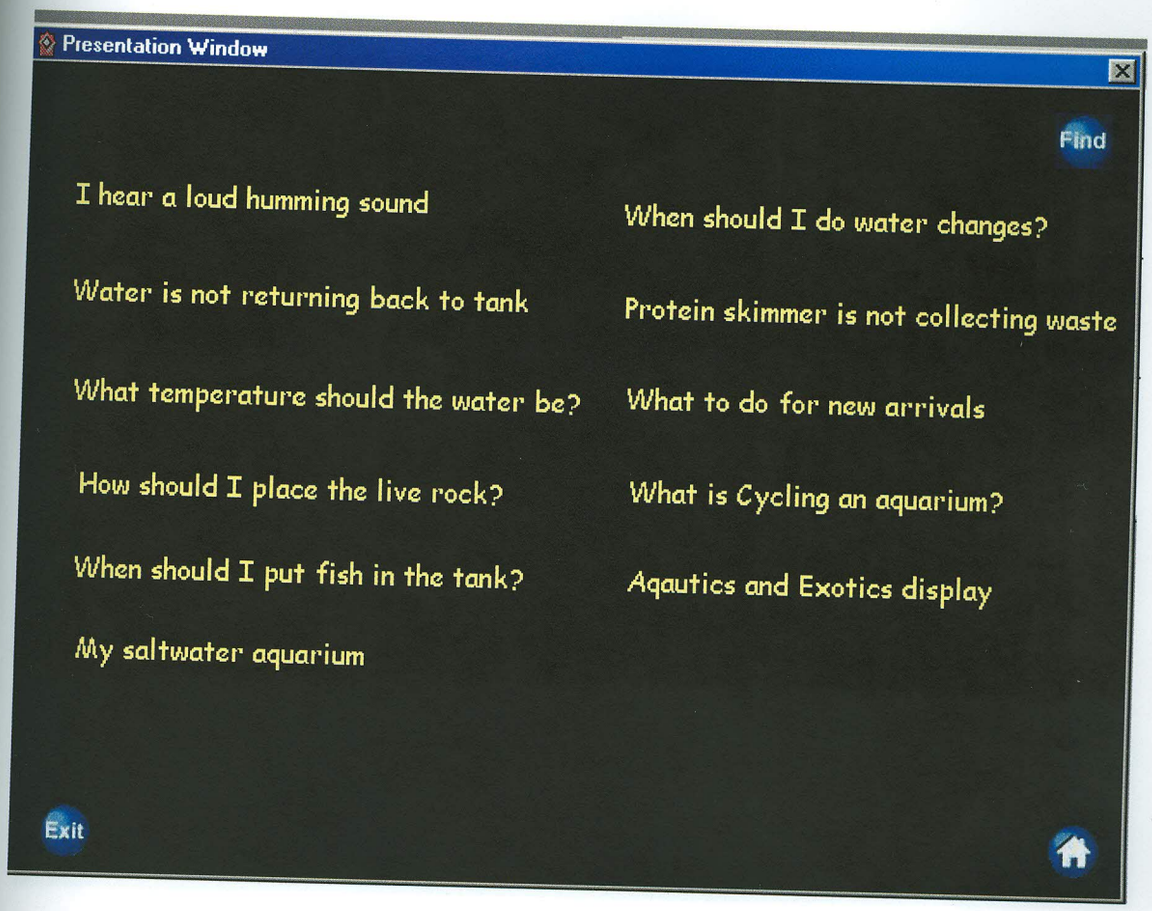

Figure 12. Troubleshooting

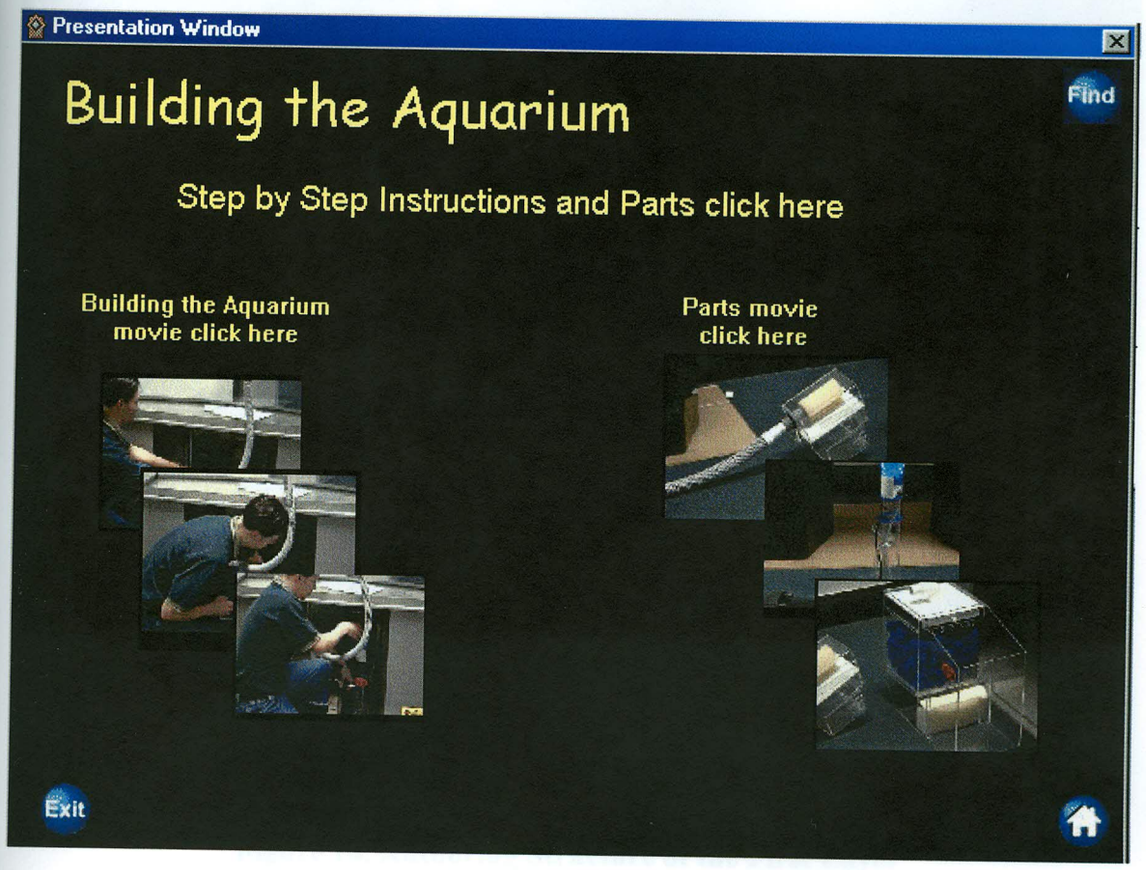

Figure 13. Building the Aquarium.

Appendix B. Authoring Interface

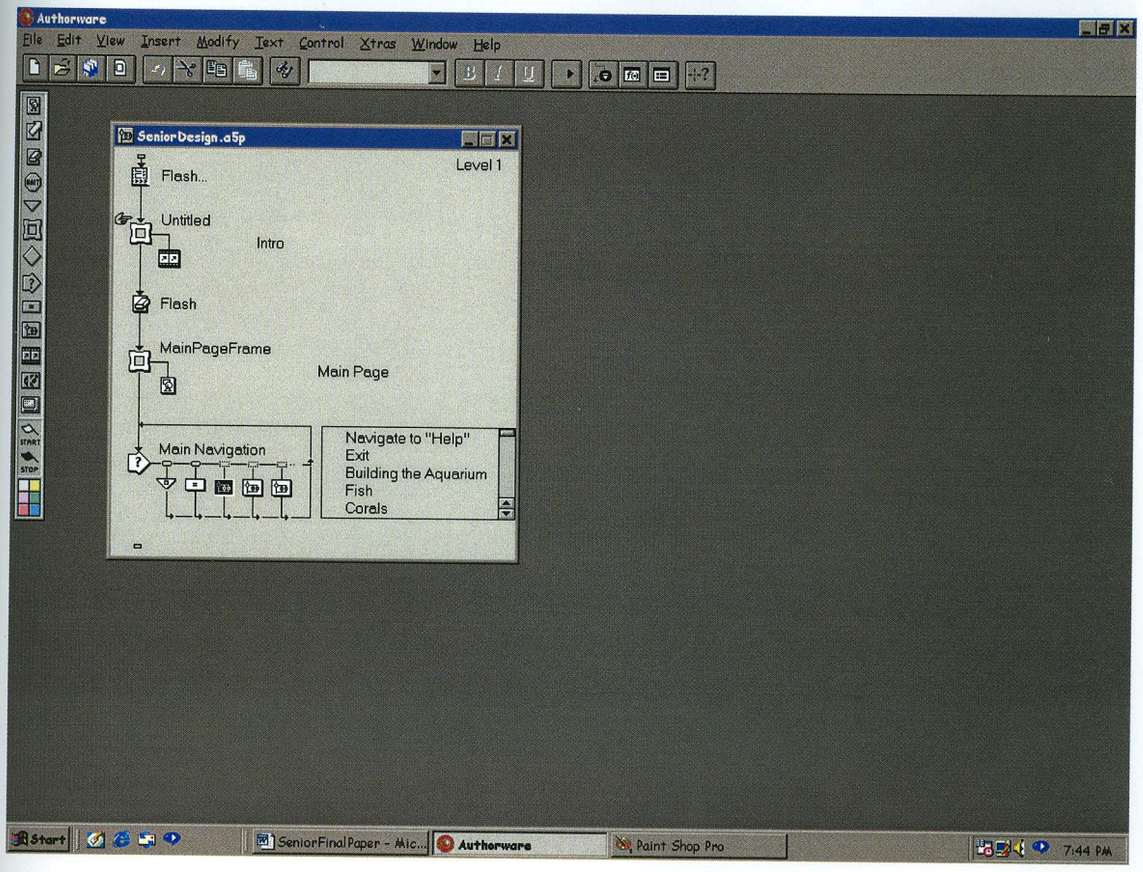

Figure 14. Authoring Structure of the First Layer

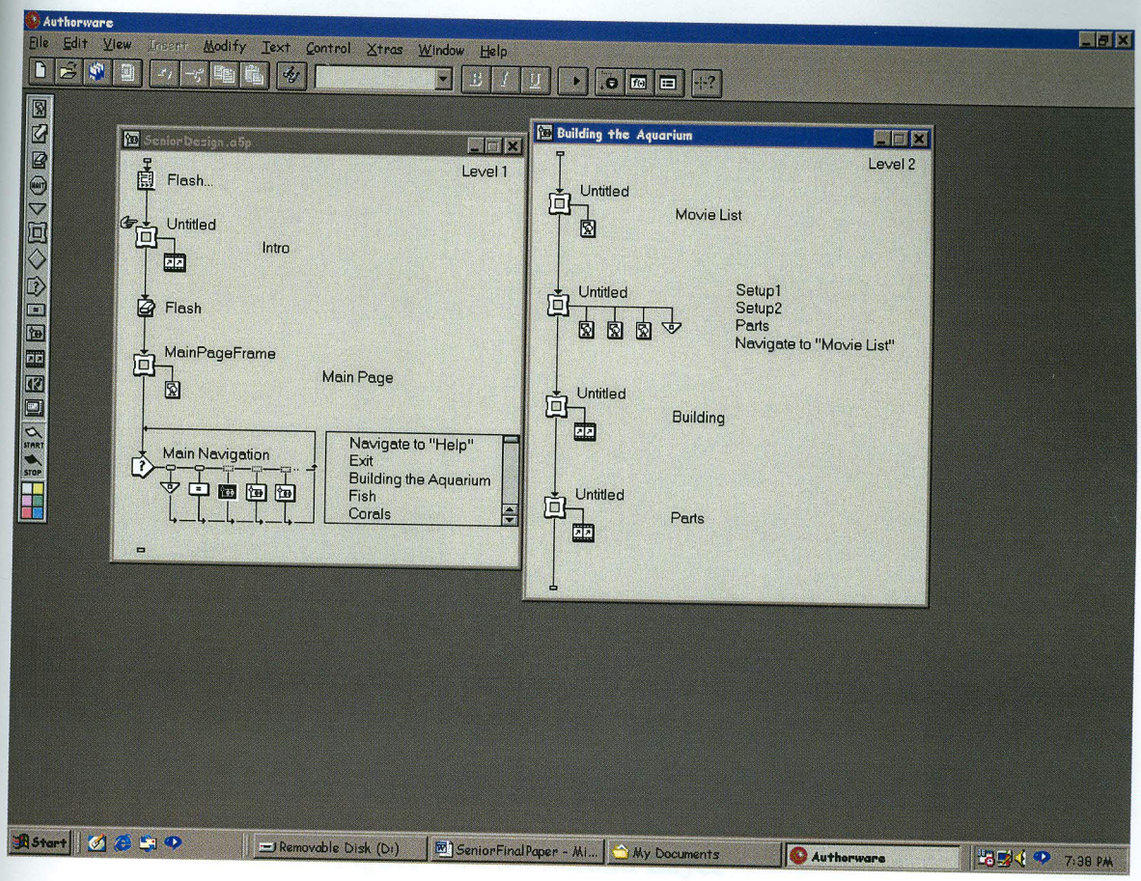

Figure 15. Building the Aquarium Second Layer

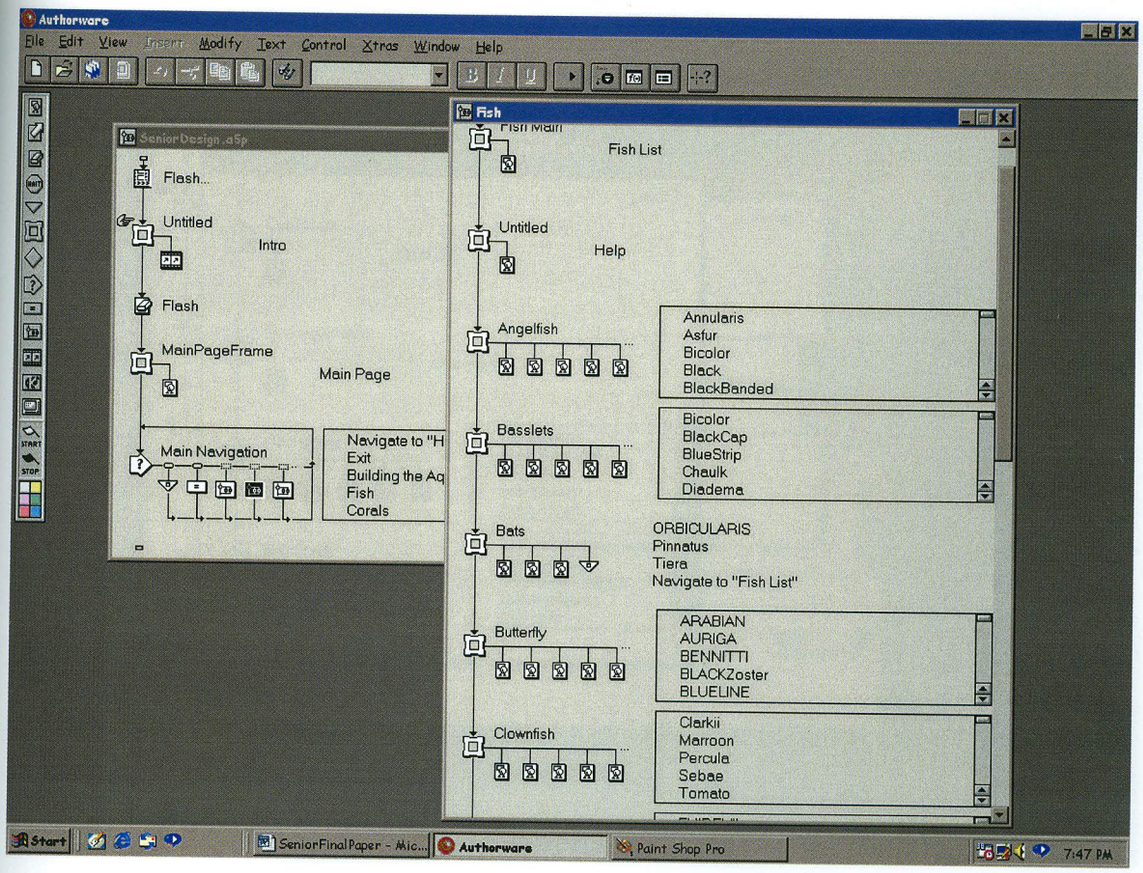

Figure 16. Fish Second Layer

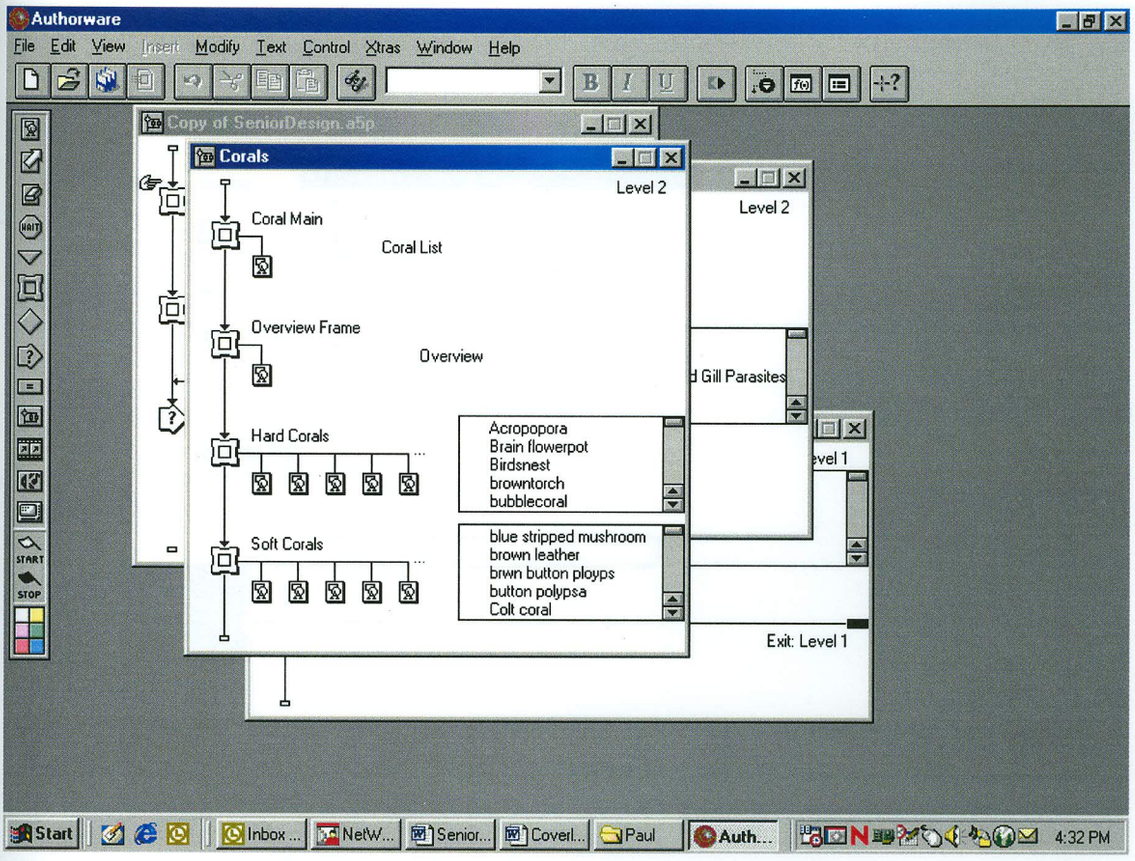

Figure 17. Corals Second Layer

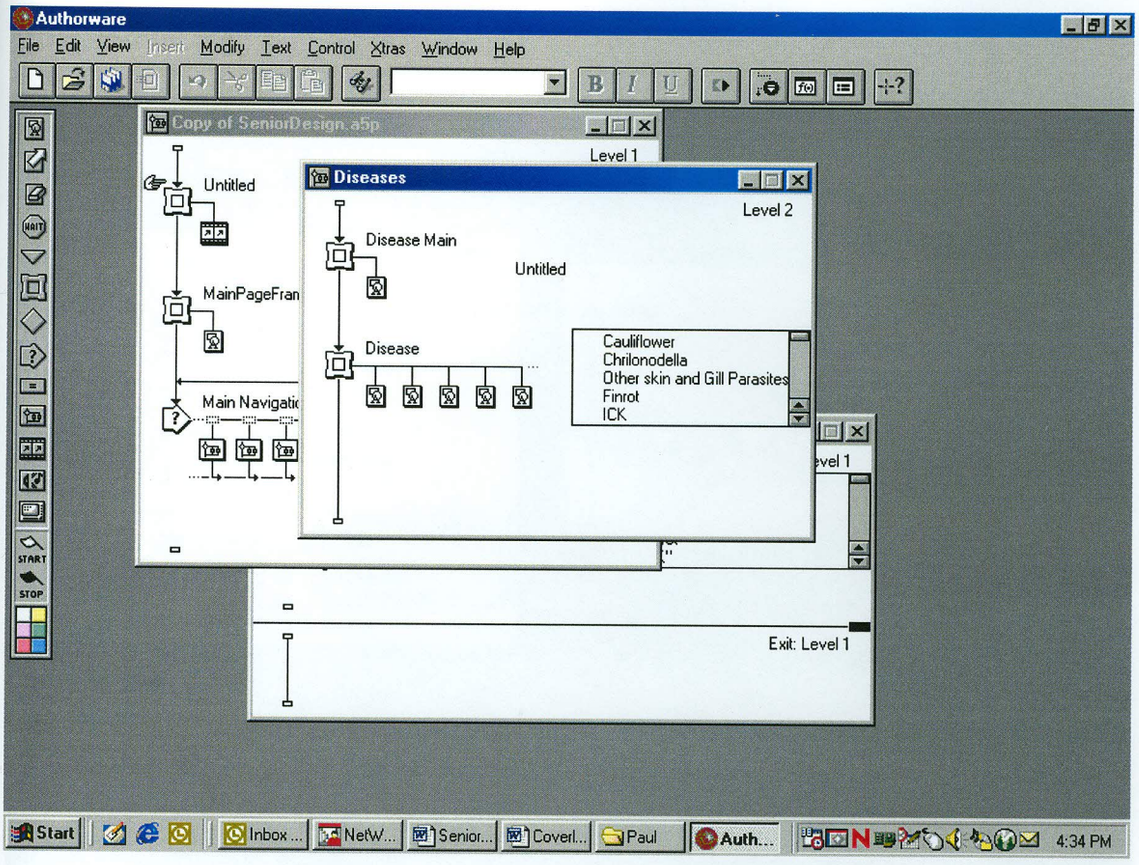

Figure 18. Diseases Second Layer

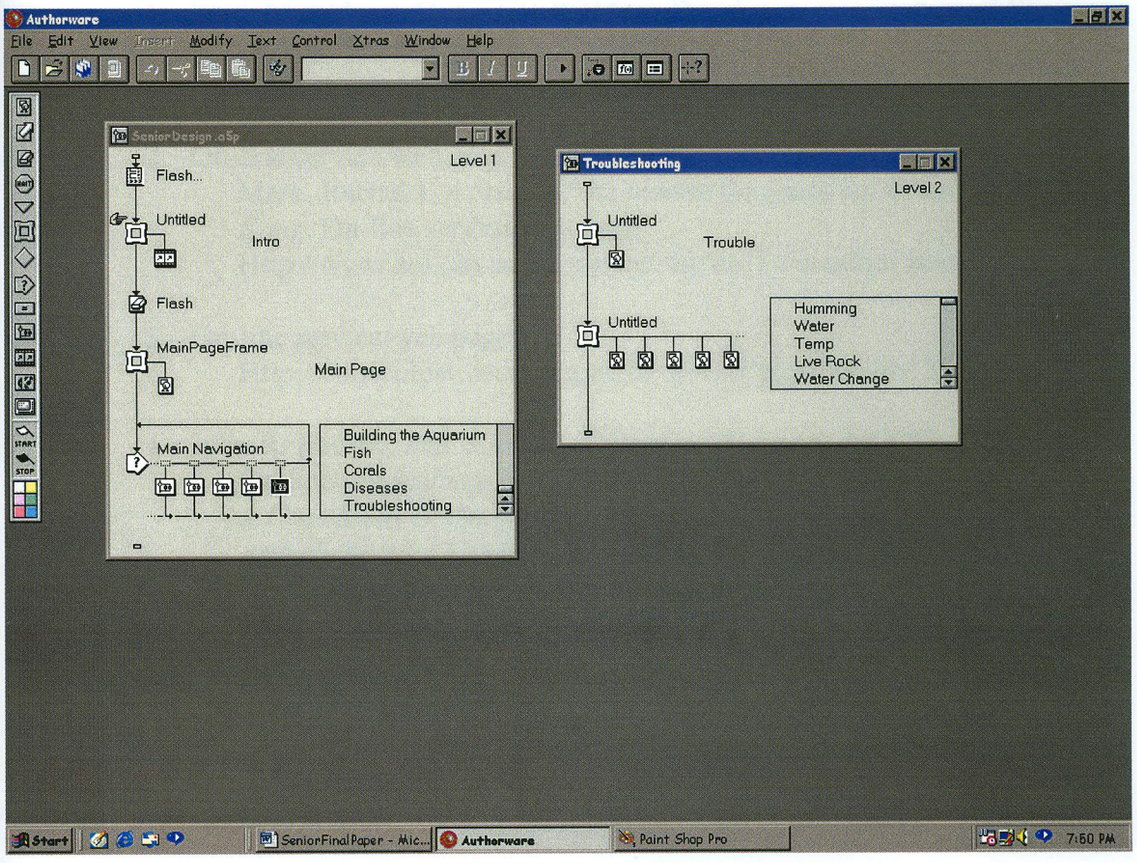

Figure 19. Troubleshooting Second Layer

References

1. Ford, Mary Jane. *Using CD-ROMs to Develop Automaticity and Fluency in Reading*. On-line service/web page
   Http://www.coe.uh.edu/insite/elec_pub/html1995/0514.htm

2. On-line service/web page:
   Mark, Rachel J. *A Study of the market for financial CD-ROMs in Hong Kong*. On-line service/web page:
   Http://www.soi.city.ac.uk/project/tej/VolTwo/author.html

3. On-line service/web page:
   Http://curriculum.becta.org.uk/docserver.php?docid=1354

4. John R. Bourne, Eric McMaster, Jennifer Rieger and J. Olin Campbell.
   On-line service/web page: Paradigms for On-Line Learning:
   A Case Study in the Design and Implementation of an Asynchronous Learning Networks (ALN) Course.
   Http://www.aln.org/alnweb/journal/issue2/assee.htm
   JALN Volume 1, Issue 2 - August 1997