University of Southern Queensland

Faculty of Engineering and Surveying

E-tutorials for Electrical Engineering courses using Dreamweaver

A dissertation submitted by

MUHAMMAD ZAKI BIN MUSTAFA

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towards the degree of

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Abstract

This dissertation report details the development of an interactive online tutorial for engineering courses using the software Dreamweaver, with Electrical Plant being the example in this particular project, with the aim to facilitate both on and off campus students of University of Southern Queensland. The dissertation helps to establish a clear understanding on what the whole project is about, the procedures in its development, the testing and results, the problems encountered and further work recommendations.

The development of the online tutorial was carried out by first researching and learning the basic programming languages in webpage development such as HTML and Macromedia Flash. The next step was the understanding of the designing and constructing of the webpages. There are only guidelines in building a webpage as the designing of the layout will depend on the creativity and preferences of each designer. This proved to be crucial as Dreamweaver provided the author with numerous options and tools to work with.

Thus the next step was to list out all the possibilities and finally narrowing it down to the most suitable design. It was decided that it has to be simple, with easy navigation and interesting tutorials for the users. Testing was carried out regularly to iron out any visible and potential errors. The resulting web tutorial had satisfied the goals of the project although more graphics, interactive tutorial questions and more coverage of the chapters could have been added if it wasn't due to insufficient time. Nevertheless, there are opportunities for future work on this project for further enhancement.

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ENG4111/2 Research Project

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MUHAMMAD ZAKI BIN MUSTAFA
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Date

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I would personally like to thank these people for their support and contributions during the process of me successfully completing this project.

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MUHAMMAD ZAKI BIN MUSTAFA

University of Southern Queensland
October 2006

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Chapter 1

Introduction

1.1 Project Overview

Distance learning is fast becoming a popular trend. Working adults wanting to upgrade themselves as well as the lure of recognized degrees abroad makes distance or correspond studying very appealing. And because of the mounting number of students doing these courses, we see the importance of online or web-based tutorials. Online tutorials not only cater to these off-campus students, but also to those on campus as well, as it provide easy access to study materials in their fields of study. This project hopes to provide an insight of how an online tutorial website can be done and shows how easy and useful it can be. With the power of the internet and a great web building tool such as the Macromedia Dreamweaver, online learning could be a refreshing and interesting experience.

1.2 Project Aim

The main aim of the project was to design a web-based interactive online tutorial for on and off campus students using the software Macromedia Dreamweaver. Electrical Plant was chosen as the course example for this project. The idea was to provide students with a refreshing and interesting way of studying online. Using the popular and critically acclaimed web design software, Macromedia Dreamweaver, the project designs a webpage that combines simplicity with multimedia tools and provide efficient learning and a fun and interesting user interaction. With the power and influence of the Internet, users can access the learning materials with ease and do practice quizzes at their own comfortable pace. The project aimed to make e-learning more attractive and interesting to the users with animated illustrations and short quizzes at the end of each chapter without installing any additional software.

1.3 Specifications

This project had a few specification requirements that needed to be satisfied. Firstly, the webpage layout was to be designed using primarily Macromedia Dreamweaver software. The tools that were provided by the Dreamweaver software gave numerous options for the design implementation. The design had to be original and simple with easy navigation for its users. Flashy animated GIFs or non-related pictures will not be tolerated. The contents of the webpage should have adequate study material from the Electrical Plant course module. They should be arranged accordingly into chapters.

Dreamweaver was not only used for the design and layout of the webpage. Macromedia Dreamweaver also supports and implements a range of interactive programming and features, such as the Macromedia Flash. As this project was an online tutorial, in addition to the static diagrams, interactive features such as animated graphics, short practice exercises and interactive quizzes were added at the end of each chapter. These practice exercises and quizzes had questions based on the chapter materials. It will consist of questions ranging from multiple choices to short answer and even drag-and-drop objects. This was the part whereby the Macromedia Flash was implemented. In addition to these interactive quizzes, some graphical simulation images also using the Macromedia Flash will be added.

1.4 Dissertation Outline

This dissertation is divided into an assortment of chapters that describe the different parts of the project. To better facilitate the reader, this section provides a brief description on what each chapter covers.

Chapter 2: Webpage Concepts covers the different aspects of a webpage. This chapter basically gives the background literature of the scripting languages and the web tools used in this project. This chapter will go into details of each of webpage coding language and the multimedia software used for the graphics and interactive quiz. It

will help to provide a sense of understanding the importance of these scripting languages and webpage tools and why they should be chosen for this project.

Chapter 3: Methodology will mainly explore the research work involved and the planning of the webpage layout. This is an important chapter as it covers all the project specifications and requirements. There will be detailed explanations of the planning and designing of the layout and what were the features that were considered and those that compulsorily needed to be implemented into the webpage to satisfy the criteria of it being a learning tool.

Chapter 4: Design Construction and Implementation will take the reader into a step-by-step procedure in the construction of each aspects of the webpage. From the webpage layout to the practice exercises and online quizzes, the reader will be able to understand how each feature was constructed and inserted into the final webpage design. The programming coding, as well as the different interactive options that were tried and tested, will be discussed. The reasons why the final templates were chosen will also be explained.

Chapter 5: Testing and Problem Solving is a short chapter whereby it contains the detailing of all the testing and problem solving involved during the completion of the project. It will mainly discuss the different templates and layout used and the problems encountered in the process of completing the graphics and interactive quiz. It also shows screenshots of the resultant webpages that wee developed.

Chapter 6: Future Work discusses whether the requirements have been satisfied. This chapter basically gives the reader some ideas of the next steps for this project. These are the specifications that could have been helpful had they been added to this project. One such specification would be the usage of PHP programming language. A database type of online quiz using this programming language will require a longer duration of time and thus it will be included in the “Future Work” section.

Chapter 7: Conclusion is the final chapter, basically summarizing the points in the earlier chapters and whether the requirements have been satisfied. This chapter will discusses the reasoning behind the author's decision to undertake this project and what his personal achievement in completing the objectives of this project.

Chapter 2

Webpage Concepts

2.1 HyperText Markup Language (HTML)

HTML is the basic scripting language used by most web developers. Even with the emergence of other dynamic languages such as ASP and PHP, HTML still proves to be most commonly used web programming language. HTML is a document-layout and hyperlink-specification language. It defines the placement of special, embedded instructions that are not displayed by the browser. What it does is, it displays the contents of the document, such as text, images and other support media. The language enables a document to be interactive through special hyperlinks, be it linked through texts or images, which connect the document with other documents or with other Internet resources.

Being able to read and write HTML coding is an important criterion for a web designer. Even with advance software such as the Macromedia Dreamweaver, where code writing is not necessary, it is still helpful for the designer to know some basic HTML coding. Understanding the HTML codes can be the difference between a good and a great webpage layout. The HTML code usually has an open and close tag brackets. The tags always start with a "< >" and closes with a "< / >". In a HTML document, it usually comprises of four main code tags which are the <html>, <title>, <head> and <body> tags. A HTML document would not work properly if either one of these tags is missing. The display titles, attributes and contents of the document are embedded within the boundaries of these tags.

Browser developers rely upon the HTML standard to program the software that formats and displays common HTML documents. Authors use these standards to make sure they are writing effective and correct HTML documents. The HTML

standard and all other Web-related standards are developed under the authority of the World Wide Web Consortium (W3C). Standards, specifications and drafts of new proposals can be found at *http://www.w3.org/*.

2.2 Macromedia Dreamweaver

Dreamweaver MX does a lot more than just help you create HTML pages, it's a full featured rapid application development tool for web developers, and it can substantially reduce the time spend writing codes. Macromedia Dreamweaver is a professional editing program for designing, coding and developing static pages and dynamic web applications. It enhances web experience and provides easy interaction with the user. The visual editing features in Dreamweaver let you quickly create pages without writing a line of code. You can view all your site elements or assets and drag them from an easy-to-use panel directly into a document. You can streamline your development workflow by creating and editing images in Macromedia Fireworks or another graphics application using Macromedia Flash, then importing them directly into Dreamweaver. Among its many distinctions, Dreamweaver was the first web authoring tool capable of addressing multiple server models, making it equally easy for developers of ASP, PHP, ColdFusion or JavaServer Pages to use.

Dreamweaver MX has re-invented itself with a new user interface and a broader focus, in addition to creating straight HTML pages, Dreamweaver is also suitable for coding a wide range of web formats including JavaScript, XML, and ActionScript to name a few. Dreamweaver is truly a tool designed by web developers for web developers. Designed from down up to work the way professional web designers do, Dreamweaver speeds site construction and streamlines site maintenance. Dreamweaver blends traditional HTML and other web languages with cutting-edge server-side techniques.

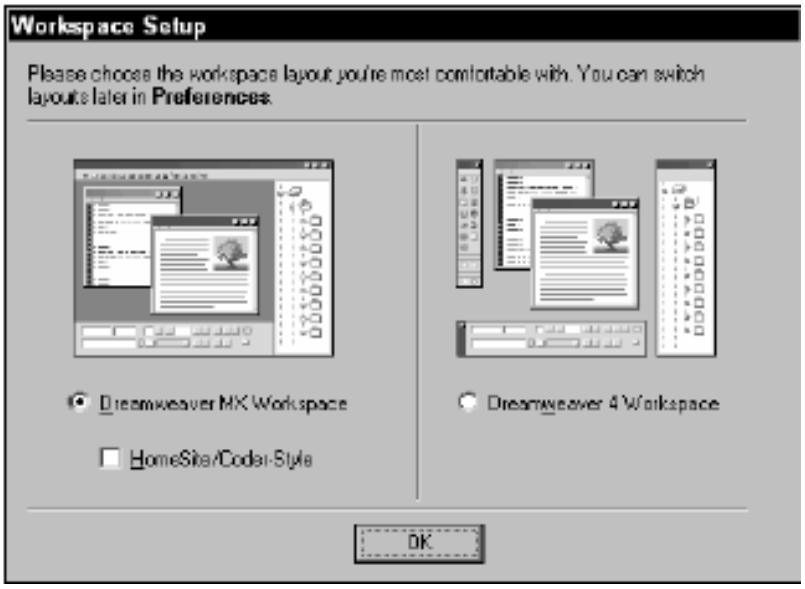


Figure 2.1: Dreamweaver workspace layout.

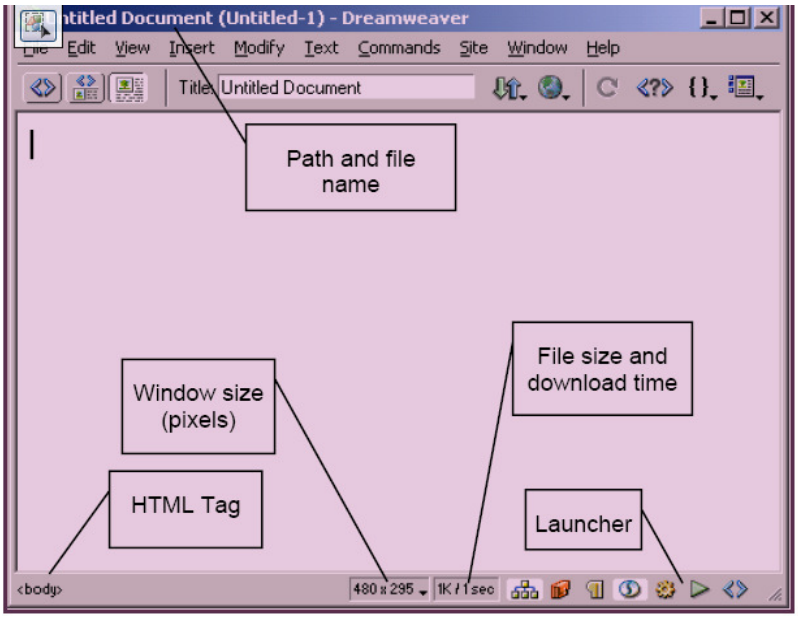


Figure 2.2: Basic Dreamweaver work area.

Dreamweaver is a program very much rooted in the real world. Dreamweaver recognizes the real-world problem of incompatible browser commands and addresses the problem by producing code that is compatible across browsers. Building any website, whether static or dynamic, is half craft and half art, and Dreamweaver is the perfect tool for blending these often dueling disciplines. Dreamweaver's visual editor enables quick and artful page creation, and at the same time, its integrated editors offer the detail-oriented focus required by programmers. Dreamweaver's key features include the following:

- Dreamweaver works the way professional web developers do, with integrated visual and text editors. Dreamweaver won't convert your code when it's used with pre-existing web pages.
- It supports HTML standard commands with easy entry and editing of text, graphics, tables, and multimedia elements. Dreamweaver provides straightforward yet robust connectivity to data sources and access to the most popular server models.
- It makes cutting-edge features, such as Dynamic HTML and Cascading Style Sheets, easy to use.
- A super-charged editor features advanced options like code completion and Code Hints.
- With Dreamweaver's Live Data view, you can construct your page while viewing the actual data to be displayed in the online application.
- Dreamweaver offers you a variety of reusable server behaviors, JavaScript behaviors, object libraries, commands, Application objects, and templates to streamline your Webpage creation.
- Enhanced templates are possible with optional and conditional regions.
- Dreamweaver's wide range of site management tools includes FTP publishing, with a file-locking capability that encourages team creation and maintenance, as well as a built-in Link Checker, cloaking capabilities and visual Site Map.

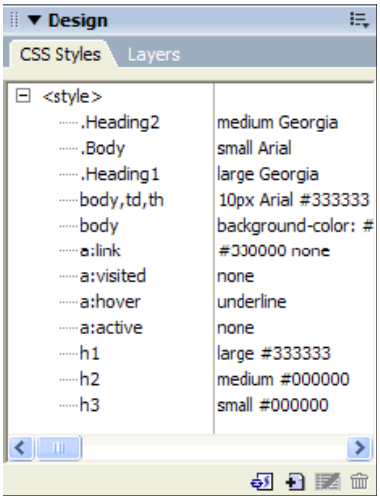


Figure 2.3: CSS Style Sheet.

David Deming wrote in his book, Dreamweaver MX Bible, "Macromedia has dutifully updated the world's leading Web development environment annually since the original Dreamweaver 1 release in December, 1997. It was getting to the point where you could plan family events around it". With the evolution of Dreamweaver, the nature and scope of Web development changed. It was reported that the likes of IBM and Cisco were suddenly laying people off and web-related projects were put on hold as if the Web was put on standby. The cyber world began to question the hype that had been generated the last couple years. The Dreamweaver team was putting out a new updated version each year and soon the people were getting skeptical over these so-called "updated version". The next version of Dreamweaver couldn't be about just incremental improvements and new features. It had to fundamentally change, just as the Web development landscape had fundamentally changed. The Web was here to stay, but there was no doubt that things were different; and with change comes opportunity.

With ColdFusion as part of the Dreamweaver's sidekick, the power of Web application development was presented to every static HTML designer out there. With the settling of standards, web developers could create next-generation sites using CSS2, XML, and XHTML to allow them to be maintained and expanded for years to

come. Dreamweaver MX stands at the center of a complex series of overlapping worlds. Dreamweaver MX is the one program robust enough for them all. Webpage design is a blend of art and craft; whether you're a deadline-driven professional or a vision-filled amateur, you'll find that the Dreamweaver underpinnings of this tool provide an intuitive way to make your Web visions a reality. Dreamweaver implies development, and Dreamweaver MX excels at producing multifaceted Web pages that bring content locked in a data store to the surface. From quick design prototyping to ongoing Web site management, Dreamweaver automates and simplifies much of a Webmaster's workload.

Dreamweaver is not only the first web authoring tool to bring the ease of visual editing to an HTML code-oriented world, it also brings a point-and-click interface to complex coding whether server-side or client-side. With the advent of Web services, the opportunity to let developers add sophisticated functionality to their sites without learning Java or C was there for the taking. And with the convergence of the web development workforce, the potential was there to produce a single tool that all members of a web development team could use to get their jobs done, whether it was visually oriented, code-centric or some combination thereof. With a product as different and new as Dreamweaver MX, it's not sure which is more difficult, building an application or describing it. Either way, the most significant release of Dreamweaver is there to solve real-world development problems.

2.3 Macromedia Flash

As a vector-based animation and authoring application, Macromedia Flash is ideal for creating high-impact, low-bandwidth websites incorporating animation, text, video, and sound. With robust support for complex interactivity and server-side communication, Flash is increasingly the solution for developing Internet applications as well. From designer to programmer, Flash has become the tool of choice for delivering dynamic content across various browsers and platforms. As the popularity of Flash increases, so does the demand for animators and developers who know how to tap its power. Flash makes it much easier to build complex animations, integrate

sophisticated interfaces and navigation schemes, and dynamically control graphics, video, sound, and text. It's not an exaggeration to say that Flash is revolutionizing the Web.

The Macromedia Flash helps the user to create interactive online instructional courses that can be run and embedded into an existing webpage document. There are many benefits of using the Flash extensions. Anyone with a Flash-enabled Web browser can design and customize their own interface to meet their needs. Because you are using Flash, you can create high-quality interfaces that load quickly and look the same on different platforms. Content developers can easily add interactive graphics to their online courses via the Flash learning interaction Smart Clips, which provide a simple interface for entering data, without writing code. The Flash learning interactions let the user send tracking information to a server side learning management system. Additionally, the sample template files give the user an idea of how each interactive example work by showing a frame by frame explanation. This helps the user in developing a more complete and interesting interactive graphical contents.

2.4 Dynamic Web Data

By the time an active webpage is seen in a visitor's browser, the data should blend seamlessly into the rest of the page. Like a well-crafted form letter, the reader shouldn't be able to tell where the basic structure starts and the dynamically generated data begin. Much of the work done consists of properly placing and formatting the data into a page layout. Its not just limited to dynamically integrating basic text into web applications such as Dreamweaver. After text is included, the user can format its look and feel on both the client and the server sides. Additionally, the user can include images, form elements like checkboxes and drop-down lists and even multimedia such as Flash movies. Just as text and images may be inserted into webpage document, all manner of multimedia including Flash and files requiring ActiveX controls or applets may also be dynamically incorporated. The core technique of attaching a data source is the same for multimedia files as it is for images; when the user inserts a

multimedia object, the desired data is chosen from the source dialog box. The linking code will automatically be written into the proper parameter for the object.

Incorporating dynamic data into your standard webpages is a core technology for data driven web applications, along with establishing a data source connection and defining a recordset. After having these three components in place, the user can begin combining HTML pages with text, images and even multimedia data. Software such as Macromedia Dreamweaver combines sophisticated connectivity with drag-and-drop simplicity for quick insertion of dynamic content. To integrate data-driven and static content:

- The Bindings panel displays fields available for inserting into a web document, much like the Assets panel, which shows available images and other elements. Like the Assets panel, data is inserted from the Bindings panel through a drag-and-drop procedure. For complex layouts, you can position your cursor precisely and choose the Insert button instead of dragging-and-dropping the dynamic fields.

- Dynamic text accepts two types of formatting: client-side and server-side. Client-side formatting is another term for standard HTML and CSS formatting; dynamic text may be styled with the same tags and attributes as regular text. The final look for these tags and attributes is interpreted by the browser. Server-side formatting, on the other hand, reshapes the data from the data source before it passes it on to the browser.

- If you encounter trouble inserting dynamic images into your web applications, its probably because the error may lie in the database setup. It's key to store the path and/or filename of the images in the data source as a text field rather than as a hyperlink.

- Flash movies, in fact any multimedia file, may be dynamically inserted into a Dreamweaver page. Again, storing just the filename or, at most, the filename and path in the database field is the best approach.

2.5 Chapter Summary

This chapter had provided an overview of the basic languages and software tools that are involved in a webpage design and implementation. The four main and basic elements in a webpage application were discussed. HTML coding was analysed as the most common and basic language for a webpage document. It was essential to know a bit of history of HTML as it was the first language to be introduced, and is still popularly used, for all webpage developers. The background of important web application software, the Macromedia Dreamweaver, and interactive dynamic tool software, the Macromedia Flash, both of which were used in this research project were also discussed. Implementation of dynamic data was an important feature of this project and thus a brief overview of the process was also discussed in this chapter.

Chapter 3

Methodology

3.1 Methodology Overview

There were many aspects that needed to be considered and a set of guidelines that had to be drawn up in order to effectively manage the project in the duration of time given. Research on the background of the programming languages to be used and website construction were also methodically done to minimize the errors in the later stages. Resources had to be carefully selected to ensure there are sufficient to comply with the requirements for an online tutoring tool. As Electrical Plant was used as an example for this project, materials from the University of Queensland Electrical Plant ELE3803 study books as well as other resources were used as guides for the content of the webpage tutorial.

Existing websites were reviewed to study the different designs and layouts. This helped in deciding the functions and features that are essential to the final webpage design. After deciding on the features and contents that needed to be implemented, only then can it be decided what were the additional tools and software to be integrated into the Macromedia Dreamweaver to complete the project. Software such as Adobe Photoshop and Macromedia Flash proved useful and will be reported in detail in the Chapter 4 as we discuss the construction and implementation of the graphics, practice exercises and the online quizzes.

After deciding on the features and content of the webpage, a project timeline was done to plan out a schedule for the project tasks. Planning and deduction of the timeline was done so that the project would follow a structure flow and ensure it could be completed by the dateline.

3.2 Dreamweaver Panels

One of the main attractions of Macromedia Dreamweaver was its easy-to-use panels. In addition to the pull-down menus, these panels enable the user to easily insert tools and features into the design. There were a total of thirteen panels, each representing a main tool for webpage designing. Upon selecting each panel, a set of buttons will appear. These buttons represent the options for that particular panel. The thirteen panels were:

- Common

  Gives the option of inserting dynamic tool such as hyperlinks, images, Flash features, rollover images or horizontal line.

Figure 3.1: The 'Common' panel.

- Layout

  Gives the option of having a 'Standard View' or a 'Layout View'.

Figure 3.2: The 'Layout' panel.

- Text

  Gives the option of changing the characteristics of the fonts (bold, italics, etc).

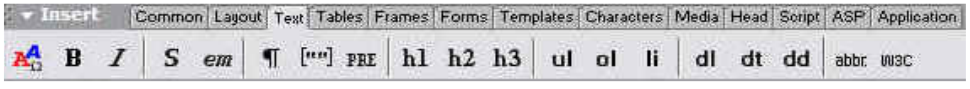


Figure 3.3: The 'Text' panel.

- Tables

  Gives the option of inserting tables into the design.

Figure 3.4: The 'Tables' panel.

- Frames

  Gives a variety of combination of nested frames.

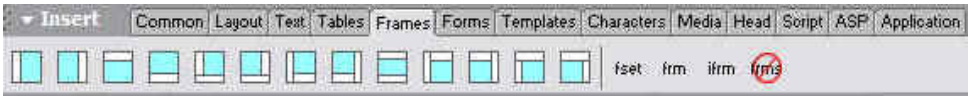


Figure 3.5: The 'Frames' panel.

- Forms

  Gives the different types of forms attributes such as textbox, checkbox, radio button and menu list.

Figure 3.6: The 'Forms' panel.

- Templates

  Gives the option of inserting pre-designed templates that includes frames and tables.

Figure 3.7: The 'Templates' panel.

- Characters

  Shows the different types of symbols commonly used such as the "€" sign and the copyright trademark.

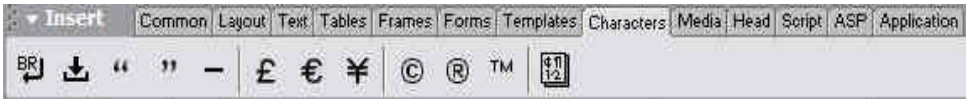


Figure 3.8: The 'Characters' panel.

- Media

  Gives the option of inserting multimedia features such as flash movies or dynamic applet.

Figure 3.9: The 'Media' panel.

- Head

  Provides comment lines for the coding window.

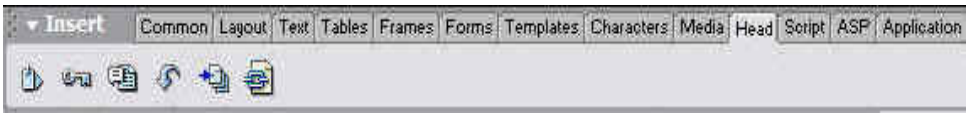


Figure 3.10: The 'Head' panel.

- Script

  Enables the addition of dynamic scripts such as the CSS styling or basic action scripts.

Figure 3.11: The 'Script' panel.

- ASP

  Provides the option of inserting ASP programming codes into the design. ASP programming is a type of database programming that was not covered in this project.

Figure 3.12: The 'ASP' panel.

- Application

  Provides dynamic tools such as the rollover buttons and dynamic text.

Figure 3.13: The 'Application' panel.

3.3 Design

The design of the webpage was an important part of this project. The reason being was that the design represented the whole image of the online tutorial. It had to standout enough to attract the students' attention but yet not too flashy to cause too much distractions. Yes, it has to be interesting and refreshing, but primarily it was a learning tool. As a webpage designer, one has to consider a list of parameters. The designer has to decide what type of layout and colours are appropriate for the webpage. What a person wears to work may differ from his home clothes; such is also the case for webpage designs. A personal webpage cannot be compared to that of a webpage for a professional company. A personal webpage may have a variety of colours, photos and even media tools such as background music. But it will look very unprofessional for a company webpage to have animated cartoon graphics or some music playing in the background.

3.4 Layout

The next logical steps would be to list the parameters of the design. And in any webpage design, the layout always comes first. Layout of a webpage design basically covers the background, colours, fonts, templates, links, navigation and any additional dynamic tools needed. For this project, the author had to find a design that balances professional and fun. Thus the author had come out with a checklist to assist him in the designing process:

- The colour of the background
- The type of fonts
- The colour of the fonts
- What type of nested frames should be implemented
- If tables were required
- Navigation tools
- Hyperlinks
- The order of the contents

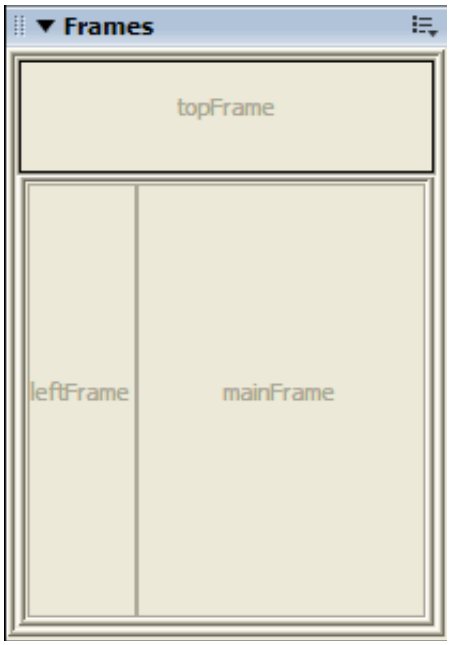


Figure 3.14: Nested frames.

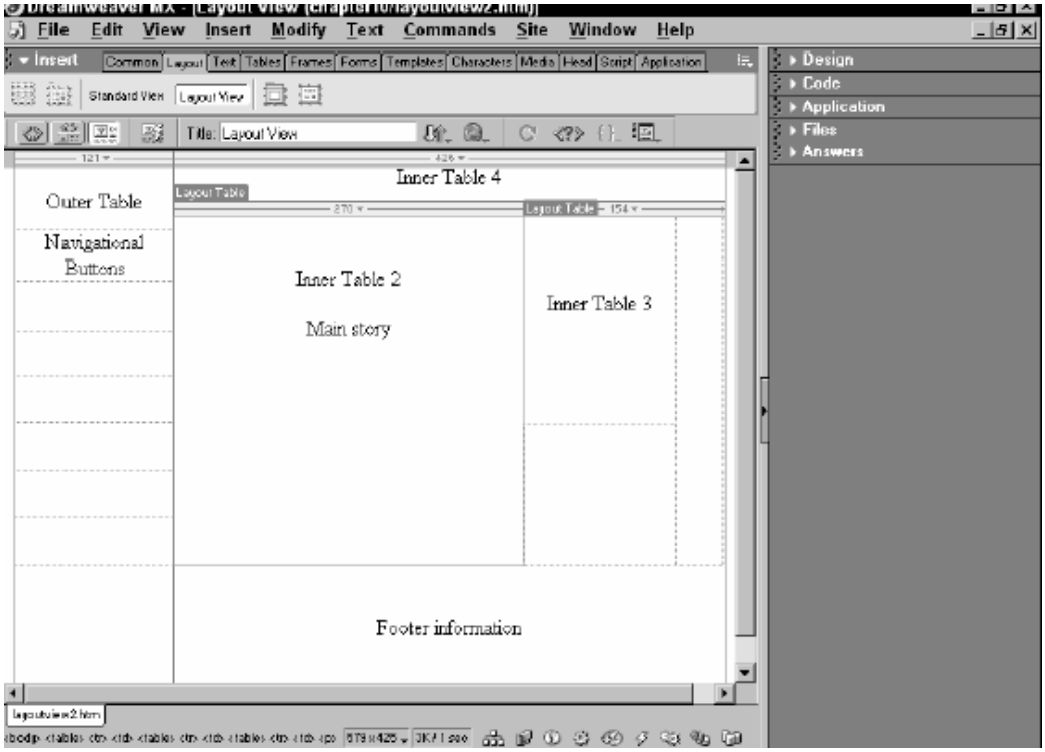


Figure 3.15: Nested layout of frames & tables.

3.5 Content

The amount of content in the webpage was critical as it had to meet the criterion of an online tutorial and should provide a reasonable amount of materials on the topics. It also had to satisfy the requirements set in the specifications in Chapter 1.3 on page 2 earlier. The interactivity level in the webpage was adequate and thus helped to enhance the users' understanding during the learning process. The presentation of the information had to be simple and concise with appropriate illustrations where necessary.

3.5.1 Selection of Electrical Plant topics

Electrical Plant was the subject chosen as an example for this particular project. Besides the design layout, the webpage must be equipped with good topics

arrangement. Two textbooks have influenced the choice of materials and contents for this project.

The first was University of Queensland very own study books, written by Ron Sharma. The chapters were arranged in sequence, starting from the basic fundamentals to the more complex topics. This enabled the students to build up their foundations solidly before moving on to the more difficult concepts. The books also contain numerous diagrams and illustrations, making it easier for the students to visualize the concept behind the theory. The important points of each chapter were boxed up and there were a lot of practice examples for the students to try and practice. Basically the materials were clearly detailed and simple to understand. The contents in the study books were similar to what the author had in mind for the online tutorial. Thus getting the materials from the study books was essential.

The second reference textbook used was "Electrical Machines, Drives and Power Systems" by Theodore Wildi. It provided a wider range of topics in greater detail.
In general, the contents in the textbook were quite complex and very technical in nature. However, due to its in-depth contents, it also provided a lot more work examples and static diagrams. At the end of each chapter, there were also quite a few practice exercises, ranging from the simple ones to the more complex ones. These practice exercises proved valuable for the short exercises and online quiz of the project.

The bulk of the content in the project were mainly obtained from the above mentioned reference textbooks. But in addition to these two textbooks, materials found in the internet were also consolidated and used where applicable. Both the text and online resources can be found in the References section. As most textbooks start off with an introduction to the topic, the author decided to use the same concept for this online tutorial. The idea was to start off with the basic chapters, and then the more complex ones would be added if time permits. The online materials were basically to assist students revise or refresh their knowledge of the courses. Therefore, only the main important points were taken and with the necessary diagrams added. Its aim was to

make the materials concise and complete with enough interactive exercises for the students to revise and practice what they have learned for that course subject. Thus the first three chapters' materials of Electrical Plant, in accordance to the ones found in the University of Queensland study books, were inserted into the webpage. The first three chapters were;

Chapter 1: Three Phase Analysis

This first introductory chapter basically covered the three phase concept. It studies the three phase line and phase voltages and currents for both star and delta systems. It also teaches how to convert a star connection to a delta connection and vice versa. Three phase power systems and loads were also discussed with phasor diagrams to explain the system.

Chapter 2: Transformers

This chapter discussed the equivalent circuit of a transformer, how to determine the efficiency and voltage regulation of transformers and calculations involving parallel transformers. Protection and maintenance techniques for the transformers were also covered.

Chapter 3: Induction Machines

This chapter covered the analysis of the operation of induction machines. The torque-slip characteristics, the dynamics of a flywheel fitted motor and the specifications of induction motors were also explained.

3.5.2 User features

Not everyone is at ease with the internet. Some may use it at their workplace or school only when necessary. With this in mind, the author had to design a webpage that was user friendly and can be easily navigated. The design might have been complex to the author but it had to look simple for the user. It was then decided that nested frames should be used so that both the menu and viewing window could be accommodated. By using the nested frames, instead of the whole window being refreshed every time a

new page was selected, which could be annoying after a while, only the viewing window would refresh when a new page was selected. When a small detail such as this is taken into account, it could prove to be critical for the whole design layout at the end of it all.

As for the navigation, dynamic buttons were placed at the bottom of each page so that users could go through the pages easily. However, the webpage covers three chapters with each chapter having an average of five pages. It would be time consuming if a student wanted to view a certain particular page at the end of the chapter. In doing so, the student would have to go through all the earlier pages in order to reach the desired page. Thus a pull-down menu using a dynamic XML file was added to enable easier navigation.

3.5.3 Animated graphics

One of the researches done by the author before designing the webpage was finding out what features would attract an internet user. The author noticed that people tend to be attracted to moving objects or colourful images. The challenge for the author was to incorporate these aspects into the online tutorial. One way would be to implement animated graphics instead of just static diagrams that were similar to the textbooks. Only the important diagrams for the chapters would be chosen as making animated graphics was a tedious process involving software such as Adobe Photoshop and Macromedia Flash. The details of the process will be discussed in the next chapter, Chapter 4: Design Construction and Implementation.

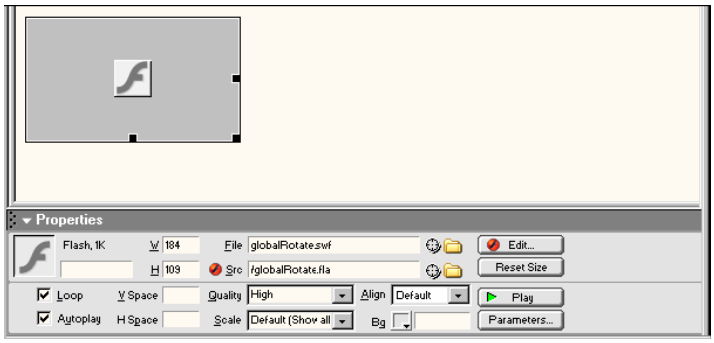


Figure 3.16: Fusing Macromedia Flash into Dreamweaver.

3.5.4 Practice exercises

One of the main requirements for this project was to implement interactive problem solving questions into the webpage. There were two types of interactive tutorials for this project. The first was the interactive practice exercises. There was at least one practice question for each chapter. These practice exercises were basically short technical questions divided into two to three parts. Each part consists of a different type of question ranging from multiple choices, fill in the blanks, true or false to drag and drop. These questions involved calculations and understanding of the concepts related to the chapter topics.

For each part of the short exercise, the user would be given two tries to answer the question. Failing in giving the correct answer the first time round, a hint would be shown once the "check answer" button was pressed. The user could then reset his or her answer and try again. If again the user keyed in a wrong answer after the second try, the word "Incorrect" as well as the right answer would be shown. However if the user types the correct answer in either of the two tries, a simple "Correct" will be flashed.

These short practice exercises were done using the Macromedia Flash templates. These templates provided the author with the option of six types of questions.

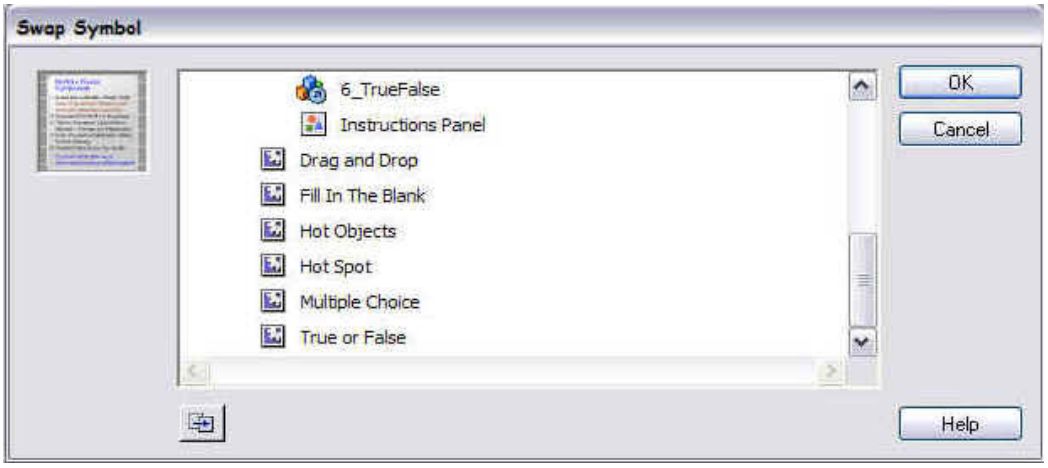


Figure 3.17: Display window for the six template options.

Using the “True or False” template in figure 3.18 on page 25 as an example, it shows that each template appeared as one piece. All the components were clumped as a whole, highlighted by the blue outline.

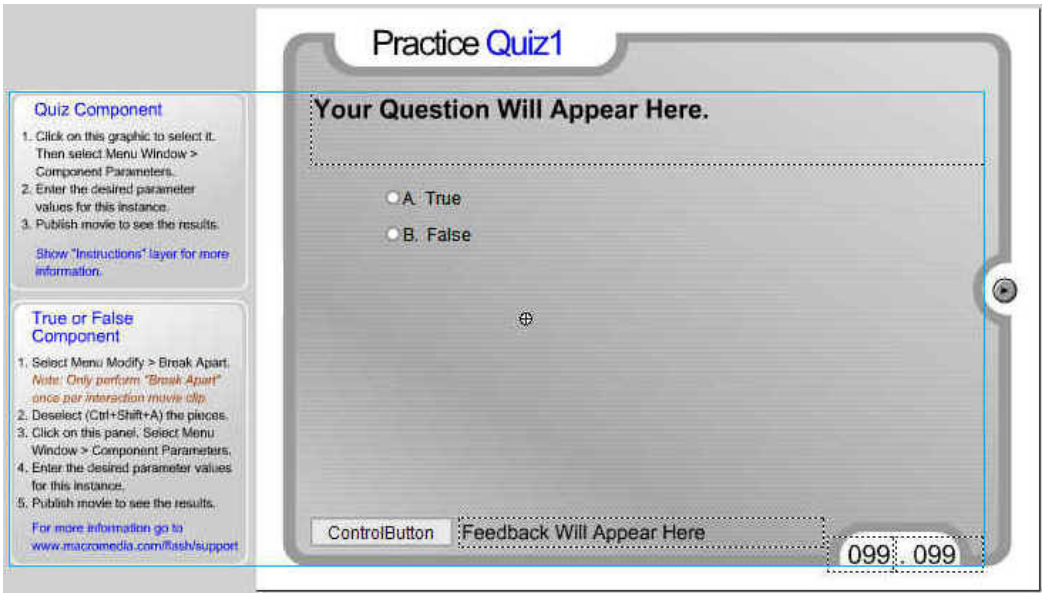


Figure 3.18: “True or False” template.

By selecting the “Break Apart” option from “Modify” pull down menu, the author was able to separate the different components individually.

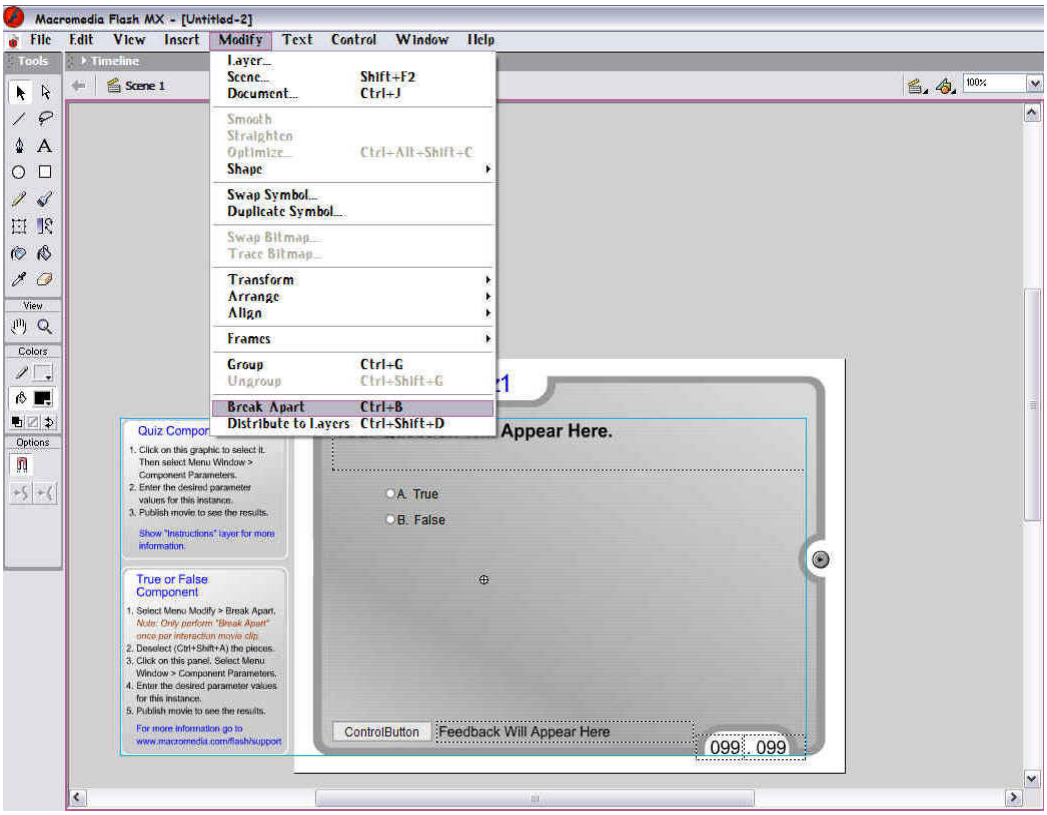


Figure 3.19: “Breaking apart” the individual components of the template.

As can be seen from figure 3.20 on page 27, instead of having all the components boxed up by one blue outline, now each component is highlighted individually. This way, it was easier to change or edit each individual component and set the parameters.

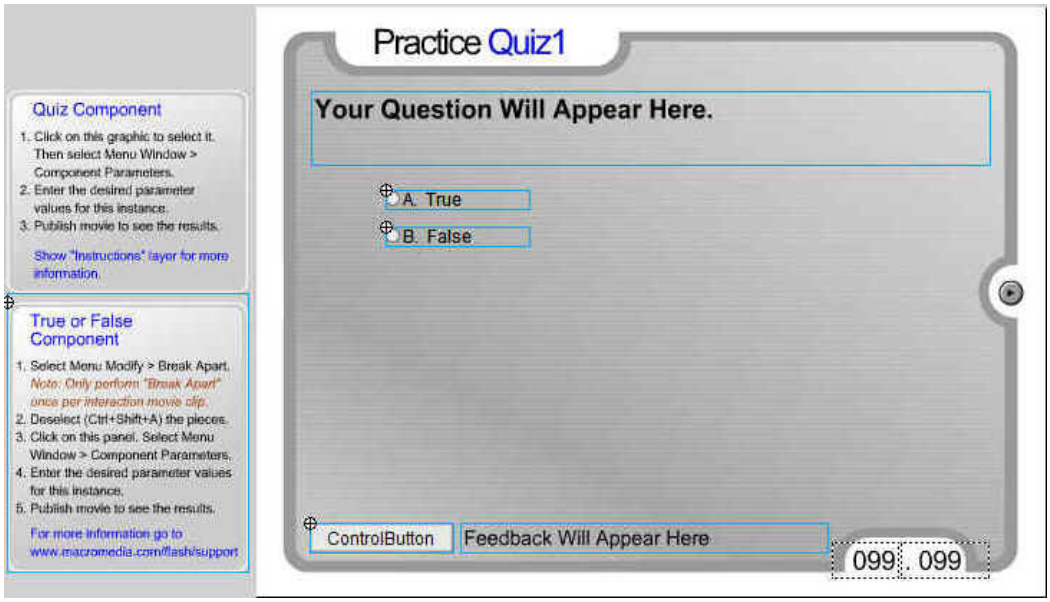


Figure 3.20: Each individual component highlighted.

- True or False

  This was the easiest type of question to set as it basically gave the user only two options. It's the least complicated type of question and did not give the author a variety of options he could set. The author had shown the template for this option previously in figure 3.20 on page 27. Now the author will show the component parameters which was used to set each question. There were two options that needed to be set from the component parameters window. The first one was the "Interaction" window. In this option window, the author recorded the actual question he wanted to display in the "Question" textbox. The author then sets whether true or false was the correct answer by selecting the radio button on the right.

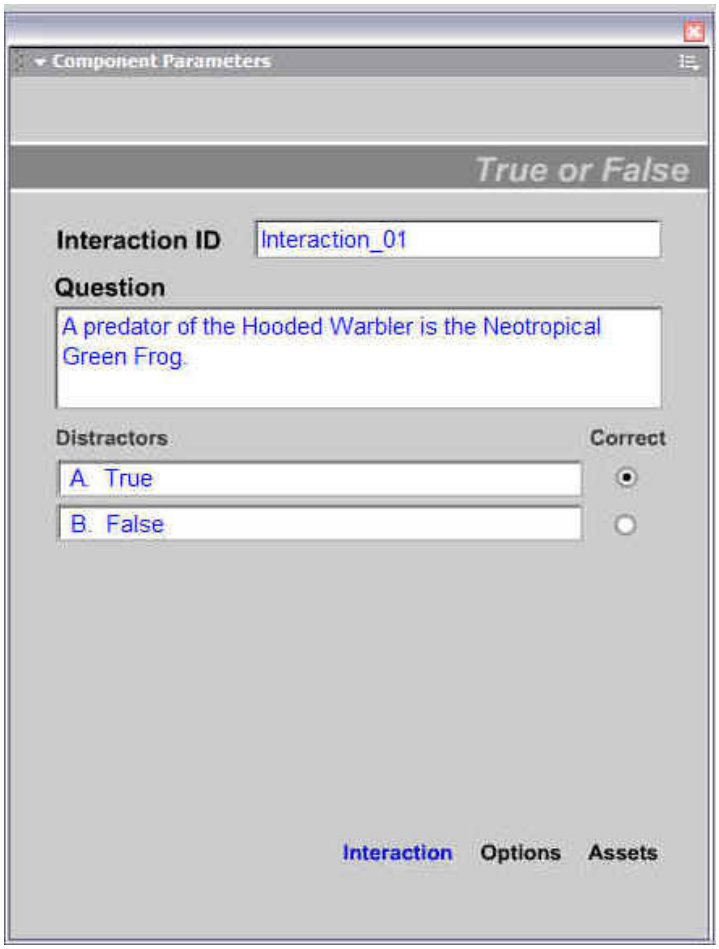


Figure 3.21: Interaction options in the "True or False" component parameters window.

The next set of parameters that needed to be set from the component window was the "Options" setting. Here the author sets the instructions to be displayed to the user in the "Initial Feedback" row space. The "Correct Feedback" and "Incorrect Feedback" row spaces represent the text that would be displayed if the user keyed in a correct or incorrect answer respectively. The "Weightage" row space represents the marks allocated by the author for that particular question and this would be the same for all templates. At the bottom of the window, the author had additional options of setting the navigation or any action scripts if any was needed. These two options setting from the component parameters window would be similar for all the six templates.

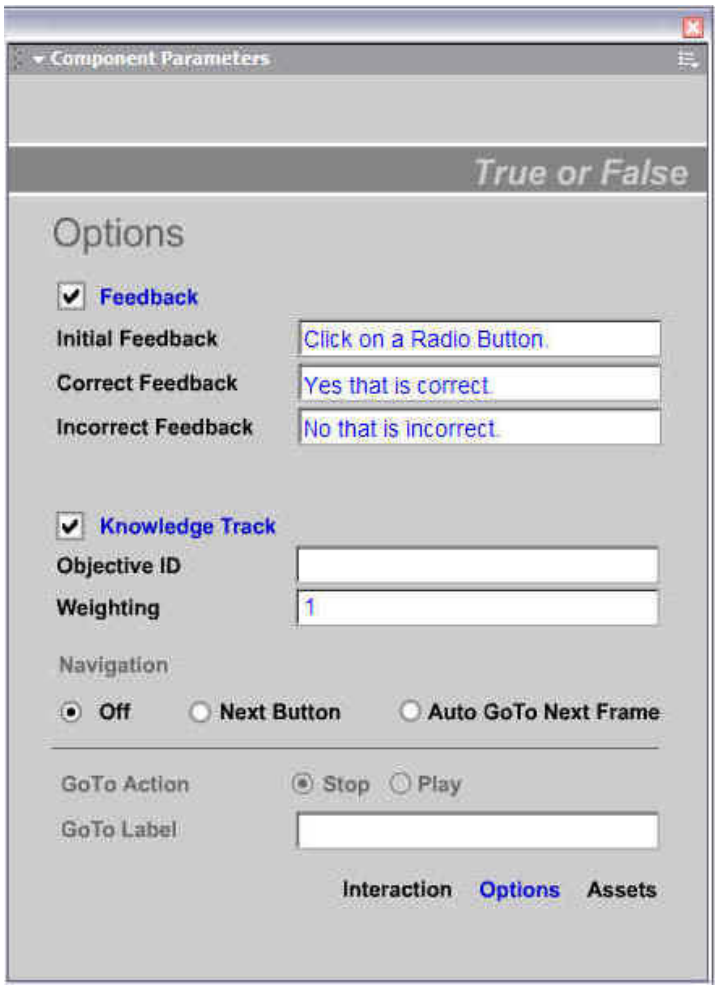


Figure 3.22: Options settings in the "True or False" component parameters window.

- Fill in the blank

  This type of question required the user to type in the answer. The author could set a number of correct words or phrases that would be matched to the answer given by the user. So as long as the user keys in a word or phrase that matches those set by the author, his or her answer would be considered correct. However, the author also had the authority to set his answers to 'exact match' or 'case sensitive'. Exact match meaning that the words or phrases keyed in by the user had to be exactly the same as those set by the author and case sensitive of course meant caps on or off.

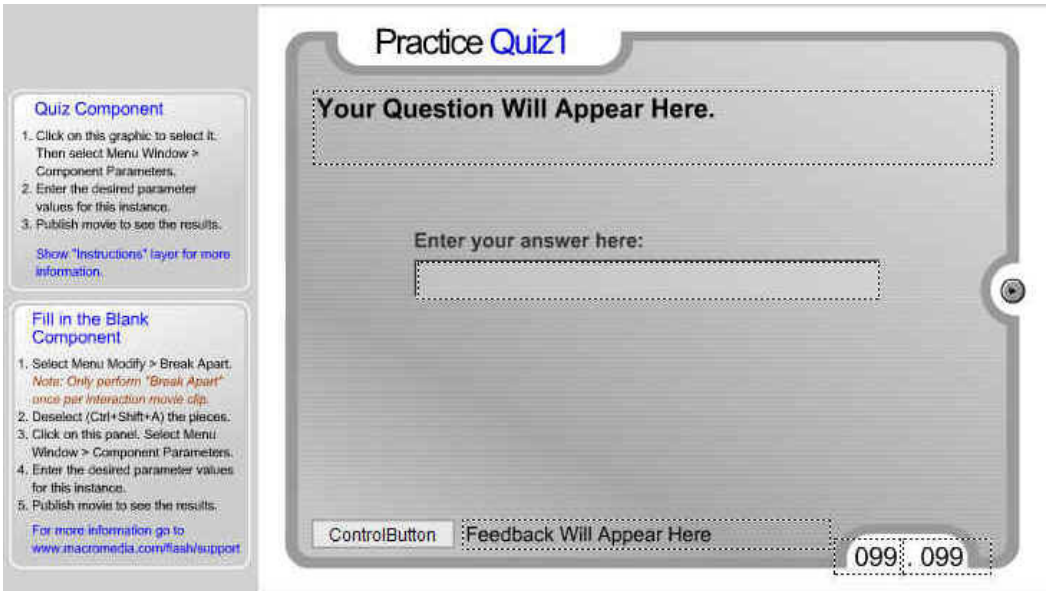


Figure 3.23: "Fill in the Blank" template.

The figure 3.24 on page 31 shows the interaction setting for the “Fill in the Blank” in the component parameters window. The actual question to be displayed would be typed in the “Question” textbox. The “Responses” row spaces are the answers set by the author as the correct and acceptable answers. These answers were then ticked in the checkboxes on the left. The “Case Sensitive” and “Exact Match” options could be selected by ticking the respective checkboxes.

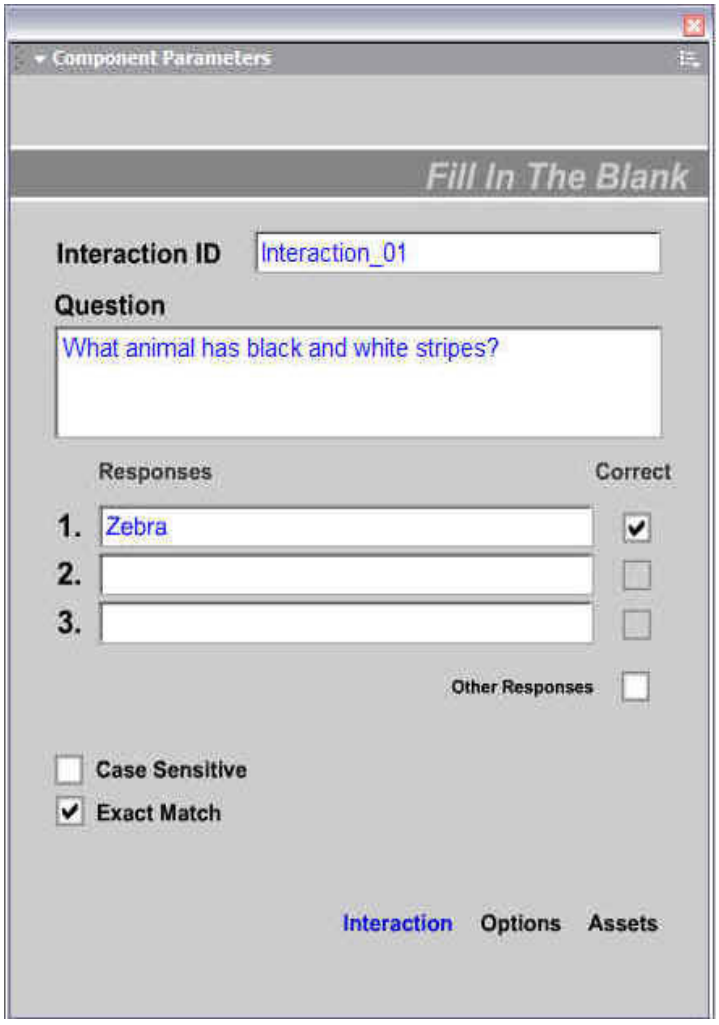


Figure 3.24: Interaction options in the “Fill in the Blank” component parameters window.

The figure 3.25 on page 32 shows the options settings for “Fill in the Blank” template. The “Tries” option sets the number of tries that the author wanted to give the user for that question. This “Tries” setting would be the same for the rest of the templates as would all the other options available as previously explained on page 29. The “Additional Tries” would come into action if the author sets the tries to be more than one.

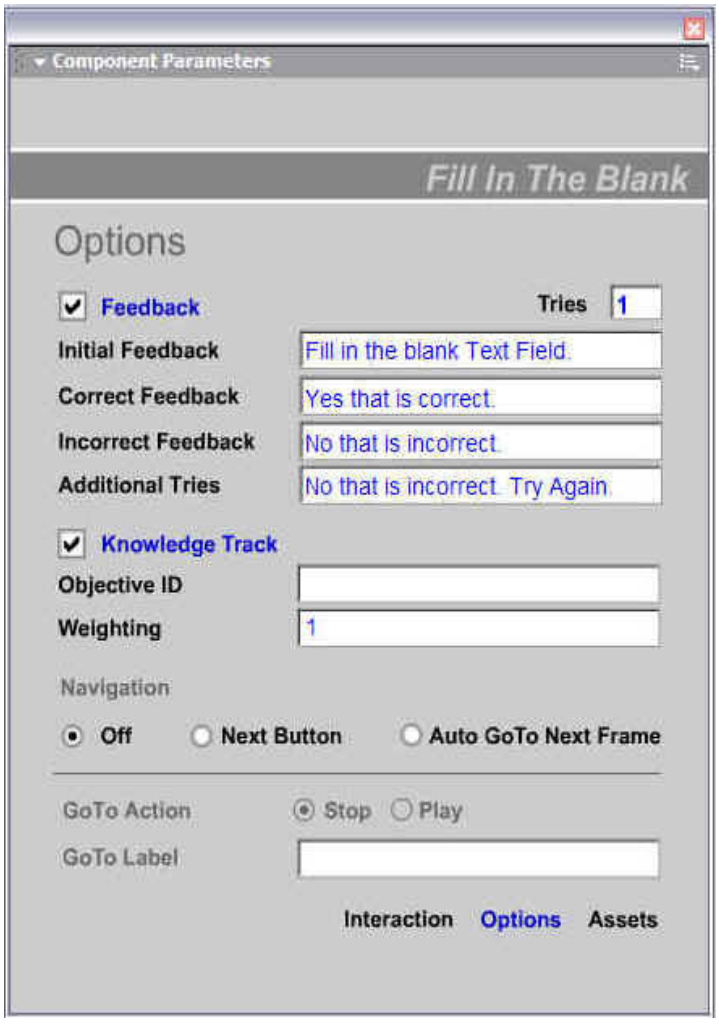


Figure 3.25: Options settings in the “Fill in the Blank” component parameters window.

- Drag and Drop

  Basically the user needs to drag a boxed-up graphic and drag it to the appropriate blank space. The number of graphics and blank spaces could be or not equal. However, the shape and dimensions must be the same as the graphics had to be fitted into the blank spaces.

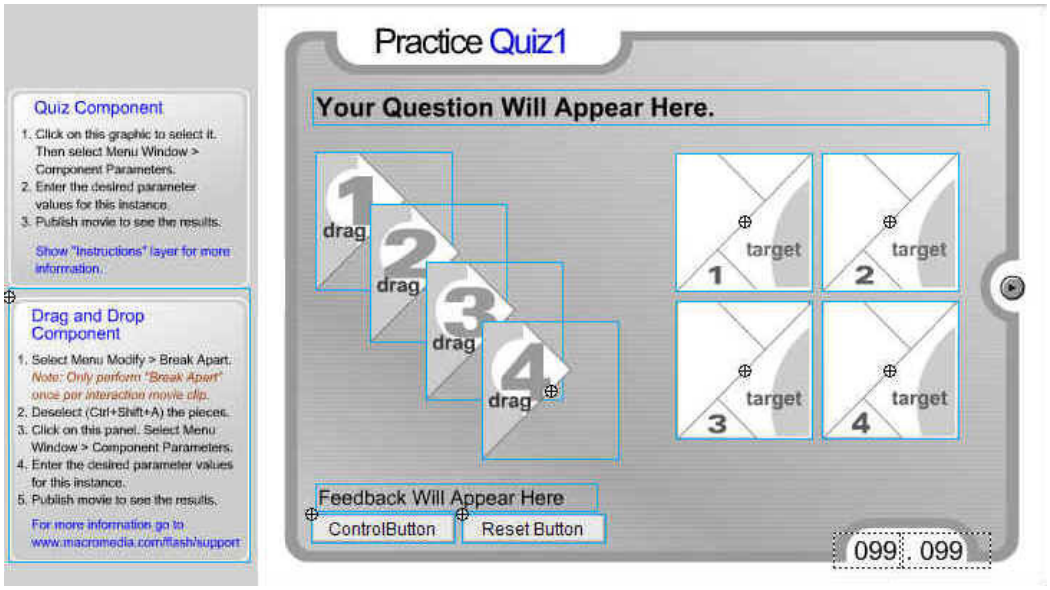


Figure 3.26: "Drag and Drop" template.

The figure 3.27 on page 34 shows the interaction setting for the “Drag and Drop” in the component parameters window. The main difference here was the “Drag Object Name” and the “Matches Target Name” options. Here the author sets how many objects and matching targets he wanted to display and also set the names for them. These objects and targets are the boxes in figure 3.26 on page 33.

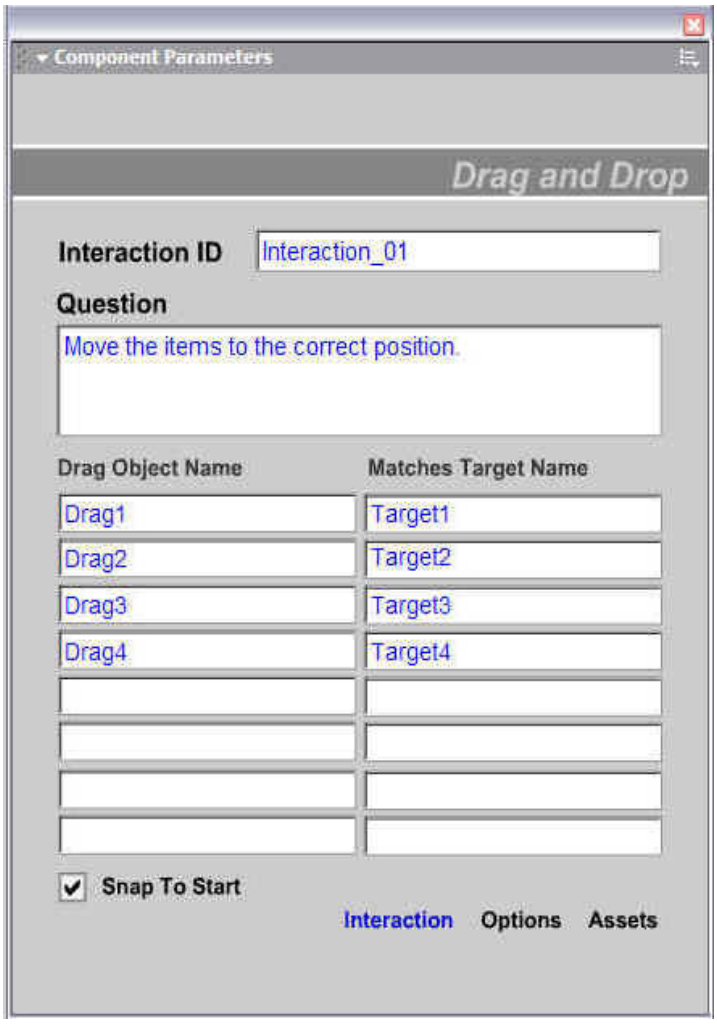


Figure 3.27: Interaction options in the “Drag and Drop” component parameters window.

The figure 3.28 on page 35 shows the options settings for “Drag and Drop” template.

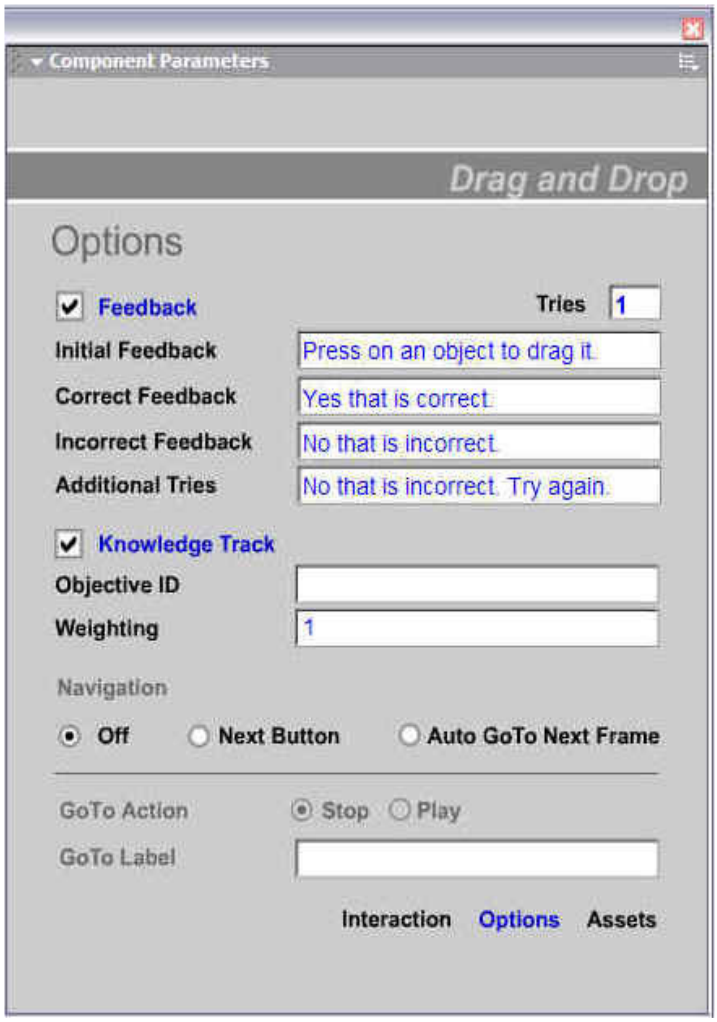


Figure 3.28: Options settings in the “Drag and Drop” component parameters window.

- Hot Objects

  A hot object question consists of a few objects or diagrams, usually between four to six objects. The user would then choose one of these objects as his correct answer.

Figure 3.29: "Hot Objects" template.

The figure 3.30 on page 37 shows the interaction setting for the “Hot Objects” in the component parameters window. The “Hot Object Instance Name” gives the author the option of how many objects or diagrams he wanted to display as options for the user. The author then chooses and sets the correct answer by ticking the checkbox for that particular object name.

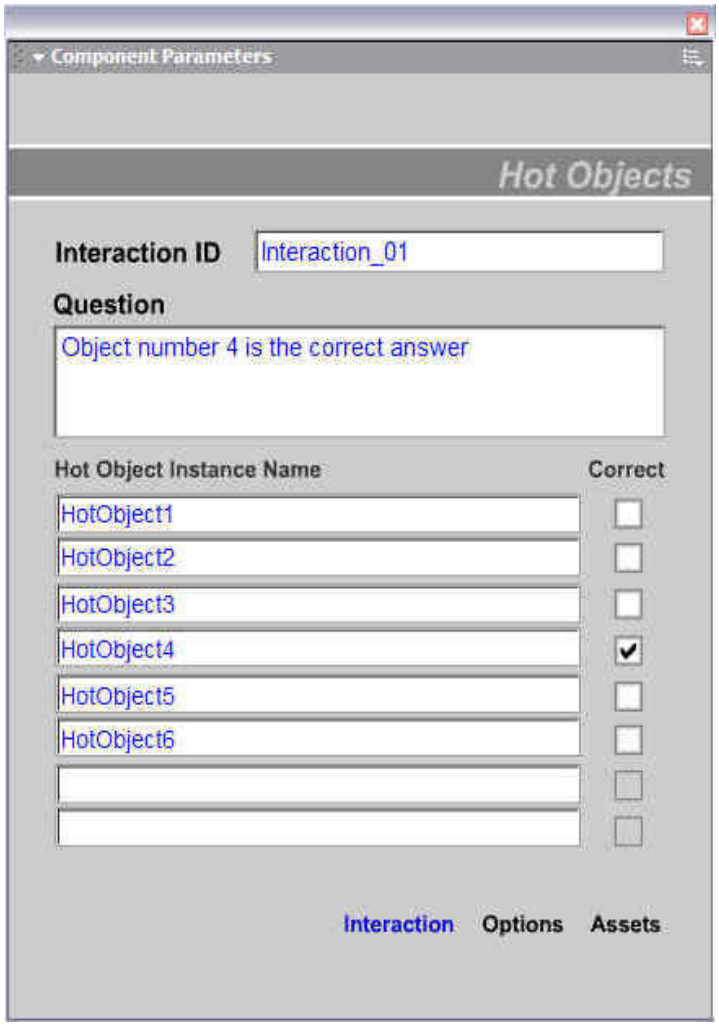


Figure 3.30: Interaction options in the “Hot Objects” component parameters window.

The figure 3.31 on page 38 shows the options settings for “Hot Objects” template.

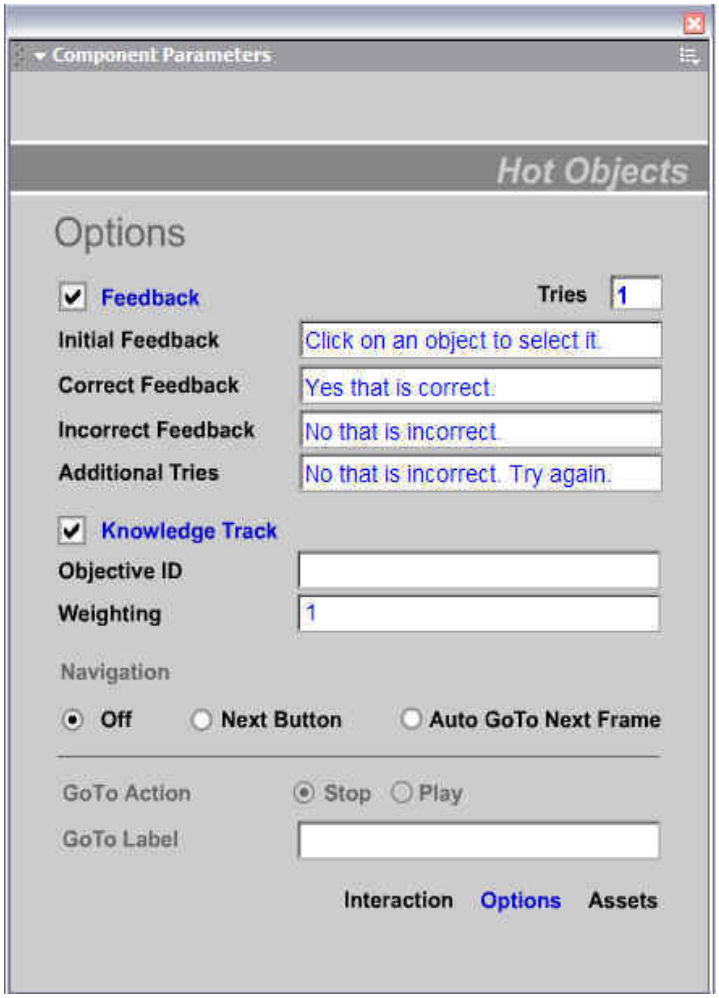


Figure 3.31: Options settings in the “Hot Objects” component parameters window.

- Hot Spot

  A hot spot question is similar to that of the hot object with the exception that it only consists of one diagram or object. This diagram or object is then dissected into different parts. The user would then need to select a part of the diagram or object as his or her answer.

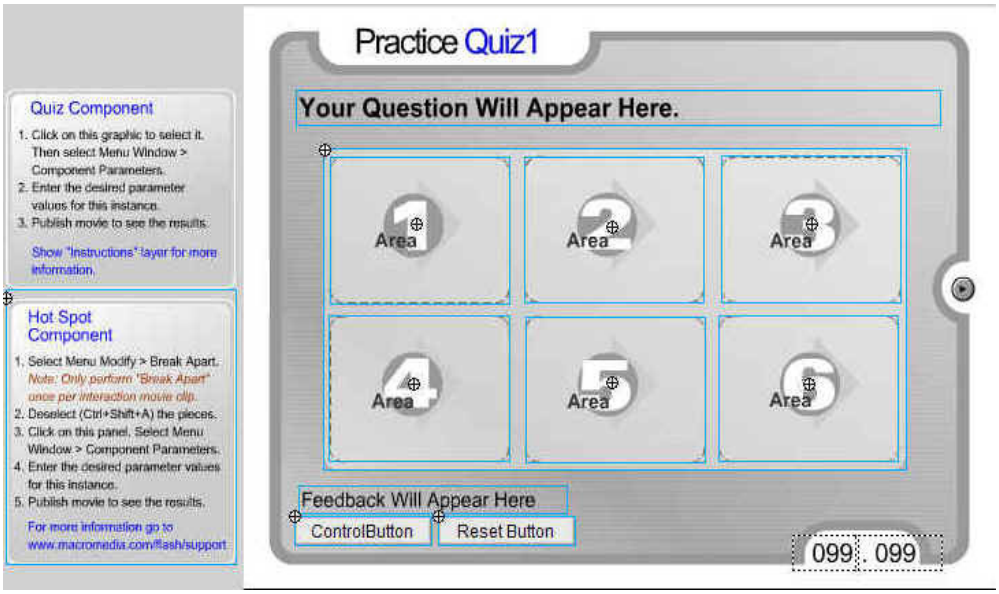


Figure 3.32: "Hot Objects" template.

The figure 3.33 on page 40 shows the interaction setting for the “Hot Spot” in the component parameters window. Here the “Hot Object Instance Name” each represents a part or portion of the object or diagram displayed. The correct part would then be set by ticking the respective checkbox.

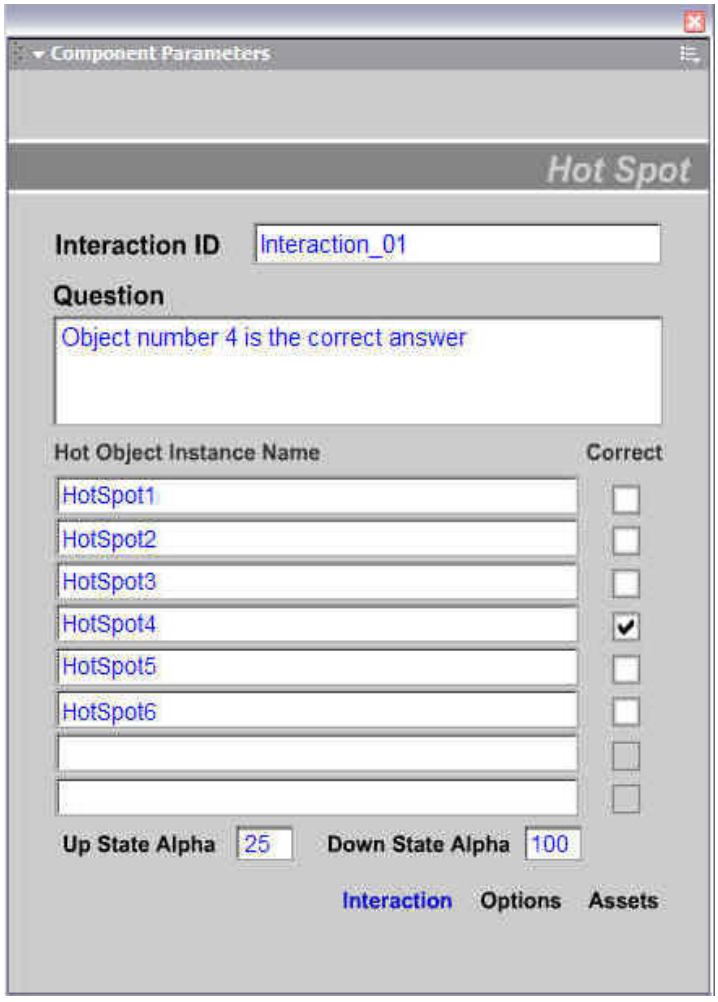


Figure 3.33: Interaction options in the “Hot Spot” component parameters window.

The figure 3.34 on page 41 shows the options settings for “Hot Spot” template.

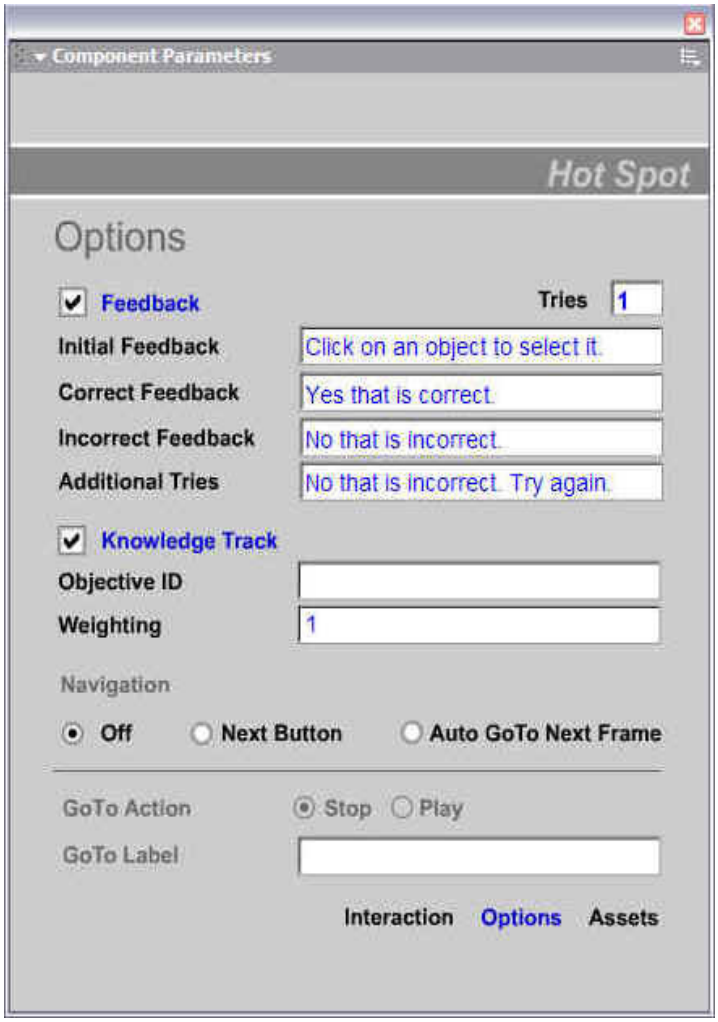


Figure 3.34: Options settings in the “Hot Spot” component parameters window.

- Multiple Choice

  The multiple choice question could be displayed using either checkboxes or radio buttons. The author could set as many options to the user as he desired. In addition to this, the author could also set multiple correct answers instead of just one correct answer. These options were helpful in order to set a variety of multiple choice questions.

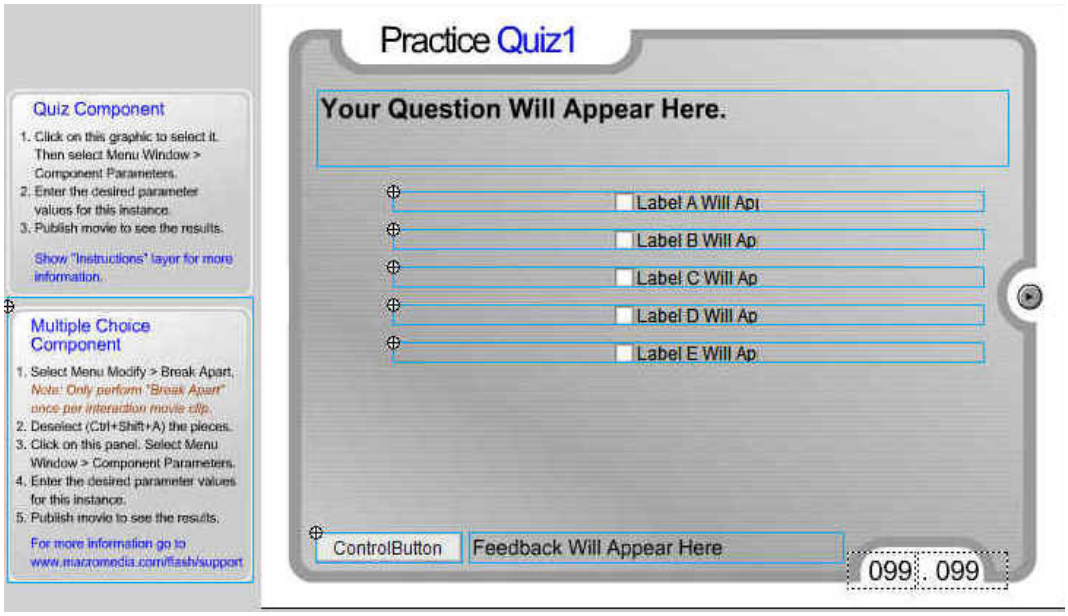


Figure 3.35: “Hot Objects” template.

The figure 3.36 on page 43 shows the interaction setting for the “Multiple Choice” in the component parameters window. The “Instance Name” sets how many options the author wants to give to the user while the “Label Text” sets the display names for the options. The correct answer will then be set by ticking the respective checkbox. The author also had the option of setting more than one correct answer for the multiple choice questions.

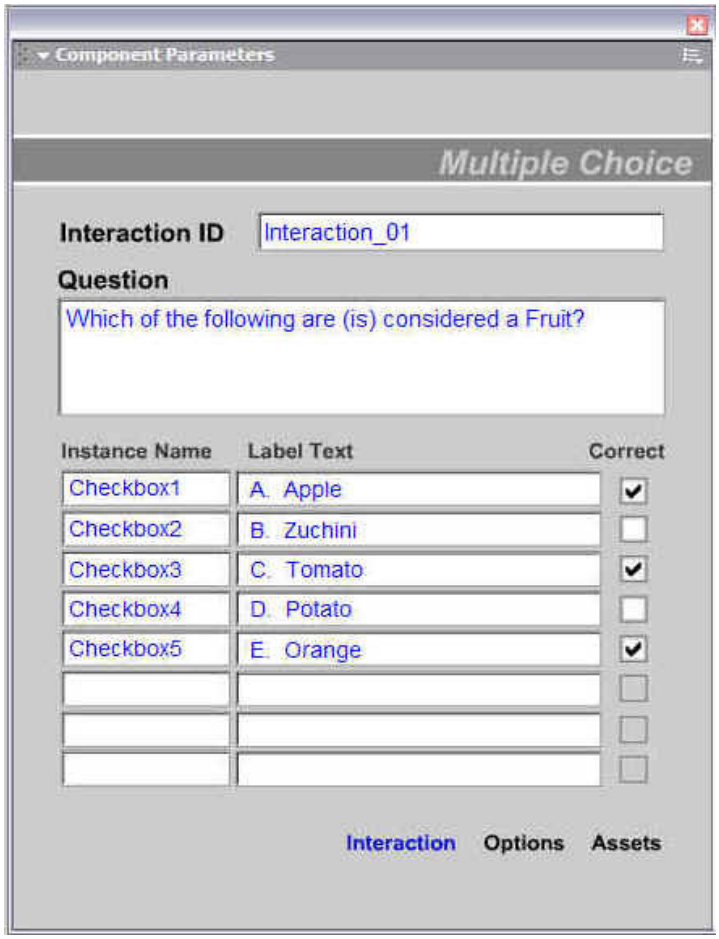


Figure 3.36: Interaction options in the “Multiple Choice” component parameters window.

The figure 3.37 on page 44 shows the options settings for “Multiple Choice” template.

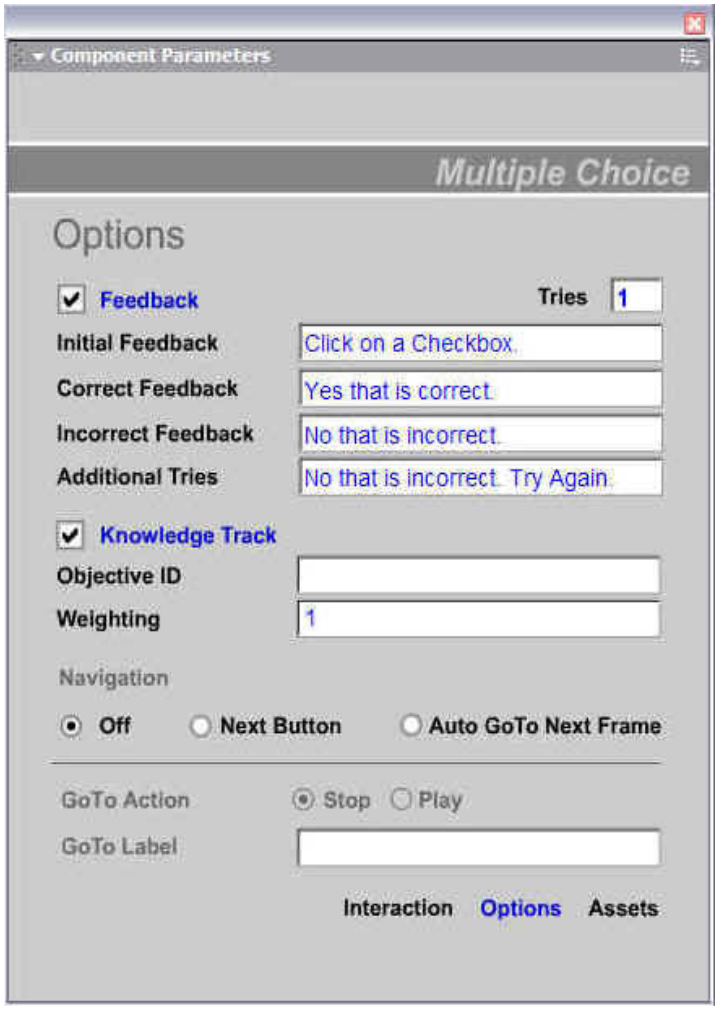


Figure 3.37: Interaction options in the “Multiple Choice” component parameters window.

These practice exercises will again be discussed in detail in the next chapter, Chapter 4, section 4.3 on page 79. Each question will be shown and the steps taken to set each type of question will be reported.

3.5.5 Online quiz

The second type of interactive tutorial was the online quizzes. These online quizzes were implemented after the summarization of the whole chapter and act as an indication as the end of each chapter. The type of questions for the online quizzes was similar to those of the practice exercises. Here, the flash templates were again used with the same component parameters setting.

The main differences between the online quiz and the practice exercises were that firstly, the online quizzes were set as marked tutorial. Each question for the online quiz of each chapter had a mark weightage. The author again, was given the option of setting how much mark he wanted to set for each question. For simplicity purposes, the author had set each question amounting to one mark each. This mark for each question was crucial because at the end of the quiz, all the marks for the questions would be accumulated and displayed to the user. The number of correct and incorrect answers, as well the percentage of correct answer for the quiz would be displayed. These marked quizzes were important as it gave the user a gauge of how much he or she was prepared for that particular chapter topic.

The other difference between the online quizzes and practice exercises was that for the practice exercises, the user had two tries to submit his or her answer for each part, whereas for the quizzes, the user only had one try for each question. This was because the quizzes was a marked tutorial and each question had only one part, not broken down into two to three parts as previously done for the practice exercises.

The online quiz was also more complicated as it needed a few frames of flash templates combined together. In comparison, each part of the practice exercise questions only required one frame. For the online quizzes, one question was set on each frame and these frames had to be connected together to make it into a quiz. And the marks set for these questions also needed to be accumulated. In order to do this, the author had to implement additional dynamic buttons which required flash programming. These buttons basically connects the frames or pages to one another

and also add on the marks from page to page. These dynamic buttons will be explained in the next section.

3.5.6 Dynamic buttons

These dynamic buttons were necessary in the construction of the online quizzes. These buttons provided links between the pages and also act as a calculator, adding the marks for all the questions. Unlike the quiz questions that used flash templates, these buttons need added flash programming to make them function. The flash programmings were only a few lines of coding, basically made up of action scripts from the macromedia flash programming tool.

3.5.7 Structure flow

The structure flow drawn out as showed in Figure 3.38 on page 47 shows the flowchart of the logical process flow of how a user can navigate the website to obtain its contents with ease. It shows the different options a user has when accessing the webpage and paints a clear picture of what the physical project will be and how the pages were linked. With the reference of the flowchart, it is easier to visualize the whole structure of the webpage.

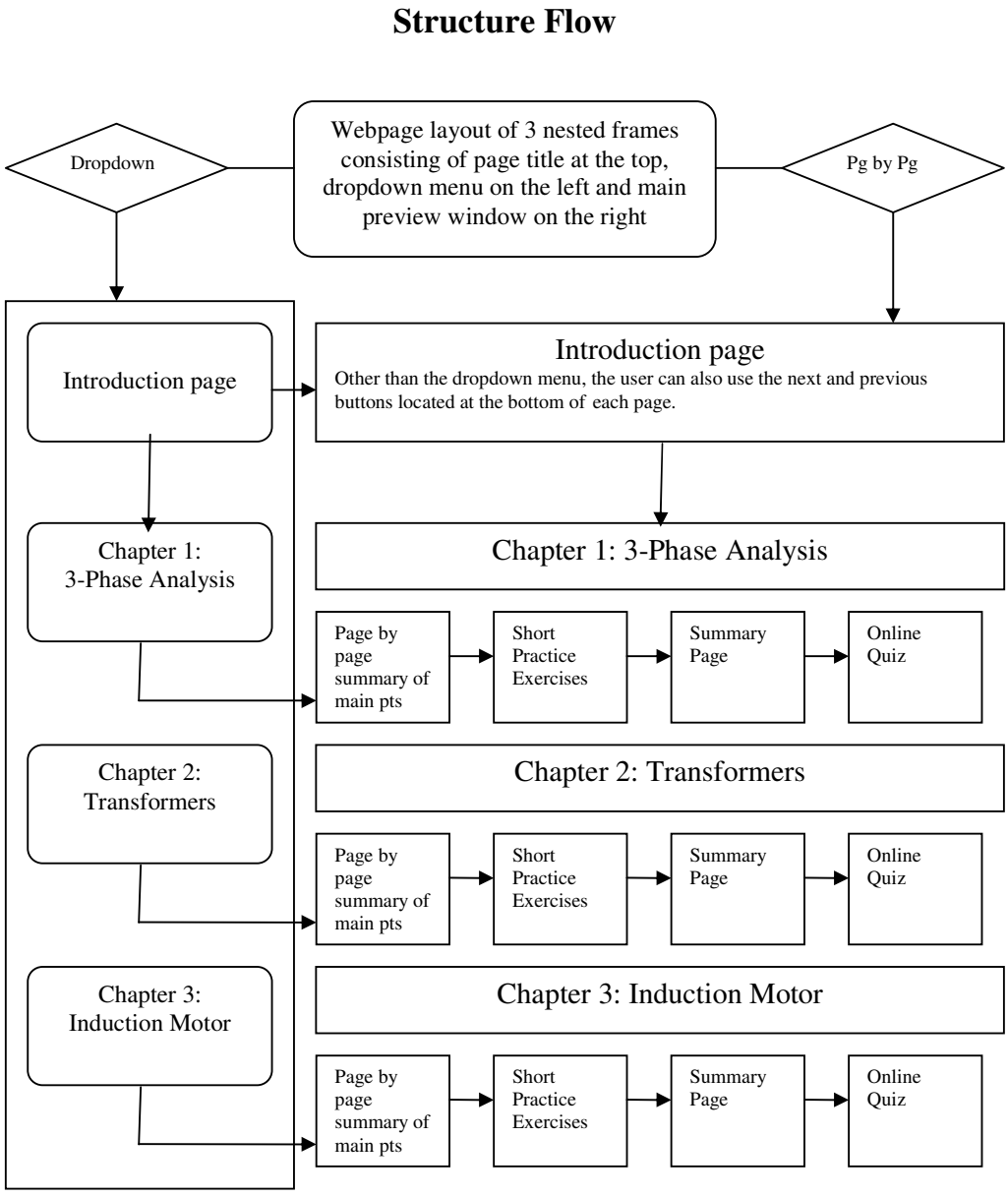


Figure 3.38: Structure flowchart.

3.6 Project Timeline

Planning the milestones and objectives was an important task. This was to ensure that the project could be managed and accomplished within the duration available. This was done to oversee the progress of the whole project such as meeting the deadlines, the activities that needs specific attention and also to serve as a guideline for estimating the approximate time frame allowed for each task. On the whole, the timeline was scheduled according to the Project Timeline in table 3.1on page 49, which was broken down into months. This scheduled timeline was for the whole project which for both ENG4111 and ENG4112.

The table showed that more time was allocated into researching the webpage concept and developing of the project. This was mainly due to the familiarization process of the Macromedia Dreamweaver software itself and the designing of the layout. The implementation of the practice exercises and online quiz were also allocated a bit of time due to the complexity of the task. Some tasks were drawn out to run concurrently with one another due to time constraint. However, for most part, the tasks were done sequentially.

Timelines and Activities		
Jan		
Feb		
Mar	**S1**	♦ **Webpage concept** ♦ **Project Proposal : 15.03.2006** ♦ **Project Specification : 27.03.2006**
Apr		♦ **Webpage design**
May		♦ **Webpage design** ♦ **Webpage layout** ♦ **Project Appreciation : 22.05.2006**
Jun		♦ **Layout** ♦ **Progress Assessment : 19.06.2006**
Jul	**S2**	♦ **Collection of data/materials** ♦ **Implementation of online tutorials**
Aug		♦ **Inclusion of data** ♦ **Implementation of online tutorials** ♦ **Extended Abstract : 25.08.2006**
Sep		♦ **Addition of images/graphics** ♦ **Partial Draft Project Dissertation : 22.09.2006**
Oct		♦ **Implementation of online tutorials** ♦ **Residential School**
Nov		♦ **Final Draft Project Dissertation : 02.11.2006** ♦ **Compilation and Documentation for Project Dissertation : 02.11.2006**
Dec	S3	♦ **Final Project Dissertation : 20.12.2006**

Table 3.1: Timeline table.

3.8 Chapter Summary

This chapter basically covered the methodology of the whole process for the project. It discussed the features that had to be implemented into the webpage design as well as the requirements needed to be satisfied. The features that were considered were listed sequentially according to the tasks in the timeline table that had been set and shown at the end of this chapter. This chapter also discussed how each feature would be helpful for the online tutorial and how they would be incorporated into the whole project. Other than the features, the content was another important aspect that was discussed. The research behind the study materials used, the interactive graphics and the online tutorials were pointed out in this chapter. Finally the structure flow of the webpage layout and the project timeline table were displayed.

Chapter 4

Design Construction and Implementation

4.1 Construction of Webpage

After researching and planning had been done, the next logical step was the construction of the webpage itself. It took a few weeks for the author to familiarize himself with the Macromedia Dreamweaver setup. The design was then finalized and having decided on the features that needed implementation, the author will now take the reader on a step by step report of how each feature was implemented.

4.2 Design

The main aspect of the webpage design was the layout. The layout covers a set of features namely the background, fonts and other attributes that the author felt were essential to the design. Macromedia Dreamweaver was chosen because it gave the author numerous choices and features that could be easily inserted into the design. These features made the design more attractive, accessible and easier to navigate. The figure 4.1 on page 52 shows the setup of the Macromedia Dreamweaver window.

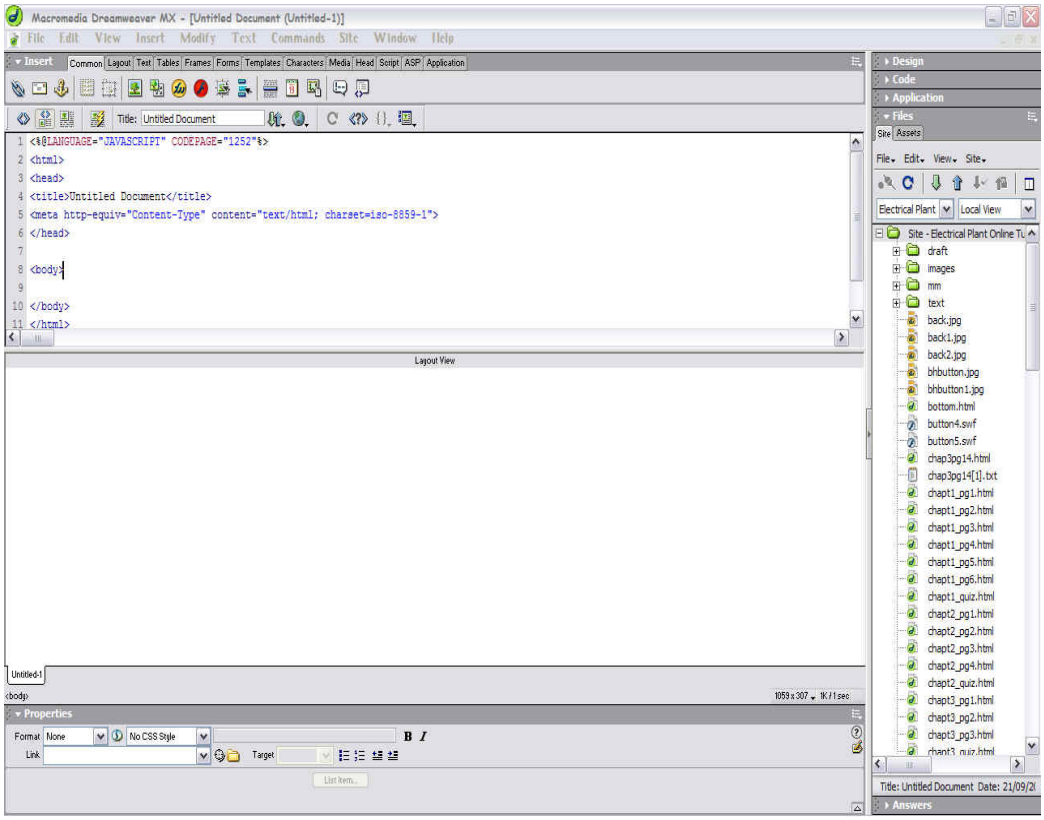


Figure 4.1: Dreamweaver window setup.

4.2.1 Background

Having a uniformed background theme was important because it showed that all the pages were standardized and belonged to one main webpage. Background usually comes in two options, either a picture background or a colour background and again, they could either be good or bad. There are those backgrounds that are so loud and so busy and cause so many distractions. This is obviously bad because if the user are unable or find it difficult to read the pages, then they will not be staying long. Backgrounds can either demonstrate the author's savvy or bad taste. The author decided to go for simple yet an eye-catching background. By applying the simple principle of dark backgrounds with light-coloured wordings or the other way around, the author had found a combination that was simple yet still attractive. The author had decided on a light coloured background, with the hexadecimal code of "#996699" and black fonts “#000000”, as he wanted to make it look professional. This combination will be used throughout the webpage.

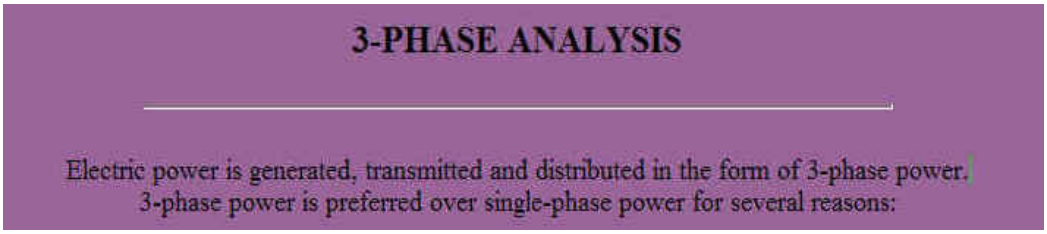


Figure 4.2: Background and fonts example.

The coding for the background colour and font colour were inserted in the “body” section of the html coding, as seen in figure 4.3 on page 53.

```
<html>
<head>
<title>Untitled Document</title>
<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1">
</head>

<body bgcolor="#996699" text="#000000">
```

Figure 4.3: Background and font colour html coding.

4.2.2 Frames

The next feature that was decided was the usage of nested frames. Frames are when your window is divided into two or more separate areas that are independent of each other. Sometimes the frames are obvious and other times the frames are invisible. Gratuitous use of frames is not recommended, especially when implementing them without a specific purpose behind their use. As some internet users hate this element, therefore the type of frames that the author were to use had to be chosen carefully so as they would not made to look redundant.

Insertion of frames into a webpage design could be difficult and might end up having disastrous results because they take a longer time to load than a single page and they are very prone to complications. These complications stem from both poor programming and poor navigation. Poor programming happens when the HTML author does not “target” their frames correctly and the visitor ends up in "nested frames". That's where one frame, usually the menu frame, shows up twice or more times in your window. Poor navigation results from an internet user not knowing how to get out of a frame or how to move forwards or backwards within frames. Another problem with frames is the major variance between their appearance on different computers, different browsers and at different window widths. This is due to the strict tolerances that browsers have for displaying such things as scroll bars and the position of the elements that are found within the frame itself.

However, there are instances where frames were used for very good reasons. These include keeping track of large lists in one frame while updating the other frame with info, or using one frame for photo thumbnails and another frame for the larger view. Never use a menu frame for only four or five links that can easily be taken care of by a separate navigation menu on the actual page. And for these reasons, the author decided on using frames as part of the design. He did however, took a few considerations during the process of implementing the nested frames into the design layout.

1. The author made sure he did not use relative widths (e.g. 40%) for left or top frames but instead use absolute widths (e.g. 250 pixels).

2. The author made sure he left plenty of room for "shifting" which may occur on some of the users' computers.

3. The author always specified a "target" of "_top" or "v" for links that go off the website. That way the users won't get stuck in one of the frames.

4. And lastly, as not everyone has the same resolution, thus the <noframes> tag was inserted so to maintain the aspect ration of the frames.

Macromedia Dreamweaver gave the author thirteen types of nested frames and from this thirteen, the author had decided on one the he felt comfortable with and in his opinion was the most appropriate one. The author's choice was a "top and nested left frames".

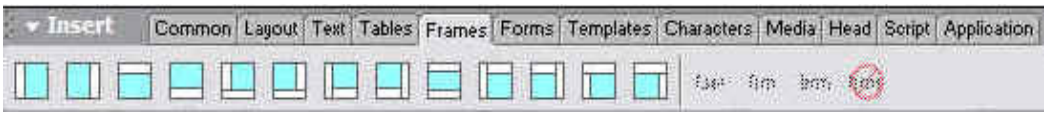


Figure 4.4: Thirteen types of nested frames.

Each of the frames within the nested frame was given a name so it would be easier to target links to any of the frames. The "frameborder" option was not used so as to give an impression of a whole page instead of three separate pages. The author had also disabled the resize option so users would not accidentally shift the frames and distort the webpage layout.

The top and nested left frame selected for the layout

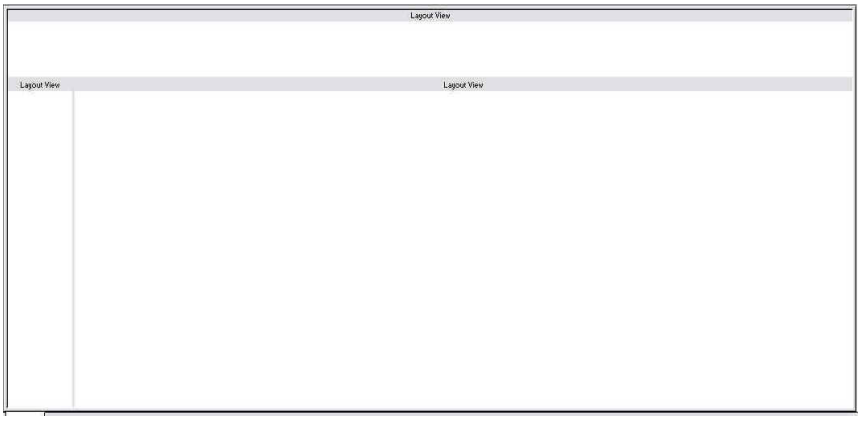


Figure 4.5: Top and nested left frames.

The nested frames after the addition of background colour.

Figure 4.6: Nested frames with background.

The figure 4.7 on page 57 shows the nested frames after the addition of the page titles and the dropdown menu.

1. The top frame was named “topFrame’ and saved as “top.html”. It was set to 80 pixels in height, no frameborder, no resize of borders, no scrolling and white border colour or hexadecimal code of “#FFFFFF”.

2. The left side of the frame that hosts the dropdown menu was named “sideFrame” and saved as”side.html”. It was set to 194 pixels in width, no scrolling and no resize.

3. The right frame was named “mainframe”. It was not set to any size dimension as it will take on whatever remainder of the total pixels. This was the main window where all the links were targeted to. This was the only frame that would change and refresh every time a new page is selected.

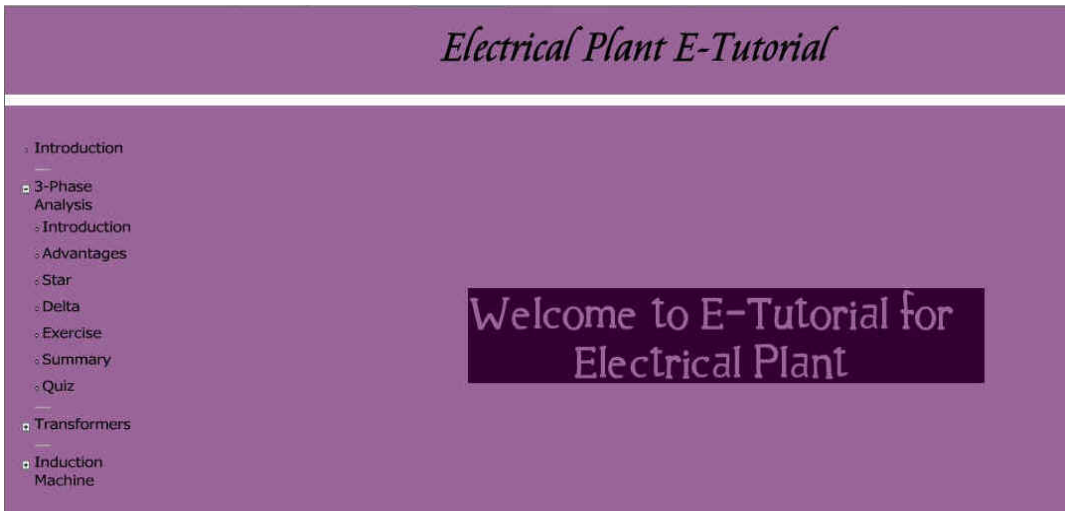


Figure 4.7: Preview of the nested frames with no frameborder and no resize.

The nested frames were not the final design for the layout. The nested frame was then incorporated into a main “IFrame”. An iframe is a floating frame that box up its contents. The iframe was set to 900 pixels in width and 535 pixels in height. The margin width and margin height were both set to 5 pixels, aligned to middle, set to no scrolling and a frame border of 25 pixels. This iframe would be the final representation of the webpage layout. Figure 4.8 on page 58 shows a blank iframe before the contents were inserted.

Figure 4.8: Blank iframe without the contents.

The figure 4.9 on page 59 shows an enhanced updated version of the iframe with a table border and background colour for its contents. The table border was set to 20 pixels, with cellspacing and cellpadding of 2 pixels each, a dark border colour with a hexadecimal code of ”#CCCCCC” and a light border colour with a hexadecimal code of “#FFFFFF”. The “cellspacing” and “cellpadding” refers to the margin spaces around the table.

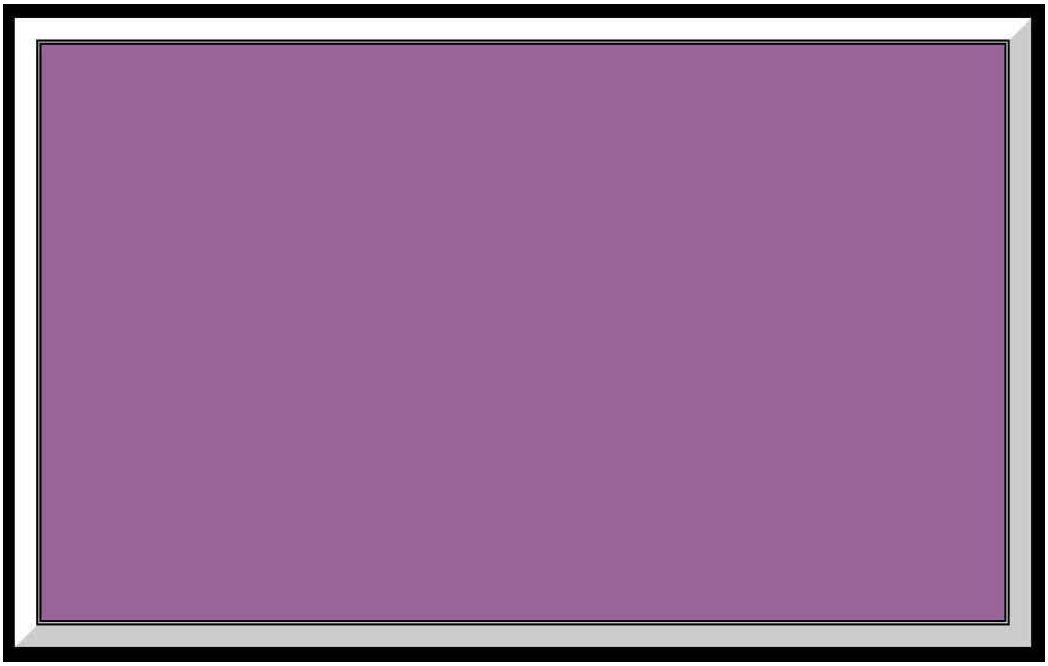


Figure 4.9: The iframe within a table border and background colour.

The fig 4.10 on page 60 shows the final layout of the iframe with the nested frames incorporated into it. This was the final layout that would be used for the webpage design.

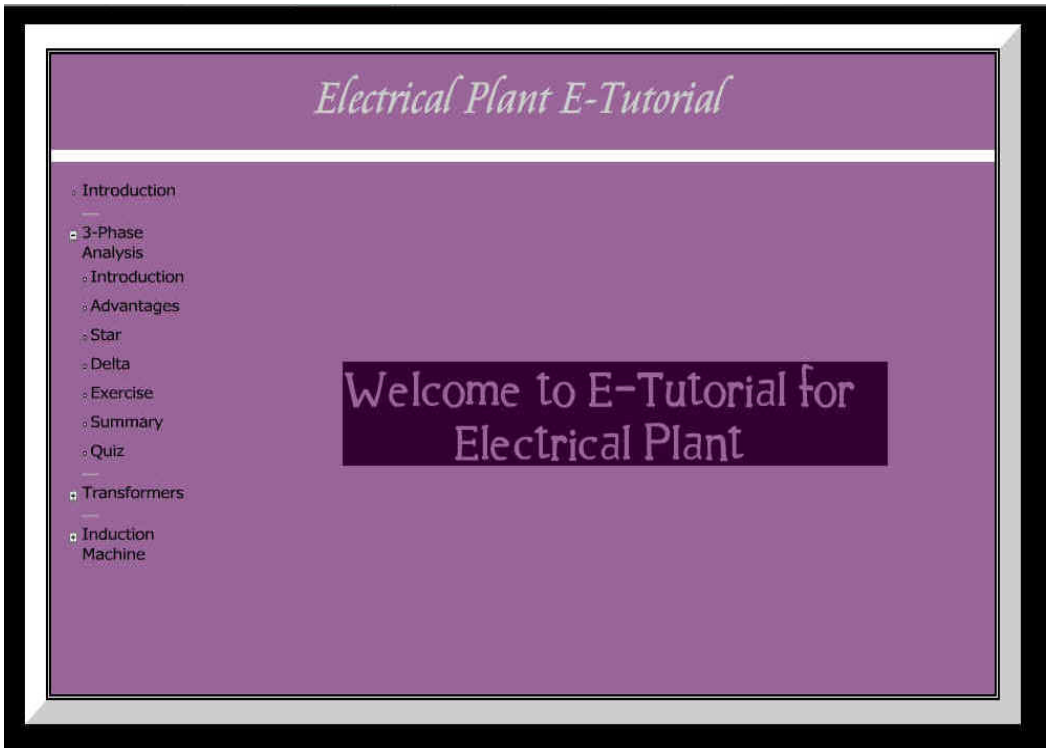


Figure 4.10: Final layout of the iframe with the incorporated nested frames inside.

4.2.3 Tables

Tables were basically used to box up and display the main important points or formulas in the page. Tables were used as attention seekers so users would know the main points that they needed to take note of for that particular page or chapter. The author could set how many rows and columns he wanted as well as the dimensions of the tables. These would all depend on the amount of data to be inserted.

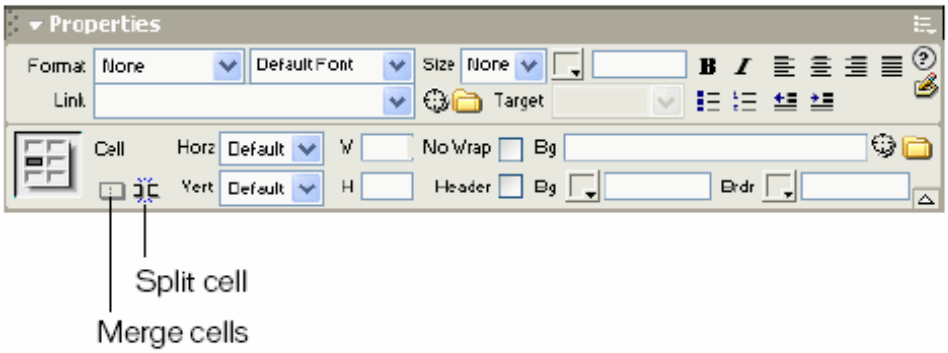
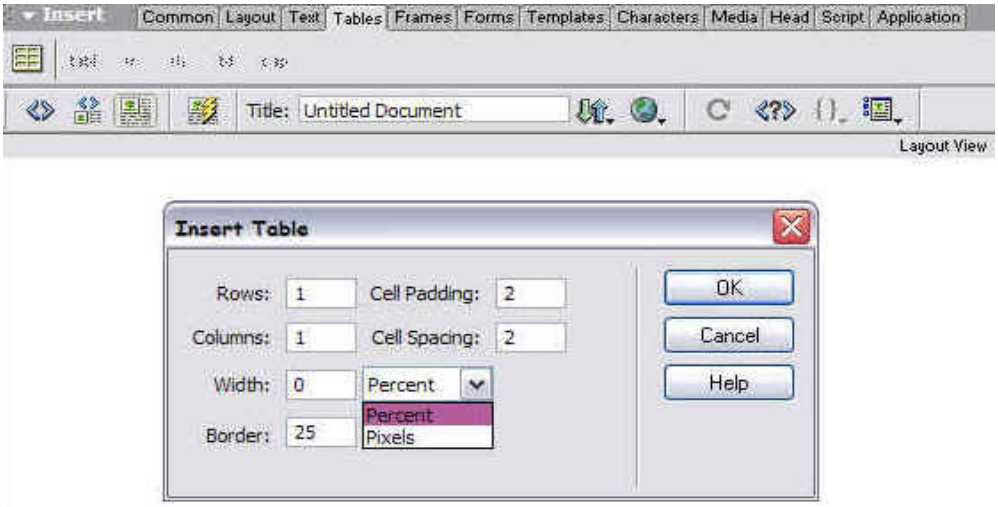


Figure 4.11: Table properties.



\

Figure 4.12: Table options.

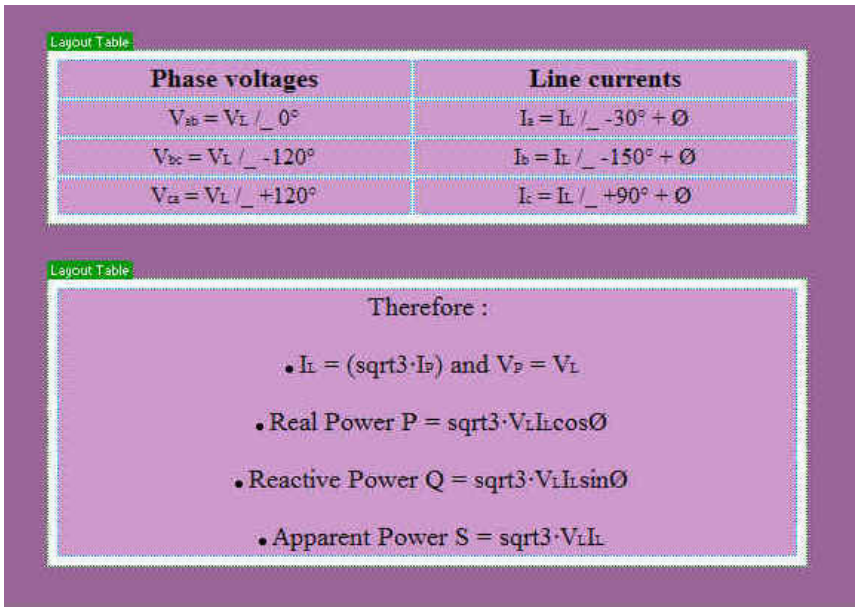


Figure 4.13: Table examples.

4.2.4 Dynamic buttons

The layout of the webpage had to be simple and also user friendly. The first part had already been covered. As for easy navigation, the author implemented two features. The first one was the dynamic buttons. These were flash rollover buttons chosen from the "Media" panel. There were many different types of samples buttons to choose from. The chosen button was picked because it matched the colour scheme of the whole webpage layout. At least one button was placed in each page. The buttons were either the previous button or the next button or both. These buttons were for the users to go to the previous or next pages.

Besides choosing the type of button, the author had to set a few parameters. These parameters were set for each button on every page as each button would be linked to a different page when pressed. These parameters included the names for the buttons, the type of font for the display name, the link page, the target frame and the background colour of the buttons. These parameters are shown in figure 4.14 on page 64.

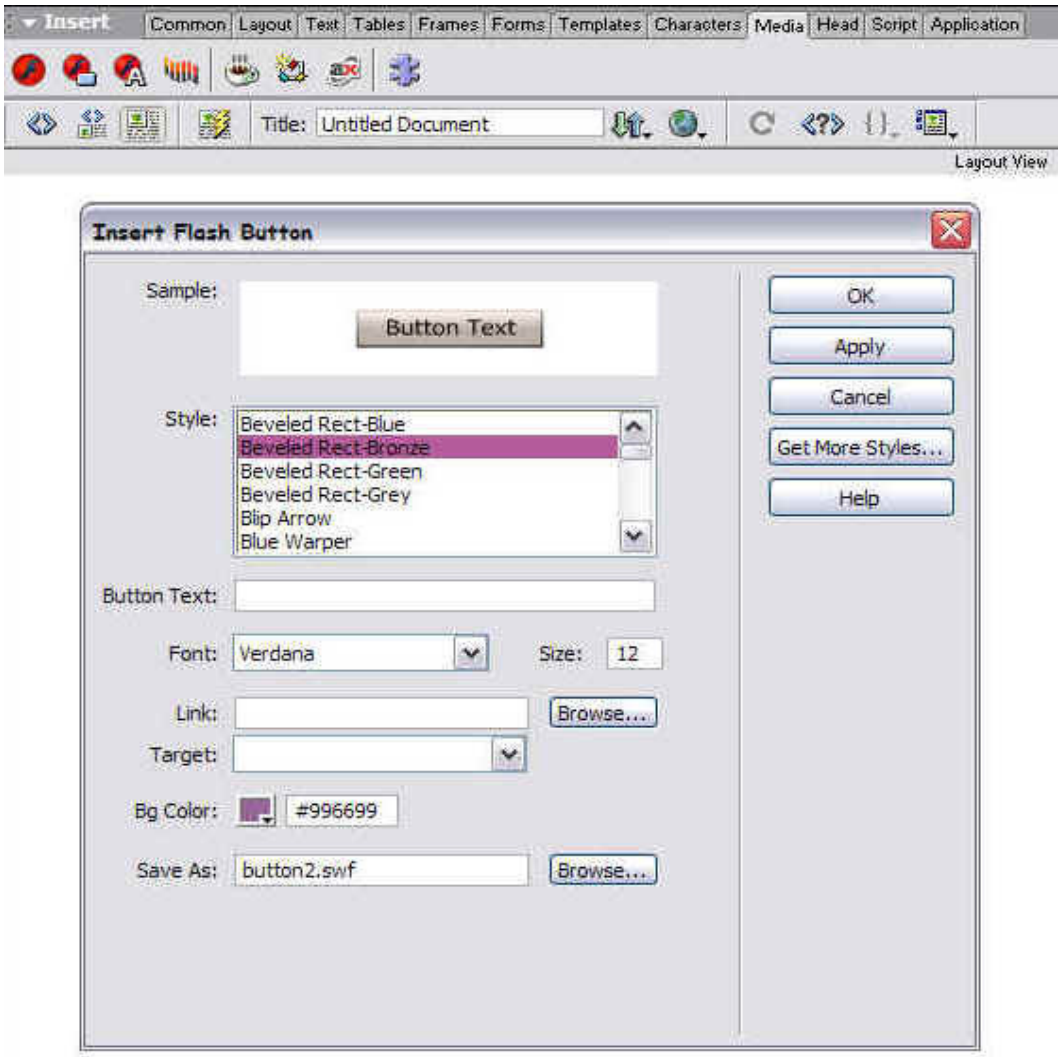


Figure 4.14: Dynamic button options.

Figure 4.15: Dynamic buttons.

4.2.5 Dropdown menu

The other feature used for navigation was the dynamic XML dropdown menu. An XML file is a dynamic tool because it provided animation as well as interactive features. The dropdown menu was to provide a better navigation as it gave the user the option of directly selecting the desired page, without having to go through each page using the dynamic buttons. The dropdown menu was done by embedding or inserting a flash menu template. The options for the dropdown menu were then added by using an XML file. This XML sets the options such as the menu topics and sub-menus. Another advantage of using this feature was also that the links changes colour as the pointer of the mouse hovers above the selected links. This way the user will know exactly if he or she is selecting the correct page that is to be viewed. The dropdown menu could also be expanded to show the sub-menus or be minimized to only show the chapter title.

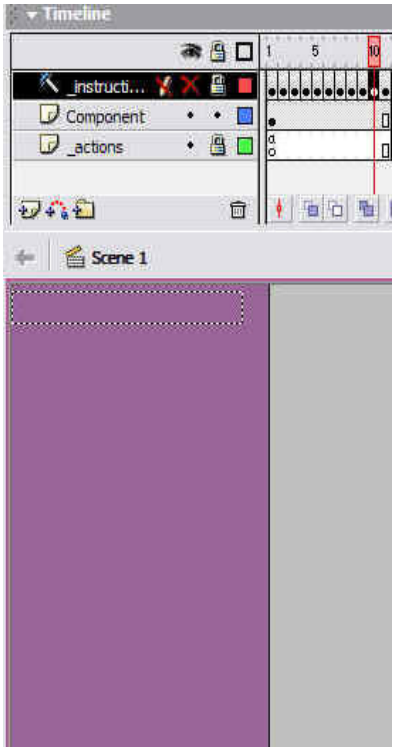


Figure 4.16: Flash menu template.

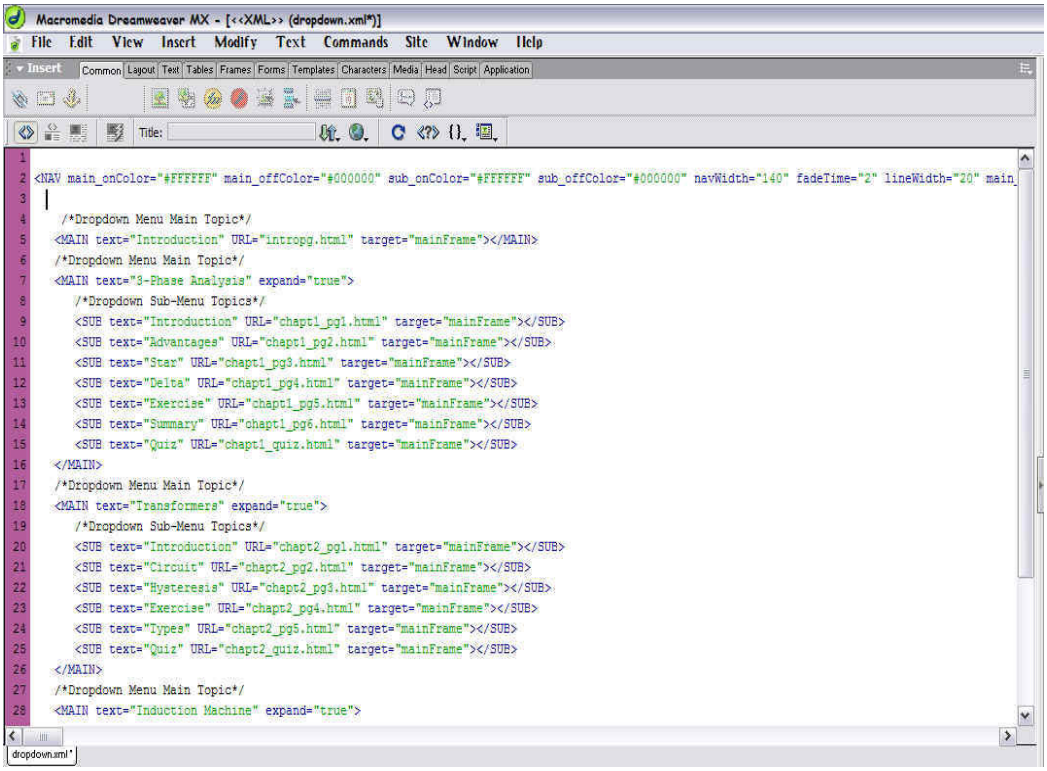


Figure 4.17: XML dropdown menu file opened in Dreamweaver.

Figure 4.18: Minimized dropdown menu.

Figure 4.19: Expanded dropdown menu.

4.2.6. Animated Graphics

Some of the research done on the internet by the author suggested that too many images was not recommended as this might cause the webpage to look cluttered. Use of the "Alt" attribute in image tags is a necessity. Blinking, spinning or shifting animated GIFs or graphics interchange format, are fun but may cause too many distractions and redundancy when they serve no purpose. However the author did managed to find a way to incorporate animated graphics into this learning tool. Instead of just having static images and diagrams, which were comparable to the ones found in the study books and textbooks, the author added animated graphics that were related to the course topics as well. These graphics were made from scratch and used Adobe Photoshop and Macromedia Flash software. The construction of these animated graphics was a tedious process and thus only a few animated graphics were managed in the limited time that was available. In this section, the author will show only one example of the implementation process of an animated graphic, as the process was similar for all the animated graphics.

The images were first done using the software Adobe Photoshop. The figure 4.20 on page 68 shows the first graph being drawn on a new canvas.

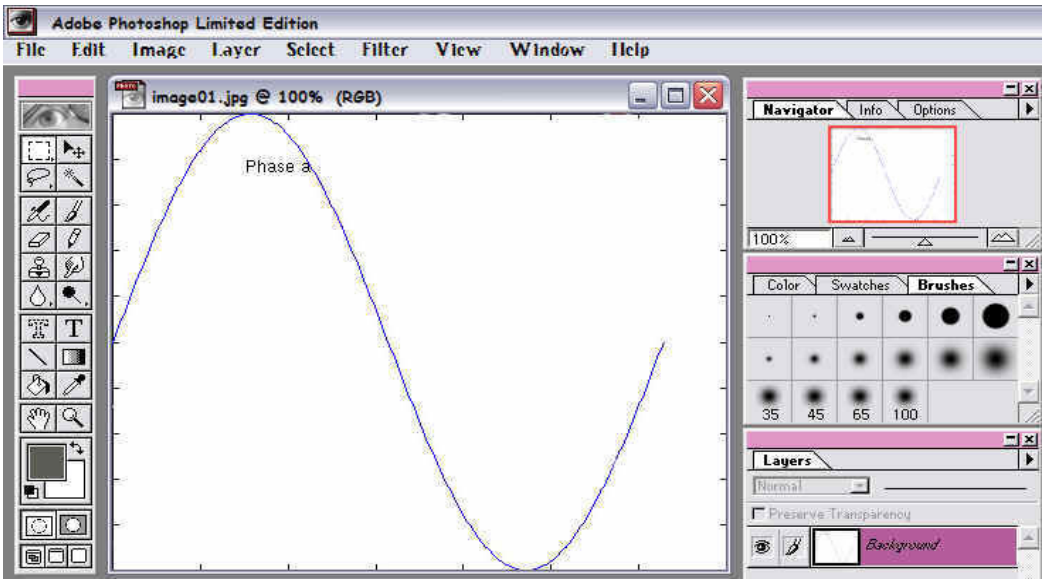


Figure 4.20: 1st image using Adobe Photoshop.

The next step was to invert the image's colour by using the "Image" pulldown menu, selecting the "Adjust" option and then the "Invert" option as in figure 4.21 in page 69. The final image was saved as "image01.jpg".

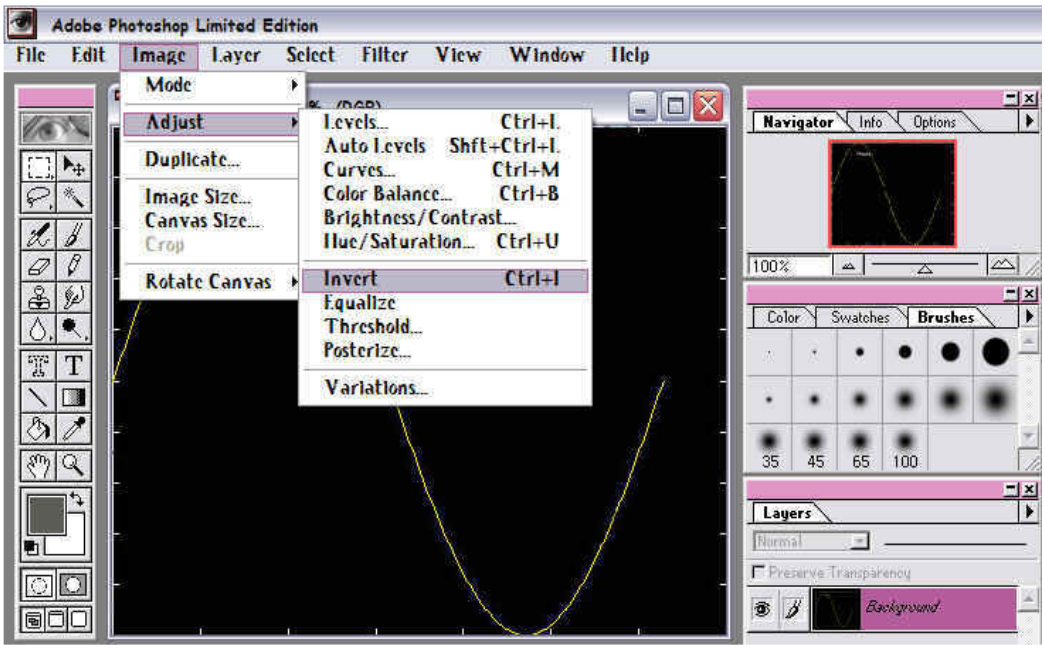


Figure 4.21: Inverting the image's colour.

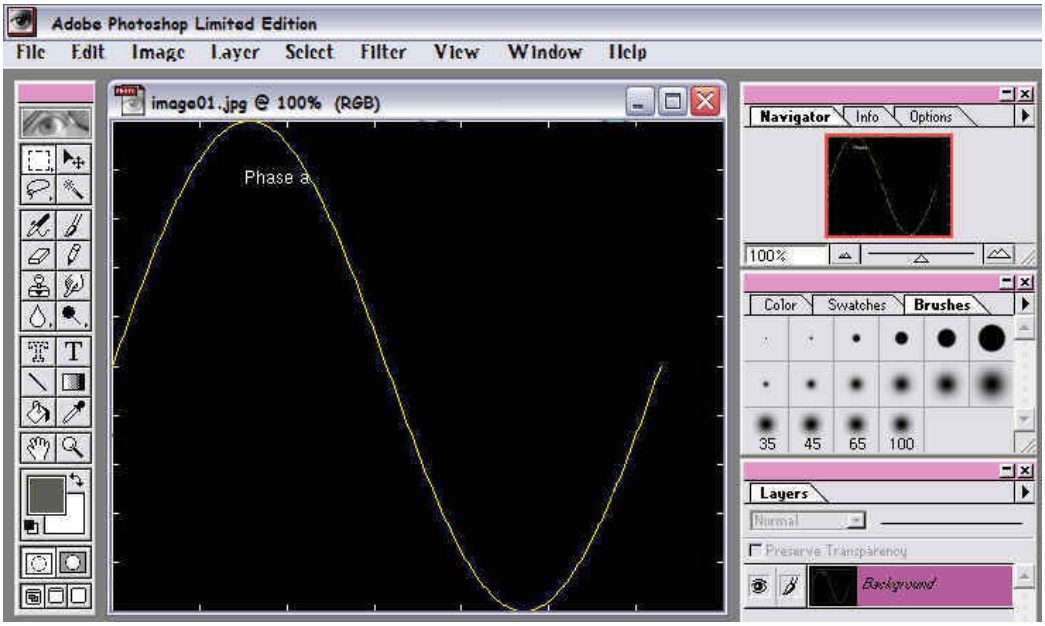


Figure 4.22: The image after colour inversion.

The second graph was then added onto the canvas and the image was saved as "image02.jpg".

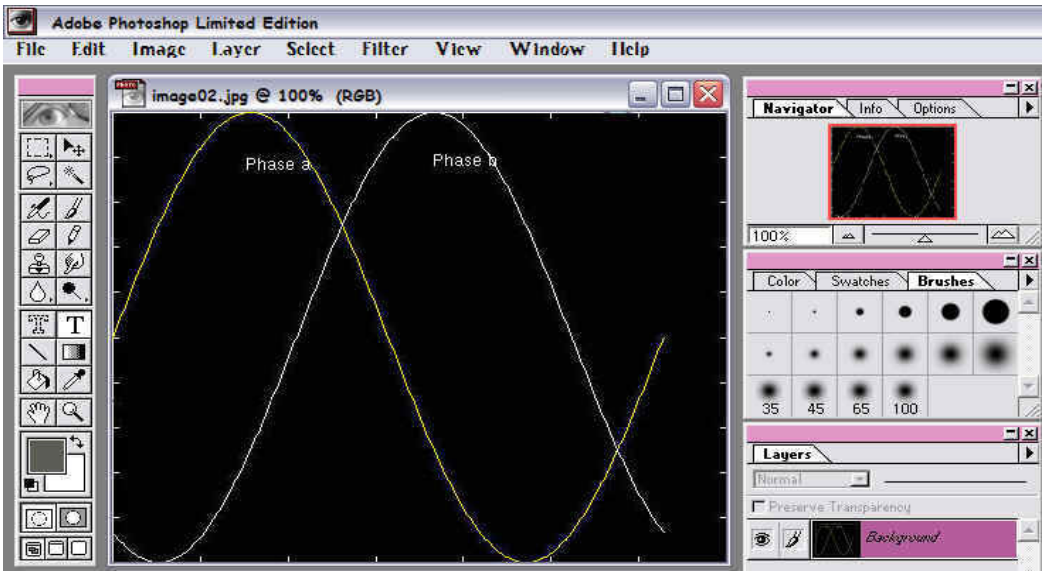


Figure 4.23: 2nd graph image.

And finally the third graph was added onto the canvas and the image was saved as "image03.jpg".

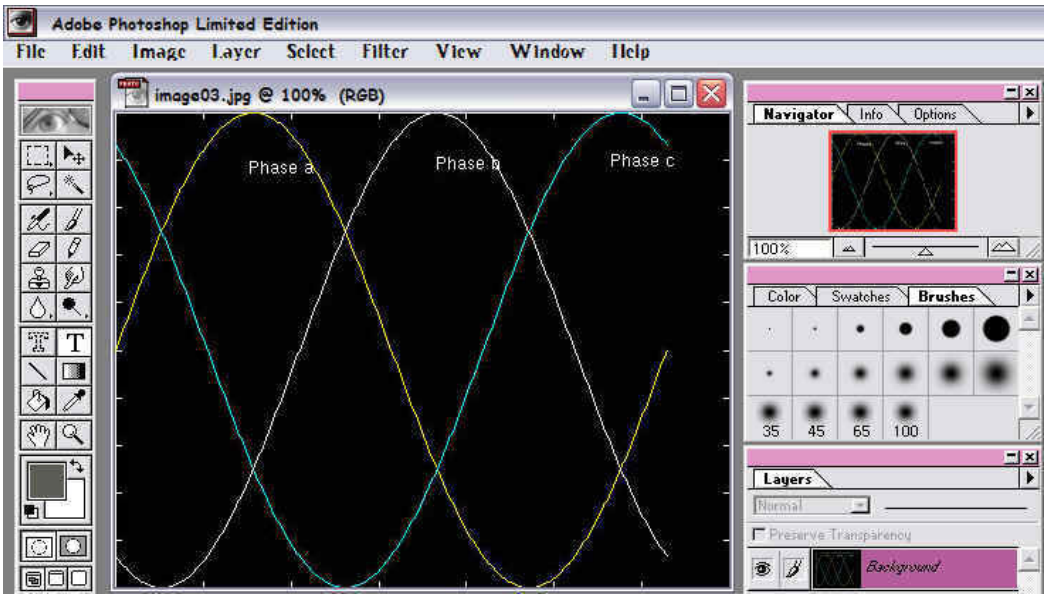


Figure 4.24: 3rd graph image.

Using the Macromedia Flash, the template for the animated graphic was setup. The background colour was hexadecimal "#996699" with dimensions of 500x400 pixels. The first image that was done in the Photoshop was then inserted onto the background as in figure 4.25 in page 71.

Figure 4.25: Animated graphic background.

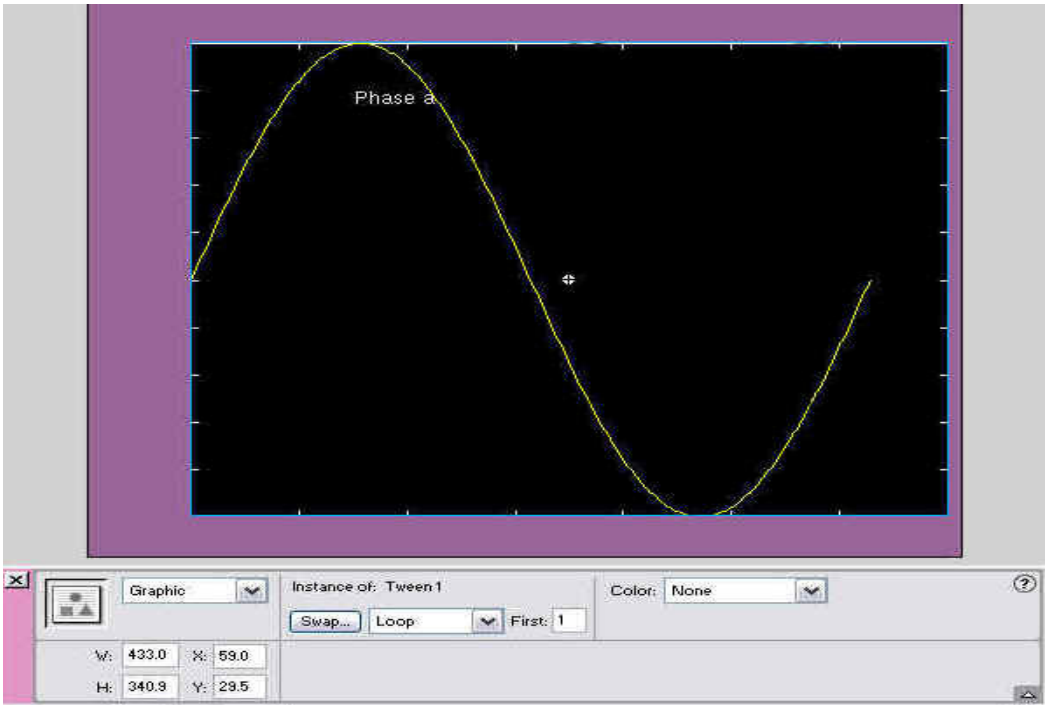


Figure 4.26: 1st graph image added onto the background.

The layers for the animated graphic were then set up in the "Timeline". A total of six layers were used for this animated graphic as seen in figure 4.27 in page 72.

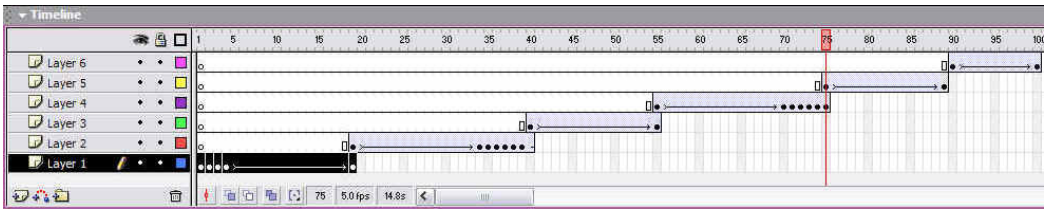


Figure 4.27: Six layers of the animated graphic.

Now the author will guide the reader through the animated graphic at different key time frames, starting from frame 5 whereby the first image is shown as seen in figure 4.28 in page 73.

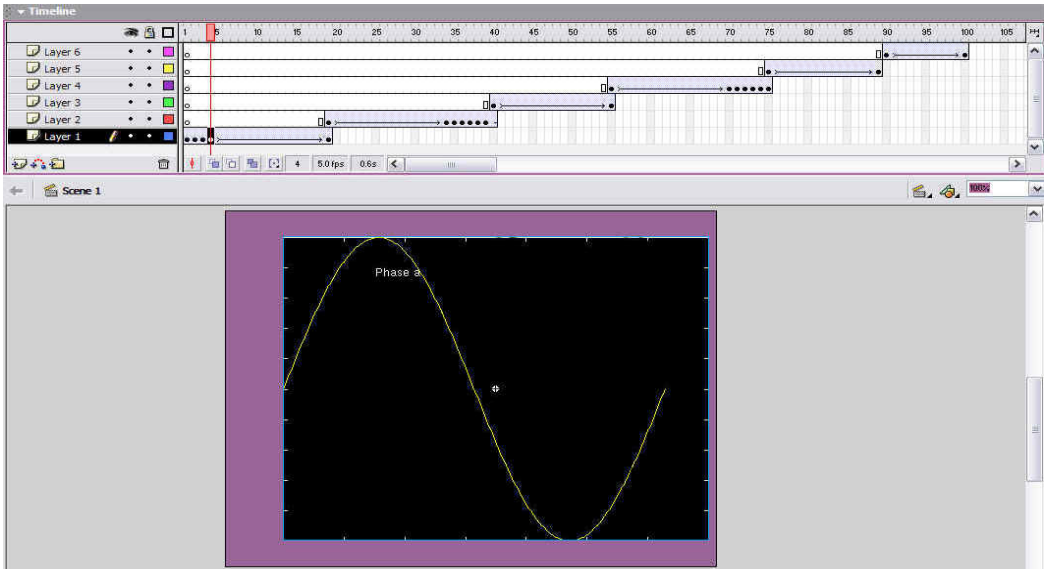


Figure 4.28: Animated graphic at frame 5.

At frame 10, the first graph began to fade.

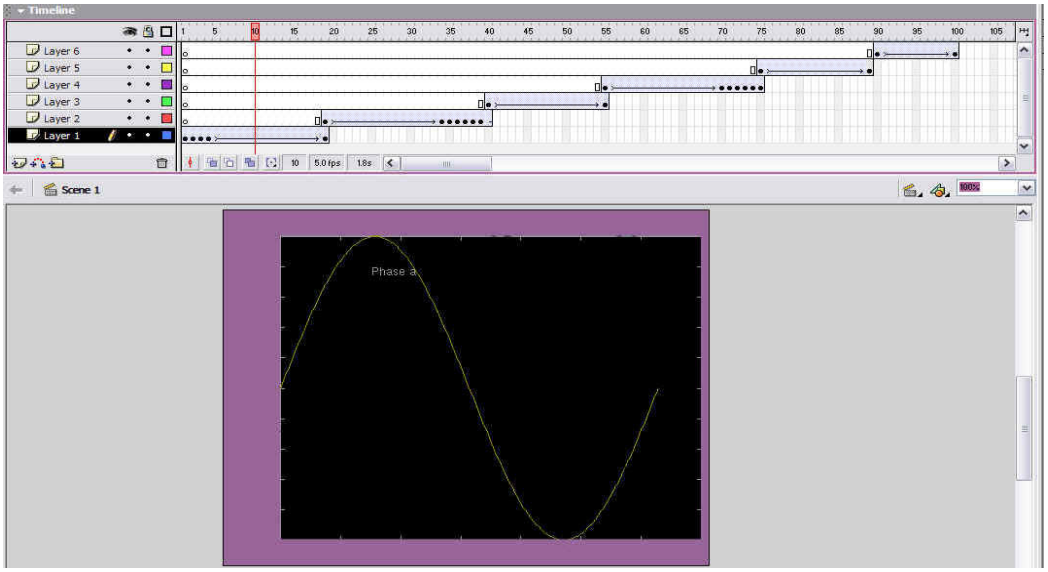


Figure 4.29: Animated graphic at frame 10.

At frame 20, the first graph totally disappeared.

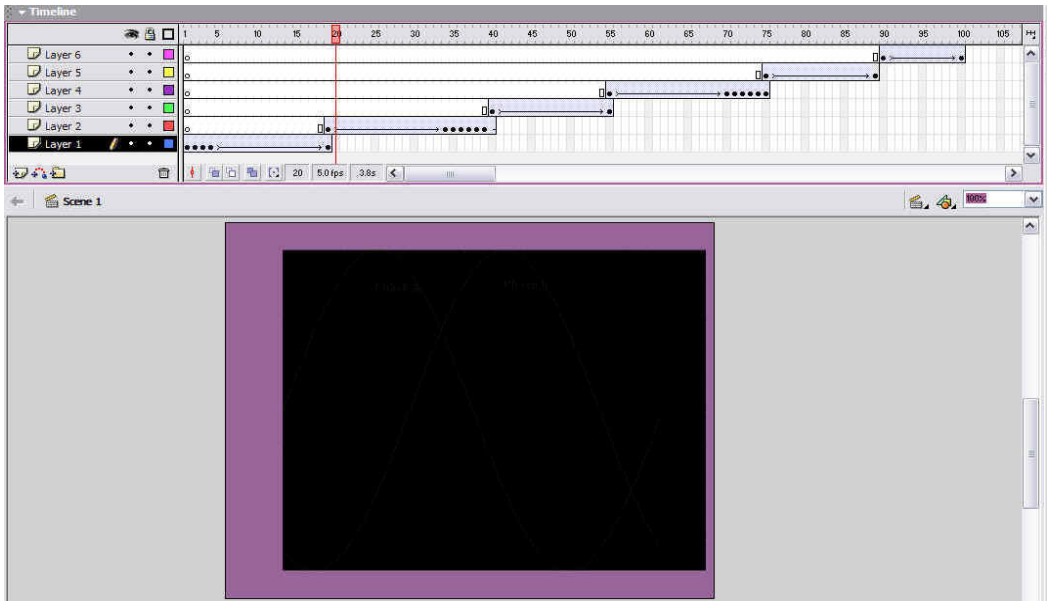


Figure 4.30: Animated graphic at frame 20.

At frame 30, the second graph image began to appear.

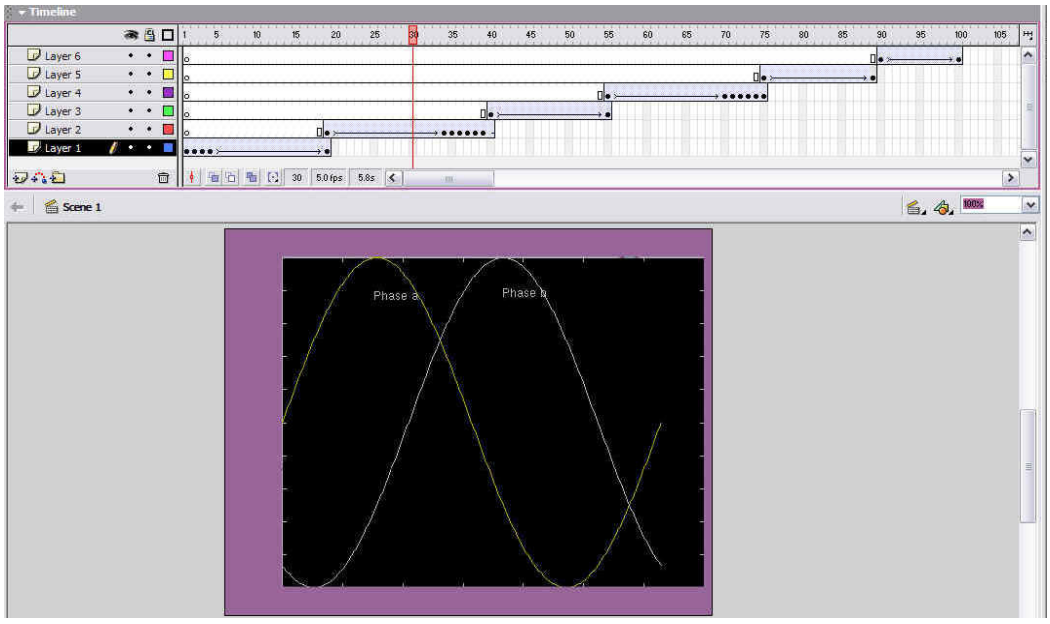


Figure 4.31: Animated graphic at frame 30.

At frame 50, the second graph image began to disappear.

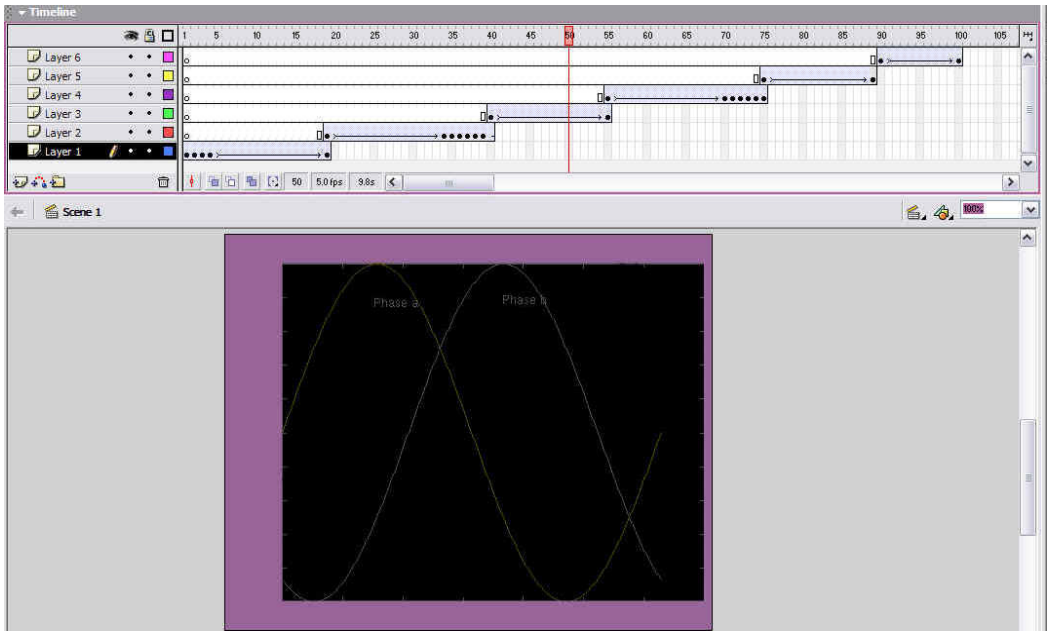


Figure 4.32: Animated graphic at frame 50.

At frame 55, the second graph image totally disappeared.

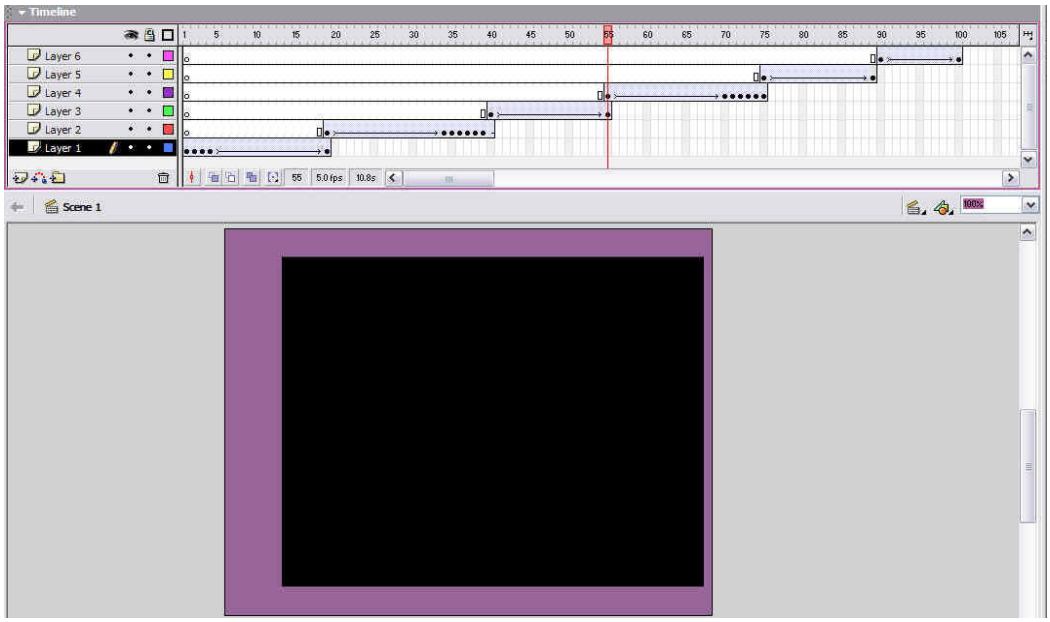


Figure 4.33: Animated graphic at frame 55.

At frame 60, the third graph image began to appear.

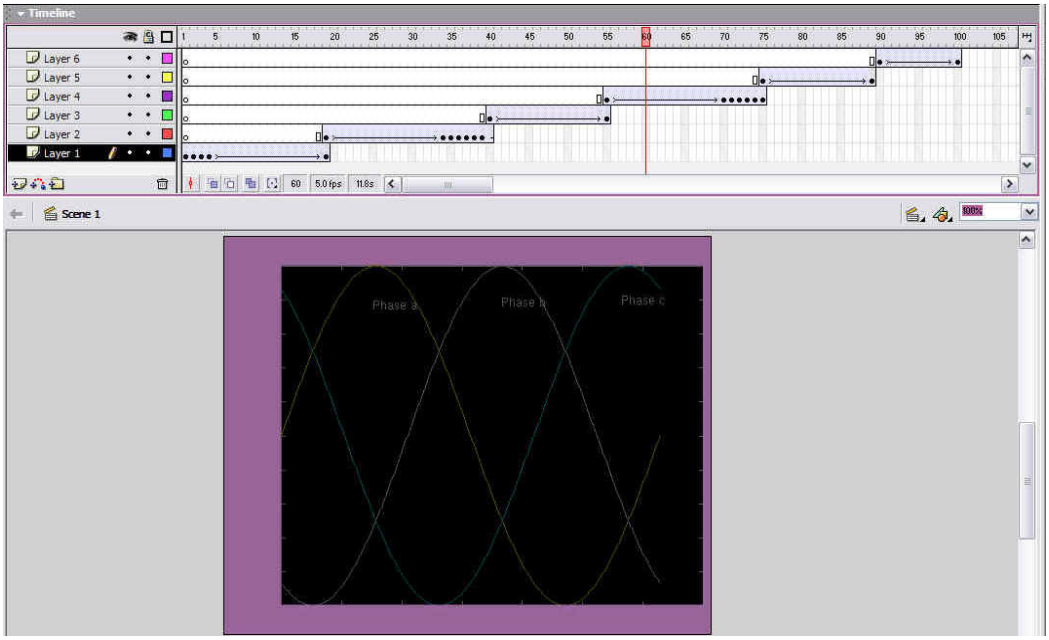


Figure 4.34: Animated graphic at frame 60.

At frame 70, the third and final graph image was totally displayed and remains static for 6 keyframes.

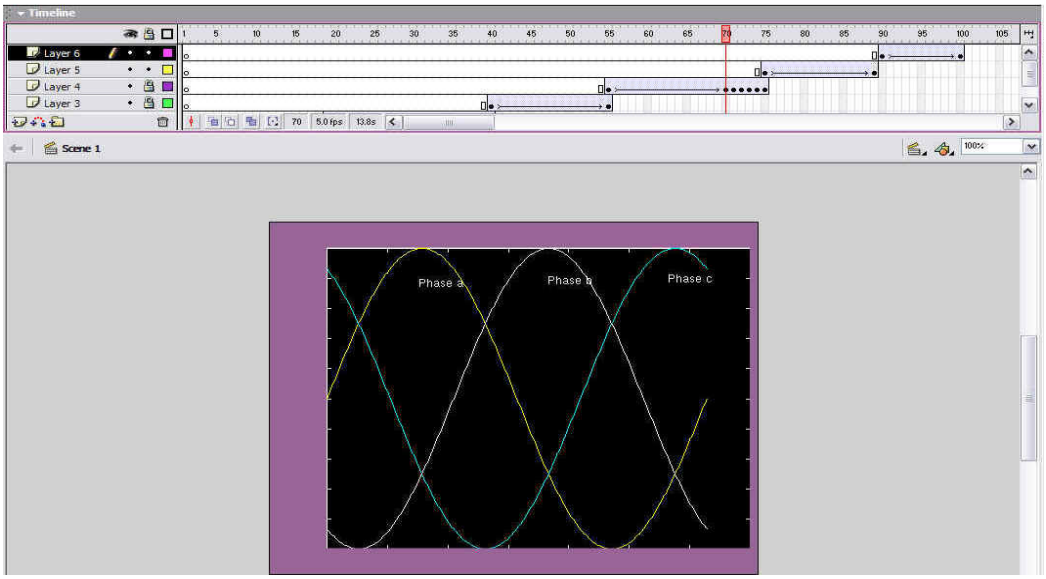


Figure 4.35: Animated graphic at frame 70.

At frame 85, the third graph image began to disappear.

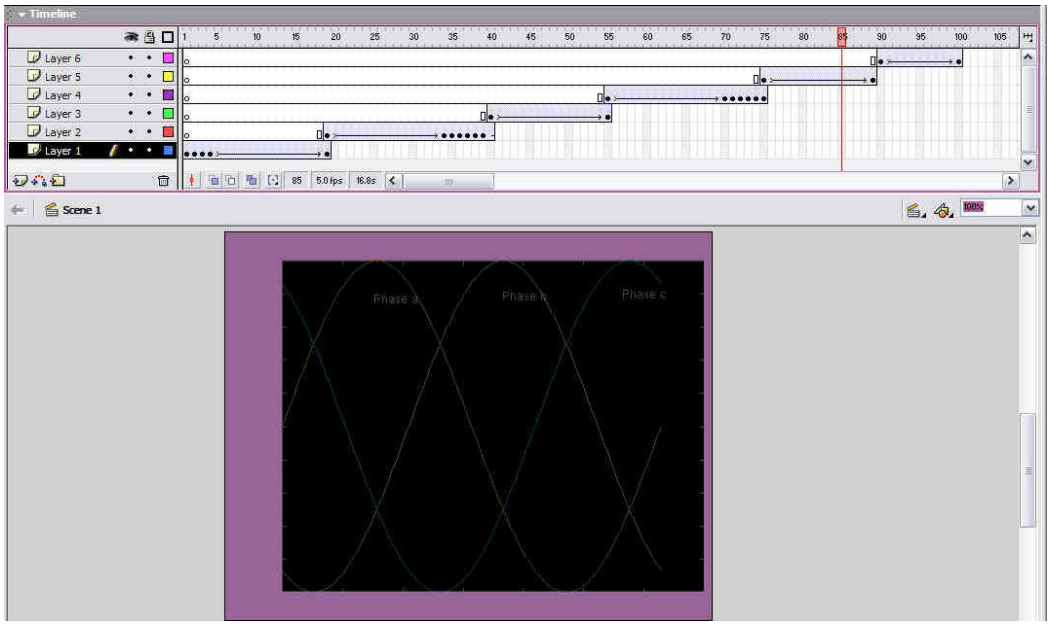


Figure 4.36: Animated graphic at frame 70.

At frame 90, the third graph image totally disappeared.

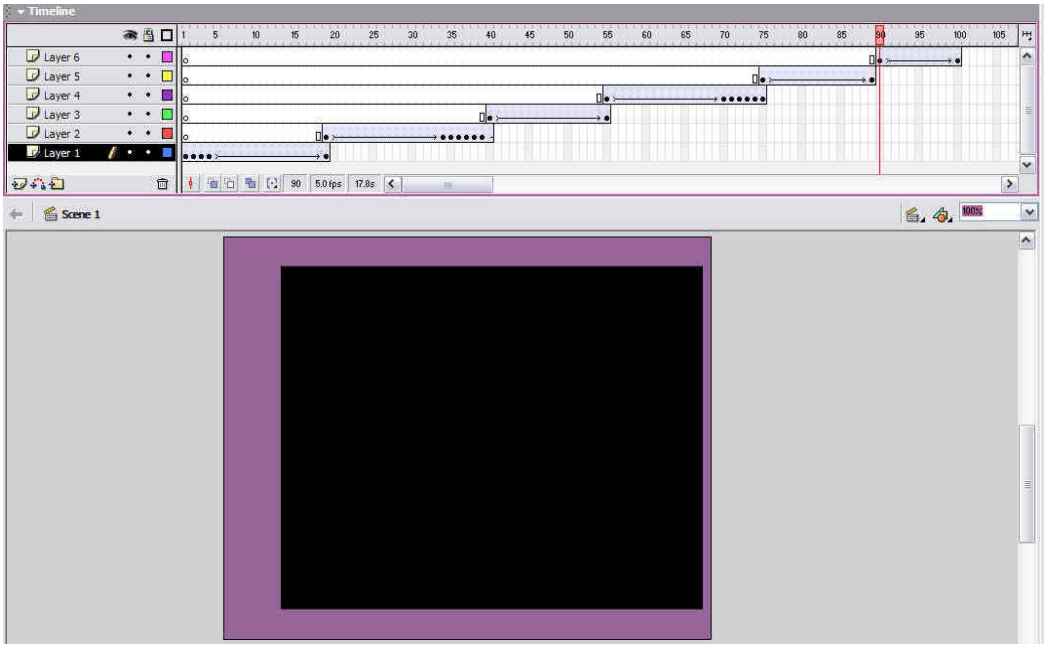


Figure 4.37: Animated graphic at frame 90.

At frame 100, the first graph image began to appear again and the whole animation would loop again. The looping process is continuous at a rate of 5 frames per second (figure 4.39 on page 78).

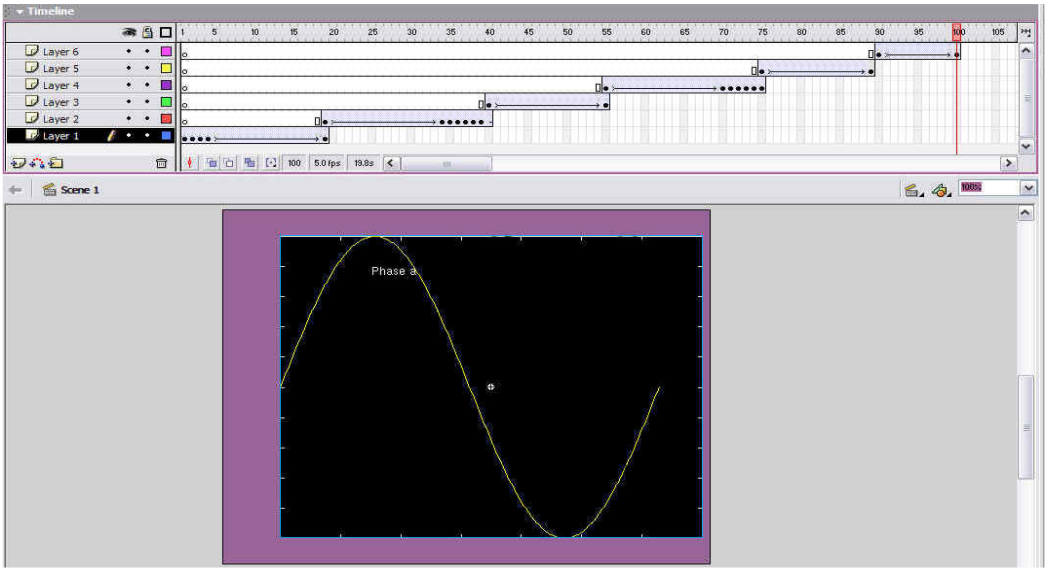


Figure 4.38: Animated graphic at frame 100.

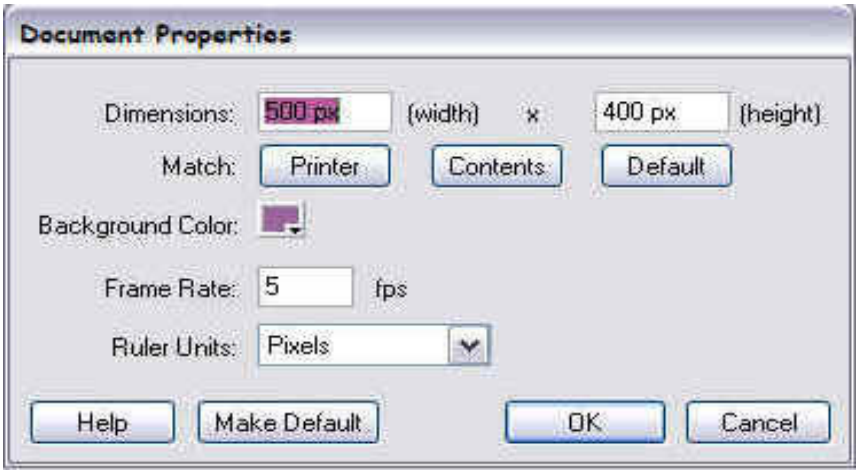


Figure 4.39: Animated graphic document properties.

4.3 Practice Exercise

The practice exercises were short technical questions broken down into small parts. As mentioned earlier in Chapter 3, section 3.5.4 on page 24, the practice questions were done using Adobe Photoshop and Macromedia Flash. The author will now go into details of each practice exercise from each chapter.

Firstly, the author had to set the background template for each practice question. This was done by opening the properties window. From this properties window, the author had the options of setting the dimension size of the background as well as the colour. As seen in figure 4.40 on page 79, the author has set the dimensions to be 425 pixels in length and 200 pixels in height. The height however, would vary for each question depending on how long the question would be. As for the background colour, the author had chosen the same colour as the webpage layout, which was hexadecimal code of "#996699", so that the questions would blend in with the whole webpage layout.

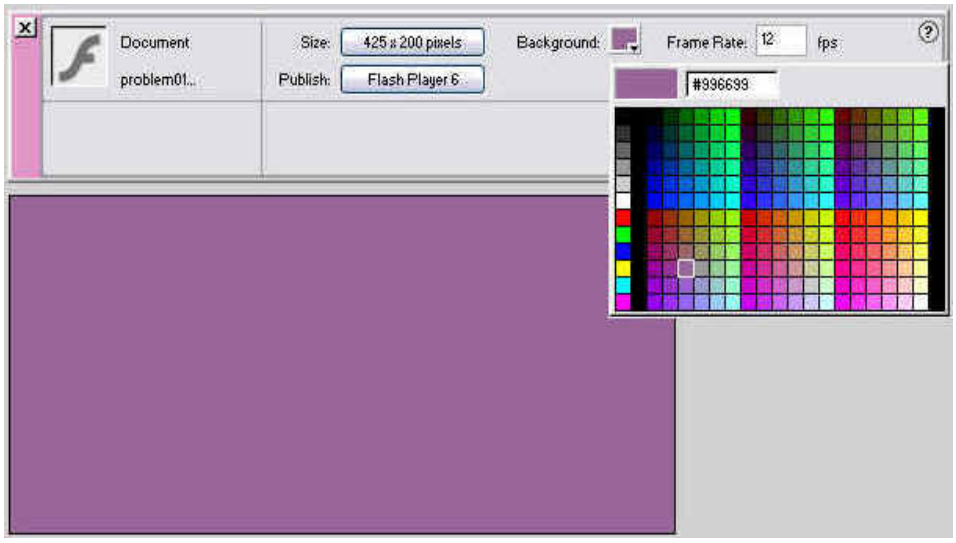


Figure 4.40: Practice exercise background template.

The next step would be to insert the question template from the "Learning Interaction Component" template. Once the template was opened, it would appear as a whole block. The individual component of the template would then be separated by using the "Break Apart" option. This process was explained previously in Chapter 3, section 3.5.4 on page 26.

Figure 4.41: Question template before "Break Apart".

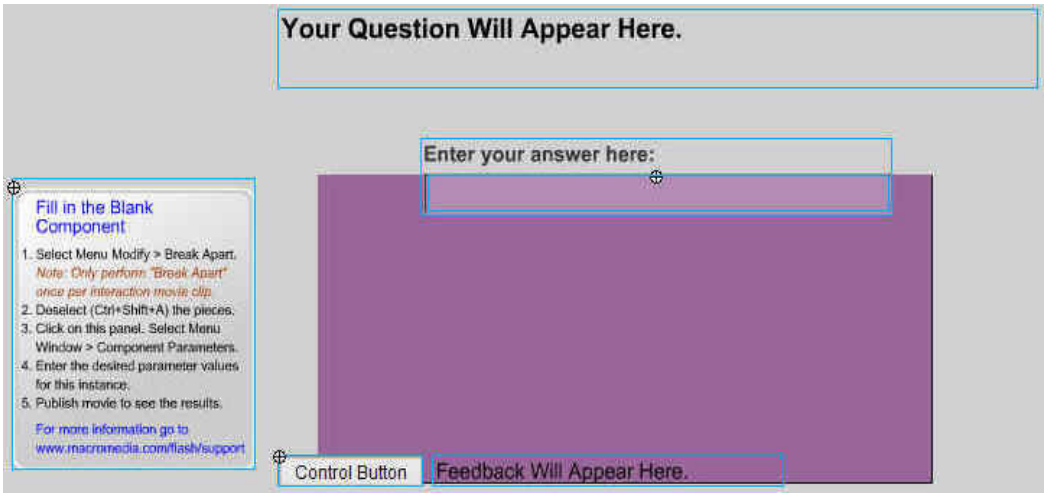


Figure 4.42: Individual components after "Break Apart".

4.3.1 Chapter 1: Practice exercise

Chapter 1: Part (a)

Part (a) of the practice exercise question in chapter 1 was a fill in the blank question.

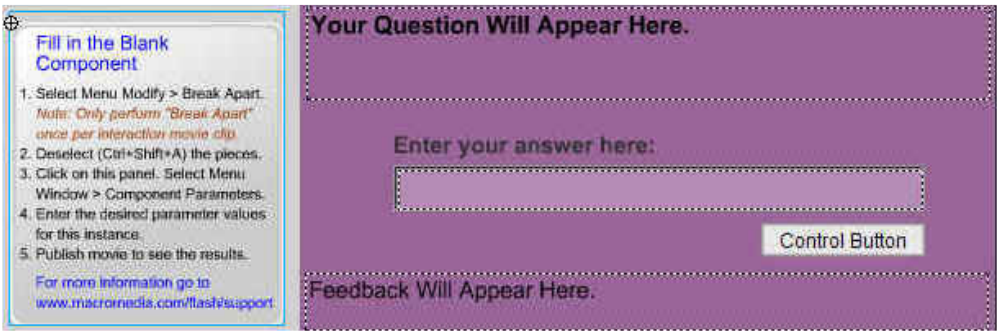


Figure 4.43: Chapter 1 - Practice exercise part (a) – "Fill in the Blank" template.

Figure 4.44 on page 81 shows that there was only one set of keyframes for all the layers at the top. It also showed the "Fill in the Blank" template with the component parameters window opened.

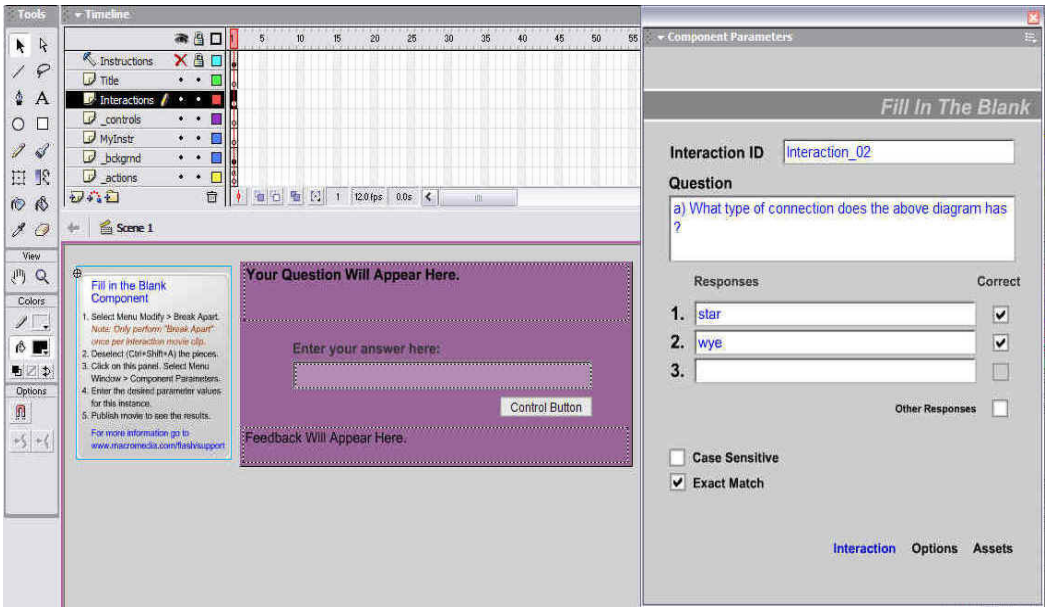


Figure 4.44: Chapter 1 - Practice exercise part (a) "Interaction" settings.

The figure 4.45 on page 82 shows again the question template with the component parameters and a preview of the fill in the blank question for part (a).

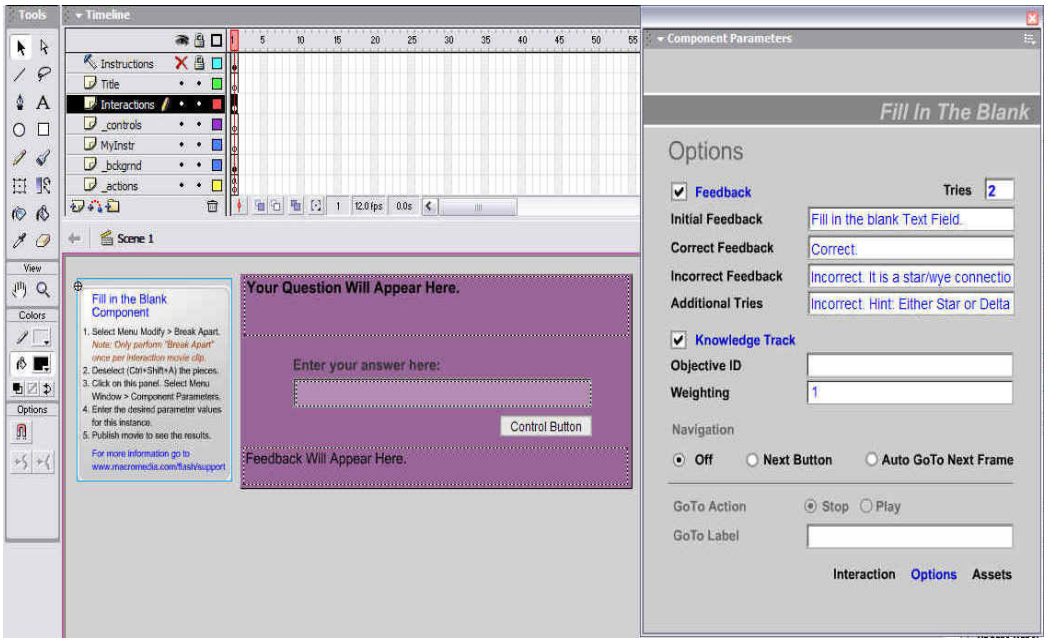


Figure 4.45: Chapter 1 - Practice exercise part (a) “Options” settings.

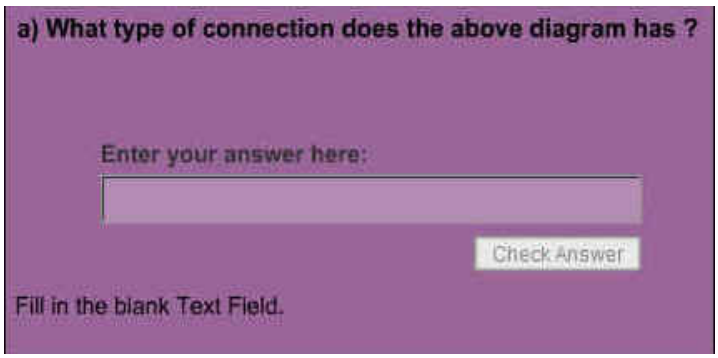


Figure 4.46: Chapter 1 - Practice exercise part (a) preview.

Chapter 1: Part (b)

Part (b) of the practice exercise question in chapter 1 was a multiple choice question.

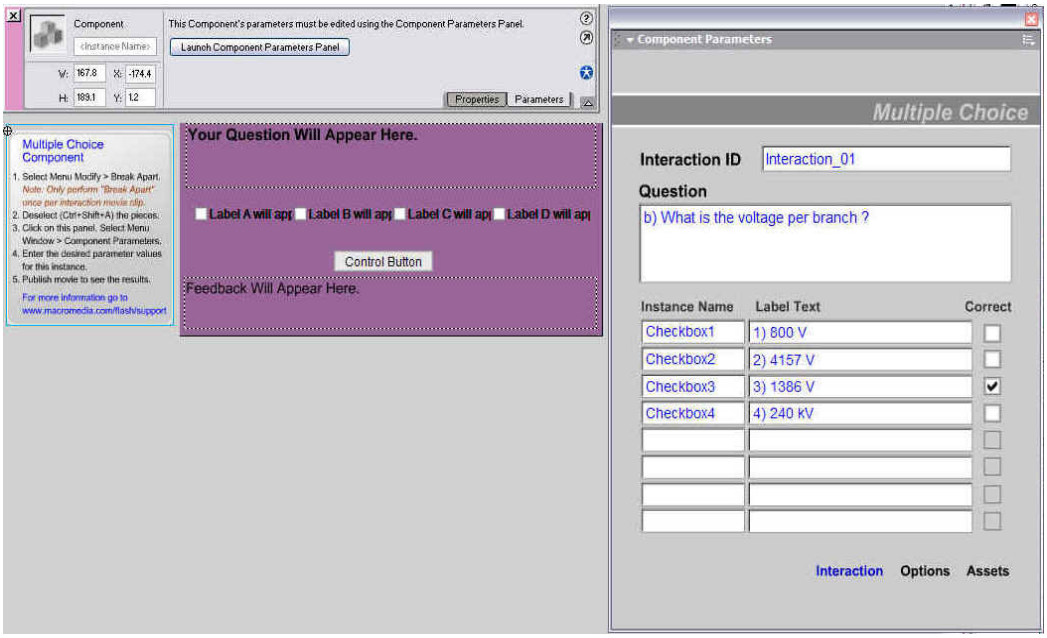


Figure 4.47: Chapter 1 - Practice exercise part (b) “Interaction” settings.

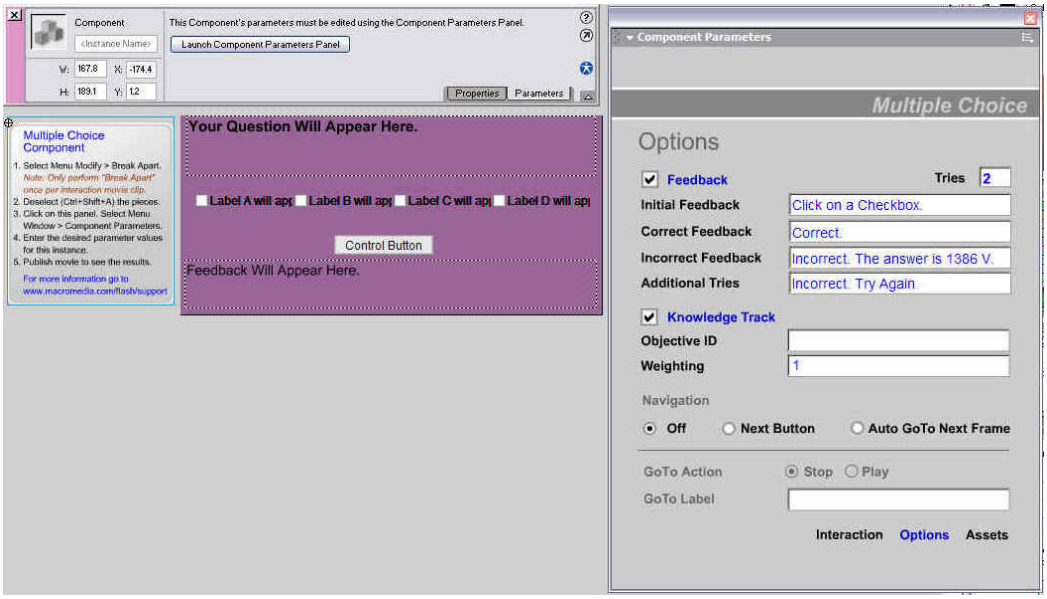


Figure 4.48: Chapter 1 - Practice exercise part (b) “Options” settings.

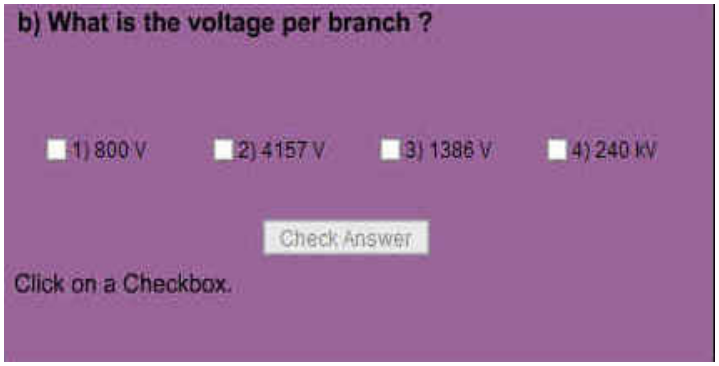


Figure 4.49: Chapter 1 - Practice exercise part (b) preview.

Chapter 1: Part (c)

Part (c) of the practice exercise question in chapter 1 was a drag and drop question.

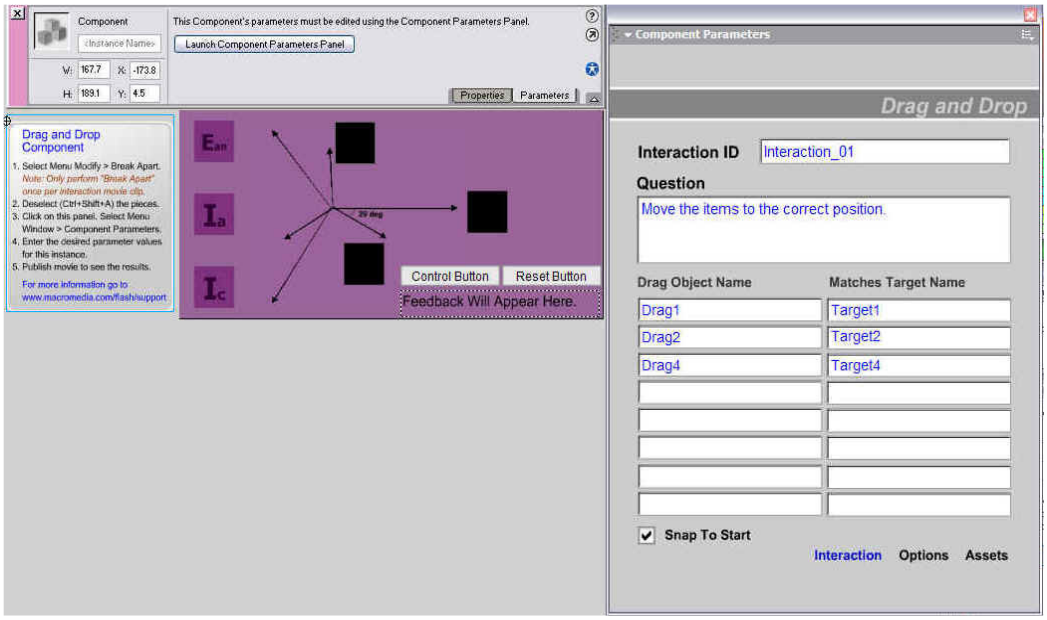


Figure 4.50: Chapter 1 - Practice exercise part (c) “Interaction” settings.

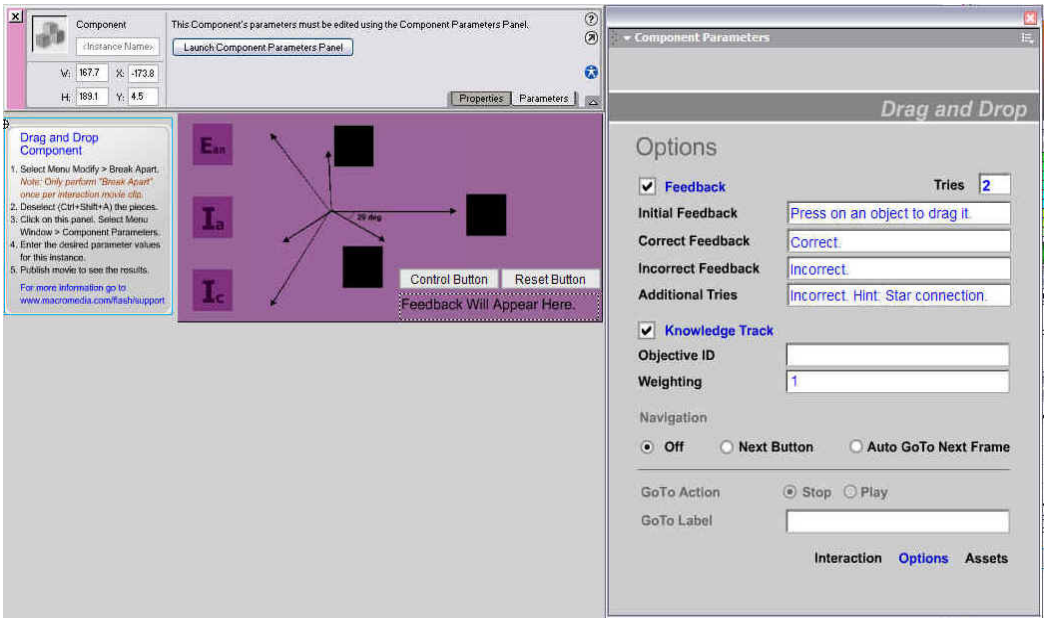


Figure 4.51: Chapter 1 - Practice exercise part (c) “Options” settings.

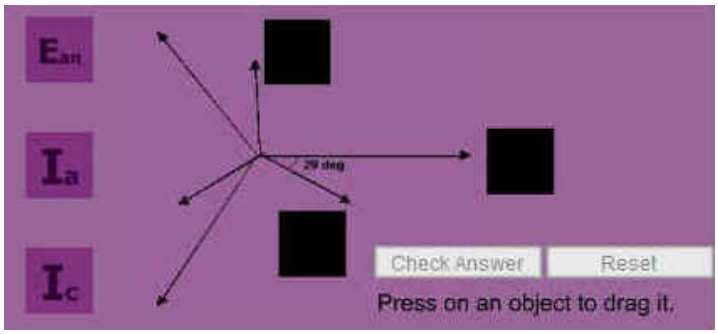


Figure 4.52: Chapter 1 - Practice exercise part (c) preview.

4.3.2 Chapter 2: Practice exercise

Chapter 2: Part (a)

Part (a) of the practice exercise question in chapter 2 was a multiple choice question.

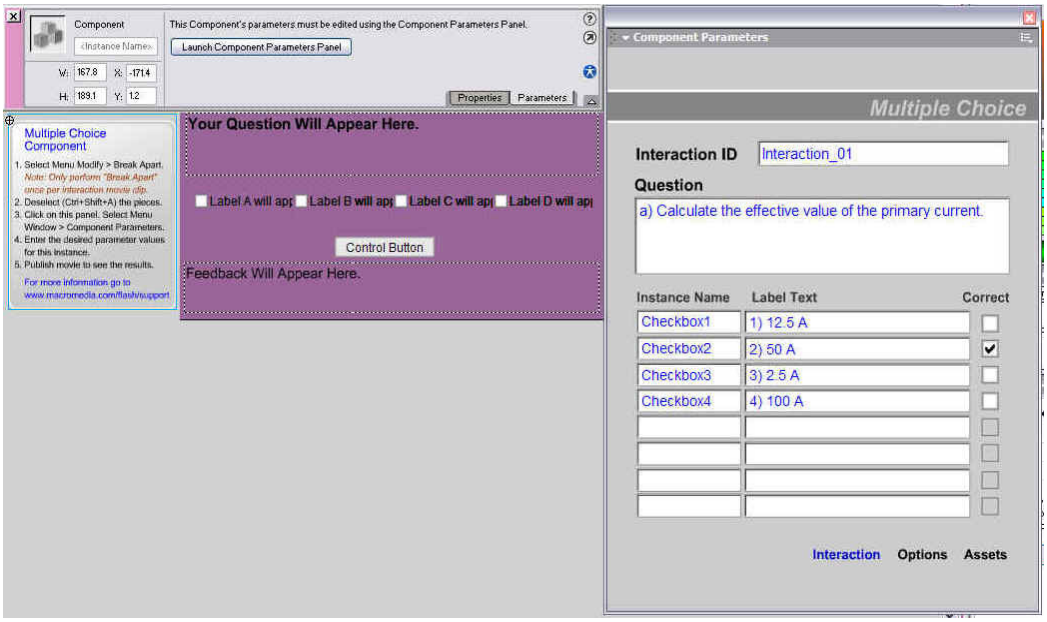


Figure 4.53: Chapter 2 - Practice exercise part (a) “Interaction” settings.

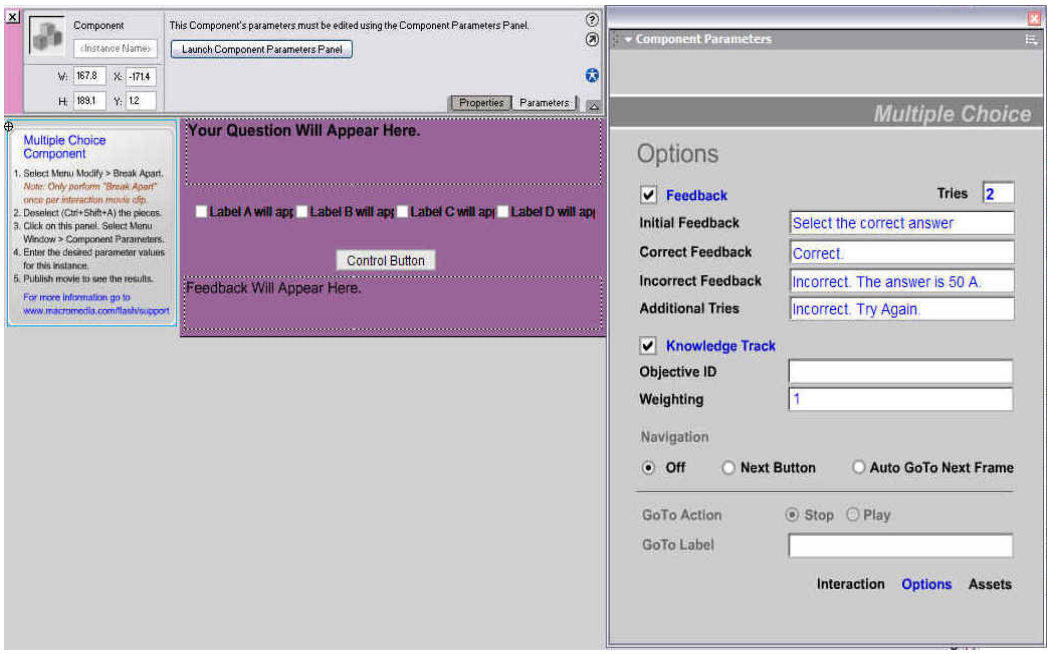


Figure 4.54: Chapter 2 - Practice exercise part (a) “Options” settings.

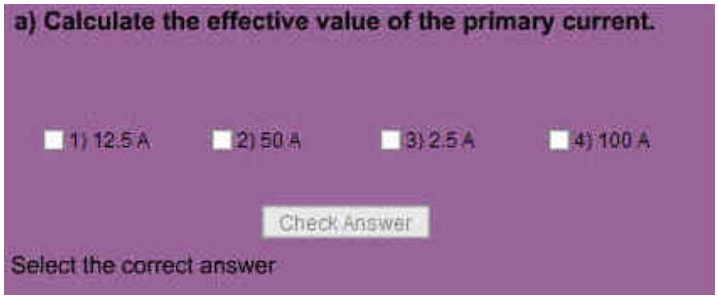


Figure 4.55: Chapter 2 - Practice exercise part (a) preview.

Chapter 2: Part (b)

Part (b) of the practice exercise question in chapter 2 was a fill in the blank question.

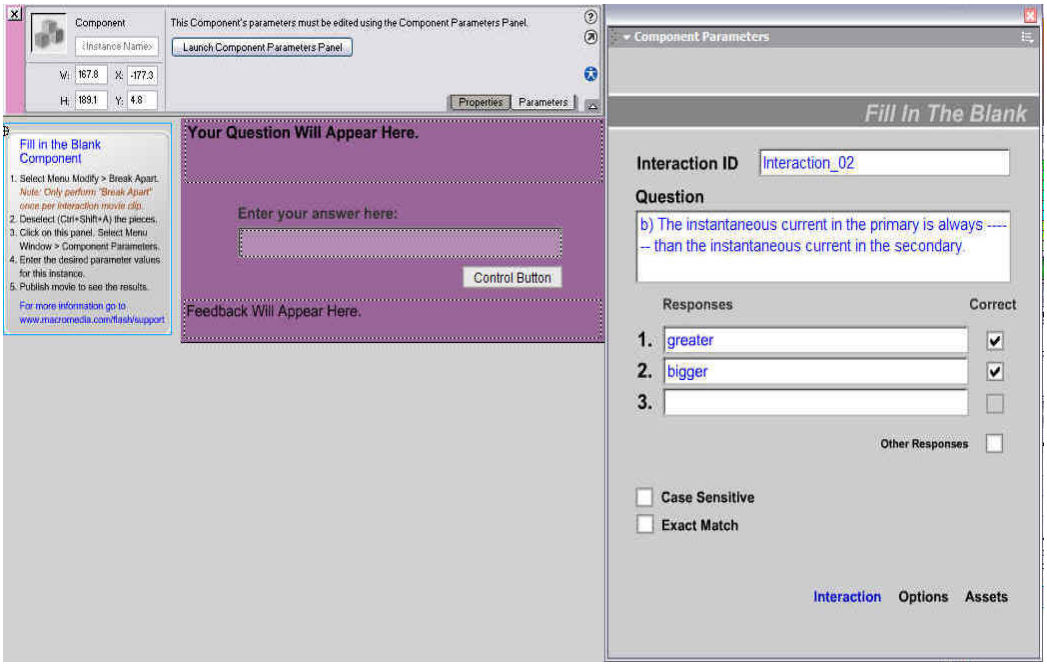


Figure 4.56: Chapter 2 - Practice exercise part (b) “Interaction” settings.

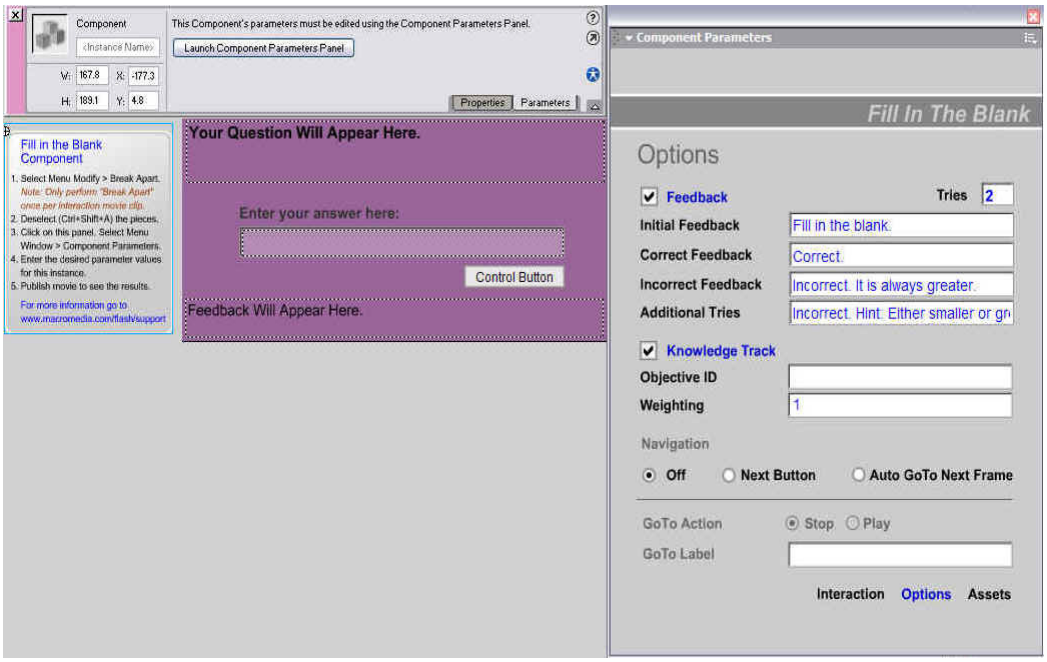


Figure 4.57: Chapter 2 - Practice exercise part (b) "Options" settings.

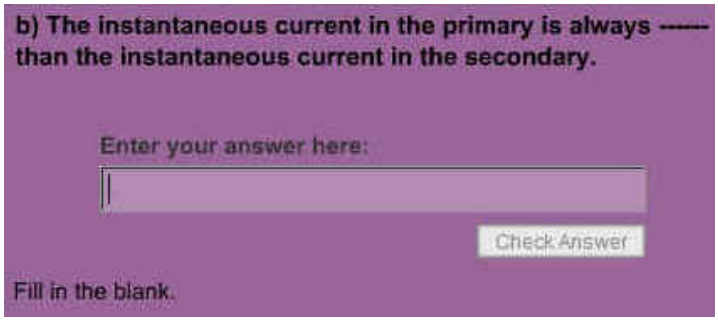


Figure 4.58: Chapter 2 - Practice exercise part (b) preview.

Chapter 2: Part (c)

Part (c) of the practice exercise question in chapter 2 was a drag and drop question.

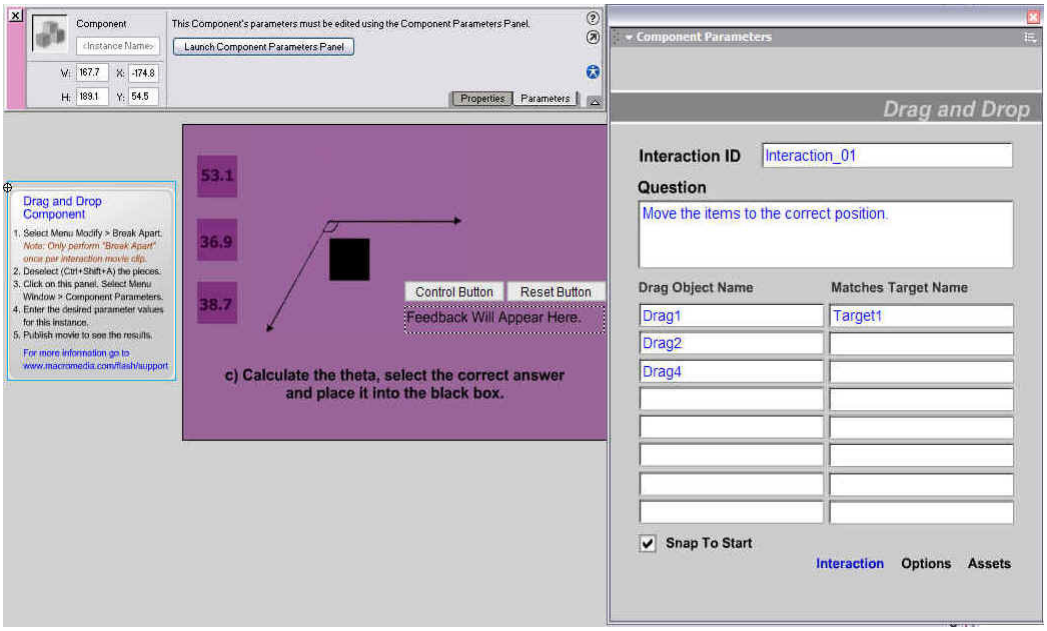


Figure 4.59: Chapter 2 - Practice exercise part (c) “Interaction” settings.

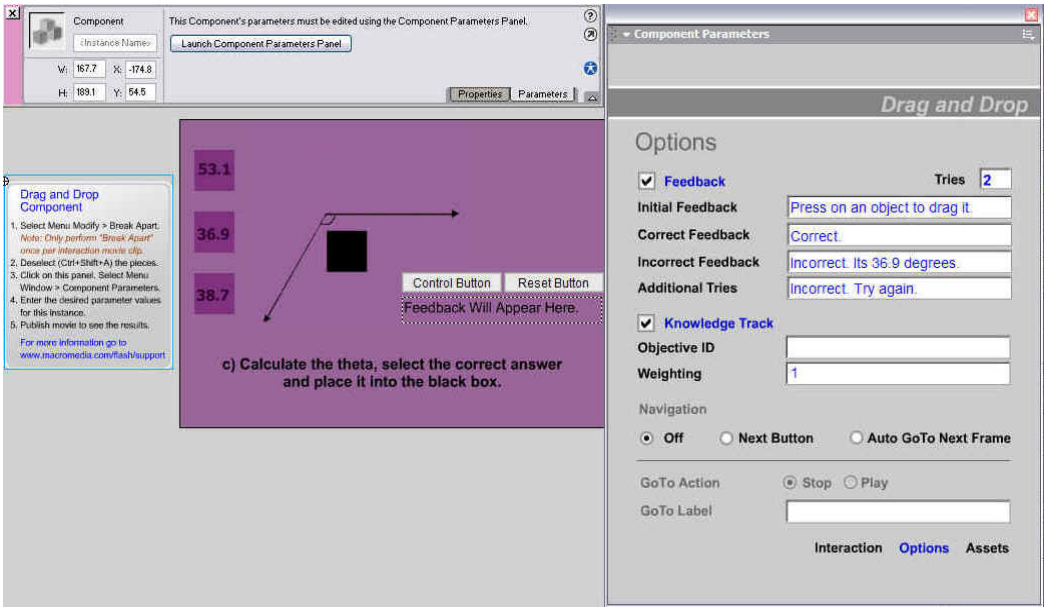


Figure 4.60: Chapter 2 - Practice exercise part (c) "Options" settings.

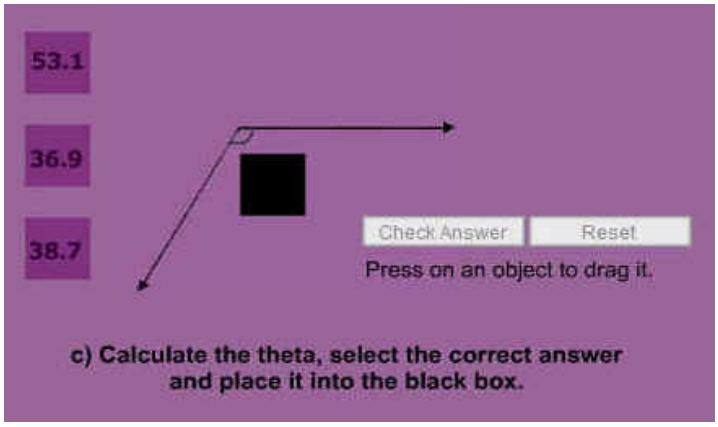


Figure 4.61: Chapter 2 - Practice exercise part (c) preview.

4.3.3 Chapter 3: Practice exercise

Chapter 3: Part (a)

Part (a) of the practice exercise question in chapter 3 was a multiple choice question.

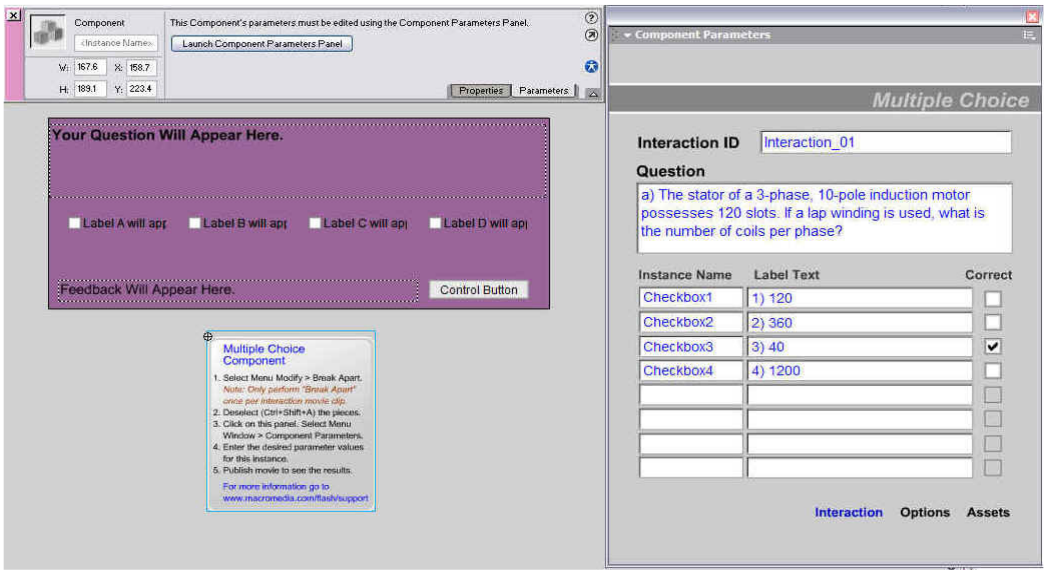


Figure 4.62: Chapter 3 - Practice exercise part (a) “Interaction” settings.

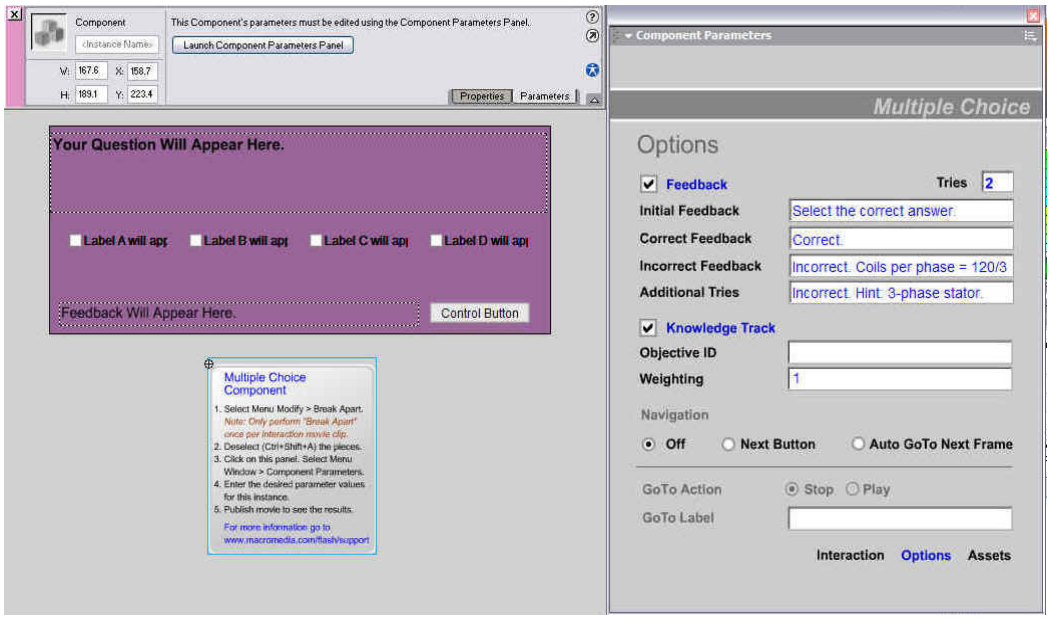


Figure 4.63: Chapter 3 - Practice exercise part (a) "Options" settings.

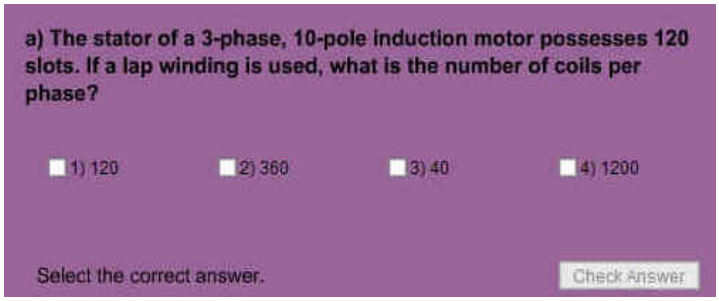


Figure 4.64: Chapter 3 - Practice exercise part (a) preview.

Chapter 3: Part (b)

Part (b) of the practice exercise question in chapter 3 was a fill in the blank question.

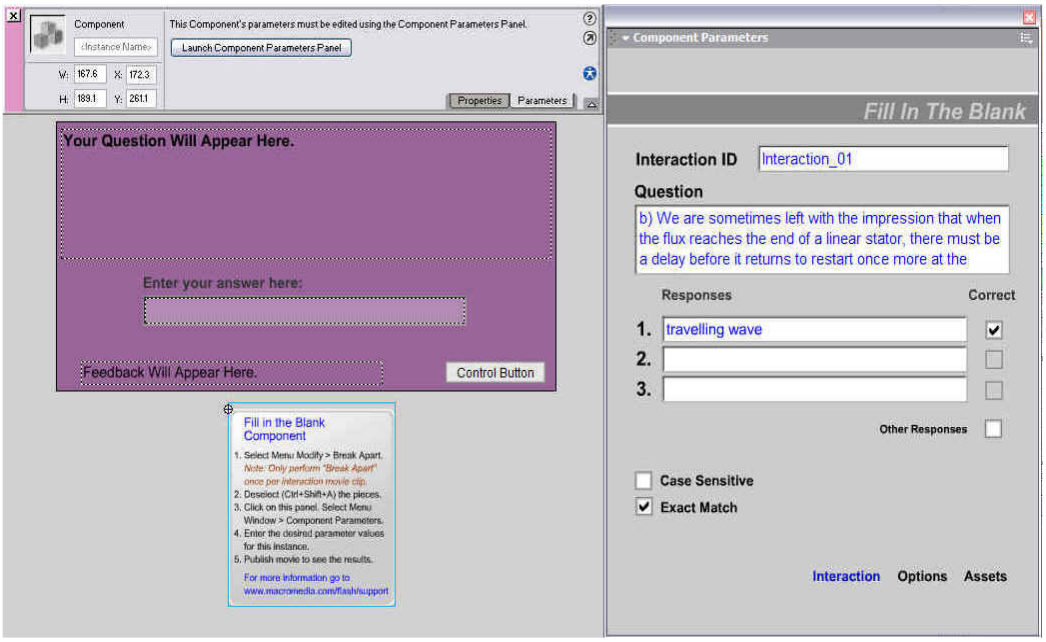


Figure 4.65: Chapter 3 - Practice exercise part (b) “Interaction” settings.

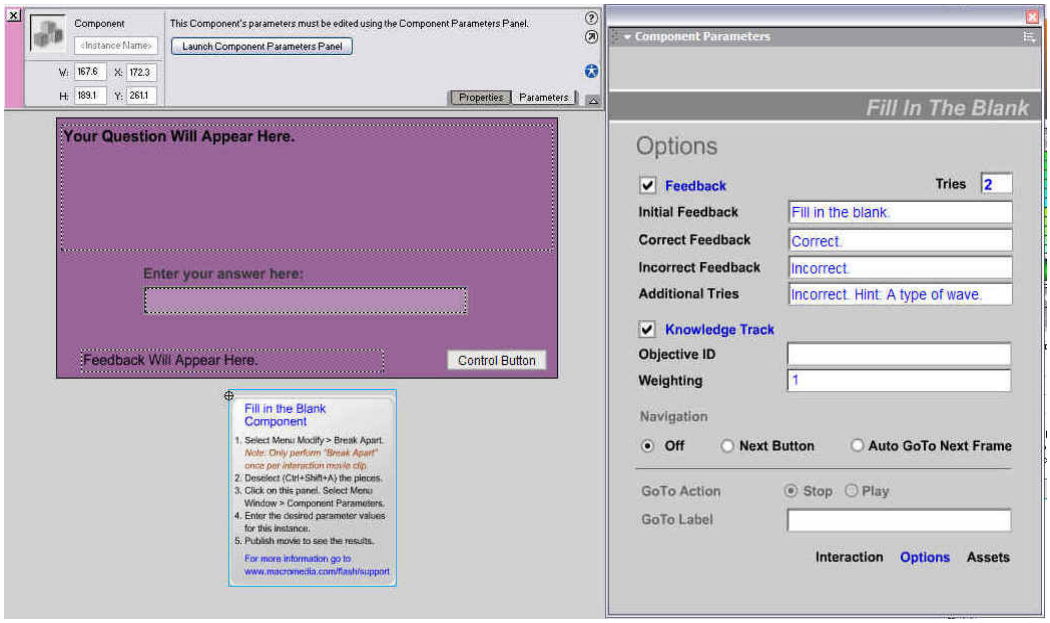


Figure 4.66: Chapter 3 - Practice exercise part (b) "Options" settings.

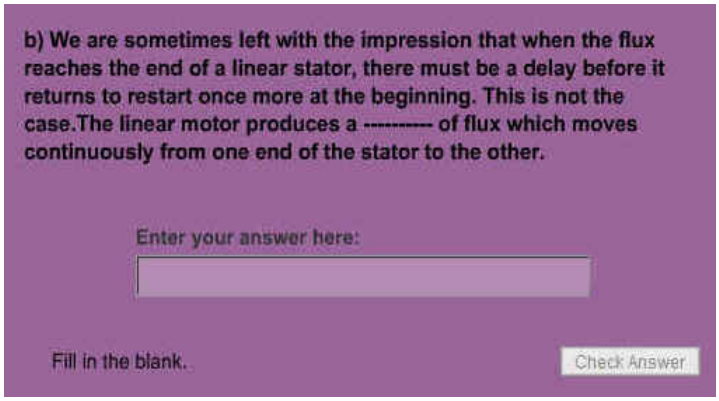


Figure 4.67: Chapter 3 - Practice exercise part (b) preview.

Chapter 3: Part (c)

Part (c) of the practice exercise question in chapter 3 was a true or false question. It was considered one question but actually had three true or false questions in it. Thus three "True or False" question templates were used but with similar component parameters "Options" settings.

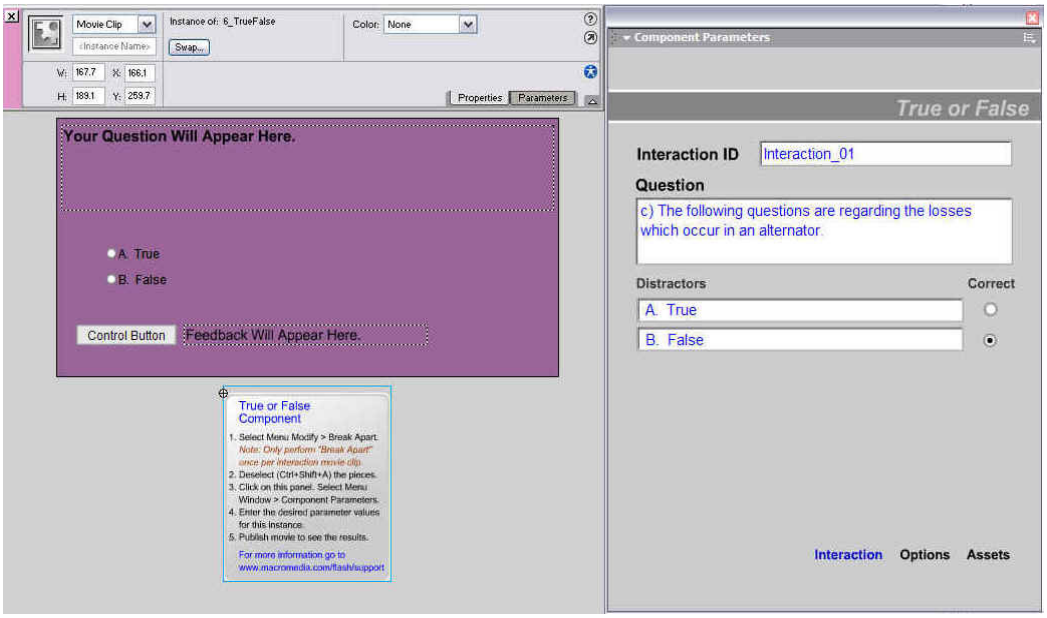


Figure 4.68: Chapter 3 - Practice exercise part (c), first template "Interaction" settings.

The first “True or False” template for the part (c) of the practice exercise question in chapter 3.

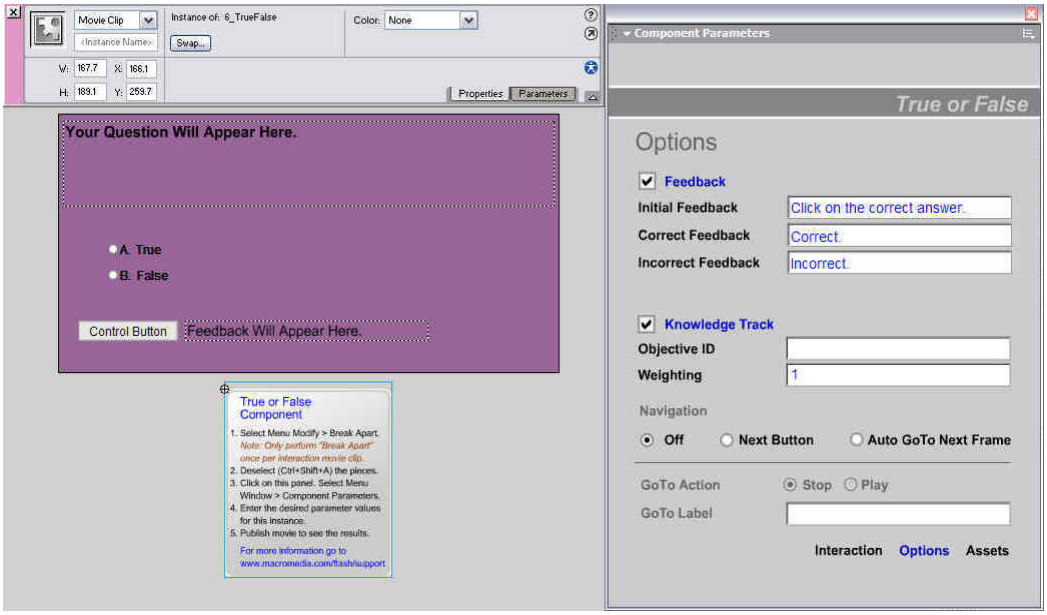


Figure 4.69: Chapter 3 - Practice exercise part (a) “Options” settings.

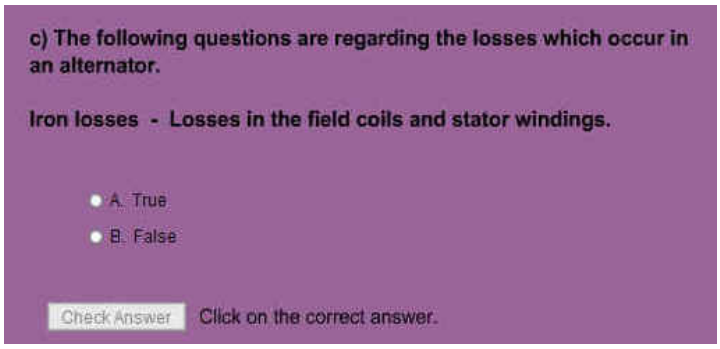


Figure 4.70: Chapter 3 - Practice exercise part (c), first template preview.

The second “True or False” template for the part (c) of the practice exercise question in chapter 3.

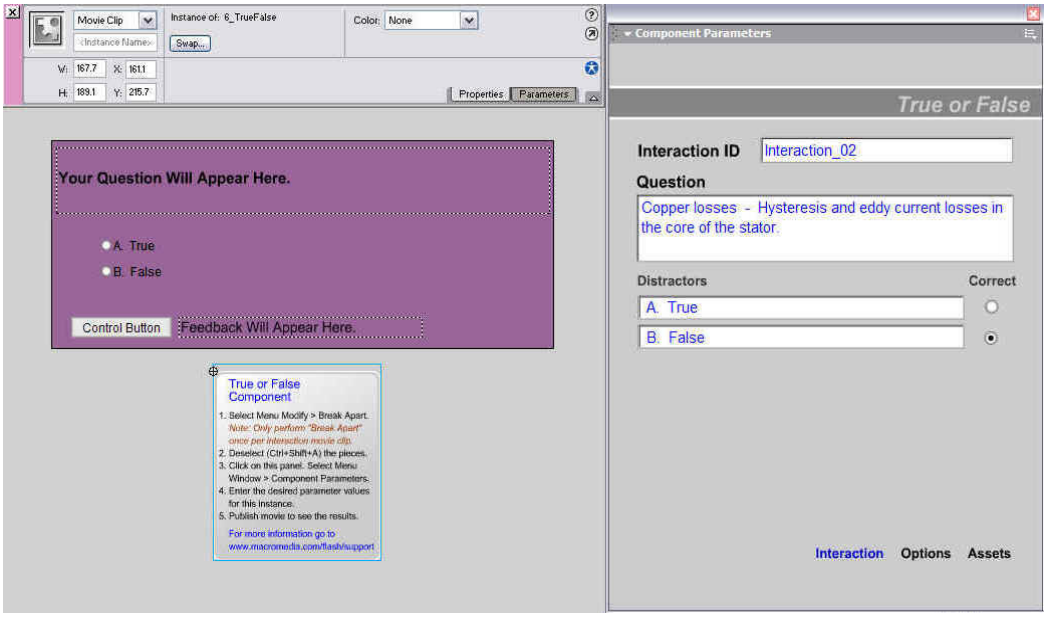


Figure 4.71: Chapter 3 - Practice exercise part (c), second template “Interaction” settings.

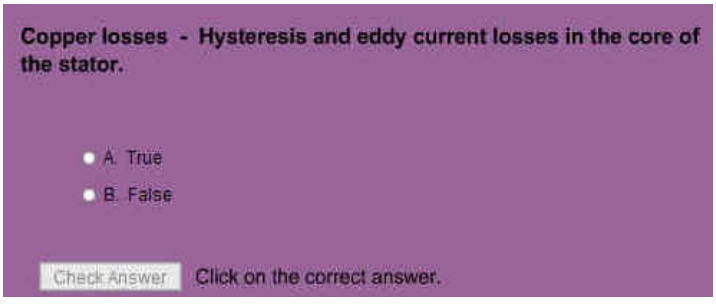


Figure 4.72: Chapter 3 - Practice exercise part (c), second template preview.

The third “True or False” template for the part (c) of the practice exercise question in chapter 3.

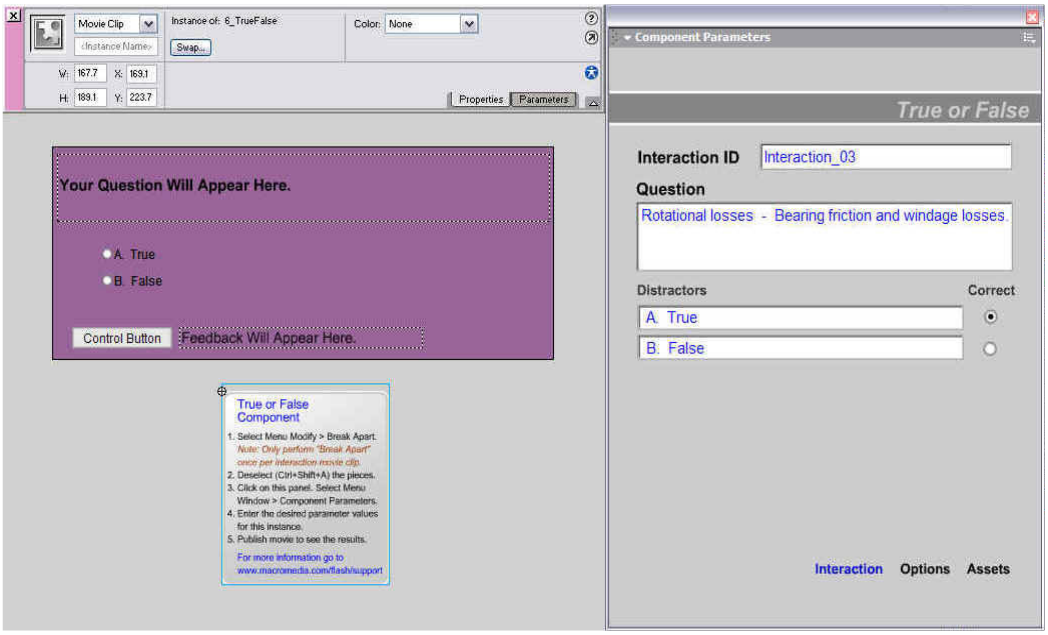


Figure 4.73: Chapter 3 - Practice exercise part (c), third template “Interaction” settings.

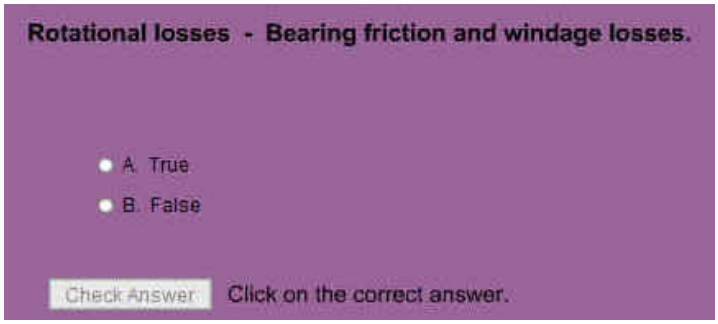


Figure 4.74: Chapter 3 - Practice exercise part (c), third template preview.

4.4 Online Quiz

In comparison to the practice exercises, the online quiz used a set of frames instead of just one. These keyframes were then compiled together as shown in figure 4.75 page 101 and each frame was set as one question for the quiz. Some of these frames were tweened as they were to be kept the same throughout the online quiz. The difference did not just stop at the frames. There were also more layers for the online quiz, six to be precise. Each layer represents a criterion for the quiz. One such layer was the background layer, as the background design for all the frames needed to be the same throughout the whole quiz. Each layer for the quiz could also be kept hidden or could be locked so they could not be accidentally amended. These features could again be seen in the figure 4.75 on page 101. The layers were:

1. Title – The title for the main quiz page.
2. Interactions – The quiz elements or type of question for each page of the quiz.
3. _controls – The layer to show the component parameters window of the quiz.
4. MyIstru – The display text at the end of the quiz.
5. _bckgrnd – The background design for the whole quiz.
6. _actions – The flash programming for the addition of the marks for the quiz.

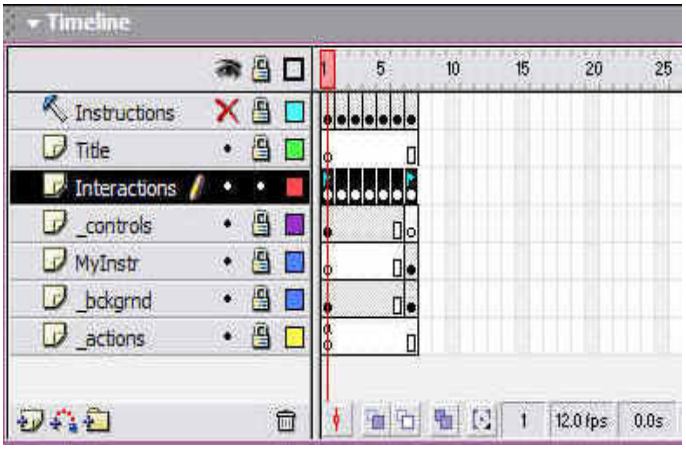


Figure 4.75: A set of timeline frames for each online quiz.

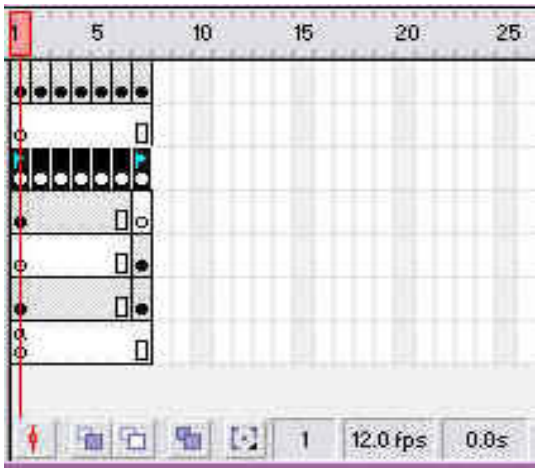


Figure 4.76: Keyframes for each online quiz.

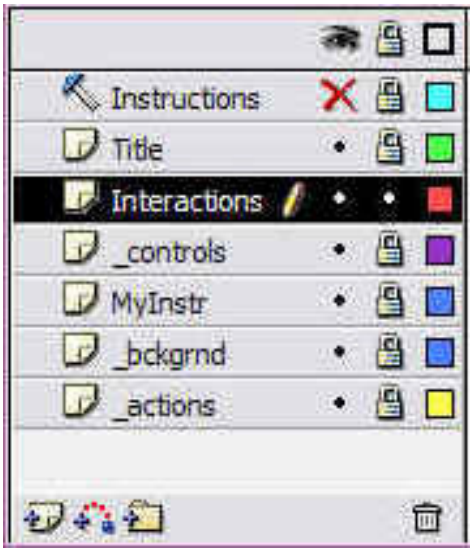


Figure 4.77: The different layers for each online quiz.

The next step was the setting of the background for the quiz. Firstly the “Rectangle Tool” was selected from the “Tools” panel, and then the hexadecimal code colour of “#996699” was chosen. This colour was the same as the webpage design layout.

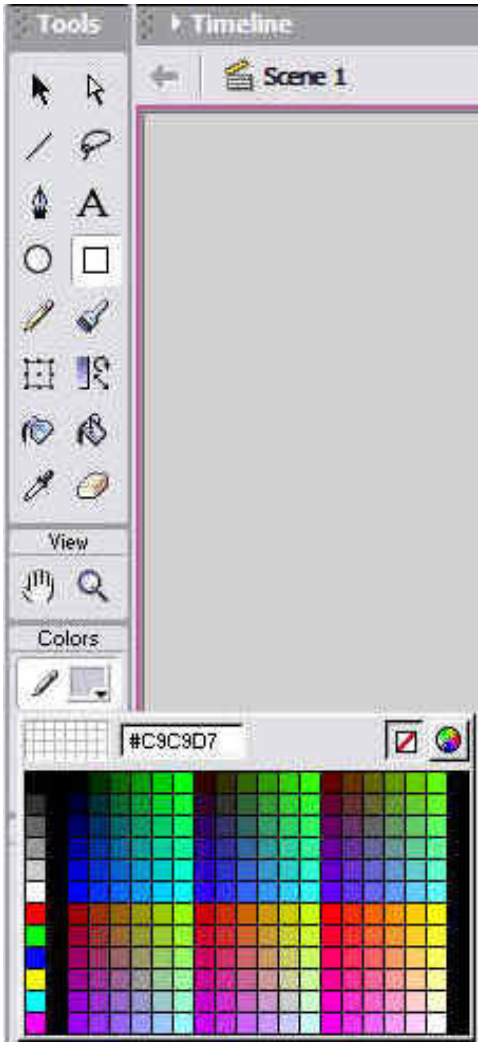


Figure 4.78: Selecting quiz background colour.

The next step was to select the whole area and changed it to the selected colour as shown in figure a on page 2. The “Radial” option was then selected form the “Color Mixer” panel. By adjusting the colour panels as shown on figure 4.79 on page 104, the author was able to produce a lens flare effect for the quiz background. The final background is shown in figure 4.82 on page 105.

Figure 4.79: Setting the colour for the quiz background.

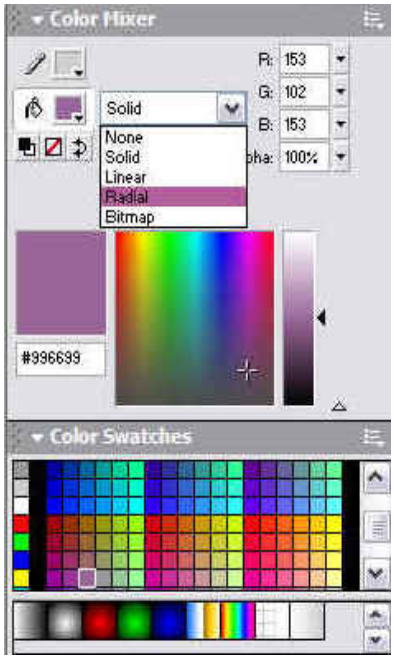


Figure 4.80: Setting to “Radial” mode in the Color Mixer panel.

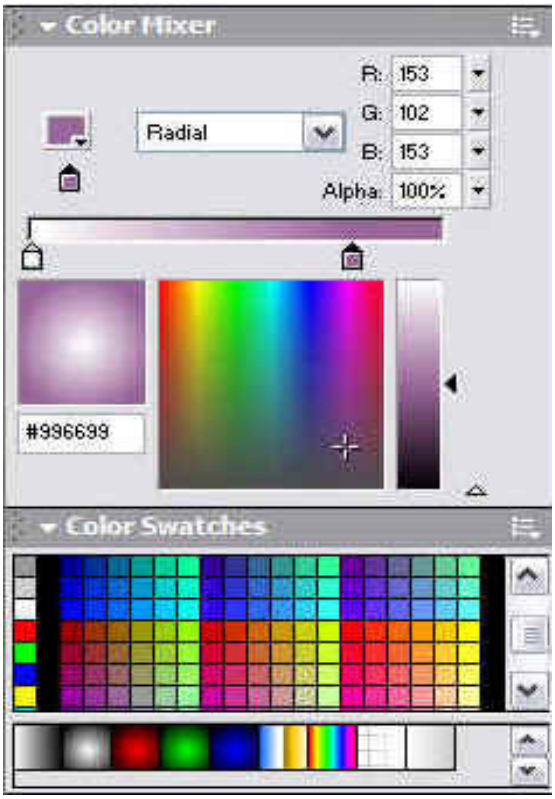


Figure 4.81: Adjusting the colour panels.

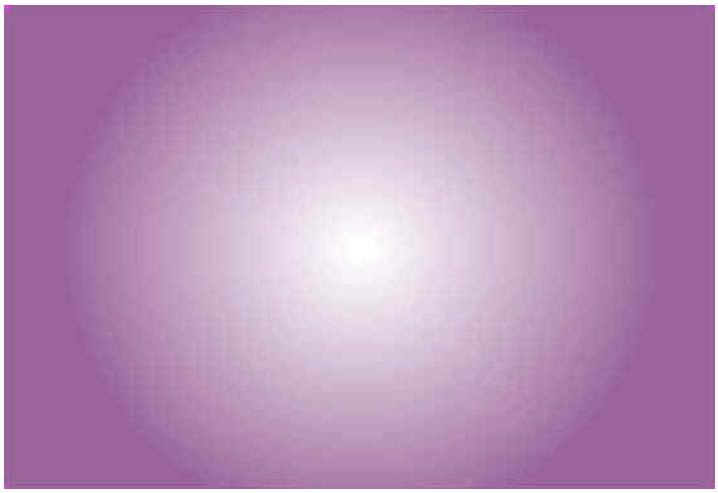


Figure 4.82: Final background for online quiz.

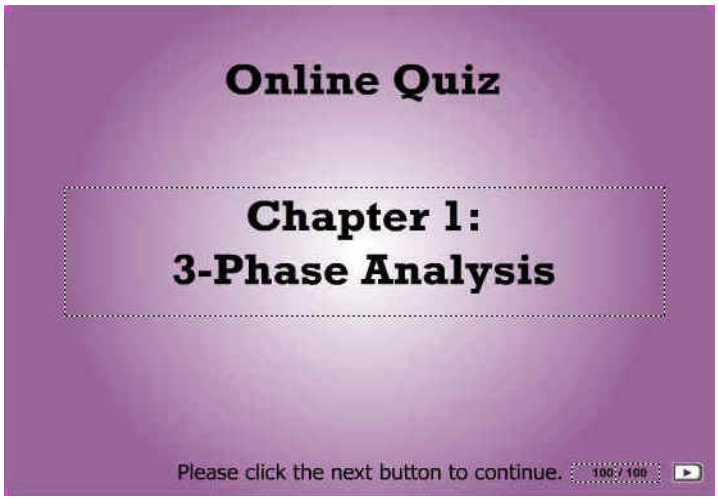


Figure 4.83: Preview of the online quiz.

4.4.1 Chapter 1: Online Quiz

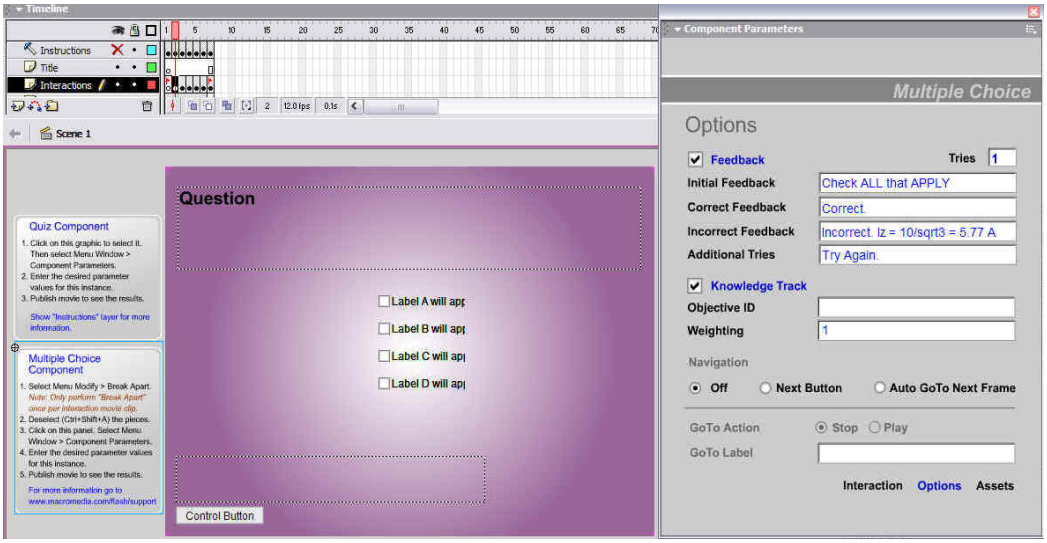


Figure 4.84: Component settings for question 1 of chapter 1 online quiz.

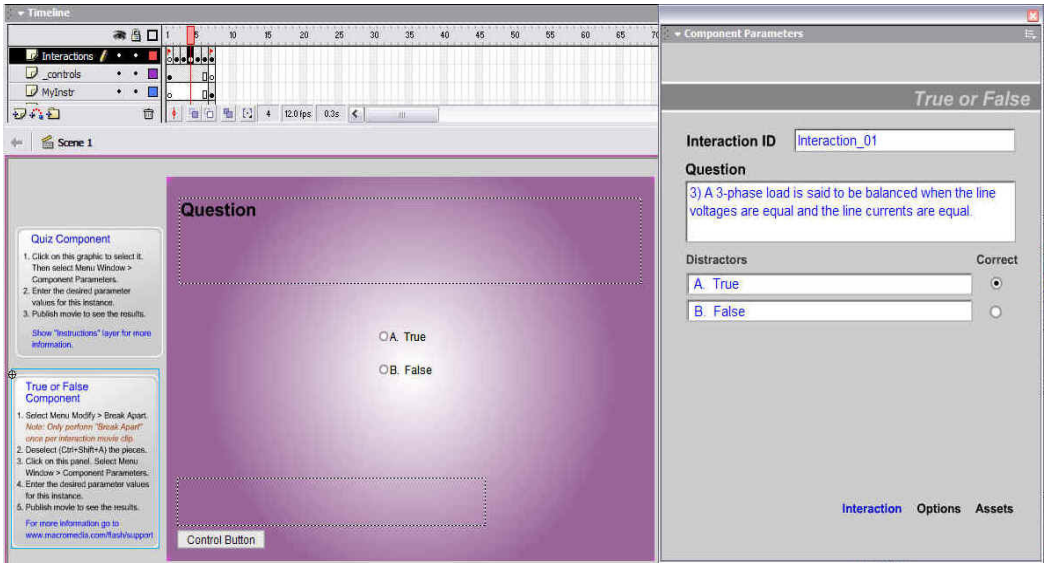


Figure 4.85: Component settings for question 2 of chapter 1 online quiz.

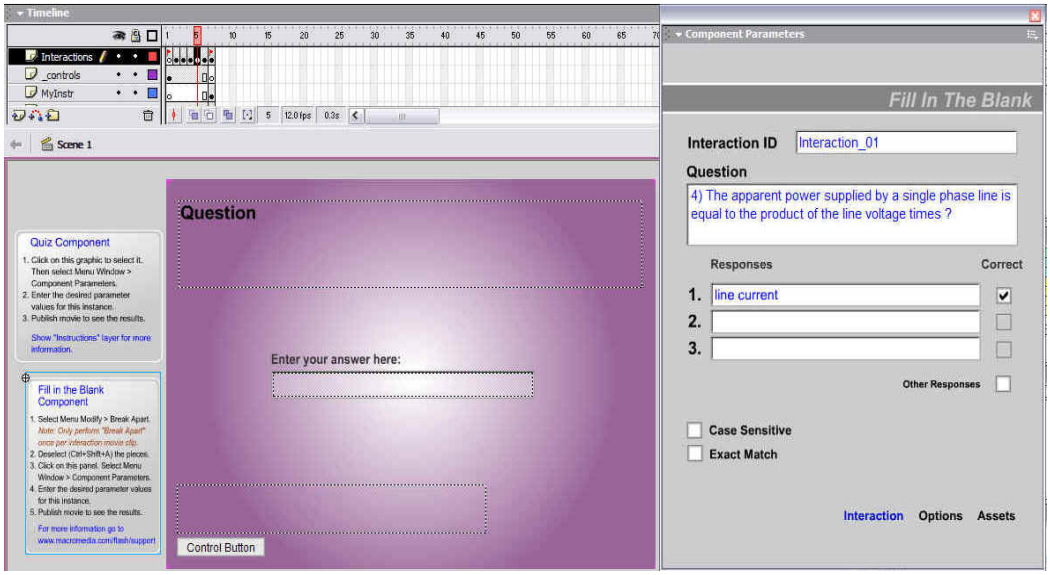


Figure 4.86: Component settings for question 3 of chapter 1 online quiz.

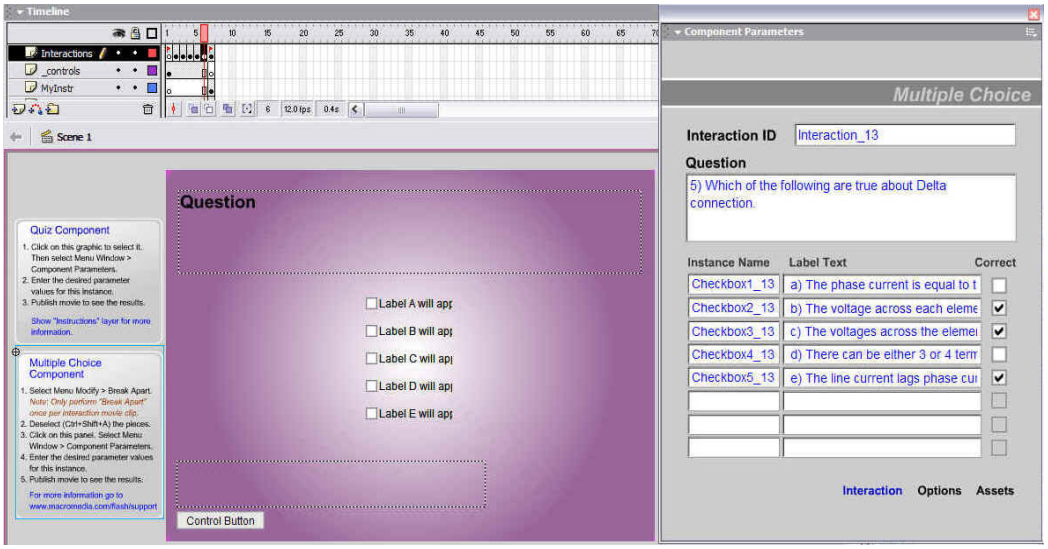


Figure 4.87: Component settings for question 4 of chapter 1 online quiz.

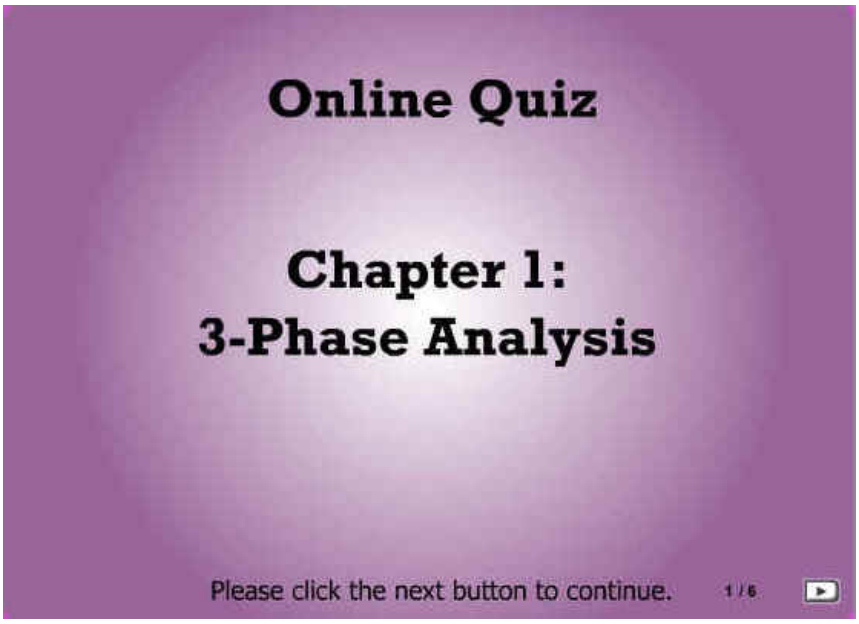


Figure 4.88: Chapter 1 online quiz page 1 preview.

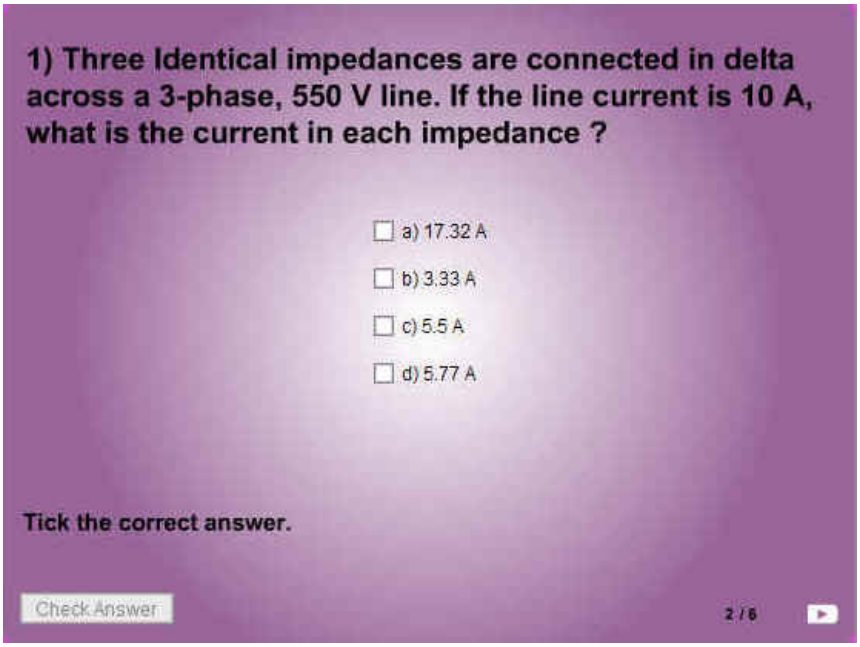


Figure 4.89: Chapter 1 online quiz page 2 preview.

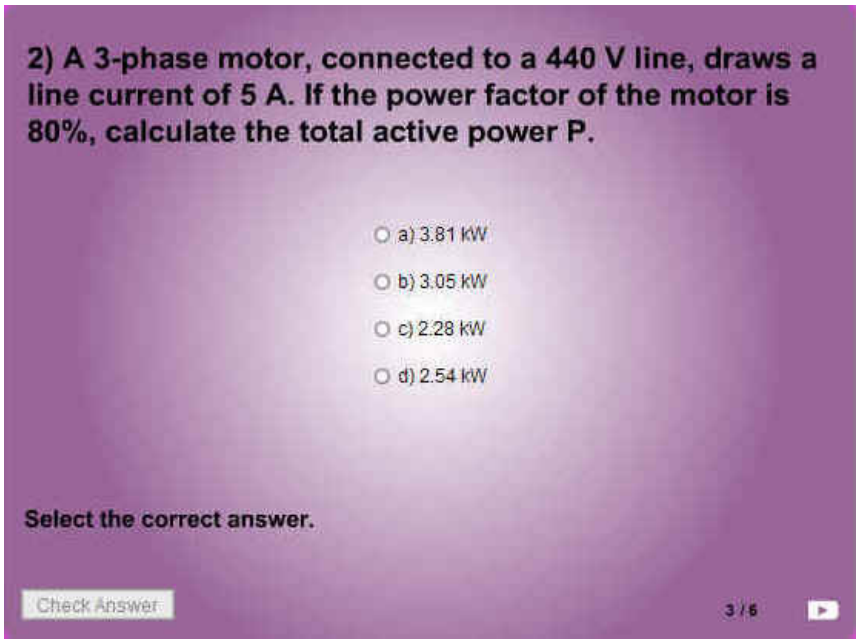


Figure 4.90: Chapter 1 online quiz page 3 preview.

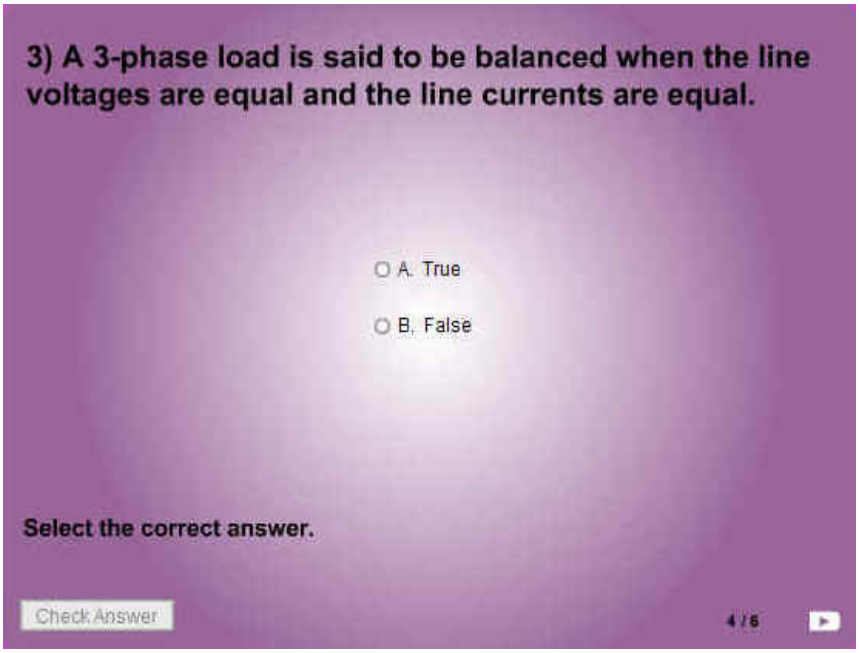


Figure 4.91: Chapter 1 online quiz page 4 preview.

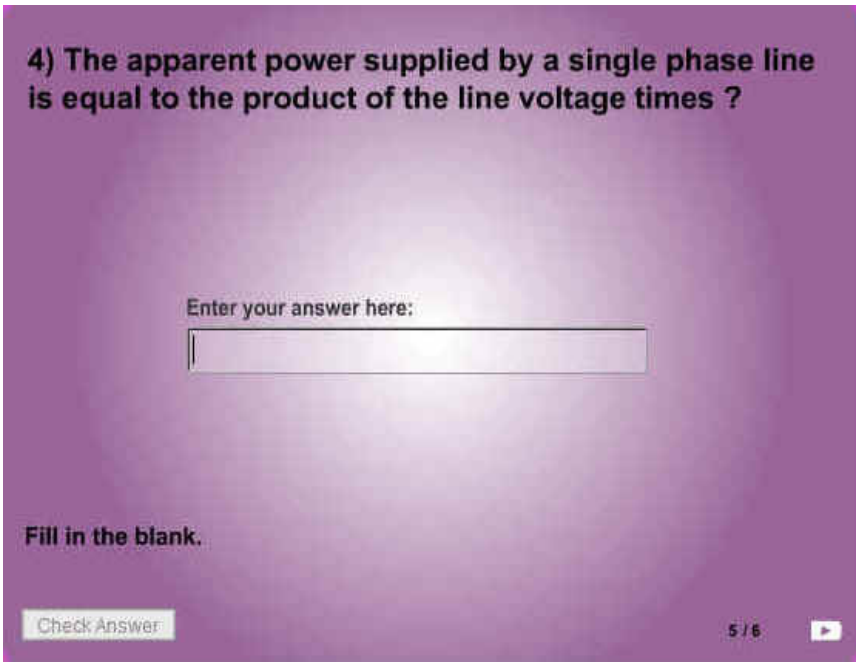


Figure 4.92: Chapter 1 online quiz page 5 preview.

Figure 4.93: Chapter 1 online quiz page 6 preview.

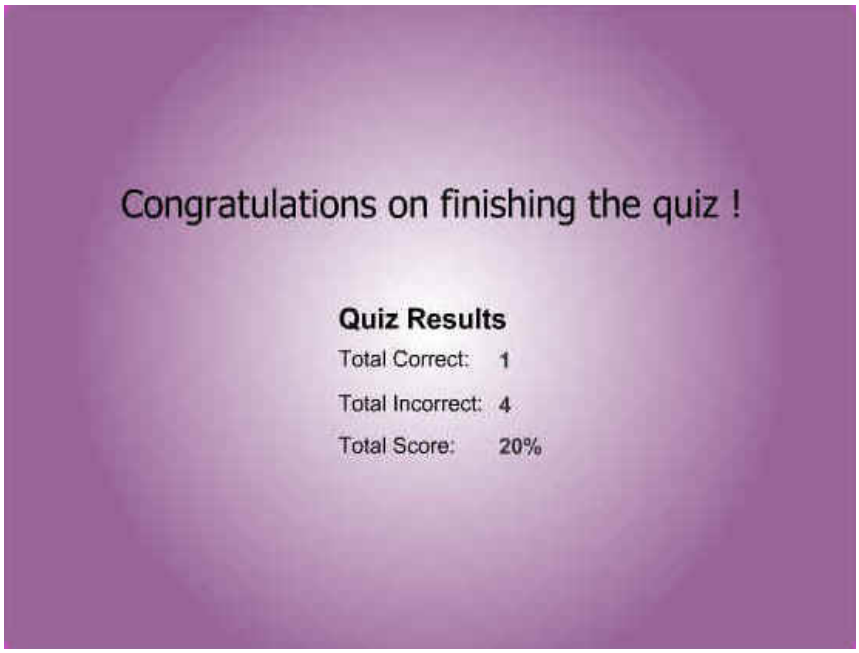


Figure 4.94: Chapter 1 online quiz score page preview.

4.4.2 Chapter 2: Online Quiz

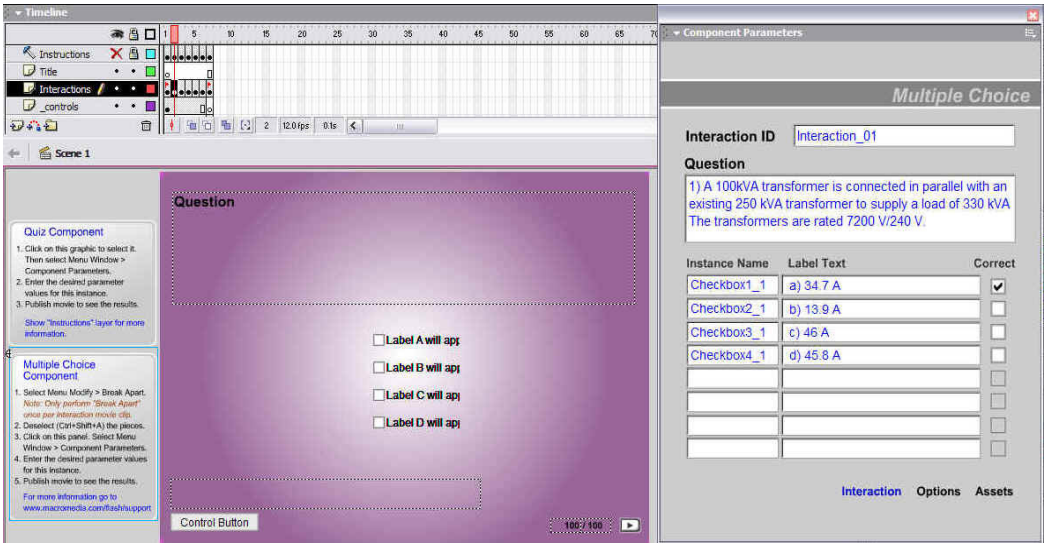


Figure 4.95: Component settings for question 1 of chapter 2 online quiz.

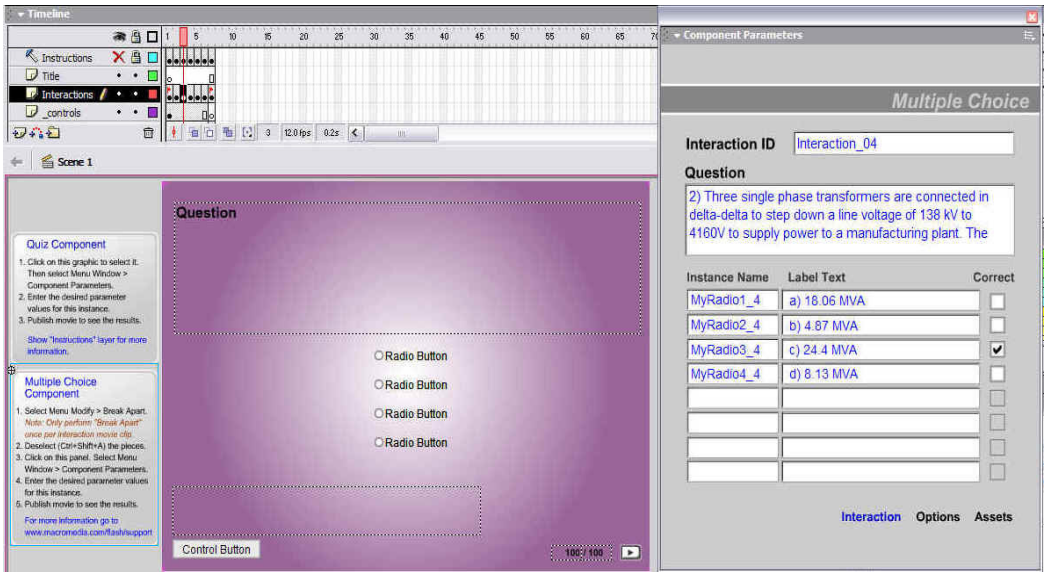


Figure 4.96: Component settings for question 2 of chapter 2 online quiz.

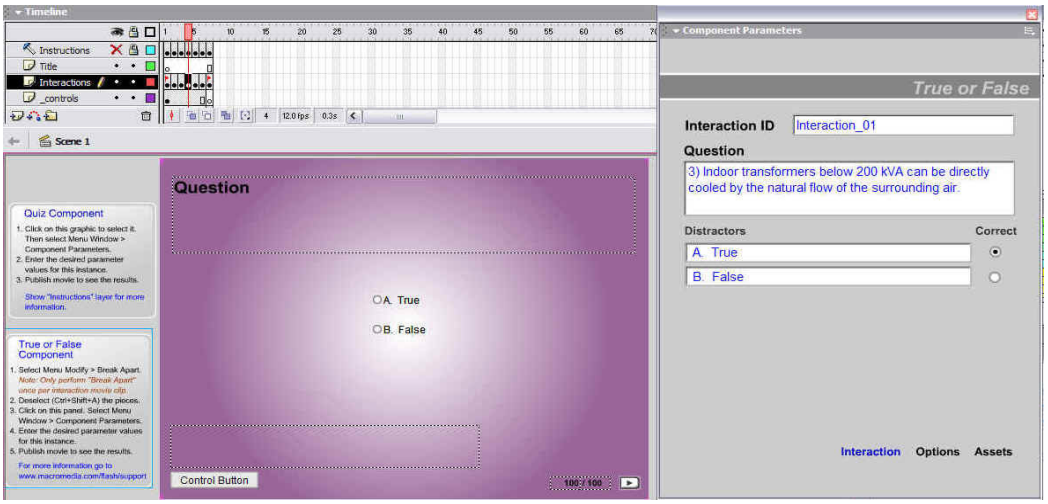


Figure 4.97: Component settings for question 3 of chapter 2 online quiz.

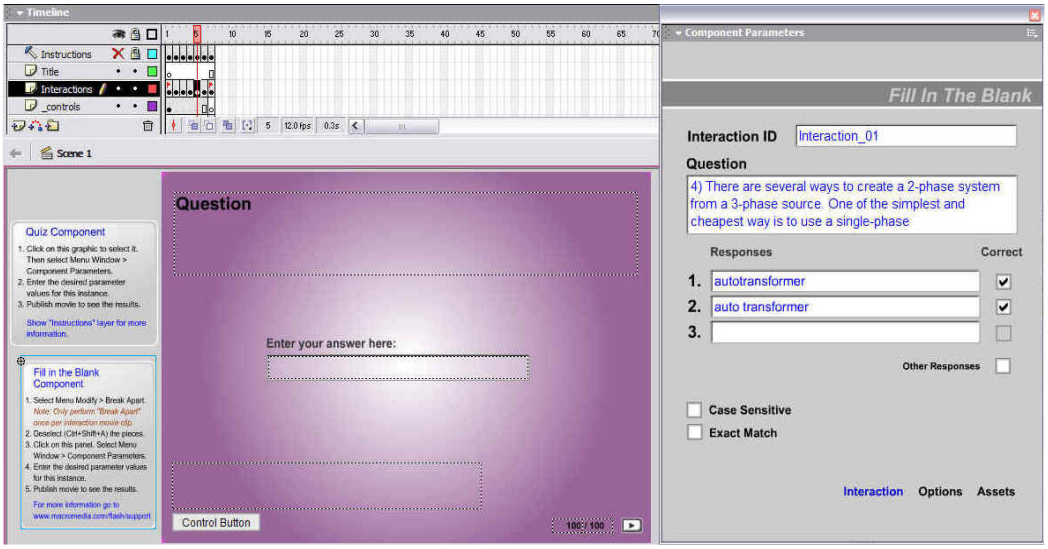


Figure 4.98: Component settings for question 4 of chapter 2 online quiz.

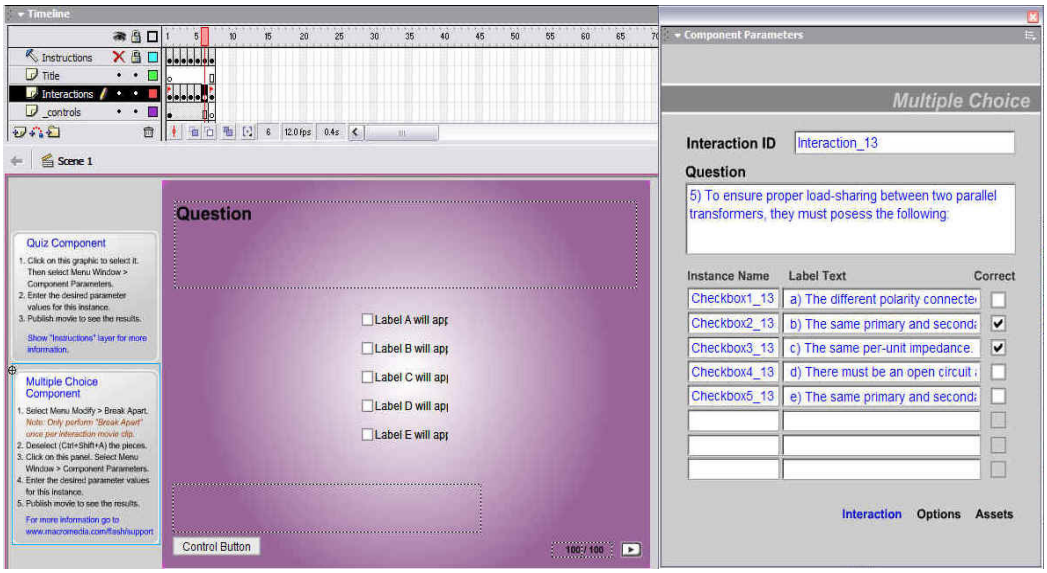


Figure 4.99: Component settings for question 5 of chapter 2 online quiz.

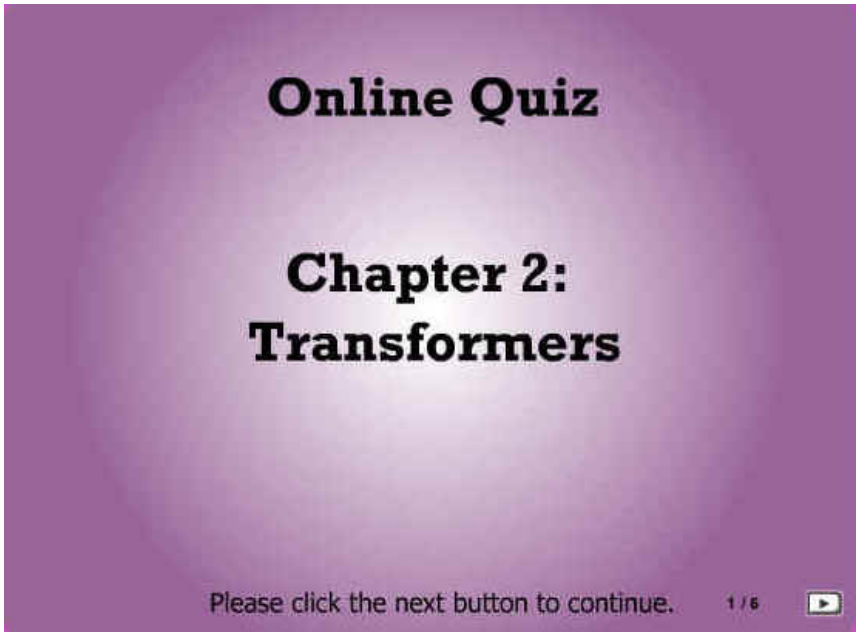


Figure 4.100: Chapter 2 online quiz page 1 preview.

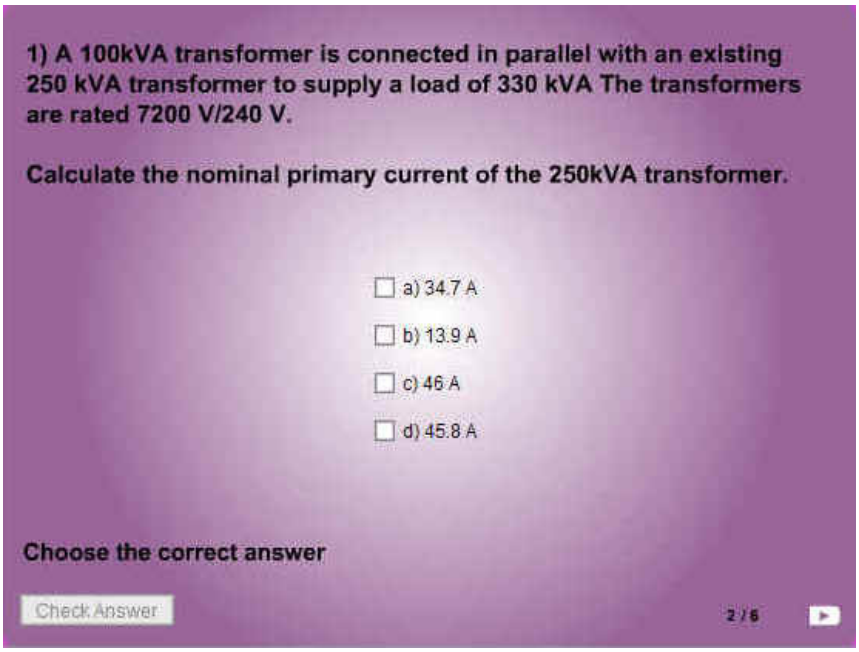


Figure 4.101: Chapter 2 online quiz page 2 preview.

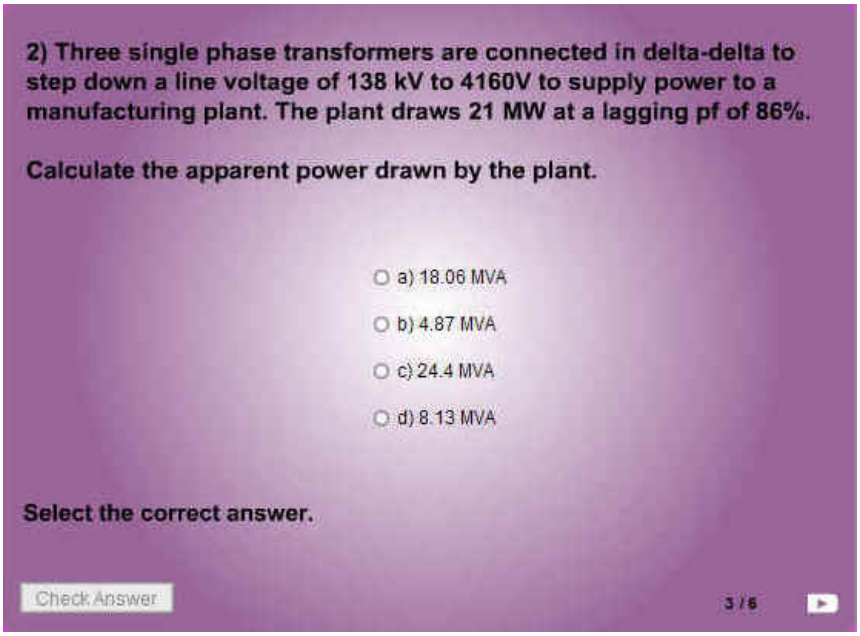


Figure 4.102: Chapter 2 online quiz page 3 preview.

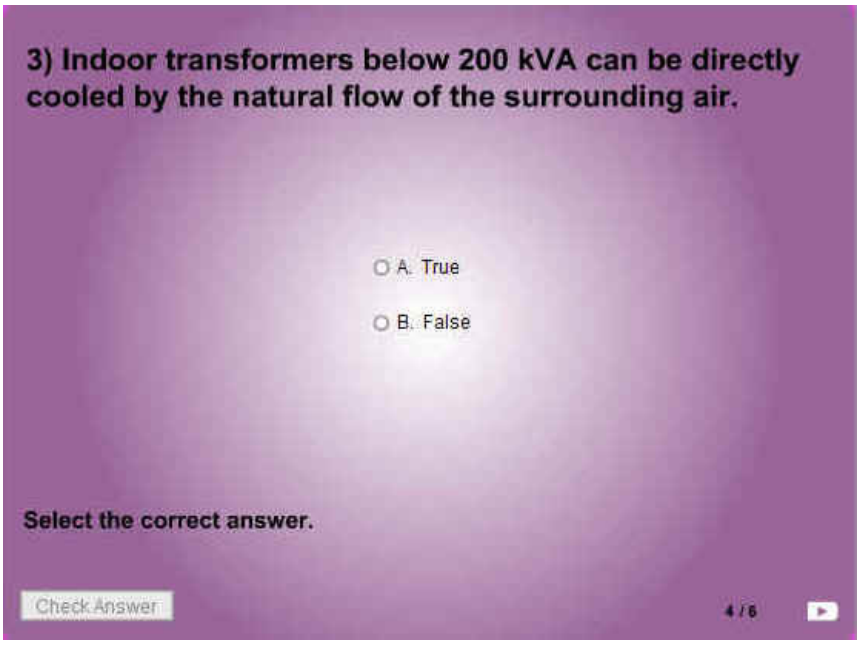


Figure 4.103: Chapter 2 online quiz page 4 preview.

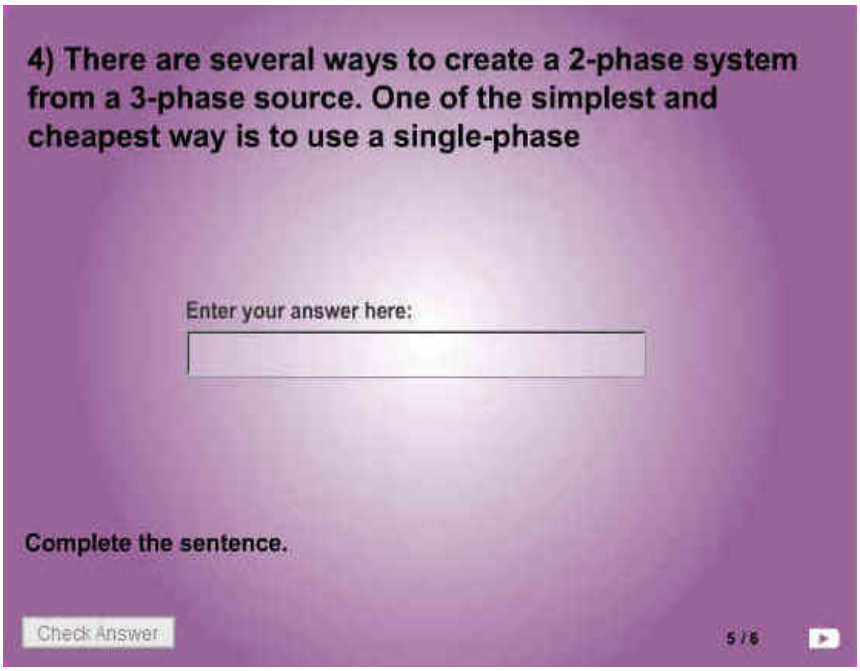


Figure 4.104: Chapter 2 online quiz page 5 preview.

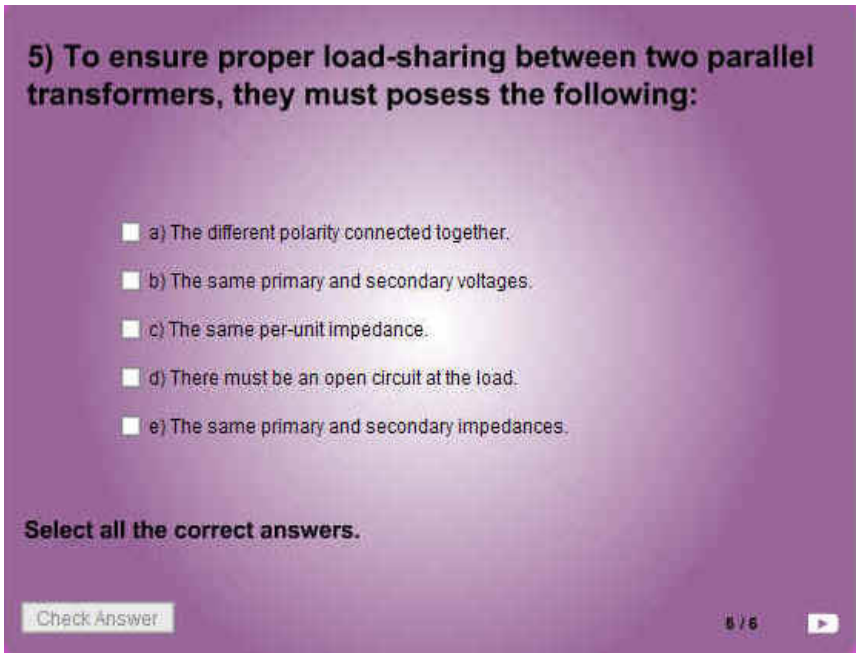


Figure 4.105: Chapter 2 online quiz page 6 preview.

Figure 4.106: Chapter 2 online quiz score page preview.

4.4.3 Chapter 3: Online Quiz

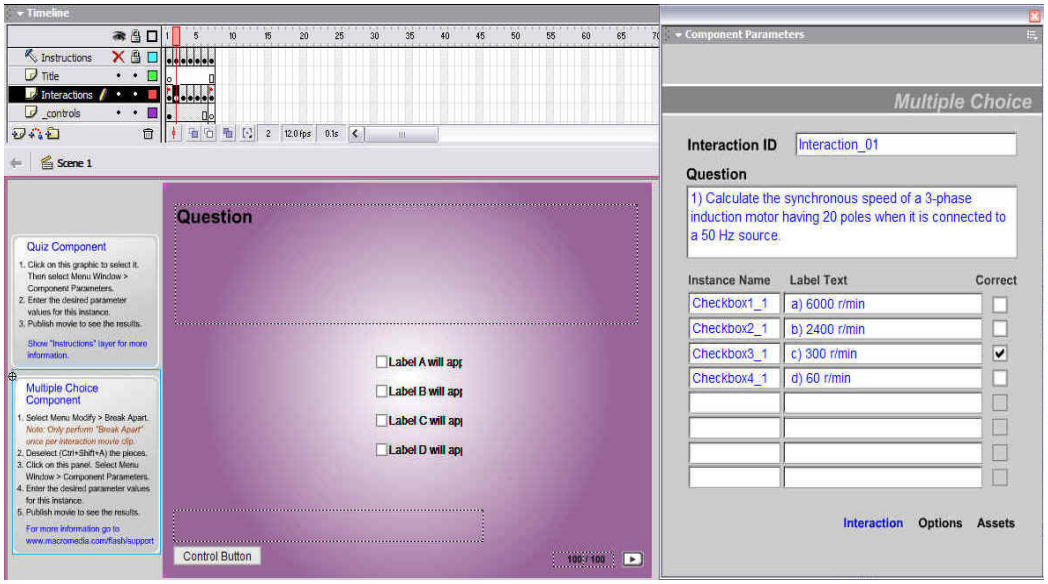


Figure 4.107: Component settings for question 1 of chapter 3 online quiz.

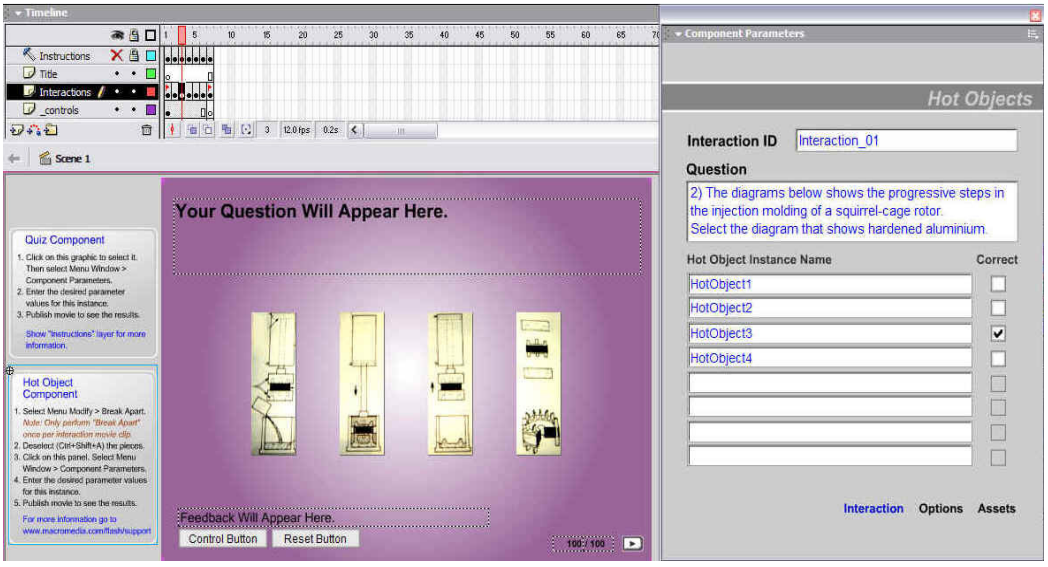


Figure 4.108: Component settings for question 2 of chapter 3 online quiz.

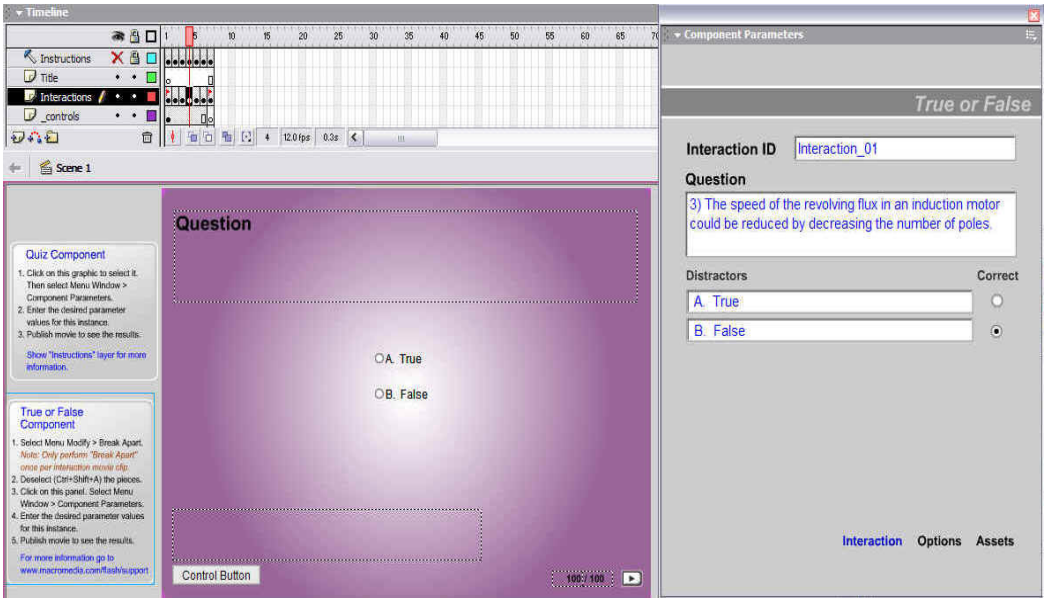


Figure 4.109: Component settings for question 3 of chapter 3 online quiz.

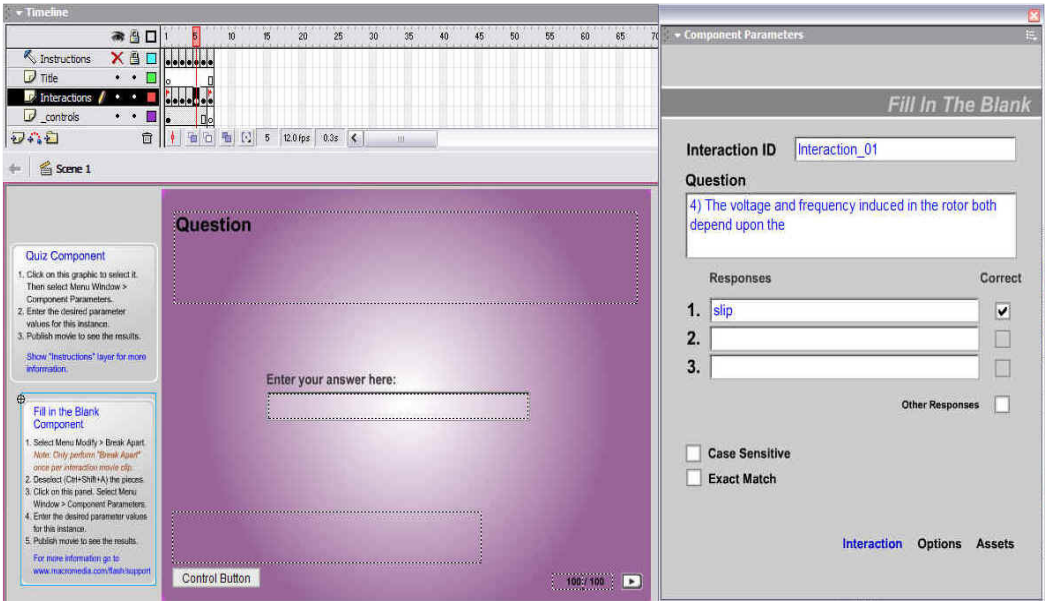


Figure 4.110: Component settings for question 4 of chapter 3 online quiz.

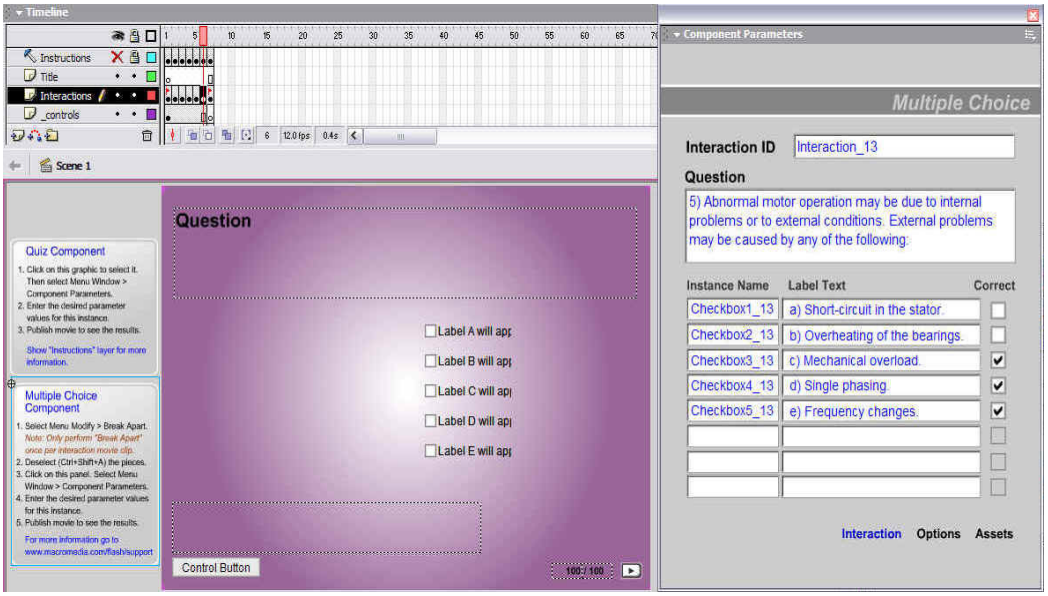


Figure 4.111: Component settings for question 5 of chapter 3 online quiz.

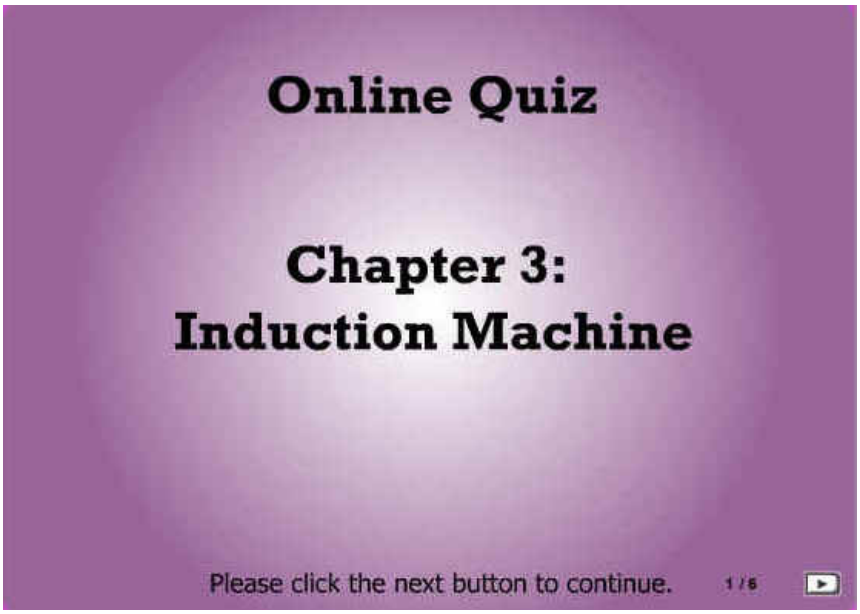


Figure 4.112: Chapter 3 online quiz page 1 preview.

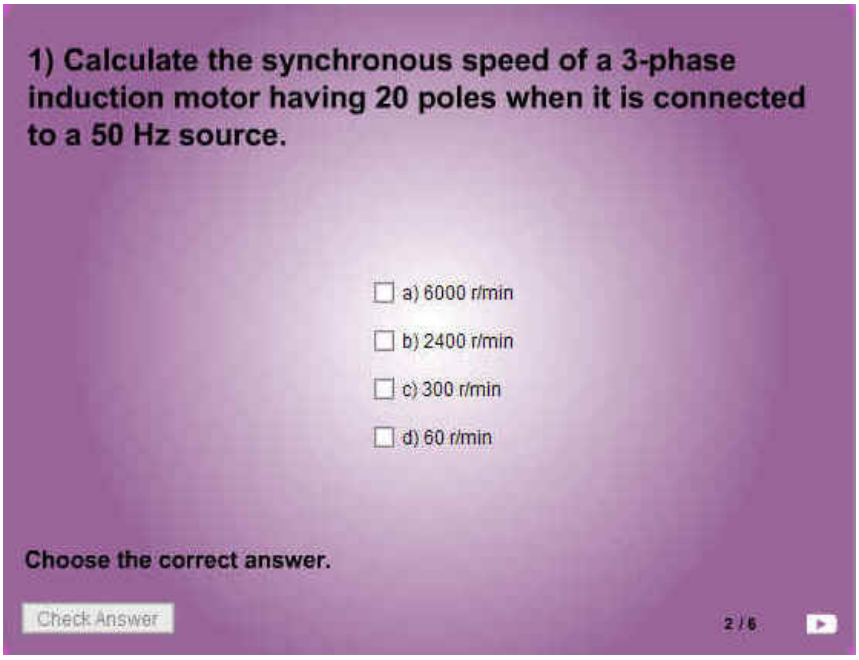


Figure 4.113: Chapter 3 online quiz page 2 preview.

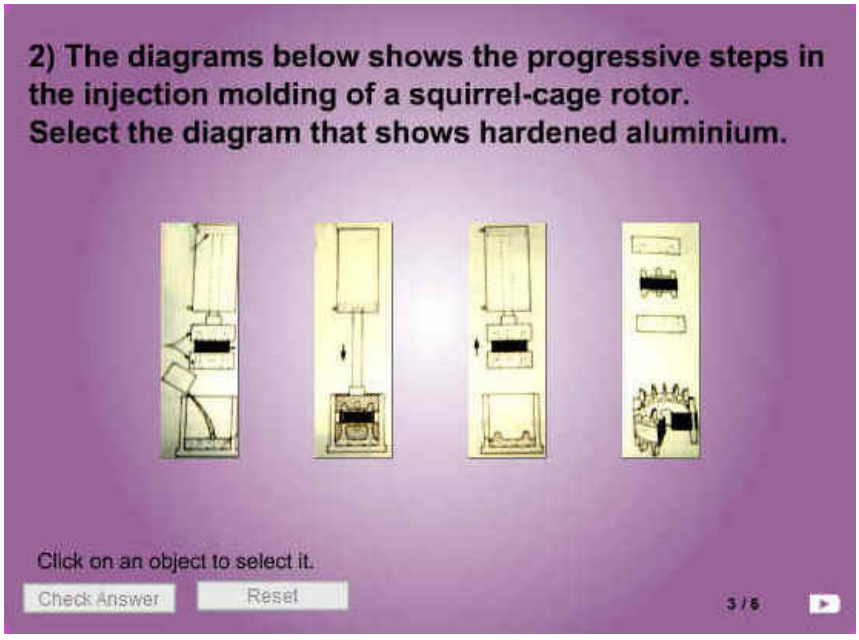


Figure 4.114: Chapter 3 online quiz page 3 preview.

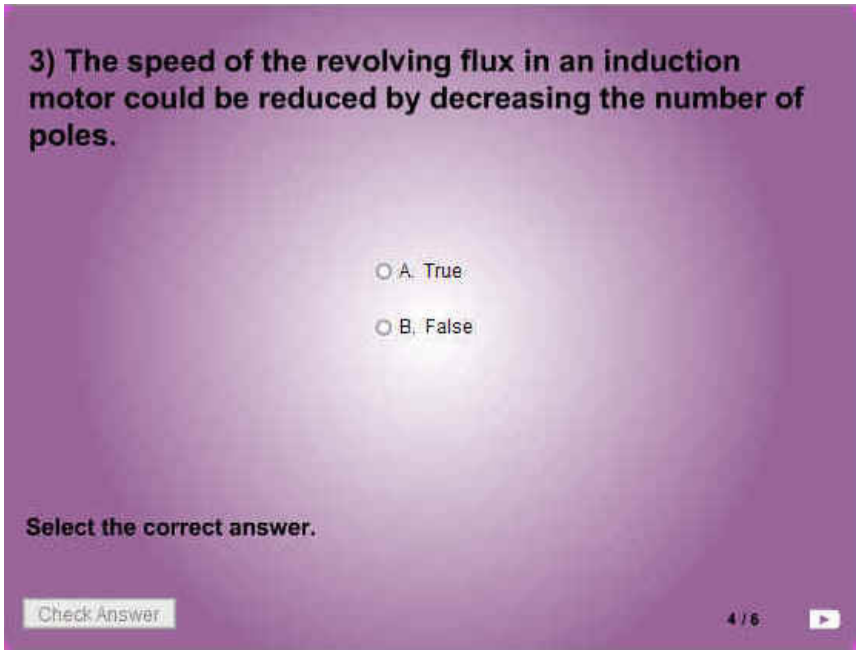


Figure 4.115: Chapter 3 online quiz page 4 preview.

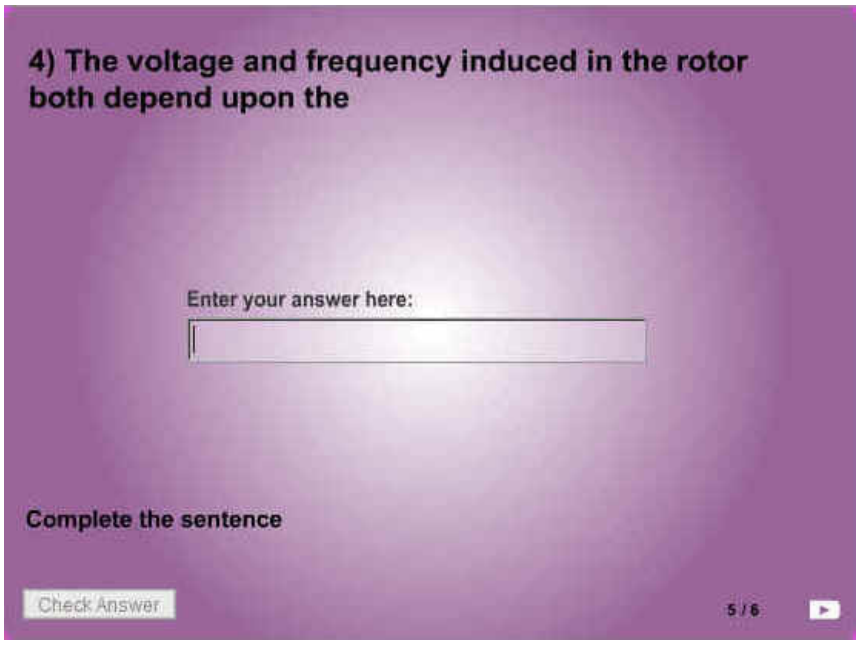


Figure 4.116: Chapter 3 online quiz page 5 preview.

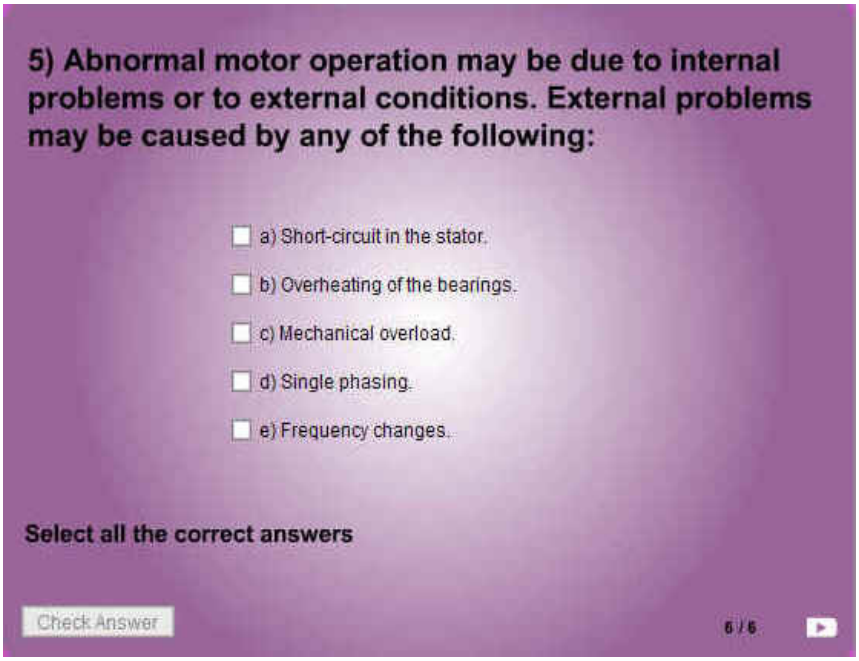


Figure 4.117: Chapter 3 online quiz page 6 preview.

Figure 4.118: Chapter 3 online quiz score page preview.

4.4.4 Interactive buttons

These interactive buttons were added solely for the purpose of linking the frames to one another and to add the marks from each page. The buttons were inserted from the "Assets" folder as seen from figure 4.119 on page 125. Flash programming was added for call action scripts. These action scripts would be called upon when the user presses the buttons.

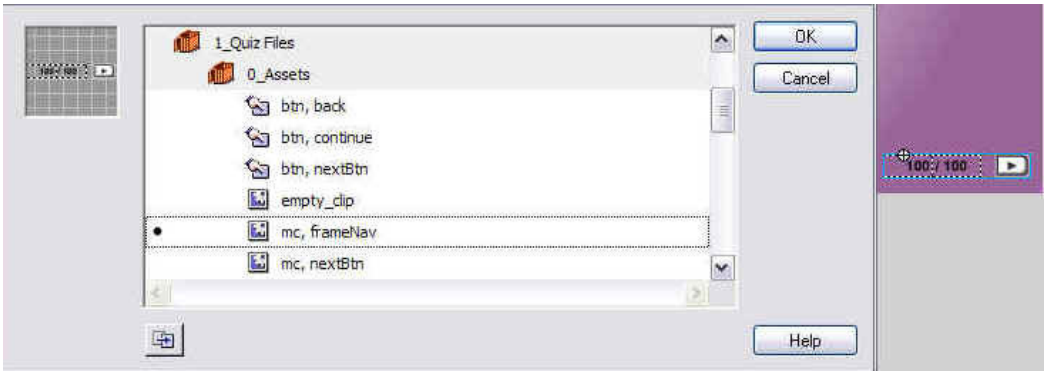


Figure 4.119: Insertion of interactive buttons.

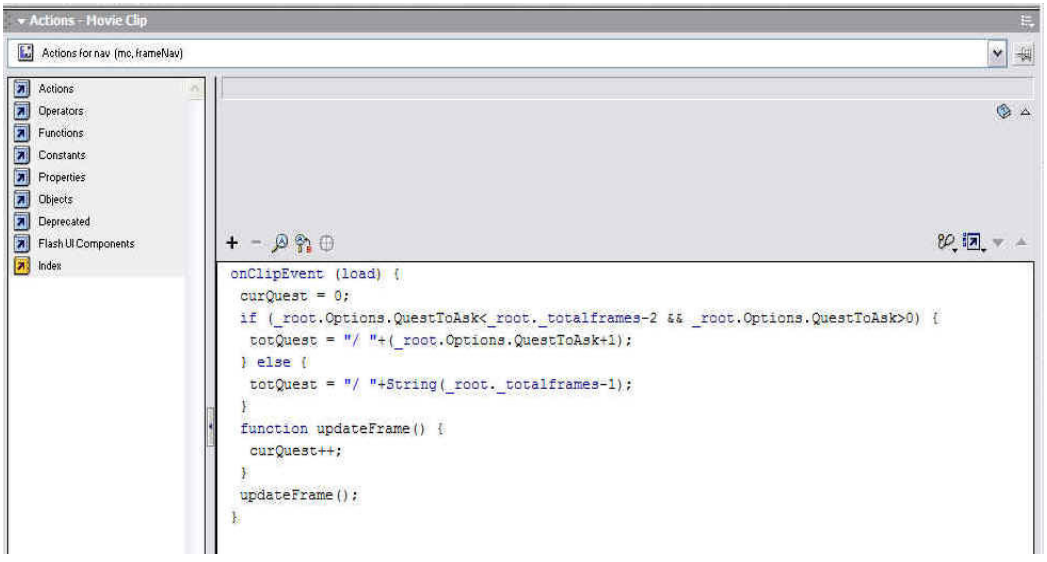


Figure 4.120: The flash programming for the interactive buttons.

4.5 Chapter Summary

This chapter outlines the step-by-step procedures of each implemented feature. In this chapter the author explained how he chose and used all the options available that had been previously discussed in Chapter 3: Methodology. The author shows the reader the process implementation at each level and displayed the final preview of each feature. This chapter gave the reader a clearer picture and understanding of the construction of each feature in the design layout as well as all the interactive tutorials and graphics.

Chapter 5

Testing and Problem Solving

5.1 Problems Encountered

The author took careful attention to all the details to minimize the problems that could be encountered during the construction process. However, even with careful planning, problems will arise and are inevitable. These problems were mainly due to the lack of understanding of the programming features and unforeseen circumstances of software glitches. The designing of the webpage and the implementation of the online tutorials were tedious tasks, and it was during these processes that the problems surfaced. Eliminating these problems took time and resulted in tasks had to be done concurrently. These problems will be further explained in the next few sections of this chapter.

5.1.1 Layout

Due to the time constraints, the author was not able to read all the reference manuals on the Macromedia Dreamweaver software. The Dreamweaver provided so many options and features that it was impossible to test out each feature in the limited time that was available. What the author did to save time was to try a trial an error. By surfing the internet and looking at other webpages, the author noted down the basic design he thought was appropriate for the project. From these notes, the author implemented the features that he wanted. However, the process was not as smooth sailing as he would have hoped. Confusion arises because each Dreamweaver feature had many options and selecting the most suitable option wasn't as straightforward. For example, implementing the nested frames was quite difficult but essential. There were thirteen types of nested frames available and targeting the links was different for each one. The dimensions of the nested frames and the tables also encountered some

problems as the author had to try and get the correct proportions to fit the whole webpage.

5.1.2 Animated graphics

As previously seen in Chapter 4, section 4.2.6 on page 68, making the animated graphics was a tedious process, especially for someone with no background experience with Macromedia Flash. Each layer added had to be defined and the 'tweening' of the keyframes posed a lot of problems for the author. Careful attention had to be made to the "tweening" process as it had to be synchronized with the objects that were supposed to appear at that time instant. Therefore "tweening" the incorrect keyframes would cause a distortion to the whole finished animated graphic. Insertion of frames in the wrong layers or time frame was another major stumbling block to the author. Thus to minimize this problem, the author took his time to carefully check each "tweening" process and made sure it matched the correct sequence of objects. All in all, this task was one of the most time consuming due to this error checking process that was done throughout.

5.1.3 Practice exercise

The short practice exercises did not pose too much of a problem mainly because each question only required one flash quiz template and one keyframe for each layer. There was no 'tweening' process involved. The only problem that arises in this task was the setting of the dimension of the template background itself. The author had to ensure that the background was big enough to accommodate both the question as well as the quiz template and the background colour had to match the webpage layout. To make sure the background was large enough, the author first set the dimensions to a large scale then slowly cutting the size down bit by bit to finally fit the exercise question.

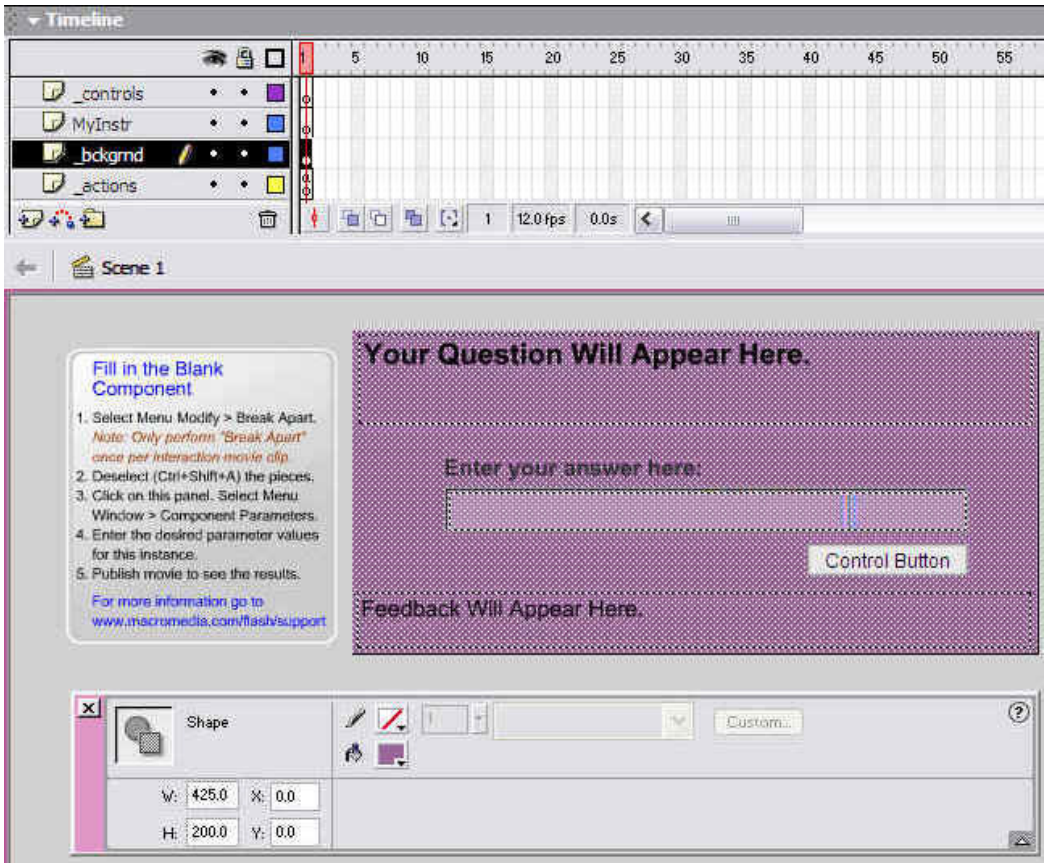


Figure 5.1: Setting for the practice exercise background dimensions and colour.

5.1.4 Online quiz

The online quiz was different to the practice exercise because the online quiz required a few practice exercises integrated together. Though here, the 'tweening' process wasn't as complicated as the animated graphics ones, there were many more layers and keyframes. For the animated graphics, each layer represented a different image, whereas each layer for the online quiz was a different feature for the whole quiz. For example, the background layer had to be "tweened" to ensure the background remained the same for all the quiz pages. However for the interactions layer, there was a different keyframe in each slot as each one represented each question for the quiz. The complications came when the author had to link all the keyframes or pages together to make a complete quiz. For this the author had to add flash programming and this was the major problem for this task. To solve this problem, the author had to open up the "Actions" panel and select the appropriate action script coding from the list provided. From this list of call functions, the author manages to select and insert the appropriate coding.

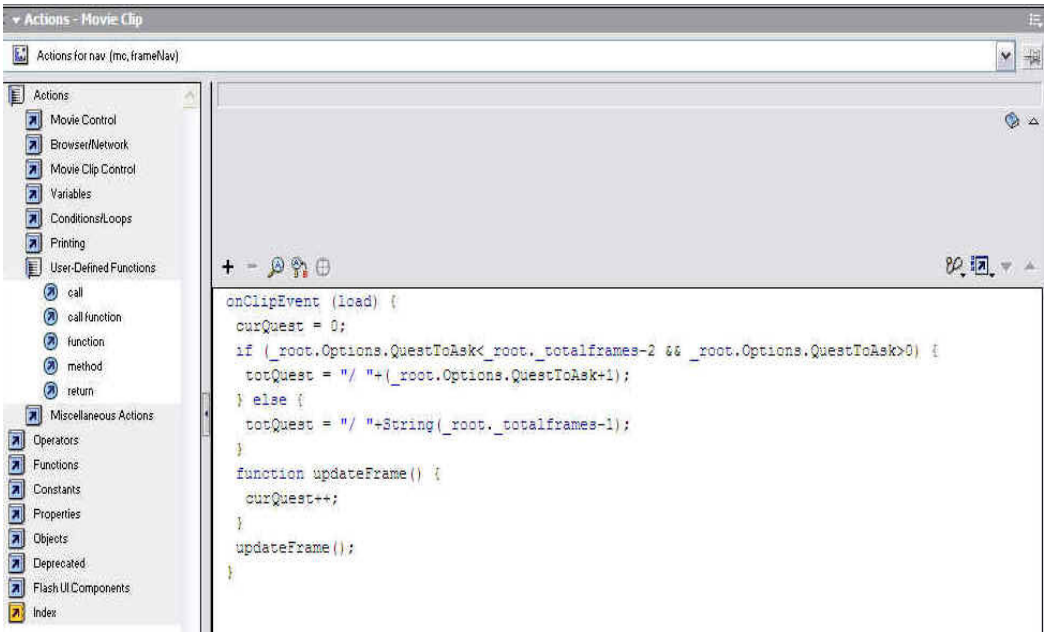


Figure 5.2: Action script coding for linking the quiz pages.

5.2 Results

After all objectives and specifications were all fulfilled, the website was uploaded onto the internet using ftp or file transfer protocol and currently running at the website: www.geocities.com/usqele3803/. The following figures will show the screenshots of each page of the project website. However, the interactive functions and animated graphics on the website could be shown here, therefore it is recommended that the reader visits the actual website to get a hands-on feel on the finished website.

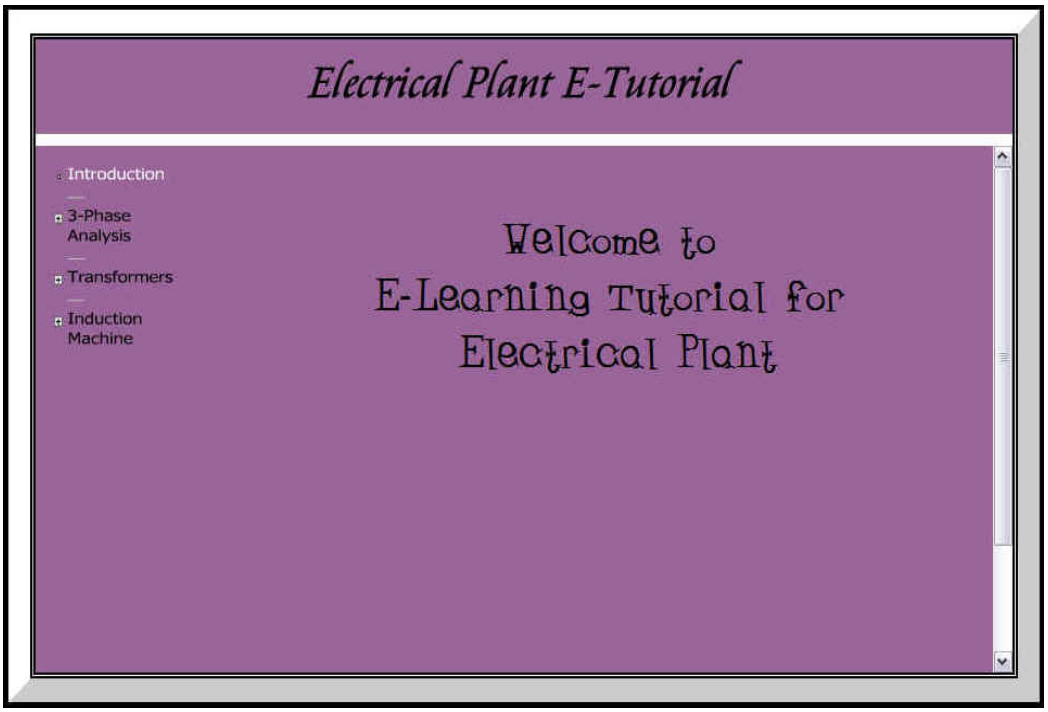


Figure 5.3: Screenshot of the Introduction page.

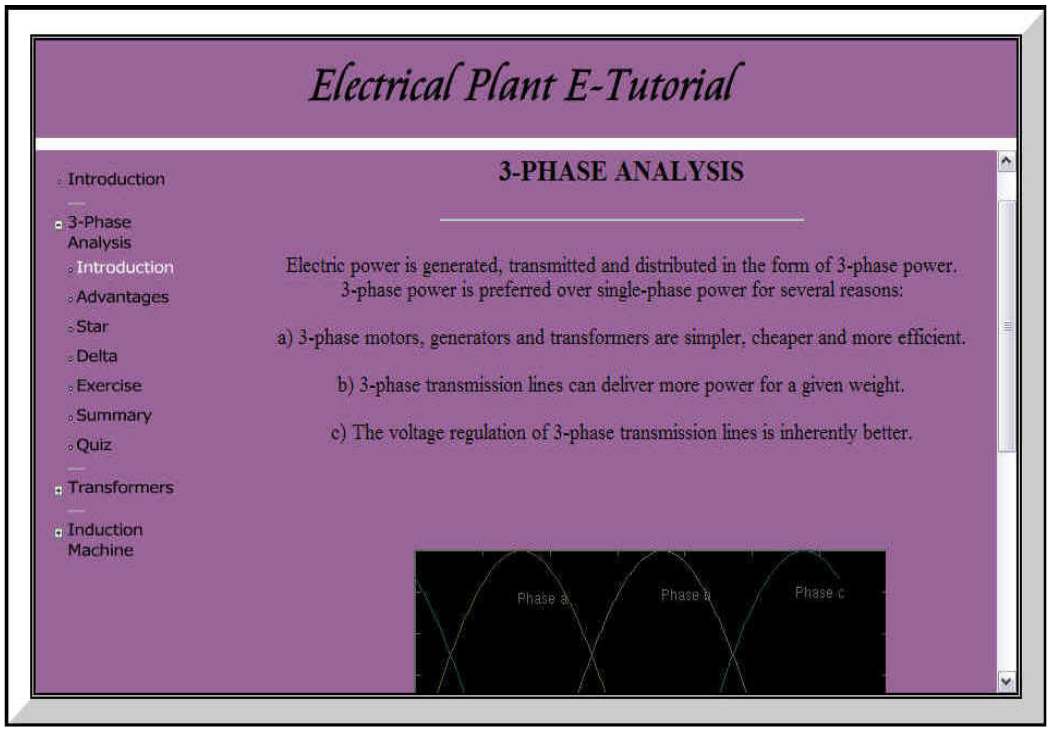


Figure 5.4: Screenshot of Chapter 1 Introduction page.

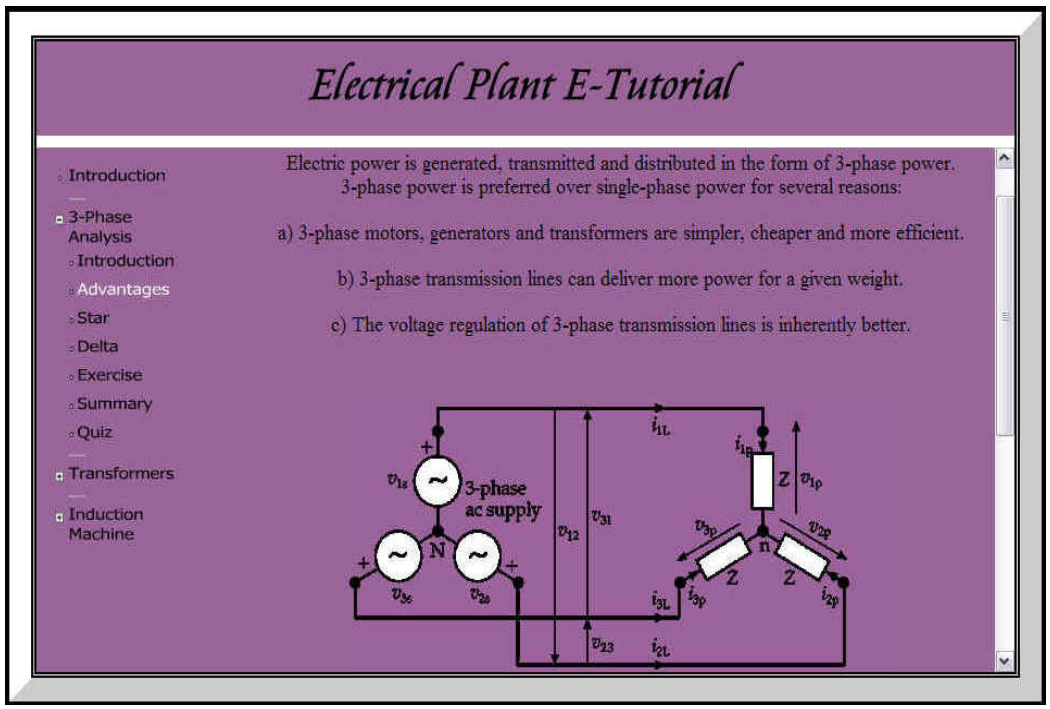


Figure 5.5: Screenshot of Chapter 1 Advantages page.

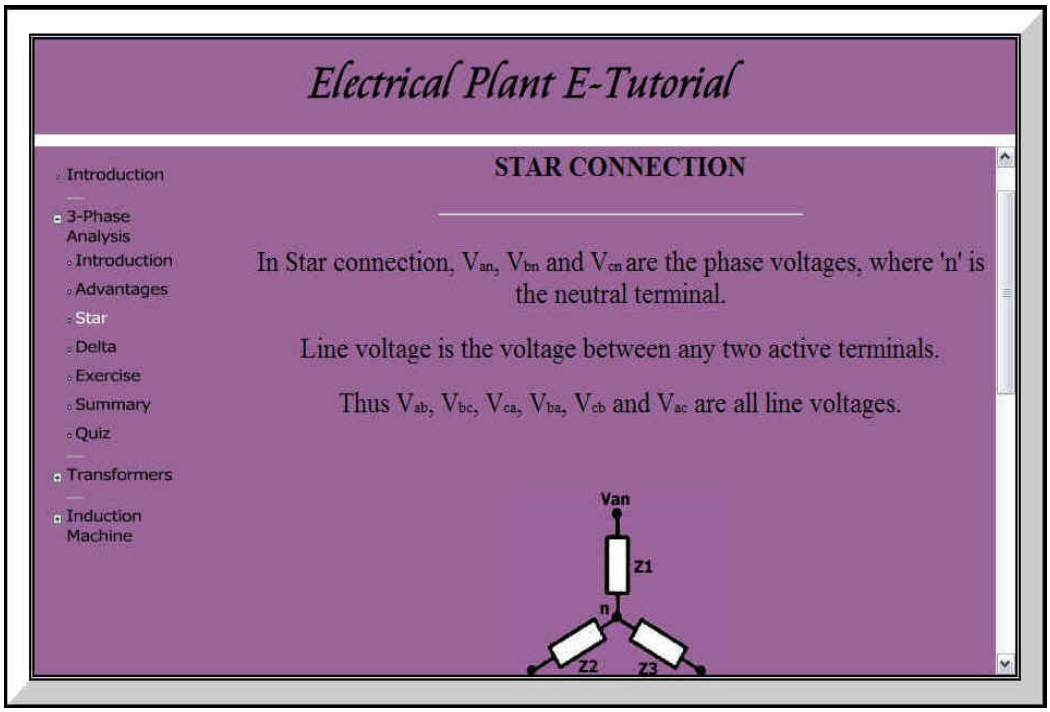


Figure 5.6: Screenshot of Chapter 1 Star page.

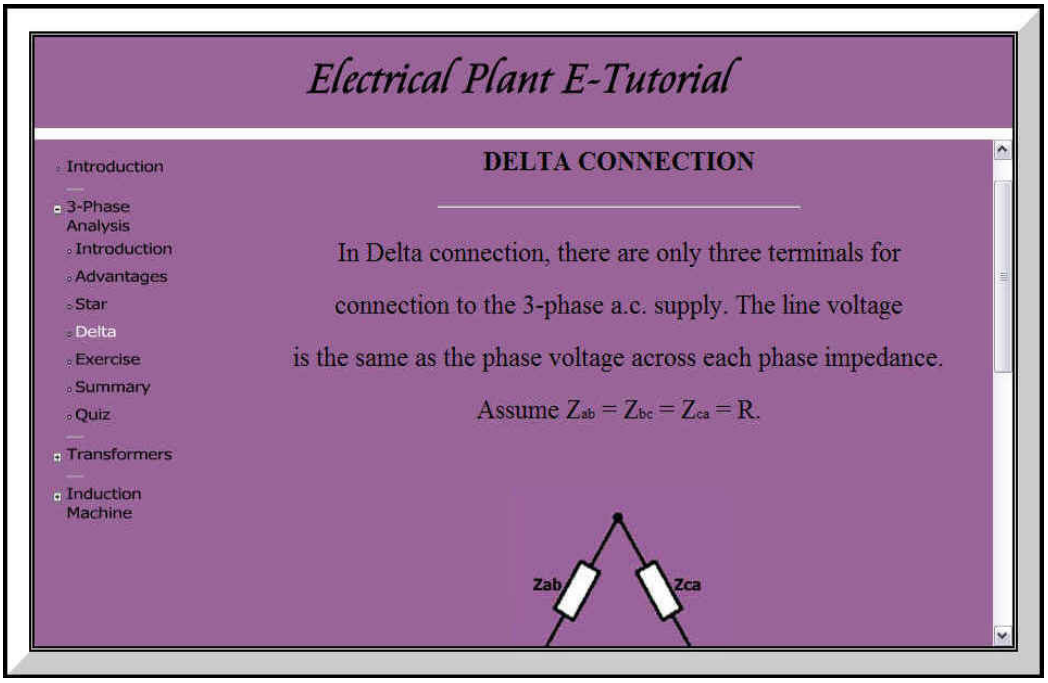


Figure 5.7: Screenshot of Chapter 1 Introduction page.

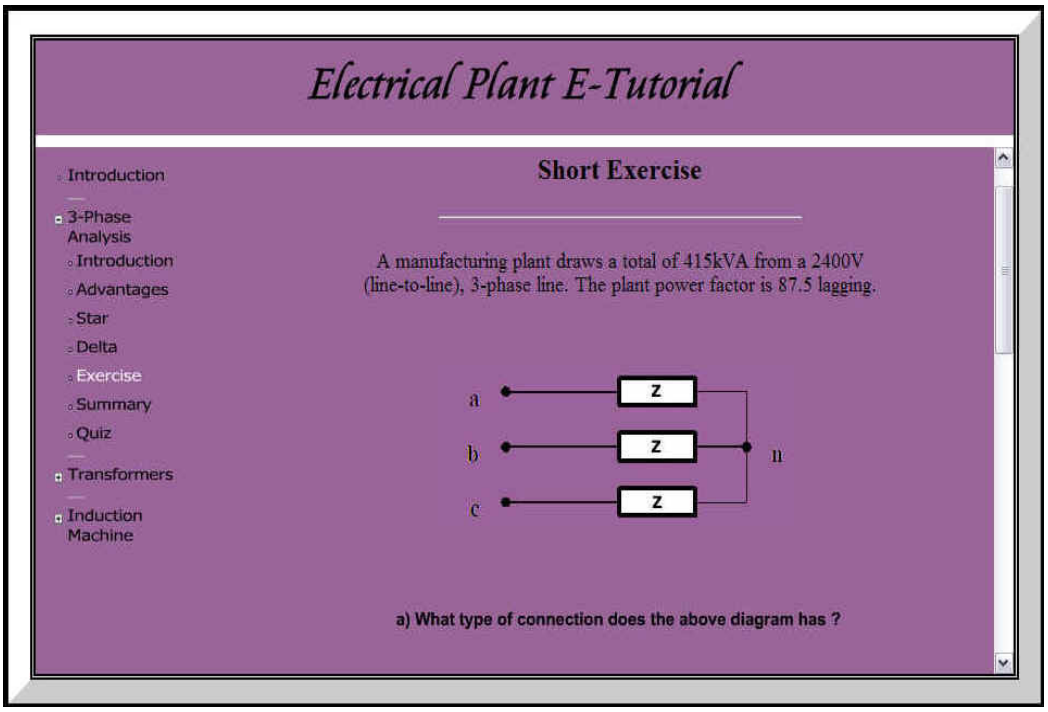


Figure 5.8: Screenshot of Chapter 1 Exercise page.

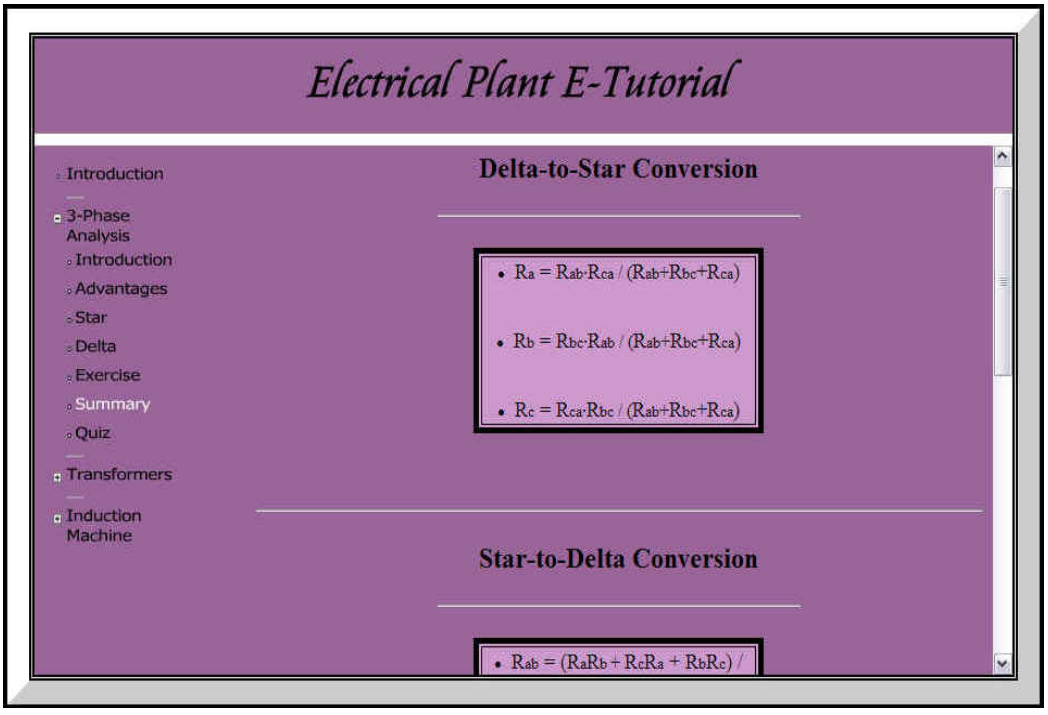


Figure 5.9: Screenshot of Chapter 1 Summary page.

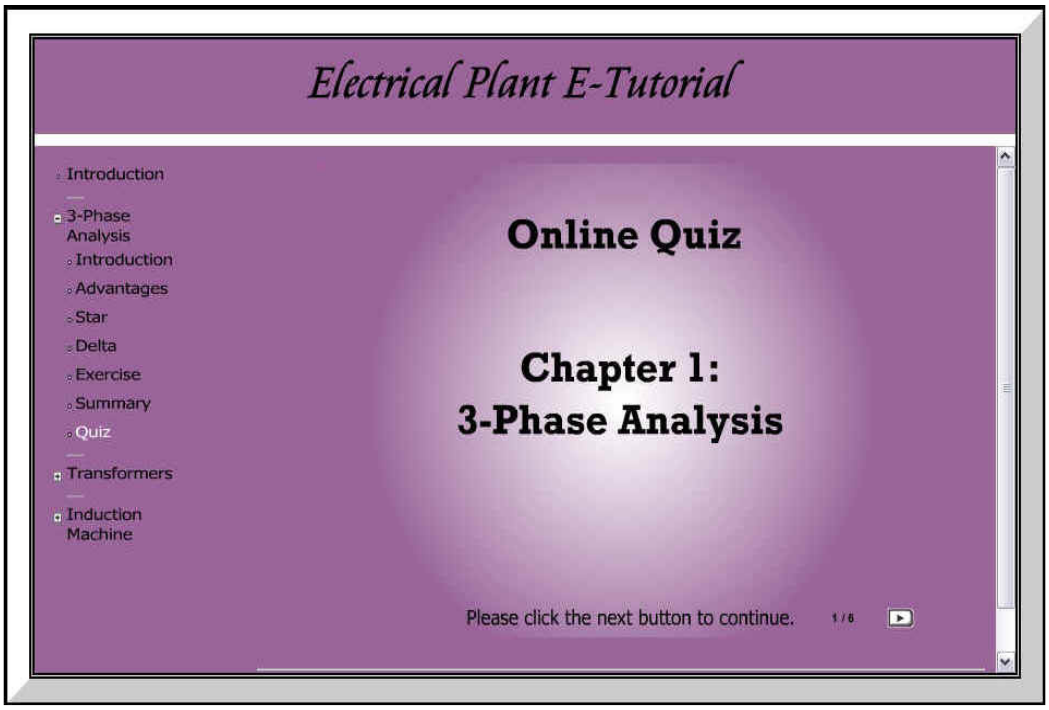


Figure 5.10: Screenshot of Chapter 1 Quiz page.

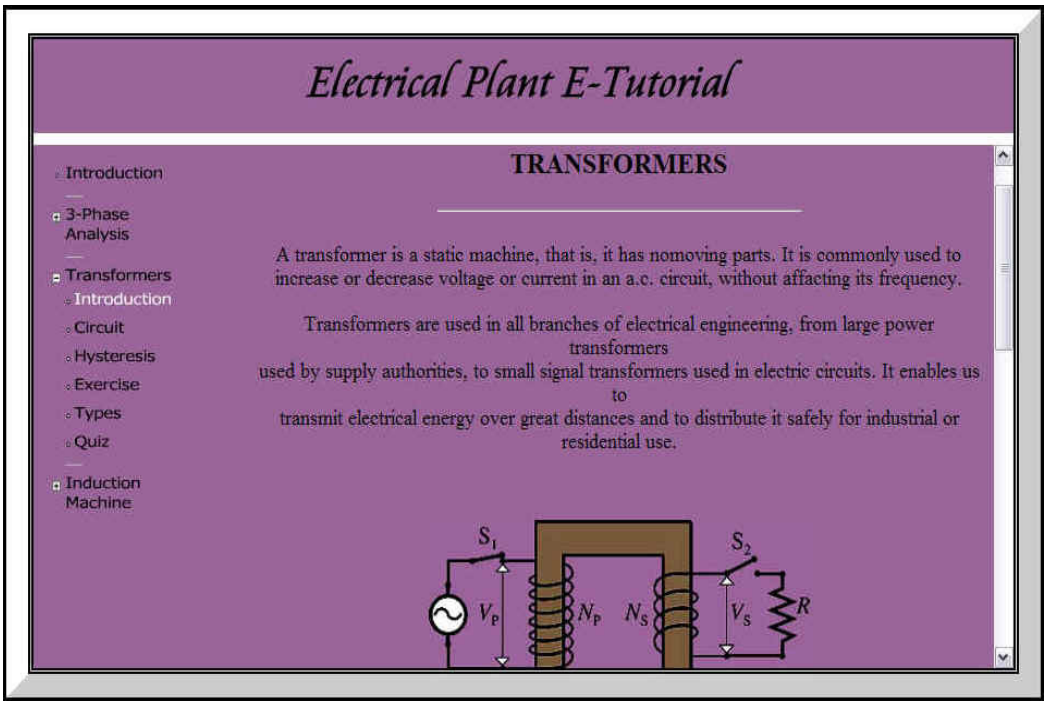


Figure 5.11: Screenshot of Chapter 2 Introduction page.

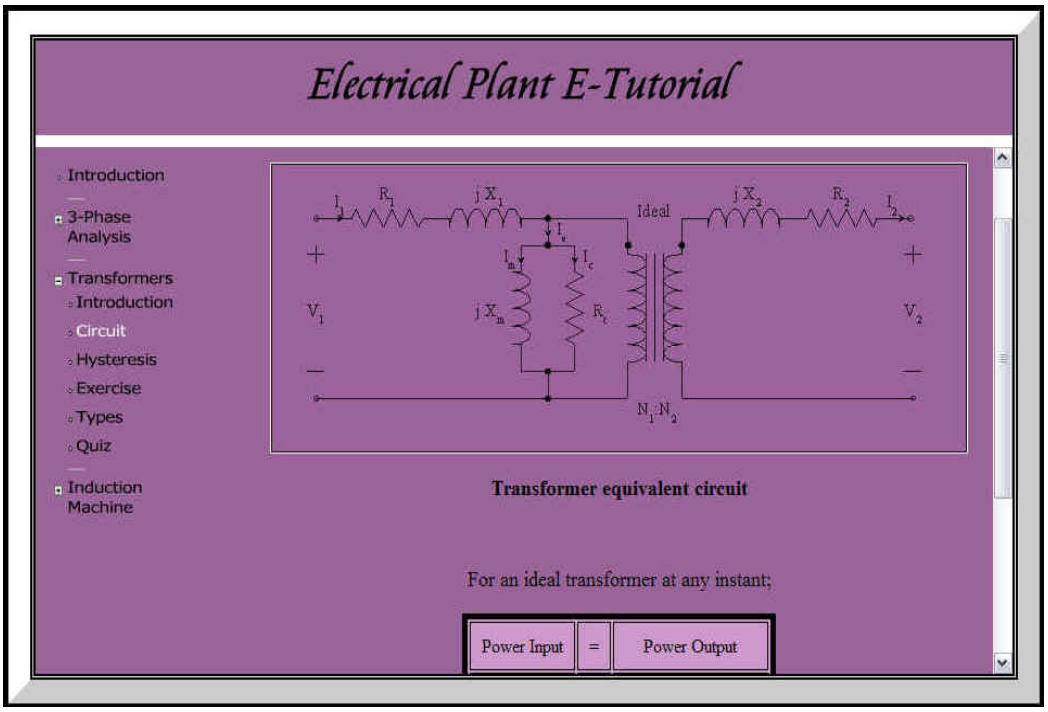


Figure 5.12: Screenshot of Chapter 2 Circuit page.

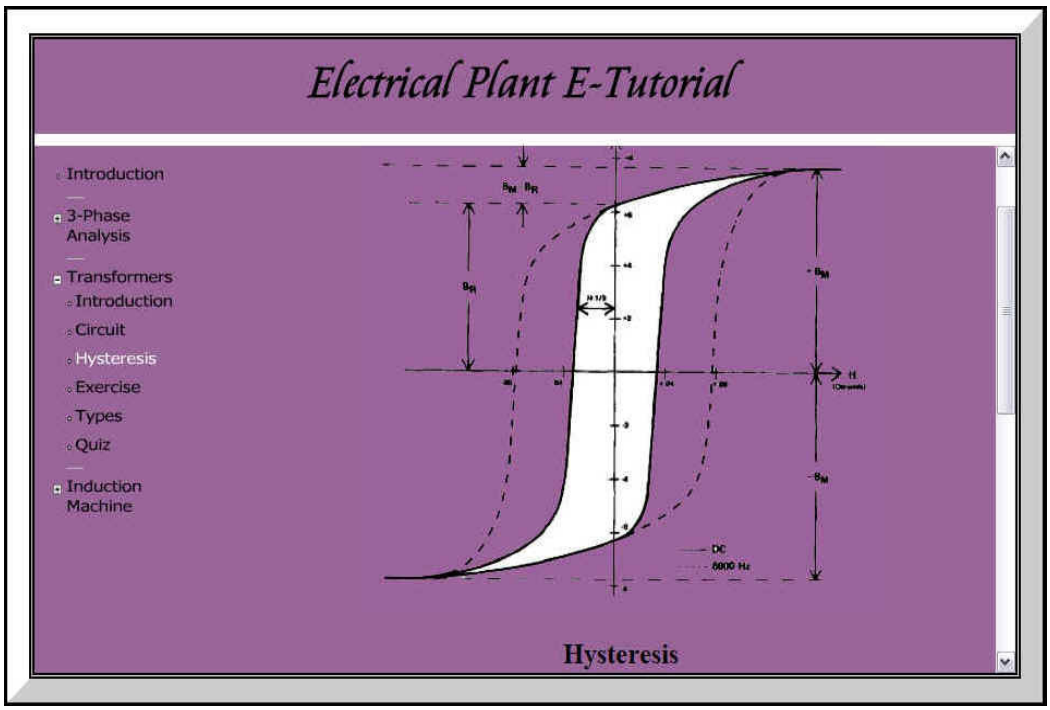


Figure 5.13: Screenshot of Chapter 2 Hysteresis page.

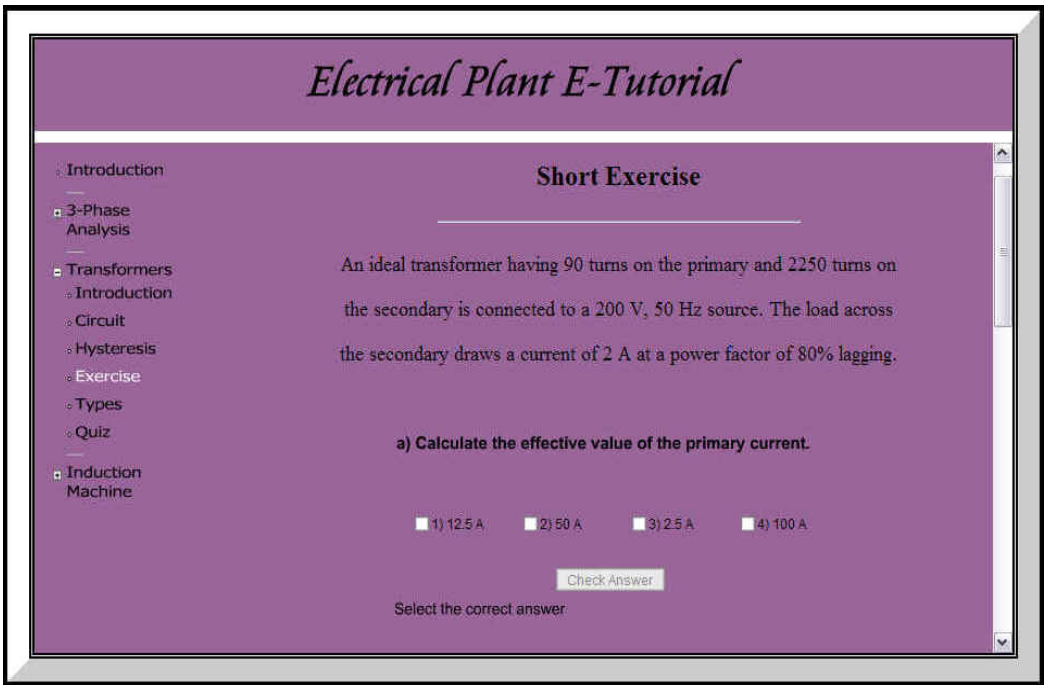


Figure 5.14: Screenshot of Chapter 2 Exercise page.

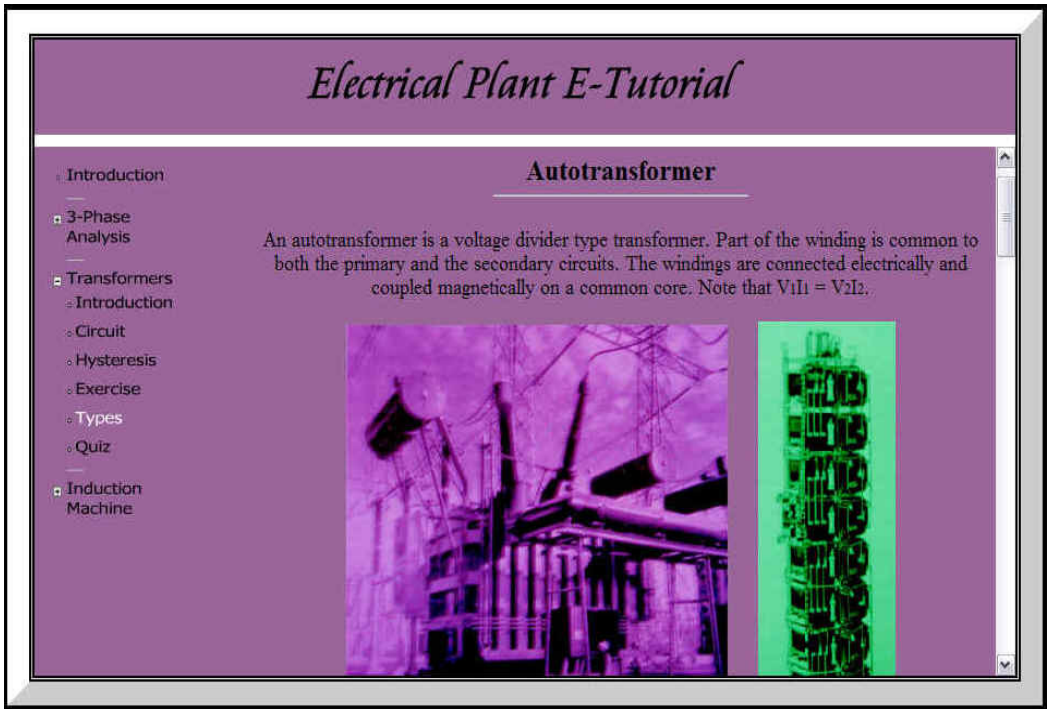


Figure 5.15: Screenshot of Chapter 2 Types page.

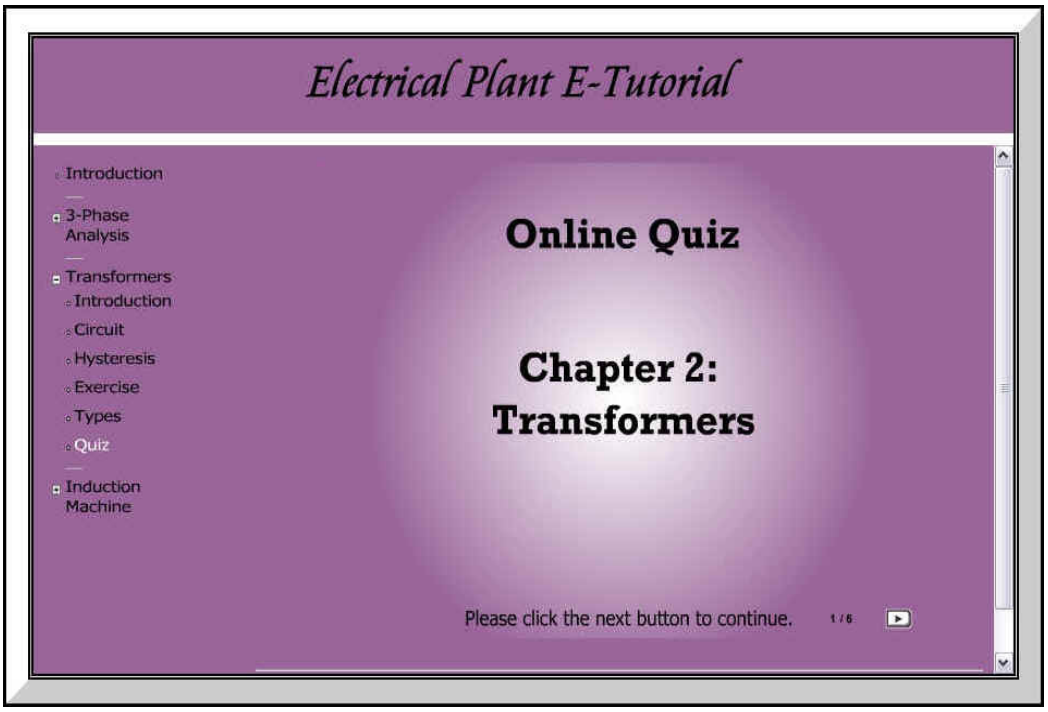


Figure 5.16: Screenshot of Chapter 2 Quiz page.

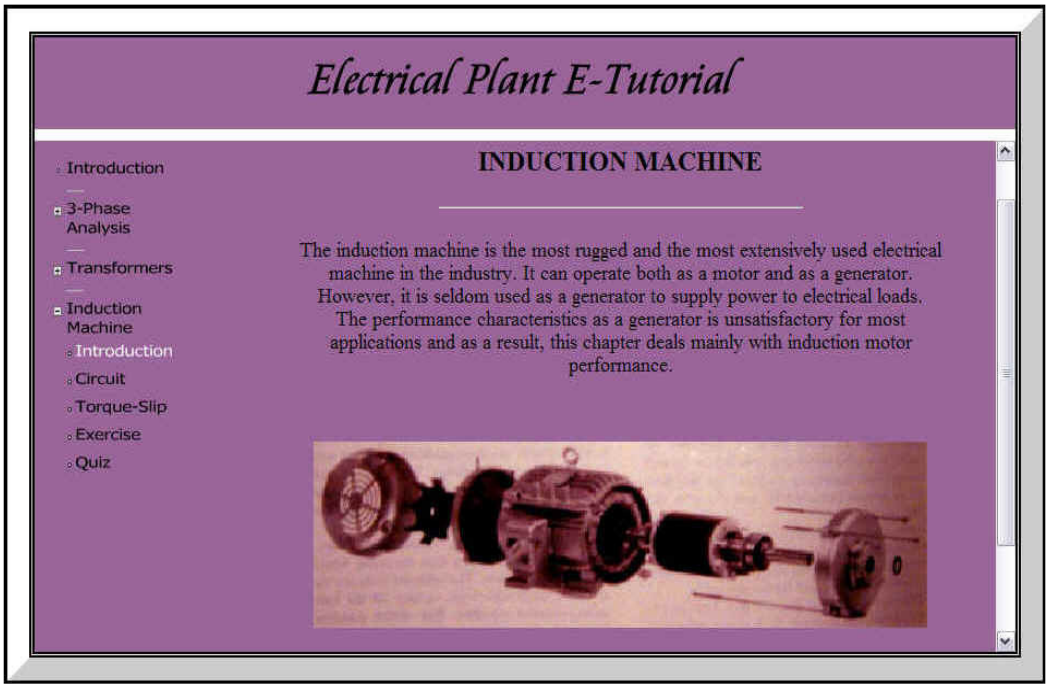


Figure 5.17: Screenshot of Chapter 3 Introduction page.

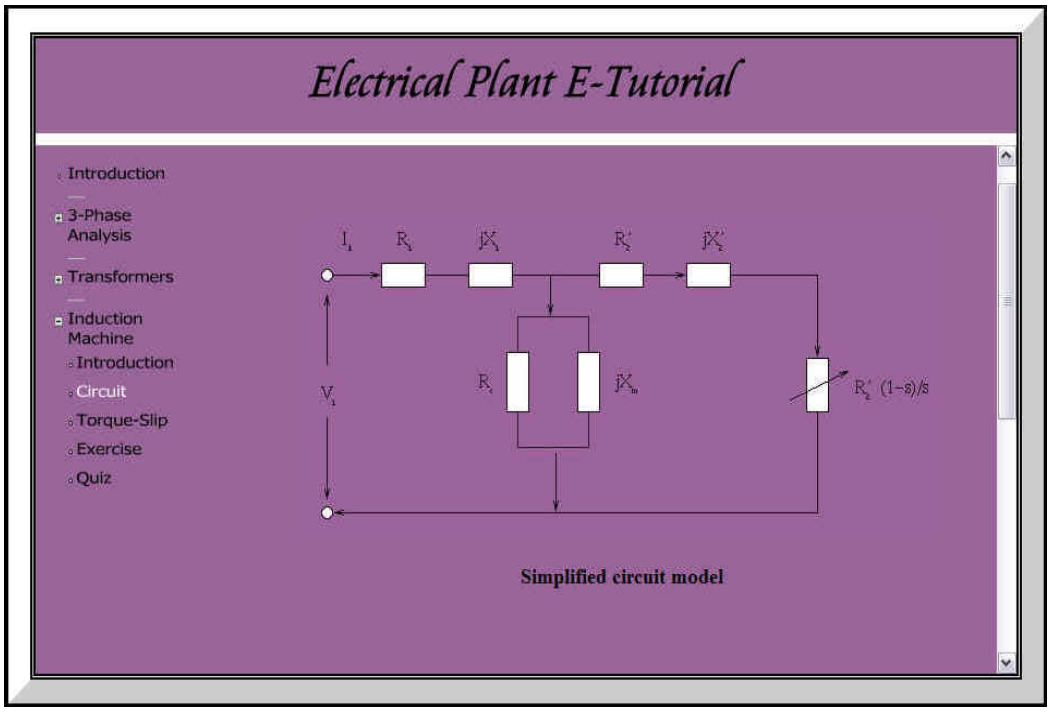


Figure 5.18: Screenshot of Chapter 3 Circuit page.

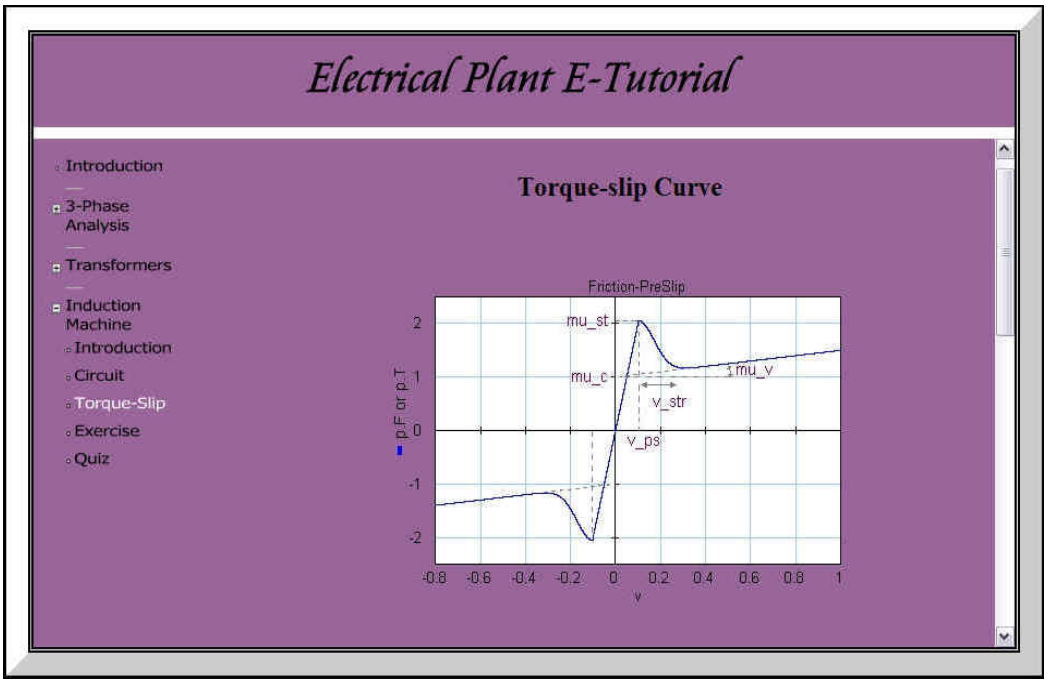


Figure 5.19: Screenshot of Chapter 3 Torque-Slip page.

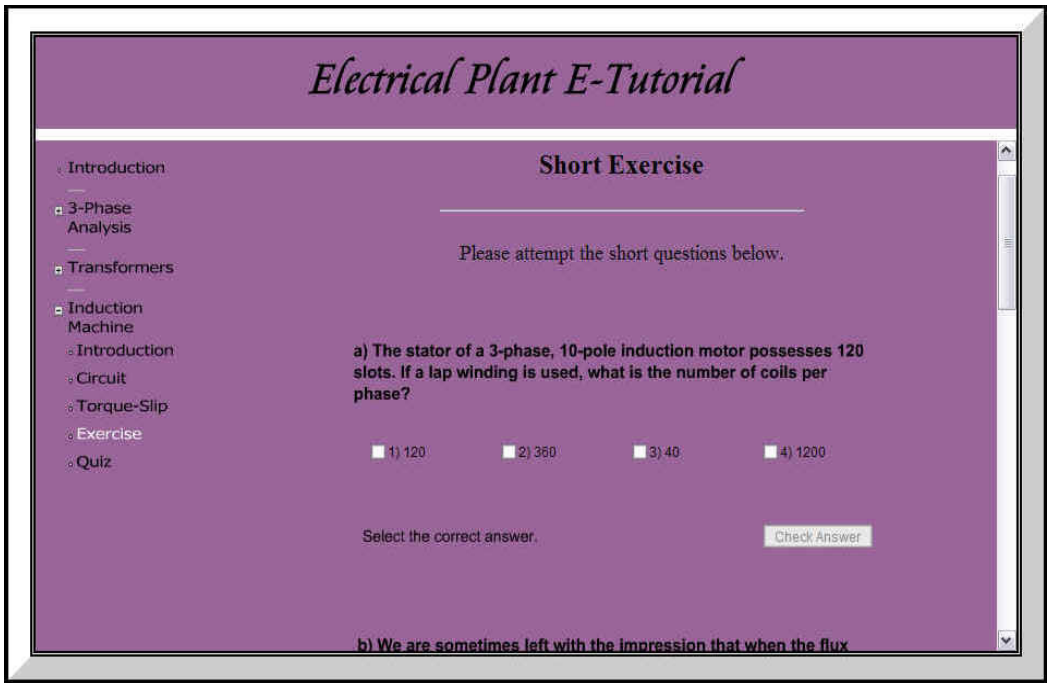


Figure 5.20: Screenshot of Chapter 3 Exercise page.

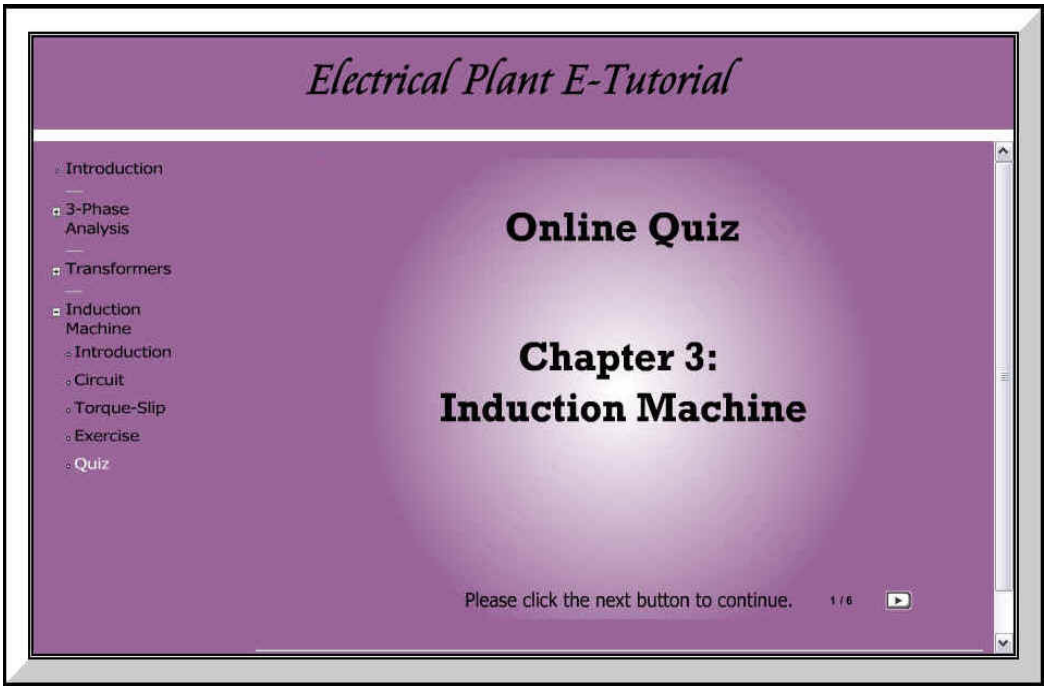


Figure 5.21: Screenshot of Chapter 3 Quiz page.

5.3 Chapter Summary

With each different major task that was undertaken, a different set of problems would arise from it. This chapter summarizes the major problems or stumbling block for each of the major tasks. The author also explained the steps taken to solve each problem or how checking was done to minimize the errors. Some was easily solved while others took a longer time. This chapter also explained to the reader how the final webpage was uploaded onto the internet and the screenshot of each webpage that was produced by the author.

Chapter 6

Future Work

6.1 Achievement of Project Objectives

On the whole, the important objectives of this project had been met. The author had designed and constructed a webpage that provided an online learning tool. This online learning tool included the main important points of the topics as well as interactive tutorials in the form of short practice exercises and online quizzes. The contents inserted were adequate to give a preview of what this online learning tool was capable of and showed just why it could prove useful for both lecturers and students alike. However, due to time constraints, this project did not achieve the maximum potential the author had first envisioned. The author complied and satisfied the requirements but much more could have been added to make this project more desirable and interesting. In the next few sections, the future work for this project will be discussed. This is the next step of the project, the features that could be implemented to take this project to the next level.

6.2 Further Work

This project may have satisfied the requirements but much more could have been done to it and made it a more complete learning tool. In the following sub-sections, the author will list the features that could have been implemented and how useful they could be to the whole project. This section would be extremely useful to the readers who might be interested in continuing up on this project in the near future.

6.2.1 Complete Electrical Plant topics

The author managed to cover the materials from the first three chapters of Electrical Plant ELE3803. While this might have been enough to set an example for the online tutorials, the ideal scenario would have been to add in all the chapter topics for the course module. However this would not have been possible for this project as the time duration had to be shared with other important tasks such as designing the webpage as well as the implementation of the online tutorial questions. With more coverage for the topics would also mean more interactive tutorial questions, and while this would seem the ideal thing to do, it would also take a longer time to complete.

6.2.2 Animated graphics

As discussed earlier in, constructing animated graphics were a tedious process whereby software such as Adobe Photoshop and Macromedia Flash were used extensively. Thus again to time constraints, the author was not able to construct and insert as many animated graphics as he would have liked. It would have been more interesting had more animated graphics been implemented as they provided a clearer visualization of the concepts.

6.2.3 Online tutorials

The interactive online tutorial was one of the main aspects of this project. It provided an interesting and fun way to do practice exercises and also test how ready the user was for the chapters by doing the marked online quizzes. The questions selected were according to the chapter topics and had to be technical questions. It was not easy to select a question and break it down to two or three parts to suit the different types of questionnaire. The author had to find and select questions that could accommodate the types of question options available and used, such as multiple choices, fill in the blanks and the drag and drop. This process took quite a bit of time and had there been more time permitted, the author would have been able to add in more interactive tutorial questions.

6.2.4 Record tracking

The online quizzes were set as marked tutorials. Marks were allocated for each question, and these marks were accumulated and displayed at the end of each online quiz. If we can somehow store and send these accumulated marks to the moderator or examiner of the course, then these online quizzes could actually be turned into online assignments. So instead of going through three or four chapters and submitting one written assignment, students can now do shorter chapter-based online assignments. This type of online assignment would need a database type of programming such as ASP or PHP programming. These types of database programming are supported by the Macromedia Dreamweaver software and can easily be incorporated into any webpage design.

The author sees this online assignment as an advantage because the students could view their credited marks immediately. This might be especially useful for external students would usually had to wait a few weeks, or even months at times, to received back their assignment folder. And as the quiz questions were programmed such that the correct answer would be displayed if the user keyed in a wrong answer, the user would also know where they have done wrong for each question. In addition to all this, it should also take note of the cost savings for the postage to send these assignments.

6.2.5 Questions database

Another feature that will help improve this project is to have a database set of questions. What the author had done for this project was implementing a fixed set of questions for the online quizzes. Therefore these questions would be the same for all users. But if the previous feature, which was the online assignment, could be implemented it would then be better if we had a database of questions for each online assignment. The reason is that, from this database of say, twenty questions, only ten questions will be randomly selected and generated each time a user attempts the online assignment. So as such, each user or student will get a different set of ten questions. Again, this implementation will need the ASP or PHP database programming.

6.3 Chapter Summary

This chapter discussed the features that could be implemented to improve make this project more interesting and complete. By adding in-depth contents and incorporating database programming into the project, this online tutorial project will not only attract current students but also engineers with related background. With the fast speed of ever-changing technology, universities will need to keep up and use the available resources such as the powerful tool of internet to our advantage. Database programming are also more widely used and implemented into webpages. Programming software for ASP and PHP languages are becoming more popular to web designers and script writers. The author sees these features and online assignments as the future prospective of e-learning and it would be an achievement if we could implement it first and set an example for the rest to follow.

Chapter 7

Conclusion

7.1 Conclusion

The potential of implementing an internet based study domain is favourable especially in a time where long distance learning and part-time degrees are growing in popularity. If this software program is further enhanced, we could even have online real-time examination, especially useful for those overseas students doing distance learning. What the author was trying to achieve in this project was to incorporate an interesting and innovative way of learning and doing tutorials. The materials that were to be supplied into the webpage itself had to be accurate and extracted from the university's study materials and not from reliable alternate sources. This was to eliminate confusion and thus the accuracy of the course materials would be open to debate. But what may become an issue will be the safety aspect of web. Hacking and other internet safety issues will have to be carefully analysed and integrated into the whole system. If it's an interactive tutorial, then the answers would have to safely reach the university or the examiner.

Another issue that may arise would be the credibility of the tutorials submitted by the students. If these tutorials were made for revision purposes, to help the students practice and prepare for examinations, then there would be no problems. But if these tutorials were created as part of a graded assignment for the course, then the credibility of the students' answers will come into question. As most online tutorial questions are in the form of multiple choice questions (mcq) or short answer questions, there would be no working required. And as such, if two students were to produce similar answers, then suspicion will arise even though they might not have cheated.

The outcome of this project was satisfactory as the main project aim and objectives were met. If there was any unsatisfied feeling that still lingers for the author, it would have been the inadequacy of the animated graphics. However, this was not one of the main aspects of the project. Throughout the project, the author acquired some useful skills and knowledge, which were different from the engineering routines that the author had been so familiar with. This project gave the author the opportunity to try his hand at something which was totally different from the engineering courses that he had gone through. The result was an interesting project that may prove very useful to the future batch of students. With reference to the future work, this project could be further improved to meet the standards and requirements of interested schools or organizations.

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Appendix A

Project Specification

UNIVERSITY OF SOUTHERN QUEENSLAND
FACULTY OF ENGINEERING AND SURVEYING

ENG 4111/2 Research Project
PROJECT SPECIFICATION

Student: Muhammad Zaki Mustafa

Project Topic: E-tutorials for Electrical Engineering courses using Dreamweaver

Supervisor: Mr. Ron Sharma

Project Aim:

To design a web-based interactive online tutorial for on and off campus students using the software Macromedia Dreamweaver.

Background:

Macromedia Dreamweaver is a professional editing program for designing, coding and developing static pages and dynamic Web applications. It enhances web experience and provides easy interaction with the user. Dreamweaver is a program very much rooted in the real world. Dreamweaver recognizes the real-world problem of incompatible browser commands and addresses the problem by producing code that is compatible across browsers. Dreamweaver blends traditional HTML and other Web languages with cutting-edge server-side techniques. By using this software, and with internet access, students will easily be able to attempt online tutorials regardless of place or time.

Programme:

1. Design a template and layout for webpage.
2. Determine which tools to use (tables, frames, forms, etc.) and if any additional applications needs to be added in (CSS, JavaScript, Flash).

3. Code scripting and building of the webpage design.
4. Use Electrical Plant ELE3803 as an example to get tutorials data and model graphics.
5. Fuse in the tutorials materials into the webpage in order of chapters and topics. Start of with a summary page and followed by tutorial questions (multiple choice, short questions). Provide answers after each question or at the end of the whole topic.
6. If time permits, try to add in graphics where appropriate using Fireworks or Flash & Shockwave software.
7. Prepare the required Project Report as detailed in the study package for this course.

AGREED: Muhammad Zaki Mustafa (Student) Mr. Ron Sharma (Supervisor)
(Dated) 17 / 03 / 2006 (Dated) 31 / 03 / 2006

Appendix B

Programming Source Codes

B.1 Source code for iframe page (index.html)

```
<html>
<head>
<title>E-Tutorial for Electrical Plant</title>
<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1">
</head>

<body bgcolor="#000000">
<center>
<table border="20" bordercolordark="#CCCCCC" bordercolorlight="#FFFFFF"
cellspacing="2" cellpadding="2">
  <tr>
        <td>
                  <iframe src="project.html" name="project" width="900"
marginwidth="5" height="535" marginheight="5" align="middle" scrolling="no"
frameborder="25">
                <!--webbot bot="HTMLMarkup" endspan -->
                <!--webbot bot="HTMLMarkup" TAG="XBOT" startspan -->
                        </iframe>
        </td>
  </tr>
</table>
</center>

</body>
</html>
```

B.2 Source code for nested frames page (project.html)

```
<html>
<head>
<title>Electrical Plant E-Tutorial</title>
<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1">
</head>


<frameset rows="80,*" cols="*" framespacing="10" frameborder="NO">
  <frame src="top.html" name="topFrame" scrolling="NO" noresize border="10"
  bordercolor="#FFFFFF">
  <frameset rows="*" cols="194,*" framespacing="0" frameborder="NO"
  border="0">
    <frame src="side.html" name="sideFrame" scrolling="NO" noresize>
    <frame src="intropg.html" name="mainFrame">
  </frameset>
</frameset>


<noframes>
<body>
</body>
</noframes>

</html>
```

B.3 Source code for top frame page (top.html)

```
<html>
<head>
<title>top framee</title>
<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1">
</head>

<body bgcolor="#996699" text="#000000">
<div align="center">

  <object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#
version=5,0,0,0" width="404" height="38">
    <param name="movie" value="title.swf">
    <param name="quality" value="high">
    <param name="bgcolor" value="#996699">
    <param name="scale" value="exactfit">
            <embed src="title.swf" quality="high"
          pluginspage="http://www.macromedia.com/shockwave/download/index.cgi?P
          1_Prod_Version=ShockwaveFlash" type="application/x-shockwave-flash"
          scale="exactfit" width="404" height="38" bgcolor="#996699"></embed>
  </object>
</div>

</body>
</html>
```

B.4 Source code for side frame page (side.html)

```
<html>
<head>
<title>Contents Page</title>
<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1">
</head>

<body bgcolor="#996699" text="#000000">
<p>
 <object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
 codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab
 #version=6,0,29,0" width="180" height="450">
  <param name="movie" value="menu.swf">
  <param name="quality" value="high">
       <embed src="menu.swf" quality="high"
       pluginspage="http://www.macromedia.com/go/getflashplayer"
       type="application/x-shockwave-flash" width="180" height="450">
       </embed>
 </object>
</p>

</body>
</html>
```

B.5 Source code for dropdown menu (dropdown.xml)

```
<NAV main_onColor="#FFFFFF" main_offColor="#000000"
sub_onColor="#FFFFFF" sub_offColor="#000000" navWidth="140" fadeTime="2"
lineWidth="20" main_y_padding="10" sub_y_padding="5" sub_indent="10">
  <MAIN text="Introduction" URL="intropg.html" target="mainFrame"></MAIN>

 /* Chapter 1 */
 <MAIN text="3-Phase Analysis" expand="true">

    <SUB text="Introduction" URL="chapt1_pg1.html" target="mainFrame">
    </SUB>
    <SUB text="Advantages" URL="chapt1_pg2.html" target="mainFrame"></SUB>
    <SUB text="Star" URL="chapt1_pg3.html" target="mainFrame"></SUB>
    <SUB text="Delta" URL="chapt1_pg4.html" target="mainFrame"></SUB>
    <SUB text="Exercise" URL="chapt1_pg5.html" target="mainFrame"></SUB>
    <SUB text="Summary" URL="chapt1_pg6.html" target="mainFrame"></SUB>
    <SUB text="Quiz" URL="chapt1_quiz.html" target="mainFrame"></SUB>

 </MAIN>

 /* Chapter 2 */
  <MAIN text="Transformers" expand="true">
    <SUB text="Introduction" URL="chapt2_pg1.html" target="mainFrame">
    </SUB>
    <SUB text="Circuit" URL="chapt2_pg2.html" target="mainFrame"></SUB>
    <SUB text="Hysteresis" URL="chapt2_pg3.html" target="mainFrame"></SUB>
    <SUB text="Exercise" URL="chapt2_pg4.html" target="mainFrame"></SUB>
    <SUB text="Types" URL="chapt2_pg5.html" target="mainFrame"></SUB>
    <SUB text="Quiz" URL="chapt2_quiz.html" target="mainFrame"></SUB>
  </MAIN>

 /* Chapter 3 */
  <MAIN text="Induction Machine" expand="true">
    <SUB text="Introduction" URL="chapt3_pg1.html" target="mainFrame">
    </SUB>
    <SUB text="Circuit" URL="chapt3_pg2.html" target="mainFrame"></SUB>
    <SUB text="Torque-Slip" URL="chapt3_pg3.html" target="mainFrame">
     </SUB>
    <SUB text="Exercise" URL="chapt3_pg4.html" target="mainFrame"></SUB>
    <SUB text="Quiz" URL="chapt3_quiz.html" target="mainFrame"></SUB>
  </MAIN>

</NAV>
```

B.6 Source code for introduction page (intropg.html)

```
<html>
<head>
<title>Introduction page</title>
<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1">
</head>

<body bgcolor="#996699" text="#000000">
<p> </p>
<p> </p>
<p> </p>
<p> </p>

<center>
  <h1>
    <object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#
version=5,0,0,0" width="520" height="87">
      <param name="movie" value="introtext.swf">
      <param name="quality" value="high">
      <param name="bgcolor" value="#330033">
      <param name="scale" value="exactfit">
      <embed src="introtext.swf" quality="high"
pluginspage="http://www.macromedia.com/shockwave/download/index.cgi?P1_Prod
_Version=ShockwaveFlash" type="application/x-shockwave-flash" scale="exactfit"
width="520" height="87" bgcolor="#330033"></embed>
    </object>
  </h1>
</center>

</body>
</html>
```

B.7 Source code for Chapter 1: Introduction page (chapt1_pg1.html)

```
<html>
<head>
<title> Chapter 1: Introduction </title>
<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1">
</head>
<body bgcolor="#996699" text="#000000">
<center>
  <p> </p>
  <p><strong><font size="+2">3-PHASE ANALYSIS</font></strong></p>
  <hr width="50%">
  <p><font size="+1">Electric power is generated, transmitted and distributed
    in the form of 3-phase power.<br> 3-phase power is preferred over single-phase
power for several reasons:</font></p>  <p><font size="+1">a) 3-phase motors,
generators and transformers are simpler, cheaper and more efficient.</font></p>
  <p><font size="+1">b) 3-phase transmission lines can deliver more power for
    a given weight.</font></p>  <p><font size="+1">c) The voltage regulation of 3-
phase transmission lines is inherently better.</font></p> <p> </p>
  <p><font size="+1">
    <object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#
version=6,0,29,0" width="500" height="400">
      <param name="movie" value="flash01.swf">
      <param name="quality" value="high">
      <embed src="flash01.swf" quality="high"
pluginspage="http://www.macromedia.com/go/getflashplayer" type="application/x-
shockwave-flash" width="500" height="400"></embed></object>
    </font></p>
  <p><font size="+1">Phase sequence waveforms</font></p>
  <hr>
  <object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#
version=5,0,0,0" width="100" height="22" align=right>
    <param name="movie" value="pg1button.swf">
    <param name="quality" value="high">
    <param name="base" value=".">
    <param name="bgcolor" value="#CC66CC">
    <embed src="pg1button.swf" base="."  quality="high"
pluginspage="http://www.macromedia.com/shockwave/download/index.cgi?P1_Prod
_Version=ShockwaveFlash" type="application/x-shockwave-flash" width="100"
height="22" bgcolor="#CC66CC"></embed>
  </object>
  </p>
</center>
</body>
</html>
```

B.8 Source code for Chapter 1: Advantages page (chapt1_pg2.html)

```
<html>
<head>
<title> Chapter 1: Advantages </title>
</head>
<body bgcolor="#996699" text="#000000">
<center>  <p> </p>
  <p><font size="+1">Electric power is generated, transmitted and distributed
    in the form of 3-phase power.<br> 3-phase power is preferred over single-phase
power for several reasons:</font></p>
  <p><font size="+1">a) 3-phase motors, generators and transformers are simpler,
    cheaper and more efficient.</font></p>
  <p><font size="+1">b) 3-phase transmission lines can deliver more power for
    a given weight.</font></p>
  <p><font size="+1">c) The voltage regulation of 3-phase transmission lines is
    inherently better.</font></p>  <p> </p>
  <p><font size="+1"><img src="images/chapt1fig01.jpg" width="500"
height="511"></font></p>
  <p><font size="+1">3-phase Star and Delta Connections</font></p>
  <hr></center>
<object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#
version=5,0,0,0" width="100" height="22" align=right>
  <param name="movie" value="pg2bbutton.swf">
  <param name="quality" value="high">
  <param name="base" value=".">
  <param name="bgcolor" value="#CC66CC">
  <embed src="pg2bbutton.swf" base="."  quality="high"
pluginspage="http://www.macromedia.com/shockwave/download/index.cgi?P1_Prod
_Version=ShockwaveFlash" type="application/x-shockwave-flash" width="100"
height="22" bgcolor="#CC66CC"></embed>
</object>
<object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#
version=5,0,0,0" width="100" height="22">
  <param name="movie" value="pg2abutton.swf">
  <param name="quality" value="high">
  <param name="base" value=".">
  <param name="BGCOLOR" value="#CC66CC">
  <embed src="pg2abutton.swf" width="100" height="22" base="."  quality="high"
pluginspage="http://www.macromedia.com/shockwave/download/index.cgi?P1_Prod
_Version=ShockwaveFlash" type="application/x-shockwave-flash"
bgcolor="#CC66CC" ></embed>
</object>
</body>
</html>
```

B.9 Source code for Chapter 1: Star page (chapt1_pg3.html)

```
<html>
<head>
<title> Chapter 1: Star </title>
<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1">
</head>

<body bgcolor="#996699" text="#000000">
<center>
  <p> </p>
  <p><font size="+2"><strong>STAR CONNECTION</strong></font></p>
  <hr width="50%">
  <p><font size="+2">In Star connection, V<font size="2">an</font>, V<font
size="2">bn<font size="+2">
    </font></font><font size="1"><font size="+2">and V<font
size="2">cn</font><font size="1">
    <font size="+2">are the phase voltages, where 'n' is the neutral terminal.
    </font></font></font></font></font></p>
  <p><font size="+2"><font size="1"><font size="+2"><font size="1"><font
size="+2">Line
    voltage is the voltage between any two active
terminals.</font></font></font></font></font></p>
  <p><font size="+2"><font size="1"><font size="+2"><font size="1"><font
size="+2">Thus
    V<font size="2">ab</font>, V<font size="2">bc</font>, V<font
size="2">ca</font>,
    V<font size="2">ba</font>, V<font size="2">cb</font> and V<font
size="2">ac</font>
    are all line voltages.</font></font></font></font></font></p>
  <p> </p>
  <p><font size="+2"><img src="images/chapt1fig02.jpg" width="200"
height="204"></font></p>
  <p> </p>
  <table width="50%" border="5" bordercolor="#000000" bgcolor="#CC99CC"
cellspacing="2" cellpadding="2">
    <tr>
      <td><div align="center"><strong><font size="+1">Phase
voltages</font></strong></div></td>
      <td><div align="center"><strong><font size="+1">Line
voltages</font></strong></div></td>
    </tr>
    <tr>
      <td><div align="center">V<font size="1">an</font> = V<font
size="1">p</font>
          /_ -30&deg;</div></td>
      <td><div align="center">V<font size="1">ab</font> = V<font
size="1">L</font>
```

```
       /_ 0&deg;</div>
     </td>
   </tr>
   <tr>
     <td><div align="center">V<font size="1">bn</font> = V<font
size="1">p</font>
       /_ -120&deg;-30&deg;</div></td>
     <td><div align="center">V<font size="1">bc</font> = V<font
size="1">L</font>
       /_ -120&deg;</div></td>
   </tr>
   <tr>
     <td><div align="center">V<font size="1">cn</font> = V<font
size="1">p</font>
       /_ +120&deg;-30&deg;</div></td>
     <td><div align="center">V<font size="1">ca</font> = V<font
size="1">L</font>
       /_ +120&deg;</div></td>
   </tr>
   <tr>
     <td colspan="2"><div align="center">V<font size="1">P</font> = V<font
size="1">L</font>
       /sqrt3</div></td>
   </tr>
 </table>
 <p>
 <p>
 <table width="50%" border="5" bordercolor="#000000" bgcolor="#CC99CC"
cellspacing="2" cellpadding="2">
   <tr>
     <td><div align="center">
       <p><font size="+1">Therefore :<br>
       <br>
       <li><font size="+1"> I<font size="1">L</font> = I<font size="1">P</font>
         and V<font size="1">P</font> = V<font size="1">L</font></font></li>
       /<font size="+1">sqrt3</font><br>
       <br>
       <li>Real Power P = sqrt3&middot;V<font size="1">L</font>I<font
size="1">L</font>cos&Oslash;</li>
       <br>
       <br>
       <li>Reactive Power Q = sqrt3&middot;V<font size="1">L</font>I<font
size="1">L</font>sin&Oslash;
       </li>
       <br>
       <br>
```

```
   <li>Apparent Power S = sqrt3&middot;V<font size="1">L</font>I<font
size="1">L</font>
        </li>
  </font></p> </div>
    </td>
   </tr>
  </table>
  <br>
  <hr>
</center>
<object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#
version=5,0,0,0" width="100" height="22" align=right>
  <param name="movie" value="pg3bbutton.swf">
  <param name="quality" value="high">
  <param name="base" value=".">
  <param name="bgcolor" value="#CC66CC">
  <embed src="pg3bbutton.swf" base="."  quality="high"
pluginspage="http://www.macromedia.com/shockwave/download/index.cgi?P1_Prod
_Version=ShockwaveFlash" type="application/x-shockwave-flash" width="100"
height="22" bgcolor="#CC66CC"></embed>
</object>
<object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#
version=5,0,0,0" width="100" height="22">
  <param name="movie" value="pg3abutton.swf">
  <param name="quality" value="high">
  <param name="base" value=".">
  <param name="BGCOLOR" value="#CC66CC">
  <embed src="pg3abutton.swf" width="100" height="22" base="."  quality="high"
pluginspage="http://www.macromedia.com/shockwave/download/index.cgi?P1_Prod
_Version=ShockwaveFlash" type="application/x-shockwave-flash"
bgcolor="#CC66CC" ></embed>
</object>
</body>
</html>
```

B.10 Source code for Chapter 1: Delta page (chapt1_pg4.html)

```
<html>
<head>
<title> Chapter 1: Delta </title>
<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1">
</head>

<body bgcolor="#996699" text="#000000">
<center>
  <p> </p>
  <p><font size="+2"><strong>DELTA CONNECTION</strong></font></p>
  <hr width="50%">
  <p><font size="+2">In Delta connection, there are only three terminals
for</font></p>
  <p><font size="+2">connection to the 3-phase a.c. supply. The line
voltage</font></p>
  <p><font size="+2">is the same as the phase voltage across each phase
impedance.</font></p>
  <p><font size="+2"><font size="1"><font size="+2"><font size="1"><font
size="+2">Assume</font><font size="+2">
    Z<font size="2">ab<font size="+2"> = Z</font></font><font size="2">bc<font
size="+2">
    = Z</font></font><font size="2">ca<font size="+2"> =
R</font></font>.</font></font></font></font></font></p>
  <p> </p>
  <p><font size="+2"><img src="images/chapt1fig03.jpg" width="204"
height="200"></font></p>
  <p> </p>
  <table width="50%" border="5" bordercolor="#000000" bgcolor="#CC99CC"
cellspacing="2" cellpadding="2">
    <tr>
      <td><div align="center"><strong><font size="+1">Phase
voltages</font></strong></div></td>
      <td><div align="center"><strong><font size="+1">Line
currents</font></strong></div></td>
    </tr>
    <tr>
      <td><div align="center">V<font size="1">ab</font> = V<font
size="1">L</font>
          /_ 0&deg;</div></td>
      <td><div align="center">I<font size="1">a</font> = I<font size="1">L</font>
          /_ -30&deg; + <font size="+1">&Oslash;</font></div></td>
    </tr>
    <tr>
      <td><div align="center">V<font size="1">bc</font> = V<font
size="1">L</font>
```

```
        /_ -120&deg;</div></td>
     <td><div align="center">I<font size="1">b</font> = I<font size="1">L</font>
        /_ -150&deg; + <font size="+1">&Oslash;</font></div></td>
   </tr>
   <tr>
     <td><div align="center">V<font size="1">ca</font> = V<font
size="1">L</font>
        /_ +120&deg;</div></td>
     <td><div align="center">I<font size="1">c</font> = I<font size="1">L</font>
        /_ +90&deg; + <font size="+1">&Oslash;</font></div></td>
   </tr>
   <tr>
     <td><div align="center">V<font size="1">L</font> = V<font
size="1">P</font></div></td>
     <td><div align="center">I<font size="1">L</font> = sqrt3&middot;I<font
size="1">P</font></div></td>
   </tr>
  </table>
  <p>
  <p>
  <table width="50%" border="5" bordercolor="#000000" bgcolor="#CC99CC"
cellspacing="2" cellpadding="2">
   <tr>
     <td><div align="center">
        <p><font size="+1">Therefore :<br><br>
        <li><font size="+1"> I<font size="1">L</font> = sqrt3&middot;I<font
size="1">P</font>
          and V<font size="1">P</font> = V<font size="1">L</font></font></li>
        <br><br>
        <li>Real Power P = sqrt3&middot;V<font size="1">L</font>I<font
size="1">L</font>cos&Oslash;</li><br><br>
                    <li>Reactive Power Q = sqrt3&middot;V<font
size="1">L</font>I<font size="1">L</font>sin&Oslash;</li><br><br>
                    <li>Apparent Power S = sqrt3&middot;V<font
size="1">L</font>I<font size="1">L</font></li></font></p>
       </div></td>
   </tr>
  </table>
  <br>
  <hr>
</center>
<object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#
version=5,0,0,0" width="100" height="22" align=right>
  <param name="movie" value="pg4bbutton.swf">
  <param name="quality" value="high">
  <param name="base" value=".">
```

```
  <param name="bgcolor" value="#CC66CC">
  <embed src="pg4bbutton.swf" base="."  quality="high"
pluginspage="http://www.macromedia.com/shockwave/download/index.cgi?P1_Prod
_Version=ShockwaveFlash" type="application/x-shockwave-flash" width="100"
height="22" bgcolor="#CC66CC"></embed>
</object>
<object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#
version=5,0,0,0" width="100" height="22">
  <param name="movie" value="pg4abutton.swf">
  <param name="quality" value="high">
  <param name="base" value=".">
  <param name="BGCOLOR" value="#CC66CC">
  <embed src="pg4abutton.swf" width="100" height="22" base="."  quality="high"
pluginspage="http://www.macromedia.com/shockwave/download/index.cgi?P1_Prod
_Version=ShockwaveFlash" type="application/x-shockwave-flash"
bgcolor="#CC66CC" ></embed>
</object>
</body>
</html>
```

B.11 Source code for Chapter 1: Exercise page (chapt1_pg5.html)

```
<html>
<head>
<title> Chapter 1: Exercise </title>
<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1">
</head>

<body bgcolor="#996699" text="#000000">
<center>
  <p> </p>
  <p><font size="+2"><strong>Short Exercise</strong></font></p>
  <hr width="50%">
  <p><font size="+1">A manufacturing plant draws a total of 415kVA from a 2400V
    <br>
    (line-to-line), 3-phase line. The plant power factor is 87.5 lagging.</font></p>
  <p> </p>
  <p><font size="+2"> <img src="images/prob1.jpg" width="327" height="140">
</font></p>
  <p> </p>
  <p><font size="+2">
    <object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#
version=6,0,29,0" width="425" height="200">
      <param name="movie" value="problem01_parta.swf">
      <param name="quality" value="high">
      <embed src="problem01_parta.swf" quality="high"
pluginspage="http://www.macromedia.com/go/getflashplayer" type="application/x-
shockwave-flash" width="425" height="200"></embed></object>
    </font></p>
  <p><font size="+2">
    <object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#
version=6,0,29,0" width="425" height="200">
      <param name="movie" value="problem01_partb.swf">
      <param name="quality" value="high">
      <embed src="problem01_partb.swf" quality="high"
pluginspage="http://www.macromedia.com/go/getflashplayer" type="application/x-
shockwave-flash" width="425" height="200"></embed></object>
    </font></p>
  <p><font size="+1">c) cos theta = power factor = 0.875,</font></p>
  <p><font size="+1">theta = 29&deg;</font></p>
  <p><font size="+1">Now complete the phasor diagram below by dragging<br>
    the correct box into the appropriate blank spaces.</font></p>
  <p><font size="+1">
```

```
   <object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#
version=6,0,29,0" width="425" height="200">
     <param name="movie" value="problem01_partc.swf">
     <param name="quality" value="high">
     <embed src="problem01_partc.swf" quality="high"
pluginspage="http://www.macromedia.com/go/getflashplayer" type="application/x-
shockwave-flash" width="425" height="200"></embed></object>
   </font></p>
  <hr>
</center>
<object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#
version=5,0,0,0" width="100" height="22" align=right>
  <param name="movie" value="pg5bbutton.swf">
  <param name="quality" value="high">
  <param name="base" value=".">
  <param name="bgcolor" value="#CC66CC">
  <embed src="pg5bbutton.swf" base="."  quality="high"
pluginspage="http://www.macromedia.com/shockwave/download/index.cgi?P1_Prod
_Version=ShockwaveFlash" type="application/x-shockwave-flash" width="100"
height="22" bgcolor="#CC66CC"></embed>
</object>
<object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#
version=5,0,0,0" width="100" height="22">
  <param name="movie" value="pg5abutton.swf">
  <param name="quality" value="high">
  <param name="base" value=".">
  <param name="BGCOLOR" value="#CC66CC">
  <embed src="pg5abutton.swf" width="100" height="22" base="."  quality="high"
pluginspage="http://www.macromedia.com/shockwave/download/index.cgi?P1_Prod
_Version=ShockwaveFlash" type="application/x-shockwave-flash"
bgcolor="#CC66CC" ></embed>
</object>
</body>
</html>
```

B.12 Source code for Chapter 1: Summary page (chapt1_pg6.html)

```
<html>
<head>
<title> Chapter 1: Summary </title>
<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1">
</head>

<body bgcolor="#996699" text="#000000">
<center>
  <p> </p>
  <p><font size="+2"><strong>Delta-to-Star Conversion</strong></font></p>
  <hr width="50%">
  <br>
  <table width="40%" border="5" bordercolor="#000000"
bgcolor="#CC99CC"cellspacing="2" cellpadding="2">
    <tr>
      <td><div align="center">
          <p>
          <li><font size="+1"> R<font size="2">a</font> = R<font
size="2">ab</font></font>&middot;<font size="+1">R<font
size="2">ca</font></font>
            / (<font size="+1">R<font size="2">ab</font></font>+<font
size="+1">R<font size="2">bc</font>+</font><font size="+1">R<font
size="2">ca</font>)</font><br>
          </li><br><br>
          <li><font size="+1">R<font size="2">b</font> = R<font
size="2">bc</font></font>&middot;<font size="+1">R<font
size="2">ab</font></font>
            / (<font size="+1">R<font size="2">ab</font></font>+<font
size="+1">R<font size="2">bc</font>+</font><font size="+1">R<font
size="2">ca</font>)</font><br>
          </li><br><br>
          <li><font size="+1">R<font size="2">c</font> = R<font
size="2">ca</font></font>&middot;<font size="+1">R<font
size="2">bc</font></font>
            / (<font size="+1">R<font size="2">ab</font></font>+<font
size="+1">R<font size="2">bc</font>+</font><font size="+1">R<font
size="2">ca</font>)</font><br>
          </li>
          </div></td>
    </tr>
  </table>
  <p> </p>
  <hr>
  <br>
```

```
 <p><font size="+2"><strong>Star-to-Delta Conversion</strong></font></p>
  <hr width="50%">
  <br>
  <table width="40%" border="5" bordercolor="#000000"
bgcolor="#CC99CC"cellspacing="2" cellpadding="2">
    <tr>
     <td><div align="center">
        <p>
        <li><font size="+1"> R<font size="2">ab</font> = (R<font
size="2">a</font></font><font size="+1">R<font size="2">b
          </font></font> + <font size="+1">R<font size="2">c</font></font><font
size="+1">R<font size="2">a</font>
          + </font><font size="+1">R<font size="2">b</font><font size="+1">R<font
size="2">c</font>)
          / </font></font><font size="+1"><font size="+1">R<font
size="2">c</font></font></font><br><br>
        </li>
        <li><font size="+1">R<font size="2">bc</font> = (R<font
size="2">a</font></font><font size="+1">R<font size="2">b
          </font></font> + <font size="+1">R<font size="2">c</font></font><font
size="+1">R<font size="2">a</font>
          + </font><font size="+1">R<font size="2">b</font><font size="+1">R<font
size="2">c</font>)
          / </font></font><font size="+1"><font size="+1">R<font
size="2">a</font></font></font><br><br>
        </li>
        <li><font size="+1">R<font size="2">ca</font> = (R<font
size="2">a</font></font><font size="+1">R<font size="2">b
          </font></font> + <font size="+1">R<font size="2">c</font></font><font
size="+1">R<font size="2">a</font>
          + </font><font size="+1">R<font size="2">b</font><font size="+1">R<font
size="2">c</font>)
          / </font></font><font size="+1"><font size="+1">R<font
size="2">b</font></font></font><br>
        </li>
        </div></td>
    </tr>
  </table>
  <p> </p><hr width="50%">
  <p><img src="images/chapt1fig04.jpg" width="500" height="321"></p>
  <hr width="50%">
  <hr>
</center>
<object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#
version=5,0,0,0" width="100" height="22" align=right>
  <param name="movie" value="pg6bbutton.swf">
```

```
  <param name="quality" value="high">
  <param name="base" value=".">
  <param name="bgcolor" value="#CC66CC">
  <embed src="pg6bbutton.swf" base="."  quality="high"
pluginspage="http://www.macromedia.com/shockwave/download/index.cgi?P1_Prod
_Version=ShockwaveFlash" type="application/x-shockwave-flash" width="100"
height="22" bgcolor="#CC66CC"></embed>
</object>
<object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#
version=5,0,0,0" width="100" height="22">
  <param name="movie" value="pg6abutton.swf">
  <param name="quality" value="high">
  <param name="base" value=".">
  <param name="BGCOLOR" value="#CC66CC">
  <embed src="pg6abutton.swf" width="100" height="22" base="."  quality="high"
pluginspage="http://www.macromedia.com/shockwave/download/index.cgi?P1_Prod
_Version=ShockwaveFlash" type="application/x-shockwave-flash"
bgcolor="#CC66CC" ></embed>
</object>
</body>
</html>
```

B.13 Source code for Chapter 1: Quiz page (chapt1_quiz.html)

```
<html>
<head>
<title> Chapter 1: Quiz </title>
<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1">
</head>

<body bgcolor="#996699" text="#000000">
<center>
  <p><font size="+1">
    <object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#
version=6,0,29,0" width="550" height="400">
      <param name="movie" value="quiz01.swf">
      <param name="quality" value="high">
      <embed src="quiz01.swf" quality="high"
pluginspage="http://www.macromedia.com/go/getflashplayer" type="application/x-
shockwave-flash" width="550" height="400"></embed></object>
    </font></p>
  <hr>
</center>
<object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#
version=5,0,0,0" width="100" height="22">
  <param name="movie" value="pgq01button.swf">
  <param name="quality" value="high">
  <param name="base" value=".">
  <param name="BGCOLOR" value="#CC66CC">
  <embed src="pgq01button.swf" width="100" height="22" base="."  quality="high"
pluginspage="http://www.macromedia.com/shockwave/download/index.cgi?P1_Prod
_Version=ShockwaveFlash" type="application/x-shockwave-flash"
bgcolor="#CC66CC" ></embed>
</object>
</body>
</html>
```

B.14 Source code for Chapter 2: Introduction page (chapt2_pg1.html)

```
<html>
<head>
<title> Chapter 2: Introduction </title>
<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1">
</head>

<body bgcolor="#996699" text="#000000">
<center>
  <p> </p>
  <p><strong><font size="+2">TRANSFORMERS</font></strong></p>
  <hr width="50%">
  <p><font size="+1">A transformer is a static machine, that is, it has no moving
    parts. It is commonly used to<br>
    increase or decrease voltage or current in an a.c. circuit, without affecting
    its frequency.</font></p>
  <p><font size="+1">Transformers are used in all branches of electrical engineering,
    from large power transformers<br>
    used by supply authorities, to small signal transformers used in electric
    circuits. It enables us to <br>
    transmit electrical energy over great distances and to distribute it safely
    for industrial or<br>
    residential use.</font></p>
  <p> </p>
  <p><img src="images/chapt2fig01.jpg" width="350" height="328"></p>
  <p> </p>
  <p><img src="images/chapt2fig09.jpg" width="359" height="400"></p>
  <p><font size="+1"><strong>3-Phase Transformer</strong></font></p>
  <hr>

  <object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#
version=5,0,0,0" width="100" height="22" align=right>
    <param name="movie" value="pg7button.swf">
    <param name="quality" value="high">
    <param name="base" value=".">
    <param name="bgcolor" value="#CC66CC">
    <embed src="pg7button.swf" base="."  quality="high"
pluginspage="http://www.macromedia.com/shockwave/download/index.cgi?P1_Prod
_Version=ShockwaveFlash" type="application/x-shockwave-flash" width="100"
height="22" bgcolor="#CC66CC"></embed>
  </object>
  </p>
</center>
</body>
</html>
```

B.15 Source code for Chapter 2: Circuit page (chapt2_pg2.html)

```
<html>
<head>
<title> Chapter 2: Circuit </title>
</head>

<body bgcolor="#996699" text="#000000">
<center>  <p> </p>
  <p><img src="images/chapt2fig02.jpg" width="643" height="246"></p>
  <p><strong><font size="+1">Transformer equivalent circuit</font></strong></p>
  <p> </p>
  <p><font size="+1">For an ideal transformer at any instant;</font></p>
  <table border="5" bordercolor="#000000" bgcolor="#CC99CC" cellspacing="2"
cellpadding="10">
    <tr><td><div align="center">Power Input</div></td>
      <td><div align="center">=</div></td>
      <td><div align="center">Power Output</div></td></tr>
    <tr><td><div align="center">v<font size="1">1</font>i<font
size="1">1</font></div></td>
      <td><div align="center">=</div></td>
      <td><div align="center">v<font size="1">2</font>i<font
size="1">2</font></div></td></tr>
    <tr><td><div align="center">v<font size="1">1</font>/v<font
size="1">2</font></div></td>
      <td><div align="center">=</div></td>
      <td><div align="center">N<font size="1">1</font>/N<font
size="1">2</font></div></td></tr>
    <tr><td><div align="center">N<font size="1">1</font>i<font
size="1">1</font></div></td>
      <td><div align="center">=</div></td>
      <td><div align="center">N<font size="1">2</font>i<font size="1">2</font>
        or N<font size="1">1</font>/N<font size="1">2</font> or i<font
size="1">2</font>i<font size="1">1</font></div></td>
    </tr> </table>
 <br><br><br> <p>
  <table border="5" bordercolor="#000000" bgcolor="#CC99CC" cellspacing="2"
cellpadding="10">
    <tr><td colspan="2"><div align="center"><strong><font size="+2">3-Phase
transformation using two transformers</font></strong></div></td></tr>
    <tr><td><div align="center"><img src="images/chapt2fig10.jpg" width="280"
height="195"></div></td>
      <td><object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#
version=6,0,29,0" width="327" height="256">
        <param name="movie" value="flash02a.swf">
        <param name="quality" value="high">
```

```
   <embed src="flash02a.swf" quality="high"
pluginspage="http://www.macromedia.com/go/getflashplayer" type="application/x-
shockwave-flash" width="327" height="256"></embed></object></td></tr>
   <tr><td colspan="2"><div align="center"><strong><font size="+1">V-V or Open
        delta connection</font></strong></div></td></tr>
   <tr><td><div align="center"><img src="images/chapt2fig11.jpg" width="280"
height="190"></div></td>
     <td><object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#
version=6,0,29,0" width="327" height="256">
        <param name="movie" value="flash02b.swf">
        <param name="quality" value="high">
        <embed src="flash02b.swf" quality="high"
pluginspage="http://www.macromedia.com/go/getflashplayer" type="application/x-
shockwave-flash" width="327" height="256"></embed></object></td></tr>
   <tr><td colspan="2"><div align="center"><strong><font size="+1">Open Star-
Open delta connection</font></strong></div></td></tr></table></p>
  <hr></center>
<object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#
version=5,0,0,0" width="100" height="22" align=right>
  <param name="movie" value="pg8bbutton.swf">
  <param name="quality" value="high">  <param name="base" value=".">
  <param name="bgcolor" value="#CC66CC">
  <embed src="pg8bbutton.swf" base="."  quality="high"
pluginspage="http://www.macromedia.com/shockwave/download/index.cgi?P1_Prod
_Version=ShockwaveFlash" type="application/x-shockwave-flash" width="100"
height="22" bgcolor="#CC66CC"></embed></object>
<object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#
version=5,0,0,0" width="100" height="22">
  <param name="movie" value="pg8abutton.swf">
  <param name="quality" value="high">  <param name="base" value=".">
  <param name="BGCOLOR" value="#CC66CC">
  <embed src="pg8abutton.swf" width="100" height="22" base="."  quality="high"
pluginspage="http://www.macromedia.com/shockwave/download/index.cgi?P1_Prod
_Version=ShockwaveFlash" type="application/x-shockwave-flash"
bgcolor="#CC66CC" ></embed> </object>
</body>
</html>
```

B.16 Source code for Chapter 2: Hysteresis page (chapt2_pg3.html)

```
<html>
<head>
<title> Chapter 2: Hysteresis </title>
<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1">
</head>

<body bgcolor="#996699" text="#000000">
<center>
  <p> </p>
  <p><img src="images/chapt2fig03.jpg" width="477" height="427"></p>
  <p><strong><font size="+2">Hysteresis</font></strong></p>
  <p><font size="+1">An ideal core material would have a hysteresis loop with
    no area inside it. It is most economical to operate magnetic materials at
    as high a flux density as possible, usually near the knee of the curve. Note
    that the curve in the figure is a hysteresis curve (alternating flux), not
    a magnetization curve. </font></p>
  <p><font size="+1">In actual magnetic materials, the flux does not drop to zero
    when the mmf returns to zero, but there is a remanent flux. To reduce the
    flux to zero, an mmf in the reverse direction called the coercive force must
    be applied. Since the flux lags the current, there is now component of the
    voltage in phase with the applied current, which means an energy loss, the
    hysteresis loss. The amount of loss, in ergs per cycle per cubic centimeter,
    is the area within the hysteresis loop divided by 4p. </font></p>
  <p><font size="+1">If a sinusoidal alternating voltage is applied to the winding
    creating the emf, the flux is sinusoidal, but the current is not. The current
    must vary in just such a way as to produce the sinusoidal flux, which is 90&deg;
    out of phase with the applied voltage. The magnetization current, will be
    almost 90&deg; out of phase with the applied voltage, with a small in-phase
    component representing hysteresis loss. A transformer is designed so that
    the magnetizing current is a small fraction of the normal load current, usually
    only a few per cent. Since the flux is accurately sinusoidal, the secondary
    voltage (and current) will also be sinusoidal. The peculiarities of the magnetizing
    current will not be reflected in the transformer output, and will not cause
    distortion.</font></p>
  <p></p>
  <hr>
</center>
<object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#
version=5,0,0,0" width="100" height="22" align=right>
  <param name="movie" value="pg9bbutton.swf">
  <param name="quality" value="high">
  <param name="base" value=".">
  <param name="bgcolor" value="#CC66CC">
```

```
  <embed src="pg9bbutton.swf" base="."  quality="high"
pluginspage="http://www.macromedia.com/shockwave/download/index.cgi?P1_Prod
_Version=ShockwaveFlash" type="application/x-shockwave-flash" width="100"
height="22" bgcolor="#CC66CC"></embed>
</object>
<object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#
version=5,0,0,0" width="100" height="22">
  <param name="movie" value="pg9abutton.swf">
  <param name="quality" value="high">
  <param name="base" value=".">
  <param name="BGCOLOR" value="#CC66CC">
  <embed src="pg9abutton.swf" width="100" height="22" base="."  quality="high"
pluginspage="http://www.macromedia.com/shockwave/download/index.cgi?P1_Prod
_Version=ShockwaveFlash" type="application/x-shockwave-flash"
bgcolor="#CC66CC" ></embed>
</object>
</body>
</html>
```

B.17 Source code for Chapter 2: Exercise page (chapt2_pg4.html)

```
<html>
<head>
<title> Chapter 2: Exercise </title>
<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1">
</head>

<body bgcolor="#996699" text="#000000">
<center>
  <p> </p>
  <p><font size="+2"><strong>Short Exercise</strong></font></p>
  <hr width="50%">
  <p><font size="+1">An ideal transformer having 90 turns on the primary and 2250
    turns on</font></p>
  <p><font size="+1">the secondary is connected to a 200 V, 50 Hz source. The
    load across</font></p>
  <p><font size="+1">the secondary draws a current of 2 A at a power factor of
    80% lagging.</font></p>
  <p> </p>
  <p><font size="+2"> </font></p>
  <p>
    <object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#
version=6,0,29,0" width="425" height="200">
      <param name="movie" value="problem02_parta.swf">
      <param name="quality" value="high">
      <embed src="problem02_parta.swf" quality="high"
pluginspage="http://www.macromedia.com/go/getflashplayer" type="application/x-
shockwave-flash" width="425" height="200"></embed></object>
  </p>
  <p> </p>
  <p>
    <object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#
version=6,0,29,0" width="425" height="200">
      <param name="movie" value="problem02_partb.swf">
      <param name="quality" value="high">
      <embed src="problem02_partb.swf" quality="high"
pluginspage="http://www.macromedia.com/go/getflashplayer" type="application/x-
shockwave-flash" width="425" height="200"></embed></object>
  </p>
  <p> </p>
  <p>
    <object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#
version=6,0,29,0" width="500" height="500">
```

```
    <param name="movie" value="problem02_partc.swf">
    <param name="quality" value="high">
    <embed src="problem02_partc.swf" quality="high"
pluginspage="http://www.macromedia.com/go/getflashplayer" type="application/x-
shockwave-flash" width="500" height="500"></embed></object>
  </p>
  <hr>
</center>
<object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#
version=5,0,0,0" width="100" height="22" align=right>
  <param name="movie" value="pg10bbutton.swf">
  <param name="quality" value="high">
  <param name="base" value=".">
  <param name="bgcolor" value="#CC66CC">
  <embed src="pg10bbutton.swf" base="."  quality="high"
pluginspage="http://www.macromedia.com/shockwave/download/index.cgi?P1_Prod
_Version=ShockwaveFlash" type="application/x-shockwave-flash" width="100"
height="22" bgcolor="#CC66CC"></embed>
</object>
<object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#
version=5,0,0,0" width="100" height="22">
  <param name="movie" value="pg10abutton.swf">
  <param name="quality" value="high">
  <param name="base" value=".">
  <param name="BGCOLOR" value="#CC66CC">
  <embed src="pg10abutton.swf" width="100" height="22" base="."  quality="high"
pluginspage="http://www.macromedia.com/shockwave/download/index.cgi?P1_Prod
_Version=ShockwaveFlash" type="application/x-shockwave-flash"
bgcolor="#CC66CC" ></embed>
</object>
</body>
</html>
```

B.18 Source code for Chapter 2: Types page (chapt2_pg5.html)

```
<html>
<head>
<title> Chapter 2: Types </title>
<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1">
</head>

<body bgcolor="#996699" text="#000000">
<center>
  <p> </p>
  <p><font size="+2"><strong>Autotransformer</strong></font>
  <hr width="35%">
  <p> <font size="+1">An autotransformer is a voltage divider type transformer.
    Part of the winding is common to<br>
    both the primary and the secondary circuits. The windings are connected
electrically
    and<br>
    coupled magnetically on a common core. Note that V<font
size="2">1</font>I<font size="2">1</font>
    = V<font size="2">2</font>I<font size="2">2</font>. </font></p>
  <p><img src="images/chapt2fig04.jpg" width="350"
height="353">       <img
src="images/chapt2fig07.jpg" width="126" height="356"></p>
  <p><font size="+1"><strong>Autotransformers</strong></font></p>
  <p> </p>
  <p> </p>
  <p><font size="+2"><strong>Parallel Operation of
Transformers</strong></font></p>
  <hr width="35%">
  <p><font size="+1">If the load on a single transformer exceeds its overload
    rating, it may be necessary to operate<br>
    two or more transformers in parallel.</font></p>
  <p><font size="+1">Conditions for parallel operation:</font></p>
  <p>
  <ul>
    <li><font size="+1">The voltages and transformation ratios must be the
same.</font></li>
  </ul>
  <p>
  <ul>
    <li><font size="+1">The voltage regulation of transformers must be the
same.</font></li>
  </ul>
  <p>
  <ul>
```

```
   <li><font size="+1">The polarities of input and output must be the
same.</font></li>
  </ul>
  <p><img src="images/chapt2fig08.jpg" width="349" height="311"> </p>
  <p><font size="+1"><strong>Parallel Transformer</strong></font></p>
  <p> </p>
  <p> </p>
  <p><font size="+2"><strong>Voltage Transformer</strong></font></p>
  <hr width="35%">
  <p><font size="+1">A voltage transformer (VT), also known as the potential
transformer
    (PT), transforms<br>
    high voltage to low voltage,with a high degree of accuracy in magnitude, and
    very small<br>
    phase angle error.</font></p>
  <p><img src="images/chapt2fig06.jpg" width="177" height="321"></p>
  <p><font size="+1"><strong>Voltage Transformer</strong></font></p>
  <p> </p>
  <p> </p>
  <p><font size="+2"><strong>Current Transformer</strong></font></p>
  <hr width="35%">
  <p><font size="+1">A current transformer (CT), accurately steps down large
currents
    to low values (5A or 1A).<br>
    The primary may be a busbar or wound coil with a few turns of thick conductor.
    The <br>
    secondary is a wound coil, large number of turns with taps or multiple
coils.</font></p>
  <p><font size="+1"><img src="images/chapt2fig05.jpg" width="248"
height="348"></font></p>
  <p><font size="+1"><strong>Current Transformer</strong></font></p>
  <hr>
</center>
<object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#
version=5,0,0,0" width="100" height="22" align=right>
  <param name="movie" value="pg11bbutton.swf">
  <param name="quality" value="high">
  <param name="base" value=".">
  <param name="bgcolor" value="#CC66CC">
  <embed src="pg11bbutton.swf" base="."  quality="high"
pluginspage="http://www.macromedia.com/shockwave/download/index.cgi?P1_Prod
_Version=ShockwaveFlash" type="application/x-shockwave-flash" width="100"
height="22" bgcolor="#CC66CC"></embed>
</object>
```

```
<object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#
version=5,0,0,0" width="100" height="22">
  <param name="movie" value="pg11abutton.swf">
  <param name="quality" value="high">
  <param name="base" value=".">
  <param name="BGCOLOR" value="#CC66CC">
  <embed src="pg11abutton.swf" width="100" height="22" base="."  quality="high"
pluginspage="http://www.macromedia.com/shockwave/download/index.cgi?P1_Prod
_Version=ShockwaveFlash" type="application/x-shockwave-flash"
bgcolor="#CC66CC" ></embed>
</object>
</body>
</html>
```

B.19 Source code for Chapter 2: Quiz page (chapt2_quiz.html)

```
<html>
<head>
<title> Chapter 2: Quiz </title>
<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1">
</head>

<body bgcolor="#996699" text="#000000">
<center>
  <p>
    <object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#
version=6,0,29,0" width="550" height="400">
      <param name="movie" value="quiz02.swf">
      <param name="quality" value="high">
      <embed src="quiz02.swf" quality="high"
pluginspage="http://www.macromedia.com/go/getflashplayer" type="application/x-
shockwave-flash" width="550" height="400"></embed></object>
  </p>
  <hr>
</center>
<object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#
version=5,0,0,0" width="100" height="22">
  <param name="movie" value="pg12button.swf">
  <param name="quality" value="high">
  <param name="base" value=".">
  <param name="BGCOLOR" value="#CC66CC">
  <embed src="pg12button.swf" width="100" height="22" base="."  quality="high"
pluginspage="http://www.macromedia.com/shockwave/download/index.cgi?P1_Prod
_Version=ShockwaveFlash" type="application/x-shockwave-flash"
bgcolor="#CC66CC" ></embed>
</object>
</body>
</html>
```

B.20 Source code for Chapter 3: Introduction page (chapt3_pg1.html)

```
<html>
<head>
<title> Chapter 3: Introduction </title>
<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1">
</head>

<body bgcolor="#996699" text="#000000">
<center>
  <p> </p>
  <p><strong><font size="+2">INDUCTION MACHINE</font></strong></p>
  <hr width="50%">
  <p><font size="+1">The induction machine is the most rugged and the most
extensively
    used electrical <br>
    machine in the industry. It can operate both as a motor and as a generator.
    <br>
    However, it is seldom used as a generator to supply power to electrical loads.<br>
    The performance characteristics as a generator is unsatisfactory for most<br>
    applications and as a result, this chapter deals mainly with induction motor<br>
    performance. </font></p>
  <p> </p>
  <p><img src="images/chapt3fig05.jpg" width="563" height="162"></p>
  <p><b>Cage motor</b></p>
  <hr>

  <object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#
version=5,0,0,0" width="100" height="22" align=right>
    <param name="movie" value="pg13button.swf">
    <param name="quality" value="high">
    <param name="base" value=".">
    <param name="bgcolor" value="#CC66CC">
    <embed src="pg13button.swf" base="."  quality="high"
pluginspage="http://www.macromedia.com/shockwave/download/index.cgi?P1_Prod
_Version=ShockwaveFlash" type="application/x-shockwave-flash" width="100"
height="22" bgcolor="#CC66CC"></embed>
  </object>
  </p>
</center>
</body>
</html>
```

B.21 Source code for Chapter 3: Circuit page (chapt3_pg2.html)

```
<html>
<head>
<title> Chapter 3: Circuit </title>
<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1">
</head>

<body bgcolor="#996699" text="#000000">
<center>
  <p> </p>
  <p> </p>
  <p><img src="images/chapt3fig01.jpg" width="583" height="274"></p>
  <p><font size="+1"><strong>Simplified circuit model</strong></font></p>
  <p> </p>
  <p> </p>
  <p><strong><font size="+1"><img src="images/chapt3fig04.jpg" width="379"
height="301"></font></strong></p>
  <p><font size="+1"><strong>Slip ring rotor</strong></font></p>
  <hr>
</center>
<object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#
version=5,0,0,0" width="100" height="22" align=right>
  <param name="movie" value="pg14bbutton.swf">
  <param name="quality" value="high">
  <param name="base" value=".">
  <param name="bgcolor" value="#CC66CC">
  <embed src="pg14bbutton.swf" base="."  quality="high"
pluginspage="http://www.macromedia.com/shockwave/download/index.cgi?P1_Prod
_Version=ShockwaveFlash" type="application/x-shockwave-flash" width="100"
height="22" bgcolor="#CC66CC"></embed>
</object>
<object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#
version=5,0,0,0" width="100" height="22">
  <param name="movie" value="pg14abutton.swf">
  <param name="quality" value="high">
  <param name="base" value=".">
  <param name="BGCOLOR" value="#CC66CC">
  <embed src="pg14abutton.swf" width="100" height="22" base="."  quality="high"
pluginspage="http://www.macromedia.com/shockwave/download/index.cgi?P1_Prod
_Version=ShockwaveFlash" type="application/x-shockwave-flash"
bgcolor="#CC66CC" ></embed>
</object>
</body>
</html>
```

B.22 Source code for Chapter 3: Torque-Slip page (chapt3_pg3.html)

```
<html>
<head>
<title> Chapter 3: Torque-Slip </title>
<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1">
</head>
<body bgcolor="#996699" text="#000000"><center>  <p> </p>
 <p><font size="+2"><strong>Torque-slip Curve</strong></font></p>
  <p><img src="images/chapt3fig02.jpg" width="421" height="298"></p>
  <p> </p>  <p><font size="+1">Typical torque-slip curve for an induction
machine indicating the regions<br> for motoring, braking and generating operations
is shown above.</font></p>  <p> </p>  <p> </p>
  <p><font size="+1"><img src="images/chapt3fig03.jpg" width="538"
height="403"></font></p>  <p> </p>
  <p><font size="+1">The torque-slip curve is a rectangular hyperbola. So, we see
that beyond the point of <br> maximum torque, any further increase in motor load
results in decrease of torque <br> developed by the motor. The result is that the motor
slows down and eventually stops. <br> The circuit-breakers will be tripped open if the
circuit has been so protected.</font></p>
  <hr></center>
<object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#
version=5,0,0,0" width="100" height="22" align=right>
  <param name="movie" value="pg15bbutton.swf">
  <param name="quality" value="high">
  <param name="base" value=".">
  <param name="bgcolor" value="#CC66CC">
  <embed src="pg15bbutton.swf" base="."  quality="high"
pluginspage="http://www.macromedia.com/shockwave/download/index.cgi?P1_Prod
_Version=ShockwaveFlash" type="application/x-shockwave-flash" width="100"
height="22" bgcolor="#CC66CC"></embed>
</object>
<object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#
version=5,0,0,0" width="100" height="22">
  <param name="movie" value="pg15abutton.swf">
  <param name="quality" value="high">
  <param name="base" value=".">
  <param name="BGCOLOR" value="#CC66CC">
  <embed src="pg15abutton.swf" width="100" height="22" base="."  quality="high"
pluginspage="http://www.macromedia.com/shockwave/download/index.cgi?P1_Prod
_Version=ShockwaveFlash" type="application/x-shockwave-flash"
bgcolor="#CC66CC" ></embed>
</object>
</body>
</html>
```

B.23 Source code for Chapter 3: Exercise page (chapt3_pg4.html)

```
<html>
<head>
<title> Chapter 3: Exercise </title>
<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1">
</head>

<body bgcolor="#996699" text="#000000"><center>
 <p> </p>
 <p><font size="+2"><strong>Short Exercise</strong></font></p>
 <hr width="50%">
 <p><font size="+1">Please attempt the short questions below.</font></p>
 <p> </p>
 <p><font size="+2"> </font></p>
 <p>
  <object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#
version=6,0,29,0" width="500" height="200">
    <param name="movie" value="problem03_parta.swf">
    <param name="quality" value="high">
    <embed src="problem03_parta.swf" quality="high"
pluginspage="http://www.macromedia.com/go/getflashplayer" type="application/x-
shockwave-flash" width="500" height="200"></embed></object>
 </p>
 <p> </p>
 <p>
  <object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#
version=6,0,29,0" width="500" height="250">
    <param name="movie" value="problem03_partb.swf">
    <param name="quality" value="high">
    <embed src="problem03_partb.swf" quality="high"
pluginspage="http://www.macromedia.com/go/getflashplayer" type="application/x-
shockwave-flash" width="500" height="250"></embed></object>
 </p>
 <p> </p>
 <p>
  <object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#
version=6,0,29,0" width="500" height="250">
    <param name="movie" value="problem03_partc1.swf">
    <param name="quality" value="high">
    <embed src="problem03_partc1.swf" quality="high"
pluginspage="http://www.macromedia.com/go/getflashplayer" type="application/x-
shockwave-flash" width="500" height="250"></embed></object>
 </p>
```

```
 <p>
   <object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#
version=6,0,29,0" width="500" height="200">
     <param name="movie" value="problem03_partc2.swf">
     <param name="quality" value="high">
     <embed src="problem03_partc2.swf" quality="high"
pluginspage="http://www.macromedia.com/go/getflashplayer" type="application/x-
shockwave-flash" width="500" height="200"></embed></object>
  </p>
  <p>
   <object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#
version=6,0,29,0" width="500" height="200">
     <param name="movie" value="problem03_partc3.swf">
     <param name="quality" value="high">
     <embed src="problem03_partc3.swf" quality="high"
pluginspage="http://www.macromedia.com/go/getflashplayer" type="application/x-
shockwave-flash" width="500" height="200"></embed></object>
  </p>
  <hr></center>
<object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#
version=5,0,0,0" width="100" height="22" align=right>
  <param name="movie" value="pg16bbutton.swf">
  <param name="quality" value="high">
  <param name="base" value=".">
  <param name="bgcolor" value="#CC66CC">
  <embed src="pg16bbutton.swf" base="."  quality="high"
pluginspage="http://www.macromedia.com/shockwave/download/index.cgi?P1_Prod
_Version=ShockwaveFlash" type="application/x-shockwave-flash" width="100"
height="22" bgcolor="#CC66CC"></embed>
</object>
<object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#
version=5,0,0,0" width="100" height="22">
  <param name="movie" value="pg16abutton.swf">
  <param name="quality" value="high">
  <param name="base" value=".">
  <param name="BGCOLOR" value="#CC66CC">
  <embed src="pg16abutton.swf" width="100" height="22" base="."  quality="high"
pluginspage="http://www.macromedia.com/shockwave/download/index.cgi?P1_Prod
_Version=ShockwaveFlash" type="application/x-shockwave-flash"
bgcolor="#CC66CC" ></embed>
</object>
</body>
</html>
```

B.24 Source code for Chapter 3: Quiz page (chapt3_quiz.html)

```
<html>
<head>
<title> Chapter 3: Quiz </title>
<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1">
</head>

<body bgcolor="#996699" text="#000000">
<center>
  <p><strong><font size="+2">
    <object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#
version=6,0,29,0" width="550" height="400">
      <param name="movie" value="quiz03.swf">
      <param name="quality" value="high">
      <embed src="quiz03.swf" quality="high"
pluginspage="http://www.macromedia.com/go/getflashplayer" type="application/x-
shockwave-flash" width="550" height="400"></embed></object>
    </font></strong> </p>
  <hr>
</center>
<object classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#
version=5,0,0,0" width="100" height="22">
  <param name="movie" value="pg17button.swf">
  <param name="quality" value="high">
  <param name="base" value=".">
  <param name="BGCOLOR" value="#CC66CC">
  <embed src="pg17button.swf" width="100" height="22" base="."  quality="high"
pluginspage="http://www.macromedia.com/shockwave/download/index.cgi?P1_Prod
_Version=ShockwaveFlash" type="application/x-shockwave-flash"
bgcolor="#CC66CC" ></embed>
</object>
</body>
</html>
```

Appendix C

Flash Programming Source Code

C Flash programming for dynamic button in Online Quiz