

**Interactive Multimedia Kiosk Application for Malacca Heritage**  
BY  
CHIA MIN JUN

A REPORT  
SUBMITTED TO  
Universiti Tunku Abdul Rahman  
in partial fulfillment of the requirements  
for the degree of  
BACHELOR OF INFORMATION SYSTEM (HONS) BUSINESS INFORMATION  
SYSTEM  
Faculty of Information and Communication Technology  
(Perak Campus)

JAN 2017

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**Date:** \_\_\_\_\_

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## DECLARATION OF ORIGINALITY

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Name : \_\_\_\_\_

Date : \_\_\_\_\_

## **ACKNOWLEDGEMENTS**

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## **ABSTRACT**

This proposed project is a kiosk multimedia application that is specially design for the heritage in Malacca city. With the advancement of the ICT, technology can be combined with the tourism to make the virtual tourism possible. Malacca is a place that rich of historical and cultural background from previous Portuguese, Dutch and British rule. Therefore, this project is designed to provide information to the tourist in order to let them understand the history of Malacca in a better way. The proposed project is able to help user by assisting them selecting which attractions to go as all the information are already included in this project. The tourists, as the users of this project are able to know what are the attractions in a particular place and need information in details about a particular place. Besides, with the help of this proposed project, the user's appreciation and knowledge on certain places such as historical sites can be improved. Besides, an interactive timeline will be included in this project that allows users to understand the background of the Malacca city through an interactive way. Next, with the help of this project, the user is able to find know the popular attractions in Malacca and how they should go by referring to the interactive map. Furthermore, the game-based learning module is able to test the user understanding about the history of Malacca and attract more people to use this application at the same time. This project is developed by using ADDIE model which is the methodology used in developing instructional multimedia project. In short, this project is able to enhance the knowledge of the users on Malacca City in an interactive way.

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## LIST OF ABBREVIATIONS

<i>ICT</i>	Information and Communication Technology
<i>ADDIE</i>	Analysis,Design,Development,Implementation,Evaluation
<i>NASA</i>	National Aeronautic and Space Administration
<i>AR</i>	Augmented Reality
<i>MP3</i>	MPEG-3
<i>AVI</i>	Audio Video Interleave
<i>GIF</i>	Graphics Interchange Format
<i>FPS</i>	Frame Per Second



## **Chapter 1: Introduction**

### **1-1 Motivation and Problem Statements**

History helps us to understand the change from the past and how the cultural, social and societal values developed across the time. In Malacca, there are many heritage and historical sites and each of them has their own story. Therefore, with the help of the kiosk application, the history of each site can be displayed to all the users whenever they are using the kiosk application in Malacca. Next, in order to visit all the historical sites in Malacca, the problem occurs when the user unsure about where is each of the historical sites located. Other than provide the historical information to the user, kiosk application also provide the map that containing all the historical sites and guide the user on how to visit all the places at ease.

There are few problem statements as stated below:

- (i) Lack of information on the location of each heritage sites in Malacca  
Most of the tourists especially the foreign visitors do not know the historical places that they can visit and where are these attractions are located in Malacca. Most of them figured out that the brochure on guiding them when they were not user friendly and it is difficult to find any information kiosk to help them out. (Nur Firdaus et al. 2010)
- (ii) Inconvenient in getting all the historical information for each heritage sites  
The amount of information in the form of interpretation boards is insufficient thus impede the visitors to learn more. It is important to let visitors to get information at ease. (Hasrul Yushairi Johari et al. 2010)
- (iii) Lack of detailed information and tedious way of presenting the history  
Visitors often complain that the information in traditional writing sometimes inadequate as visitors cannot capture or imagine the past. The lack of other multimedia elements may affect the effectiveness of visitors to obtain the information. (Hasrul Yushairi Johari et al. 2010)

## **1-2 Background Information**

In this modern technology era, with the advancement of information and communication technology (ICT), our daily lives have been improved. ICT has helped us in several of fields and one of these examples is tourism. Kiosk application is one of the examples on how ICT helped in tourism.

Kiosk application is the software designed to display information to the user. Kiosk application is the tool that will be used to refer to get the information of nearby attractions. It is usually placed at the entrance of the shopping mall to display the locations of each shop lot in the shopping mall which ease the user going to the desired destination. Besides, it is also designed to be placed at the tourist attraction to provide the map of the particular attraction and the direction in which the user should be heading to.

With the advancement of technology, virtual tourism is available nowadays. However, the traditional way of visiting to the actual places of the attraction is still popular. Issues occurred when the user unsure about what are the attractions in a particular place and need information in details about a particular place. Therefore, with the help of kiosk application, the user's appreciation and knowledge on certain places such as historical sites can be improved by integrating the technology we have nowadays.

Malacca is a state in Malaysia that rich of historical and cultural background from previous Portuguese, Dutch and British rule. There are lots of heritage and historical sites which are the attractions in Malacca for visitors to visit such as A' Famosa Fort, Christ Church, St. Paul's Church and etc. Besides, there are also some other must visit places in Malacca such as Jonker Street Night Market. Therefore, there is a need of kiosk to guide visitors where to go to the attractions.

History of a particular is important as it carries the meaningful story why and how the particular place is kept until now and became an attraction nowadays. It is important to preserve the history of the past of the particular place for the sake of the

future generations able to know the meaningful history of a particular place and get to see the heritage in the future. It also allows the foreign visitors to be able to understand and know well about the history happened in that particular place previously.

In short, in Malacca, a place with lots of heritage and historical sites that full with meaningful history, there is a need of kiosk application. However, there is no kiosk application that describing each of the historical sites and its history in Malacca. Therefore, kiosk application that is able to display the history of all the historical sites in Malacca, the information of the particular place that visitors need to know, as well as the guide to lead them heading to the desired location.

### **1-3 Project Scope**

In the end of this project, a kiosk application that contains the information of all heritage and historical sites in Malacca will be developed. The kiosk application that developed is able to help the people to enhance their knowledge in history of Malacca. Besides, it will also help the foreign visitors to know the history of Malacca as well. Moreover, this kiosk application is also able to convey the message to the users in an interactive way in which help the users to retain the important information.

The proposed modules are as below:

(i) Interactive timeline module

This is the introduction of Malacca city. It will show the development of Malacca city over time. Instead of presenting using plain text, multimedia elements will be used to make it more interesting to visitor.

(ii) Virtual tour module

Allow visitor to click on a particular site and view the particular place with a virtual tour guide that introduce the place to the visitor. This gives the information in which helps the visitor to decide whether or not to visit that particular place. It also shows all history information of each historical site in details by including appropriate multimedia elements to make the visitor get the information effectively and efficiently.

(iii) Interactive map module

Display the map location for each heritage sites and other attractions in Malacca so that the visitor able to click and view the map and its brief details of that particular location that have been chosen.

(iv) Game-based learning module

Test the understanding of the visitor on the historical information and reward users to play game. To make the game more interesting, the quiz is developed using score-based.

#### **1-4 Project Objectives**

In order to solve the problem statements that mentioned earlier, the following project objectives have been set:

- (i) To develop a kiosk application that provides interactive map to display the location information for each of the heritage sites in Malacca. This helps the visitors to visit to a particular place at ease which will solve the problem statement (i).
- (ii) To develop a kiosk application that contains all the historical sites' information by integrating all the information together so that the visitors are able to view the information at ease which will solve the problem statement (ii).
- (iii) To develop a kiosk application that display the historical information in an interactive manner by including other multimedia elements such as video, graphic image, sound rather than just plain text which will solve the problem statement (iii).

### **1-5 Impact, Significance and Contribution**

The proposed project is a kiosk application that is specially designed for Malacca. Malacca is a tourist attraction that is full with lots of historical sites and heritage attractions. There is no any interactive kiosk application that is designed for Malacca yet. Therefore, at the end of this project, there will be interactive kiosk application for Malacca. This kiosk application will help tourists to look out all the historical sites and heritage attractions and gain knowledge at the same time when they visit to Malacca.

Firstly, with the proposed project, the user is able to save time. The interactive kiosk application is able to give information about the historical sites and heritage attractions. The user is able to select the attractions that preferred to go and then the kiosk application will display information. This helps user to save time on thinking where to go first among all the attractions.

Next, the user is able to know the history of Malacca in an interactive way. The kiosk application is able to convey the history of each historical site to the user in an interactive way. The user does not need to read through a whole lengthy story to understand the history. Instead, the kiosk application will present the history in a story telling manner. The story telling manner used up the animation along with the narrator to tell the story which will help user to have a better retention on the history and do not feel bored easily.

Furthermore, with the help of this kiosk application, the user is able to know the importance of protecting the heritage of Malacca and learn how to appreciate through game. With this, it enables to test the user understanding of the Malacca's history and at the same time helps them to the importance of preserving the history and heritage.

### **1-6 Highlight of Achievement**

The first achievement of this proposed is the Interactive Timeline Module. This module allows users to know the history of the Malacca from the past in an interactive way. Instead of using the traditional way in which letting people know by reading from the book, the Malacca history is displayed in an interesting and interactive way by utilizing the multimedia elements into the application. It requires users to interact with the application in order to view more of the content. This allows users to control the speed of the learning by their own.

Next, the second module which is the Virtual Tour Module allows the users to view a particular Malacca's attraction at ease. Typical problem for tourists in Malacca is that they often hardly could find the information or historical details of that particular attraction during their visit. By having this module, the details of the attractions will be included in this module. Besides, with the 360 degree panorama in the application, the users are able to visit a particular attraction virtually along with the information of that particular attraction.

Furthermore, the third module is the Interactive Map Module. This module allows users to view on the map and click on the attraction that they are interested on to get more details about that particular attractions. The users able to filter out the information that they would like to see, for example, they can click on the restaurant filter to find out the restaurant in Malacca. Next, the users are able to scan on the QR code provided in order to navigate to the particular attraction that they have chosen.

Lastly, the last achievement of this project is the Game Module. This module allows users to play and learn at the same time which is also known as edutainment. Users are able to test their understanding and knowledge on Malacca by answering few simple quiz questions and play a puzzle game as a reward if they are able to get 50 marks or above.

## **1-7 Report Organization**

In chapter 1, the details of the project will be discussed in details. These include the motivation of developing this project, problem statements, project scopes, motivations, and objectives. This chapter will discuss the reason of developing this project and what will be solved after developing this project.

In chapter 2, the previous similar works that used to solve the problems will be searched and analysed. The similar projects will be researched and benchmarked to find the strengths and weaknesses of each project found. By compare and contrast the different projects, the features of the projects benchmarked that are appropriate will be implemented into the proposed project. In chapter 3, the system design will be discussed. It includes the brief description of the developing process of the whole project. The storyboards for each of the modules proposed in the project are also included in this chapter.

In chapter 4, the methodology of developing project will be discussed. Besides, the developing tools used in developing this project will be listed out as well. Next, the system performance definition, implementation challenges and the gantt chart of the project are included in this chapter. In chapter 5, the development process of the project will be discussed in details with the support of the screenshots. The complete development process will be discussed in stage-by-stage from pre-authoring to authoring to post-authoring.

In chapter 6, the guide for developing the project is discussed module by module. The complete application could be rebuilt by referring to the guide in this chapter. In chapter 7, this chapter will discuss about the whole testing process of the completed application for the proposed project. The unit verification test will be included in this chapter.

Lastly, in chapter 8 which is the final chapter. The summary and the conclusion of the project will be stated in this chapter.



## Chapter 2: Literature Review

### 2-1 Module Benchmarking Review

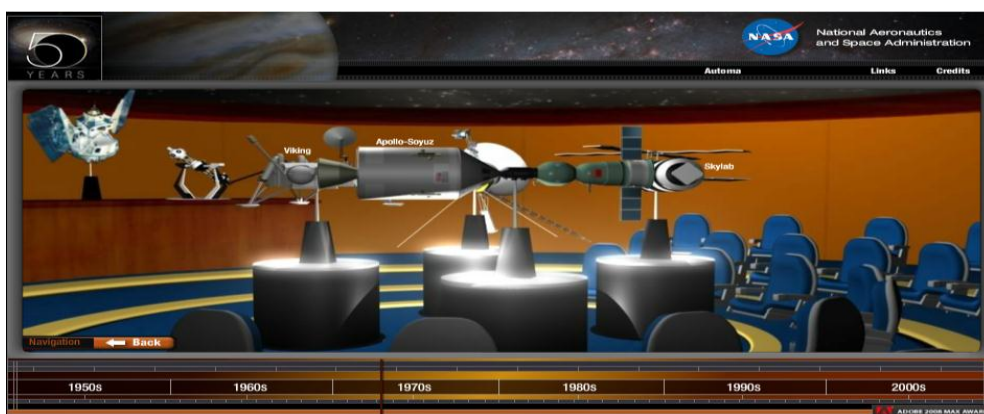
#### 2-1-1 Interactive Timeline Module

##### 2-1-1-1 NASA Official Website (Hanger, C. et al., n.d.)



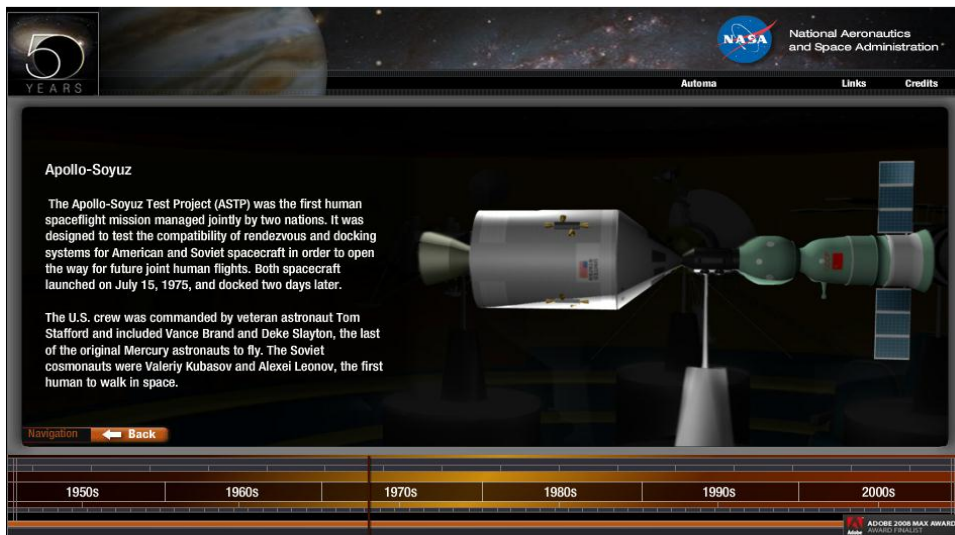
**Figure 2-1-1-1-F1:** NASA history timeline feature

The figure showed above is a flash that embedded in NASA's website. This flash is used to show the 50 years development of NASA from 1950s to 2000s. It shows the changes of the company building and the technology over time. It presents the information in an interactive way in which the user is able to click the item and view in details.



**Figure 2-1-1-1-F2:** Indoor of the NASA building

When the building is clicked, it will enter into the building and more elements will be showed out. When the users click any of it, the detailed information will be popped out for user to read as shown in figure 2-1-1-1-F3.



**Figure 2-1-1-1-F3:** Detailed information

The detailed information explains the particular thing that is clicked by the user by using a plain text with the image of the item shown by the side.

**Strength**

Present history of NASA in an interactive way as there are many things that can be clicked in the content. After clicked, there will be animation being played.

**Weakness**

There is no guide to help user on how to use the flash.

**2-1-1-2 World History Timeline (World History Timeline, 2015)**



**Figure 2-1-1-2-F1:** History for Kids

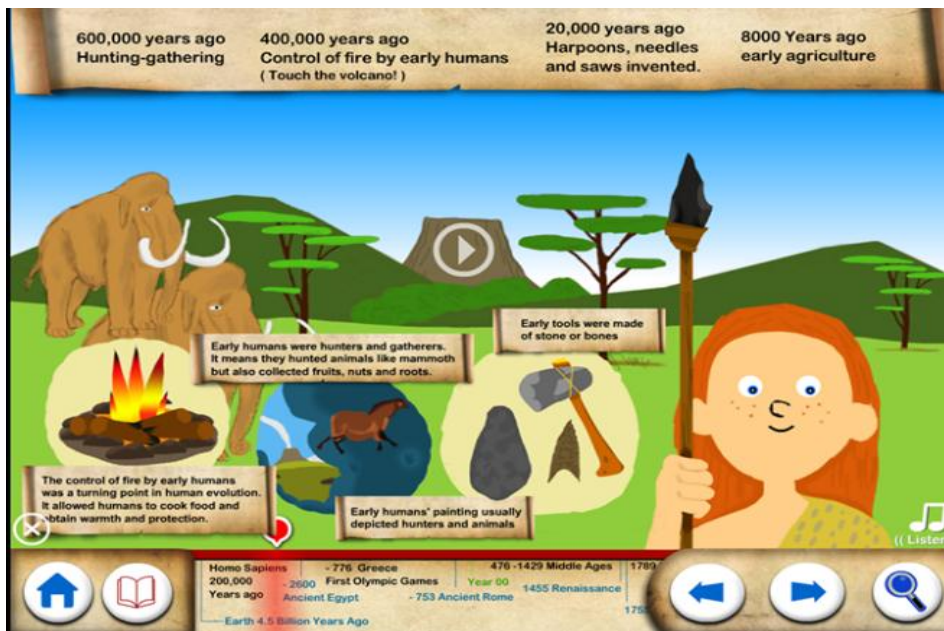
The history for kids is a mobile application. The main purpose of this application is to display the history in an interactive way.



**Figure 2-1-1-2-F2:** History timeline

The figure above showed the way that the history being displayed. This application uses animation, sound, and text to convey the message to the user. At the same time, the user may click on the animation and it will play a certain animation to

get user attraction. For example, user may click on the play button on the volcano as shown in figure 2-1-1-2-F3 and a volcanic explosion will occurs.



**Figure 2-1-1-2-F3:** Explanation of the elements

When the users click on the magnifying glass, the detailed information will be displayed to user. The user may click on the music button, the animated person will start speaking to explain the information to user.

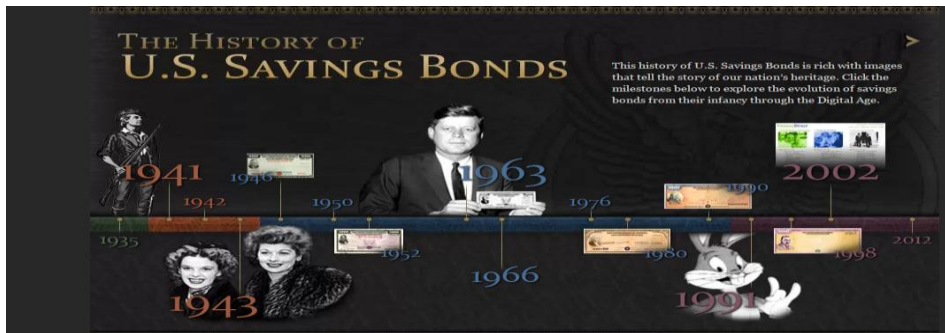
### **Strength**

Narration is available so users do not need to read lengthy text. However, texts still available in case if the users want to read by themselves.

### **Weakness**

There is no background music when presenting the information to the user.

### 2-1-1-3 The History of U.S. Savings Bonds (U.S. Savings Bonds go digital, 2002)



**Figure 2-1-1-3-F1:** Main timeline

The figure above showed another way of displaying the timeline for the history of U.S Savings Bonds on a website. This website displays the history timeline by using the images and the text. When the users mouse over the image of the respective year, the image will be highlighted as an indicator.



**Figure 2-1-1-3-F2:** History details of each year

When the users click on the image, it will direct the user to the specific page in which all the information regarding that particular year will be shown. The elements used to display the information are images and texts.

#### **Strength**

It is simple and elegant view of the interactive timeline.

#### **Weakness**

No narration is provided.

## 2-1-2 Virtual Tour Guide Module

### 2-1-2-1 NASA Official Website (Hanger, C. et al., n.d.)



**Figure 2-1-2-1-F1:** Virtual robot

The picture shown above is obtained from the flash presentation that is obtained from NASA's website as well. There is a virtual robot that will explain things to the user. This virtual robot is in 3D and will waves its hand when it is talking. This helps to grab user attention as it is not a static image but an animated robot. The user may choose to skip the speech from the robot by clicking the skip animation button on the bottom-left.

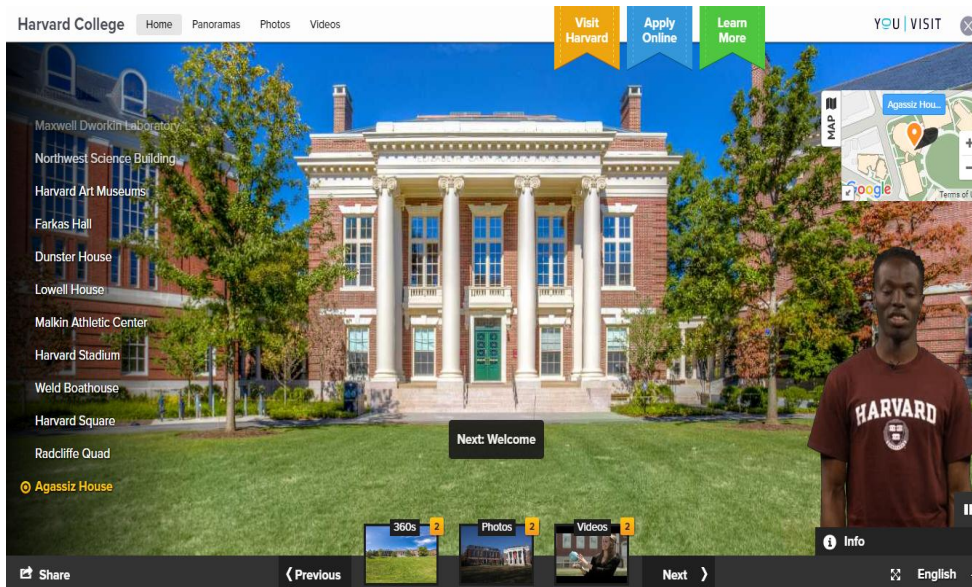
#### **Strength**

It is able to skip animation. 3D robot that performs hand gestures during speaking.

#### **Weakness**

There is no subtitle or summary of what the robot said is available in case if user could not understand the message that is trying to be delivered.

### 2-1-2-2 Harvard College (Harvard.edu, n.d.)



**Figure 2-1-2-2-F1:** Virtual tour of Harvard College

The figure above shown the virtual tour offered by Harvard College. The virtual tour guide used is real person and it is available at the bottom-right side to assist user. Users are able to view the college in different methods such as photos, videos, or 360 degree panoramas.

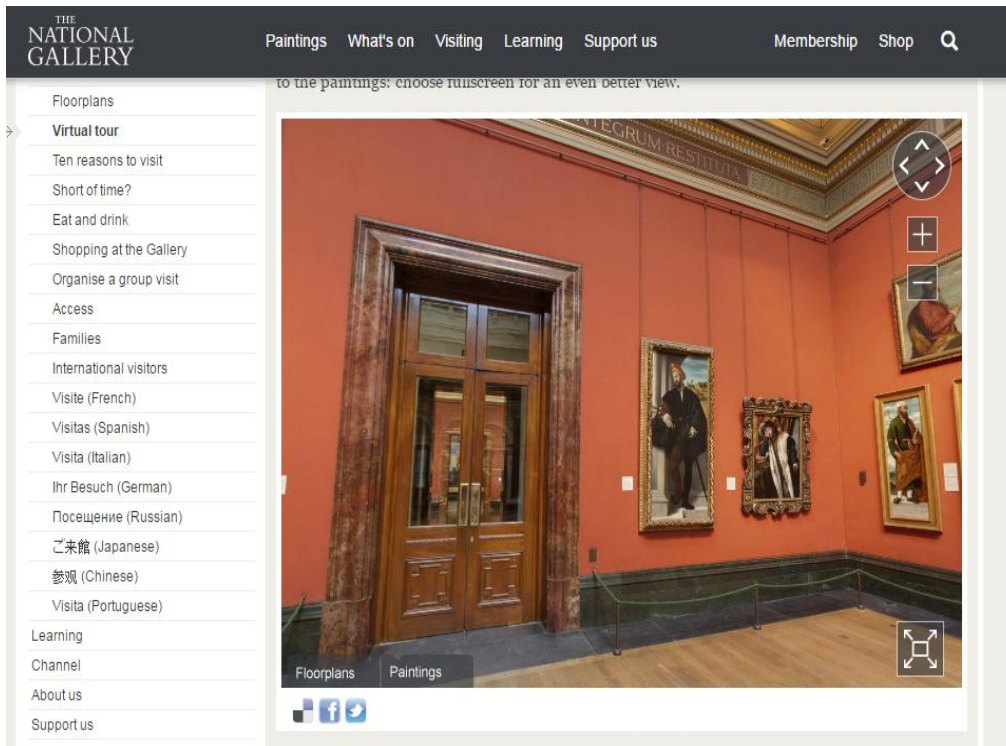
#### **Strength**

Several of options are available to do virtual tour. It is able to skip virtual tour guide. Text of the narration is available if user could not understand the speech.

#### **Weakness**

There is too much information being displayed on a single interface.

### 2-1-2-3 The National Gallery (The National Gallery, n.d.)



**Figure 2-1-2-3-F1:** Virtual tour of the national gallery

This is a virtual tour that is obtained from a website. It allows user to move around the room by controlling the buttons or using mouse to drag to view the room in various angles. The floor plan is linked with each room so that when the users click on particular place on the floor plan, it will direct the user to that particular place.

#### **Strength**

It is simple and easy to use. Buttons to assist user navigate around the virtual tour. Clickable pictures on the wall to get more information.

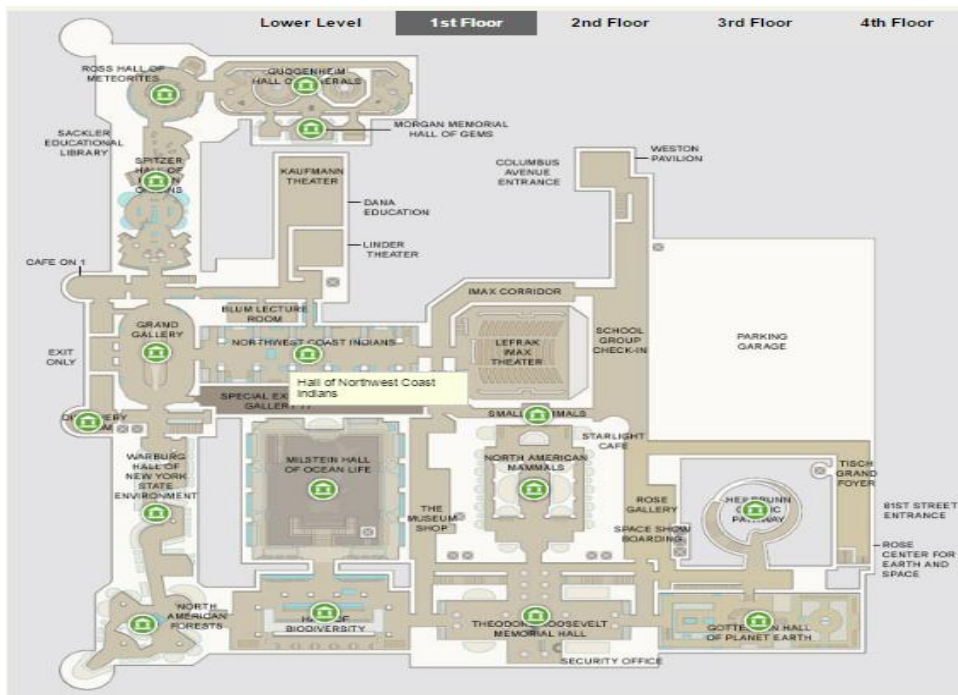
#### **Weakness**

No virtual tour guide available.



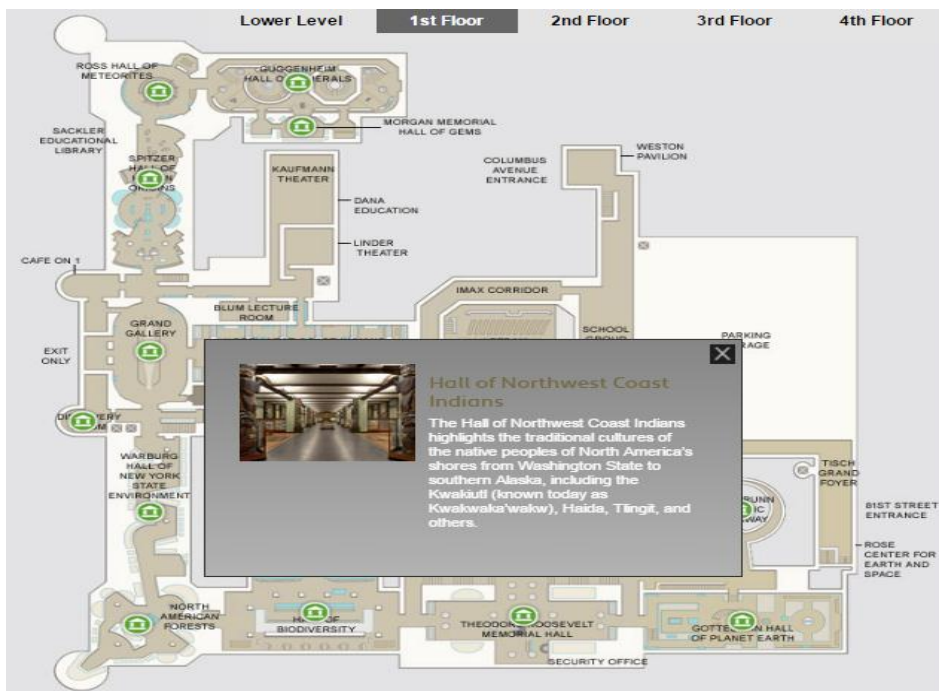
### 2-1-3 Interactive Map Module

#### 2-1-3-1 American Museum of Natural History (American Museum of Natural History, n.d.)



**Figure 2-1-3-1-F1:** Interactive map

The interactive map shown in the figure above will display a tooltip with the name of the place being highlighted. It will show out when the cursor is mouse over a particular symbol. When the users click on the symbol, the details of the particular place will be shown.



**Figure 2-1-3-1-F2:** Details of interactive map

The figure above shows the description of the particular location with a picture when the user clicked on a particular symbol.

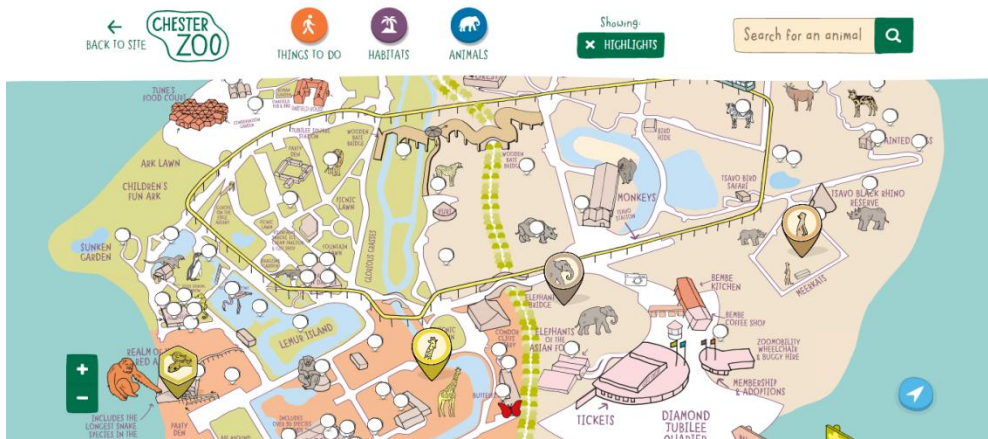
**Strength**

It is simple and organized. Attractions that are available to click are clearly shown.

**Weakness**

It only provides information but does not link to the particular place.

### 2-1-3-2 Chester Zoo (Chester Zoo, n.d.)



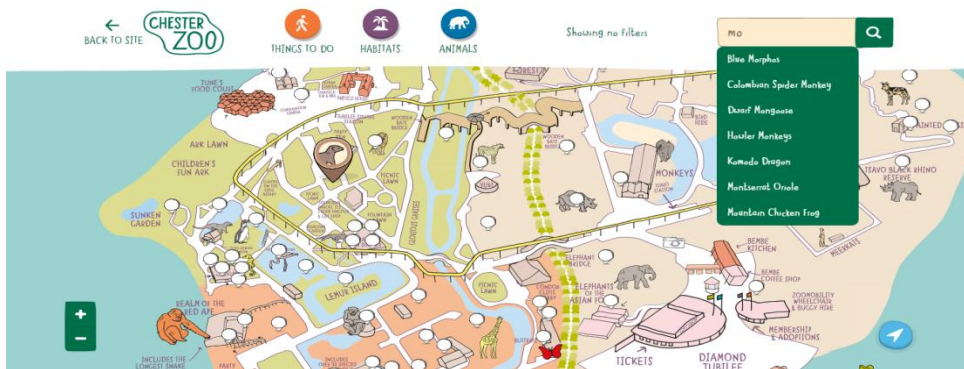
**Figure 2-1-3-2-F1:** Interactive map of Chester Zoo

The figure above shown the interactive map obtained from the official website of Chester Zoo. There are many clickable images on the map where each of it has its own information. The user is able to filter out the things that showing on the map. Besides, the user is able to zoom in to view the map in a larger view.



**Figure 2-1-3-2-F2:** Filter of the map

The figure above shown the filter that user is able to choose. User may click on the category that they wish to see, otherwise it would not be shown on the map.



**Figure 2-1-3-2-F3:** Search bar

This website provides a search bar in which user may search for a particular animal by using the search bar. This ease the user and speed up the user in finding information that they wanted.



**Figure 2-1-3-2-F4:** Interactive information

When user click on icon displayed on the interactive map, there will be a box prompting out where user may click explore more to view its detailed information.

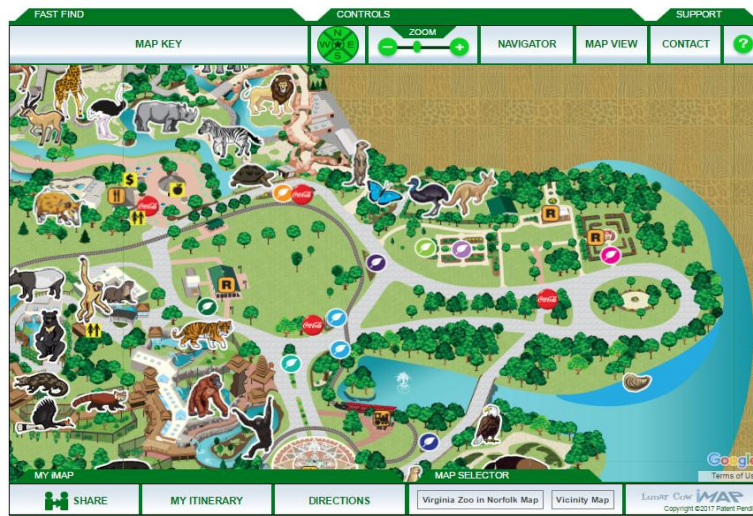
### **Strength**

Filters are available. Search bar is available to ease the searching. It is able to zoom map.

### **Weakness**

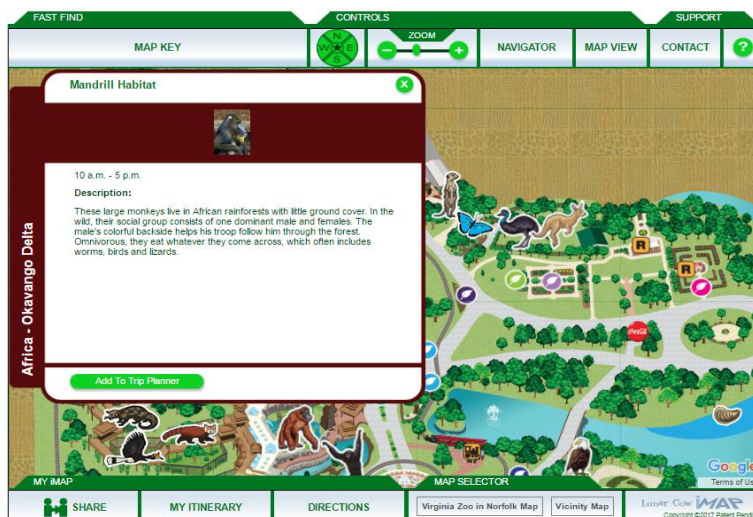
No background music.

### 2-1-3-3 Virginia Interactive Zoo Map (Virginia Zoo, n.d.)



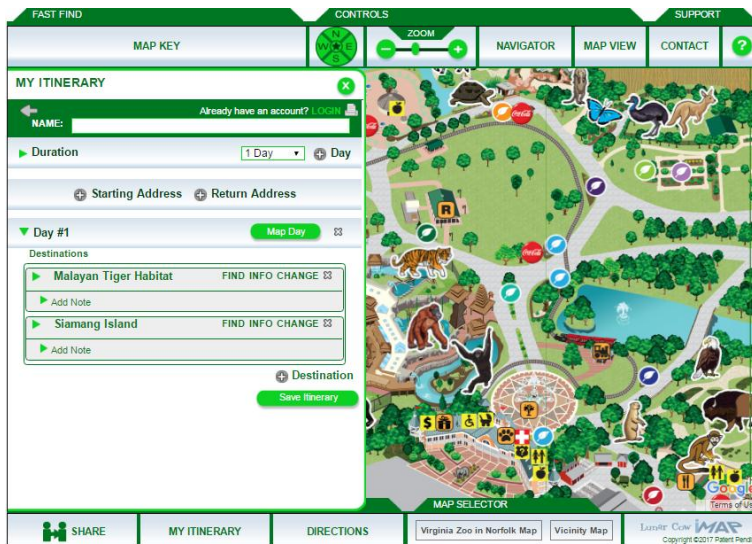
**Figure 2-1-3-3-F1:** Interactive map of Virginia Zoo

The figure above shown above is the interactive map used in Virginia zoo website. It allows user to zoom in and out the map, also filtering feature is available to allow user to get information more precise. Besides, the user is able to click on the cardinal directions which are west, north, south, and east to view different part of the map.



**Figure 2-1-3-3-F2:** Details via pop up message

When users click on the animal icon on the interactive map, the information will be displayed. Besides, user is able to add this attraction into trip planner.



**Figure 2-1-3-3-F3:** Itinerary plan

The user is able to select multiple attractions and add them into an itinerary and then refer to it on the way visiting the zoo.

### **Strength**

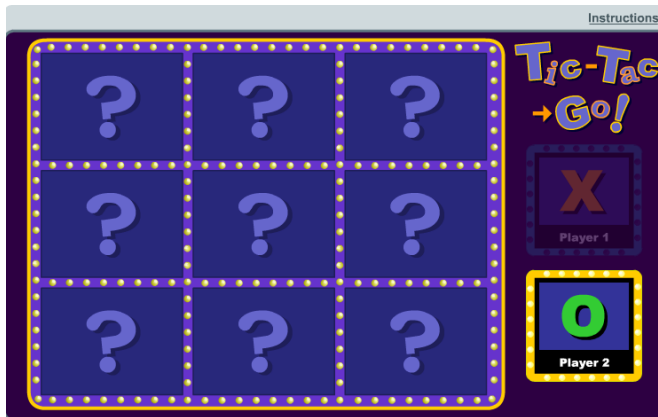
Road planning feature is available. Filters are available. It is able to zoom map.

### **Weakness**

It is too complex to use. Takes long time to load and easily not responding.

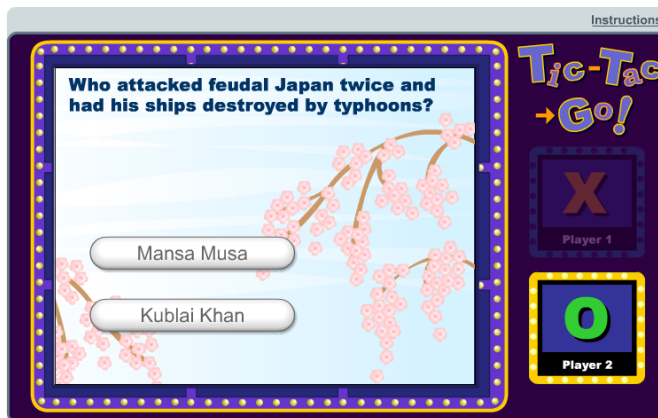
## 2-1-4 Game-Based Learning Module

### 2-1-4-1 Tic-Tac-Go (Activity Center, 2014)



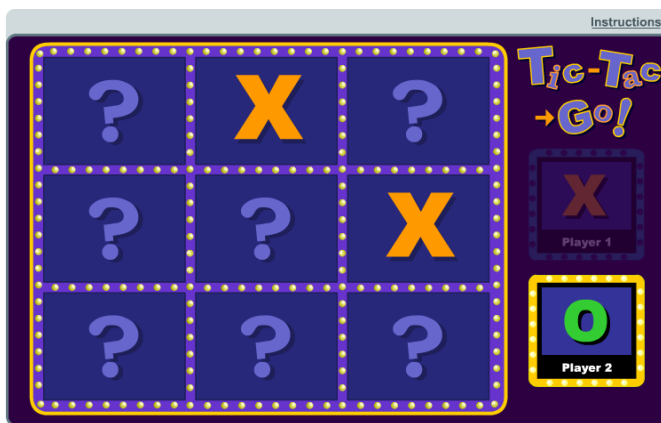
**Figure 2-1-4-1-F1:** Tic-Tac-Go gaming interface

The figure above showed the main gaming interface of the Tic-Tac-Go games. This game is enable 2 users to play at the same time. It starts off with the first player where the user is able to choose any of the 9 boxes. When the users click on any boxes, a question will be displayed as shown in figure 2-1-4-1-F2.



**Figure 2-1-4-1-F2:** Tic-Tac-Go question

The user is given options to be chosen. If the user answers wrongly, the user is unable to mark the symbol on the box and pass the turn to the next player. On the other hand, if the user successfully answers the question, the box where the user clicked will be marked with the user's represented symbol.



**Figure 2-1-4-1-F3:** Symbol marked with the correct attempt

The figure above showed where the symbol 'X' is marked on the boxes where the player chose to attempt. This game ends when any of the players successfully mark their symbol in a line with 3 of their respective symbols. Game ends with draw otherwise.

**Strength**

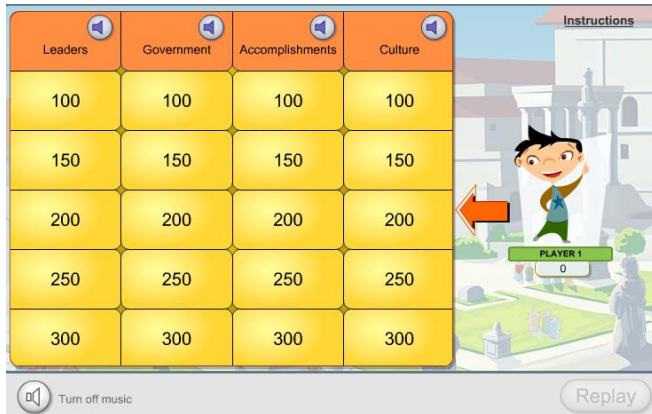
Instruction is available. It has competitive game that involves 2 people. Several questions are available.

**Weakness**

Become meaningless if there is only one person who playing this.

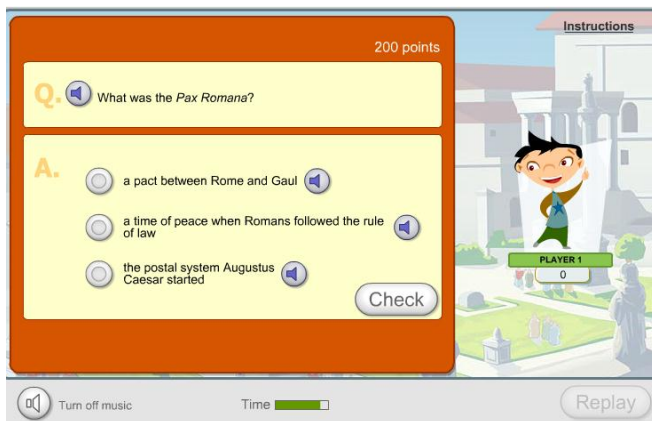


### 2-1-4-2 Roman History Trivia (Activity Center, 2014)



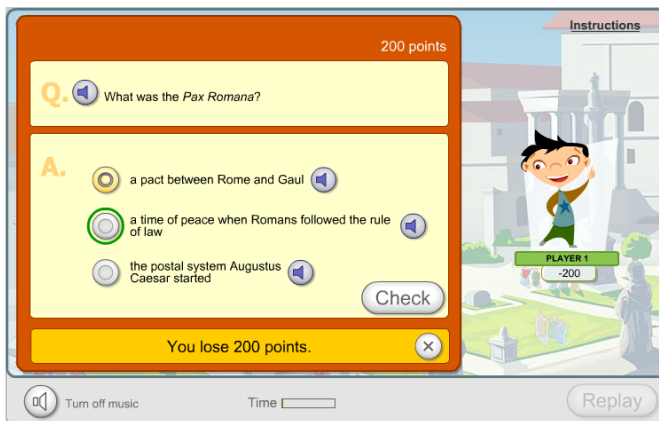
**Figure 2-1-4-2-F1:** Roman History Trivia game interface

The figure above showed the main interface of the game. This game is designed in a way that the user is able to click on the boxes that marked with respective scores to answer the question. The questions are sorted based on the category of leaders, government, accomplishments and culture. The user can click on the box to attempt the question.



**Figure 2-1-4-2-F2:** Roman History Trivia question

The question will be displayed with the options given to be chosen. If the users click on the box that is marked with 200 points, the question of that respective score will be shown.



**Figure 2-1-4-2-F3:** Roman History Trivia result

If the users are able to answer correctly, the user will get 200 points, or otherwise, it would deduct from the total score. At the end of the game, the user may check how many scores he or she obtained.

### **Strength**

It has competitive games. User is able to choose avatar. Reveal real answer after chosen if the user chose the wrong one.

### **Weakness**

It takes too long time to finish one game play.

### 2-1-4-3 World History Games - Hoop Shoot (Smart, R. n.d.)



Figure 2-1-4-3-F1: HoopShoot pre-game

This game enables user to customize the characteristic of the player before the game starts. After the users had done customize the character, the user can click on play to start the game.



Figure 2-1-4-3-F2: HoopShoot question

The user is given 10 attempts. The user is required to answer the question correctly in order to get a chance to shoot the basketball. If the question answered wrongly, it will waste an attempt.



**Figure 2-1-4-3-F3:** HoopShoot basketball play

When the users answer the question correctly, the user is given to shoot a basketball by clicking to aim the shot of the basketball.



**Figure 2-1-4-3-F4:** HoopShoot score

The user will be given 3 points if the users successfully shoot the basketball into the basketball hoop. Otherwise, the user is unable to get points even though the question is answered correctly.

**Strength**

It allows customizable player avatar with name. User is able to play game after answered correctly.

**Weakness**

Required mouse to move the basketball player in which input device could be a major problem to implement this game.

## 2-2 Highlight and Comparison of Previous Works

### 2-2-1 Interactive Timeline Module

<b>Project Features</b>	<b>NASA Official Website</b>	<b>World History Timeline</b>	<b>The History of U.S. Savings Bonds</b>	<b>Proposed Project</b>
Text	/	/	/	/
Animation	/	/		/
Background Music	/	/		/
Help Guide	/			/
Virtual Tour Guide	/			/
Narration	/			/
Graphic	/	/	/	/
Interactive	/	/	/	/

**Table 2-2-1:** Comparison of Interactive Timeline Module

### 2-2-2 Virtual Tour Module

<b>Project Features</b>	<b>NASA Official Website</b>	<b>Harvard College Website</b>	<b>The National Gallery Website</b>	<b>Proposed Project</b>
360 Panorama	/	/	/	/
Photo Gallery				/
Background Music	/	/	/	/
Virtual Tour Guide	/	/		

**Table 2-2-2 :** Comparison of Virtual Tour Module

**2-2-3 Interactive Map Module**

<b>Project Features</b>	<b>American Museum of Natural History Website</b>	<b>Chester Zoo Website</b>	<b>Virginia Interactive Zoo Map Website</b>	<b>Proposed Project</b>
Filter function		/		/
Background Music				/
Map Navigation			/	/
Search Bar		/		
Details Linkage	/			/
View Selection				/

**Table 2-2-3 :** Comparison of Interactive Map Module

**2-2-4 Game-Based Learning Module**

<b>Project Features</b>	<b>Tic-Tac-Go</b>	<b>Roman History Trivia</b>	<b>Hoop Shoot</b>	<b>Proposed Project</b>
Randomize Question	/	/	/	/
Score-Based		/	/	/
Result indication	/	/	/	/
Instruction	/	/	/	/
Game	/	/	/	/

**Table 2-2-4:** Comparison of Game-Based Learning Module

## **Chapter 3: System Design**

### **3-1 Description of the Project Development**

Building a multimedia application from scratch requires a long process of work. From brainstorming ideas, gathering information, organizing ideas, finding materials, developing the project, and up to test the project for future improvement.

Firstly, researches should be done in order to get more ideas to solve a particular issue. It could be done by doing research over the internet, from the newspaper or by the things happened around. In this case, the idea of building this Interactive Multimedia Kiosk Application for Malacca Heritage was obtained from personal experience during the visit in Malacca.

Next, in order to develop the multimedia application that could solve the problem found, the related information should be gathered via online. There are few research papers and final year projects that related to the issue have been studied, summarized and included in this document.

Organizing ideas come into next step after gathered all the information needed in developing this application. The contents of the application should be organized. The ideas of building the application such as the number of modules included, the scratch design of the modules, and also how the modules link from one place to another place. Thus, the blueprint could be done so that the author of the application could refer back to it from time to time.

After that, the materials such as videos, images, texts, animations, and sounds should be get ready before proceeding to the next stage. All these could be done by obtaining from the internet or creating, editing the existing ones using software like Adobe Photoshop, Adobe Illustrator and etc. Besides, the button that used in the application could be designed using the Microsoft Power Point as well. It is a simple to use yet could produce elegant icons. The elements that found must matches with the theme of application as it would be integrated as a whole at the end. Online text-to-speech converter is used to produce the narrator sound which could be used in the



interactive timeline module. Sounds effects and background music are obtained from Youtube that are also matching the theme of the application.

Next, in the developing stage, all the multimedia elements that have been prepared should be organized in a folder which may ease for the development process in later on as more and more files will be put into the same folder. After that, by referring to the blueprint, all the elements are imported to the Adobe Director and designed modules by modules. Then, the evaluation should be carried out from time to time in order to identify any design flaws or improvements that could be made.

Lastly, when the project is done, it is then released for testing purposes and the feedbacks are gathered and listed down in the documents. These information are analysed as they are useful for the future improvement.

3-2 System Flow Diagram

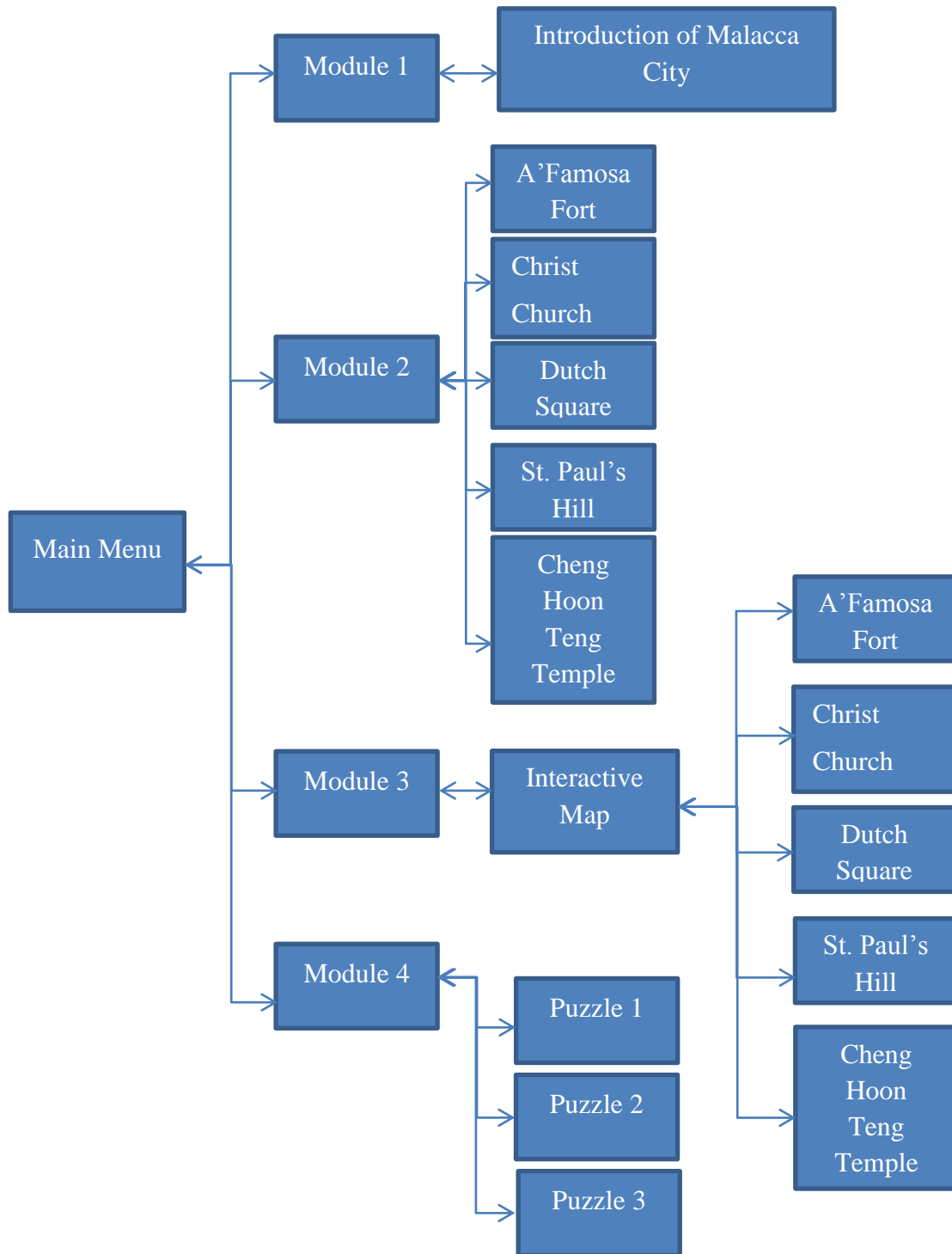
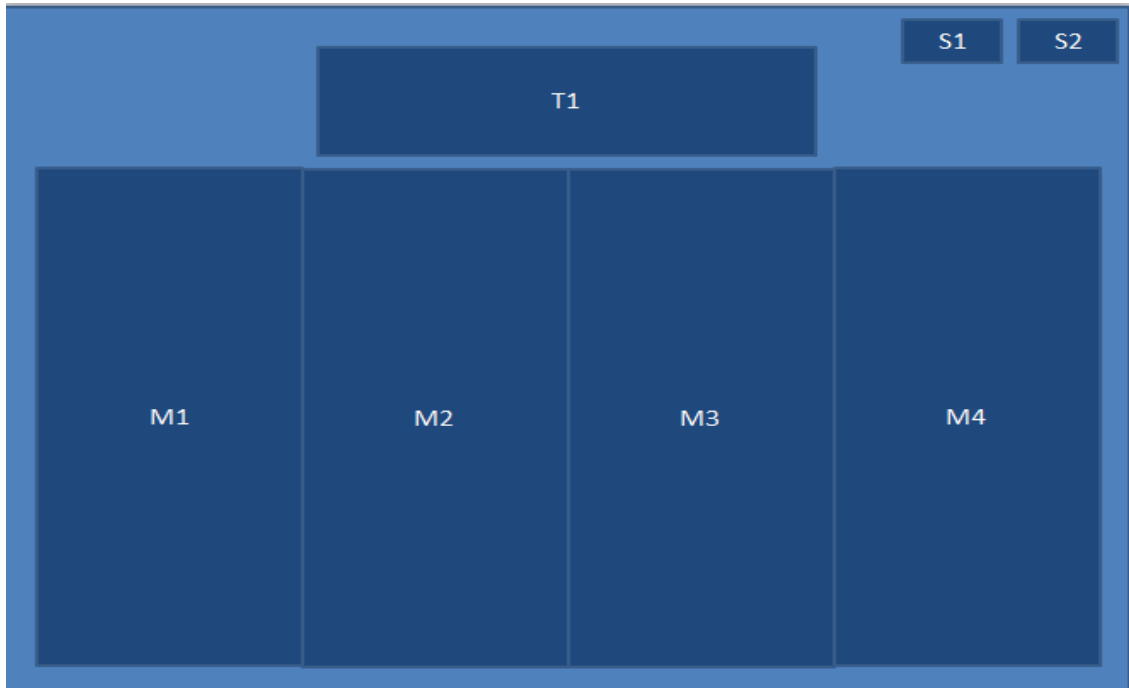


Figure 3-2-2-F1: System flow diagram

### 3-3 Storyboard Designs

#### 3-3-1 Storyboard for Main Menu

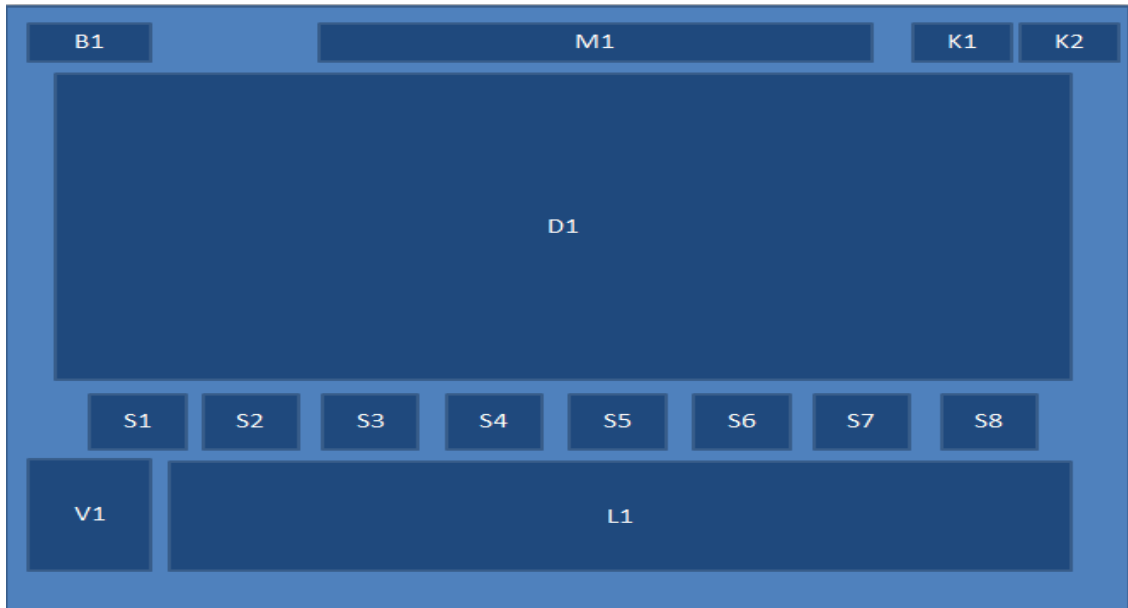


**Figure 3-3-1-F1:** Main menu interface

Label	Description
S1	Help button
S2	Button to switch sound on or off
T1	Button to display the 4 modules options
M1	Link to module 1 which is the interactive timeline module
M2	Link to module 2 which is virtual tour module
M3	Link to module 3 which is the interactive map module
M4	Link to module 4 which is the game-based learning module

**Table 3-3-1-T1:** Description of main menu interface

### 3-3-2 Storyboard for Interactive Timeline Module



**Figure 3-3-2-F1:** Interactive timeline module interface

Label	Description
B1	Back button to main menu
M1	Module 1 title
D1	Content display
K1	Help button
K2	Button to switch sound on or off
S1	Jump to “Introduction”
S2	Jump to “Sultanate of Malacca”
S3	Jump to “Portuguese Colonization”
S4	Jump to “Dutch Colonization”
S5	Jump to “British Colonization”
S6	Jump to “Japanese Conquest”
S7	Jump to “Malaysia Independence”
S8	Jump to “Conclusion”
V1	Toggle subtitle on / off
L1	Subtitle

**Table 3-3-2-T1:** Description of interactive timeline module interface

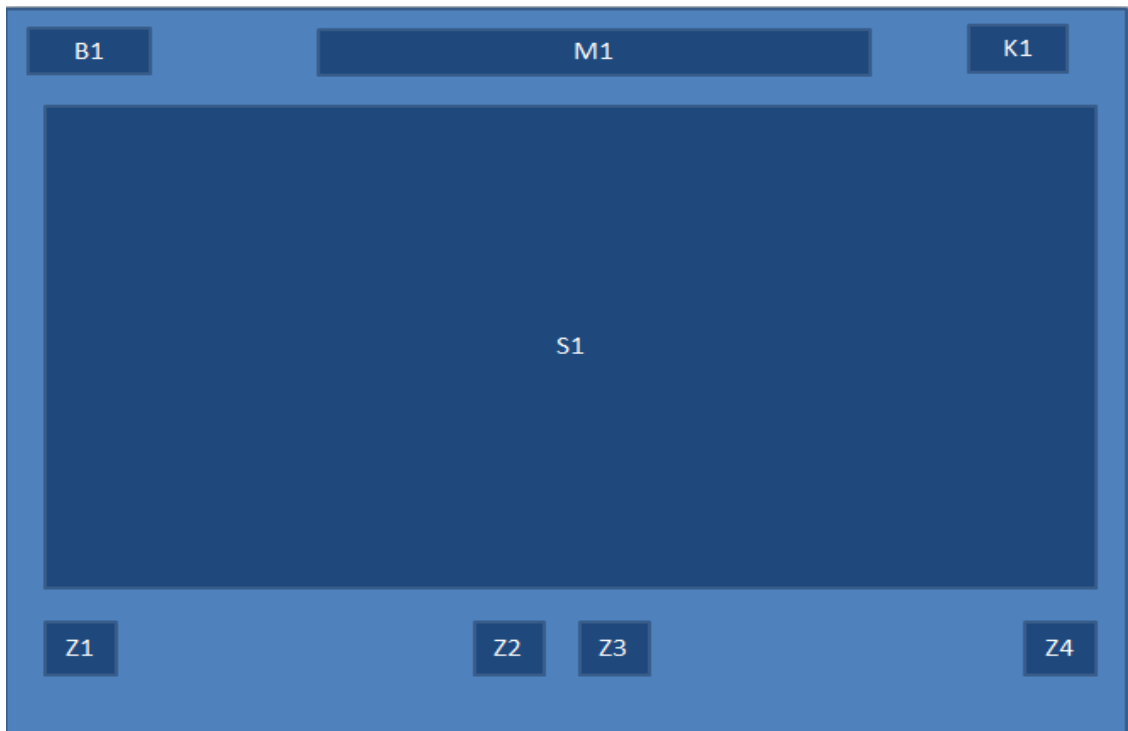
### 3-3-3 Storyboard for Virtual Tour Module



**Figure 3-3-3-F1:** Virtual tour module interface

Label	Description
B1	Back button to main menu
M1	Module 2 title
S1	Link to 360 panorama
S2	Link to Photo Gallery
S3	Link to Interactive Map
T1	History of the attraction
N1	Go to previous page
N2	Go to next page
K1	Help button
K2	Button to switch sound on or off

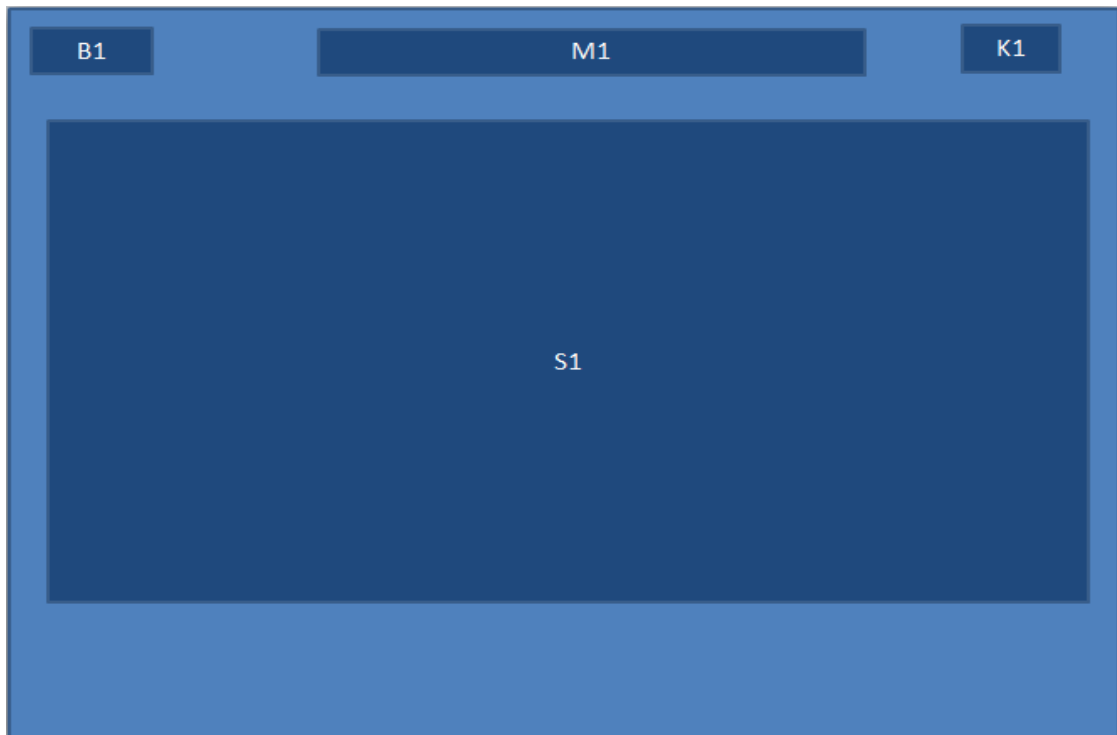
**Table 3-3-3-T1:** Description of virtual tour module interface



**Figure 3-3-3-F2:** Virtual tour module 360 panorama interface

Label	Description
B1	Back button to virtual tour module main interface
M1	Module 2 title
S1	360 degree panorama
Z1	Left button
Z2	Pause button
Z3	Resume button
Z4	Right button
K1	Button to switch sound on or off

**Table 3-3-3-T2:** Description of virtual tour module 360 panorama interface

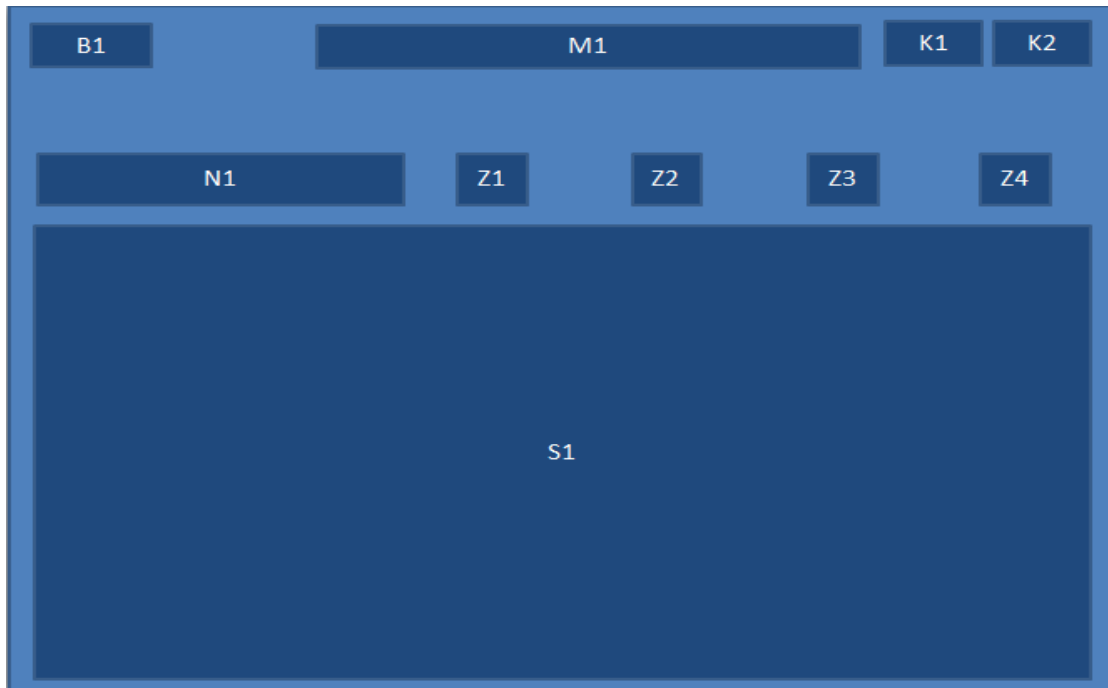


**Figure 3-3-3-F3:** Virtual tour module photo gallery interface

Label	Description
B1	Back button to virtual tour module main interface
M1	Module 2 title
S1	Photo displays
K1	Button to switch sound on or off

**Table 3-3-3-T3:** Description of virtual tour module photo gallery interface

### 3-3-4 Storyboard for Interactive Map Module

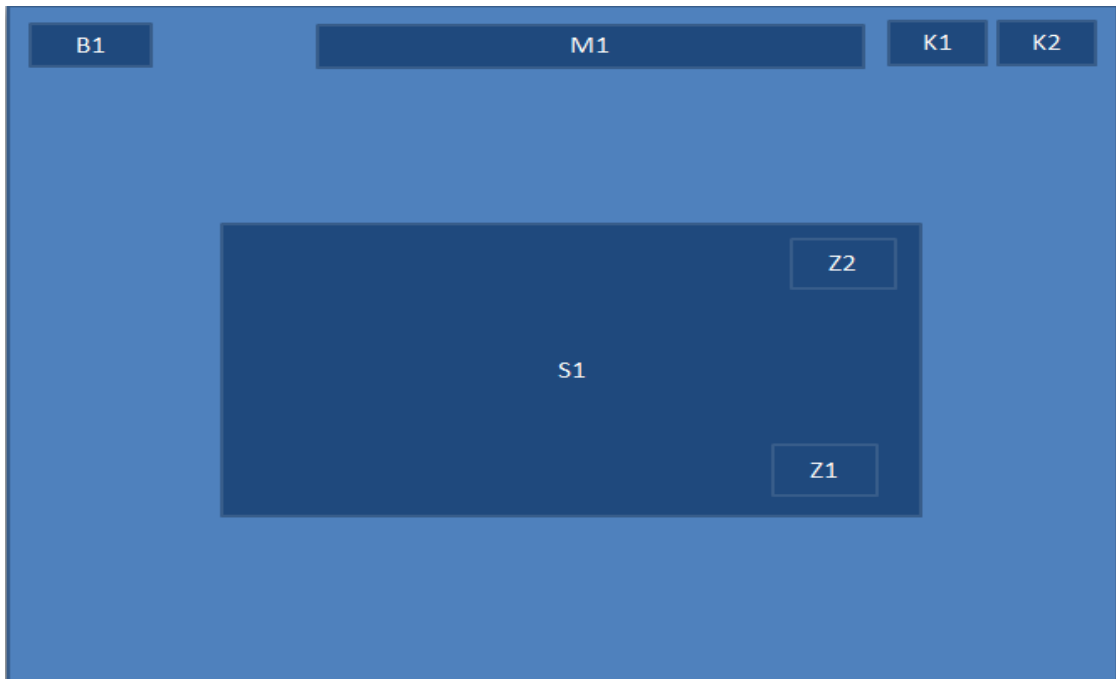


**Figure 3-3-4-F1:** Interactive map module interface

Label	Description
B1	Back button to main menu
M1	Module 3 title
S1	Interactive map
Z1	Filter for Attractions
Z2	Filter for Restaurants
Z3	Filter for Hotels
Z4	Filter for Shopping malls
N1	View selection
K1	Help button
K2	Button to switch sound on or off

**Table 3-3-4-T1:** Description of interactive map module interface



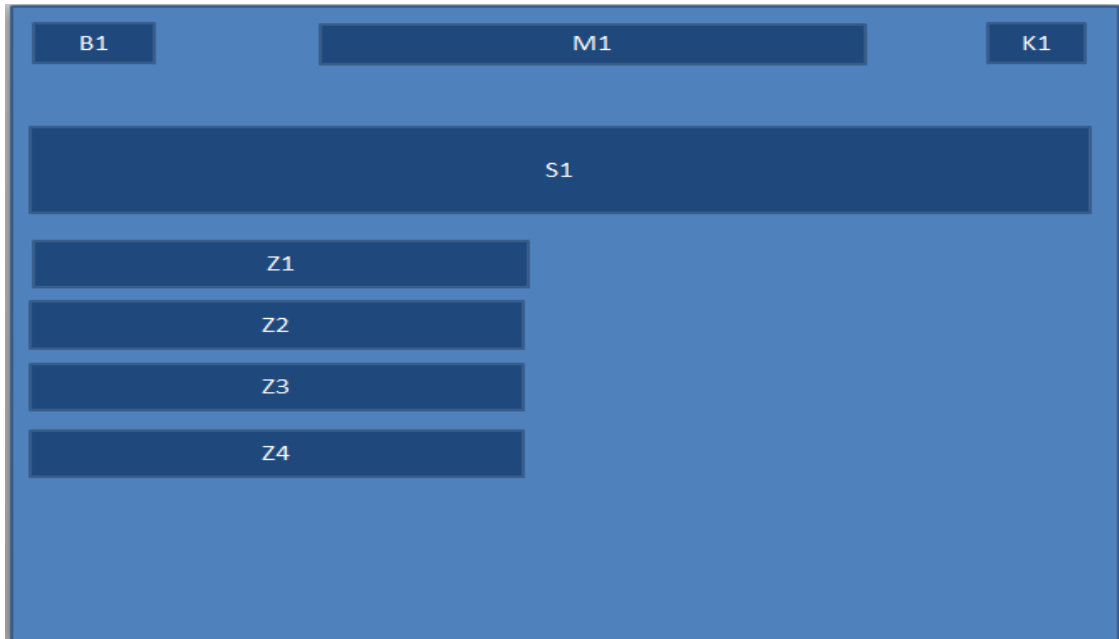


**Figure 3-3-4-F2:** Interactive map module sub-interface

Label	Description
B1	Back to main menu
M1	Module 3 title
S1	Description of the current selected option from the interactive map
Z2	Back to interactive map
Z1	Go button to link to the virtual tour of the current selected place
K1	Help button
K2	Button to switch sound on or off

**Table 3-3-4-T2:** Description of interactive map module sub-interface

### 3-3-5 Storyboard for Game-Based Learning Module



**Figure 3-3-5-F1:** Game-based learning module quiz interface

Label	Description
B1	Back button to main menu
M1	Module 4 title
S1	Quiz questions
Z1	Choice 1
Z2	Choice 2
Z3	Choice 3
Z4	Choice 4
K1	Button to switch sound on or off

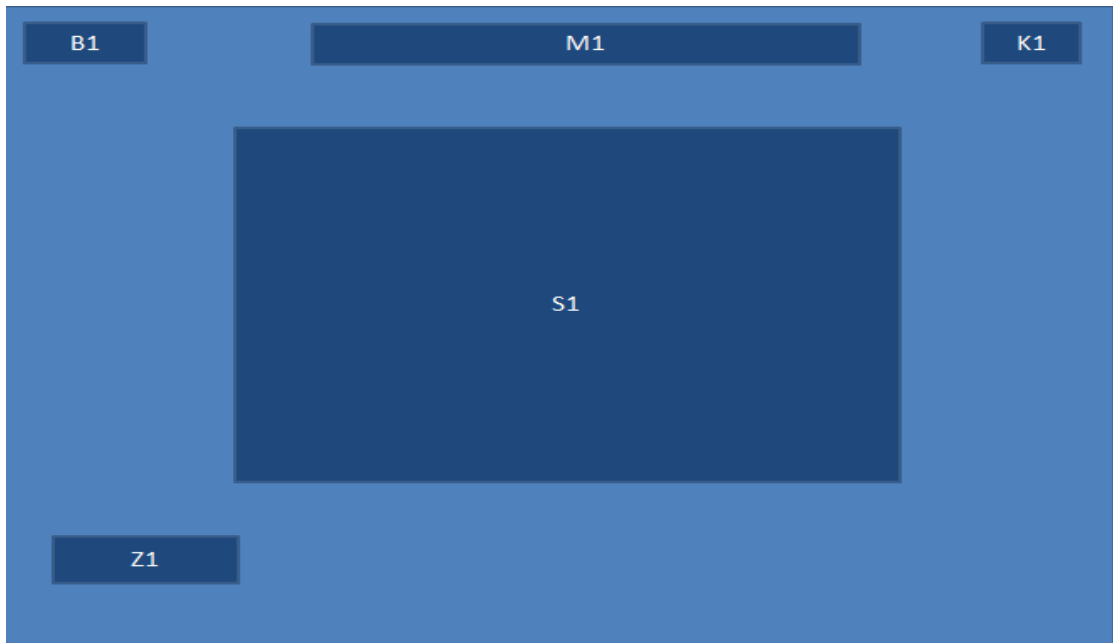
**Table 3-3-5-T1:** Description of game-based learning module quiz interface



**Figure 3-3-5-F2:** Game selection interface

Label	Description
B1	Back to main menu
M1	Module 4 tilte
Z1	Puzzle Selection
X1	Previous button
X2	Next button
X3	Start button
K1	Button to switch sound on or off

**Table 3-3-5-T2:** Description of game selection interface



**Figure 3-3-5-F3:** Game interface

Label	Description
B1	Back to main menu
M1	Title of the game
S1	Gaming area
Z1	Button to reveal the original puzzle
K1	Button to switch sound on or off

**Table 3-3-5-T3:** Description of game interface

## Chapter 4: Proposed Method / Approach

### 4-1 Design Specification

#### 4-1-1 Methodology



**Figure 4-1-1-F1:** ADDIE model

The methodology used is ADDIE model. It is an approach that used to create instructional course materials. It is suitable to use in developing this project because the ultimate goal of this project to deliver information to user effectively.

The first phase is analysis. In this analysis phase, the problem statements, goals and objectives of the project is identified. Next, the benchmarking of each module is done to identify their strengths and weaknesses. The gantt chart is developed as a schedule, so that it can be checked periodically in order to make sure that the project could be done on time.

The next phase is design phase. In the design phase, the selections of multimedia elements are determined for each of the module so that the information could be delivered to the users effectively. Besides, storyboards are designed so that the idea of basic user interface could be identified. The contents of the project are organised carefully so that the final outcome of the project is easily understandable by users.

In development phase, the development of the project is done in this phase based on the blueprint that has been done in the design phase. All multimedia elements are prepared and created to make up modules. Each modules are developed with the functionalities that have been identified earlier. After that, all modules are integrated as a whole.

In Implementation phase, the materials created in the previous phase are introduced and delivered to target audience. The target audiences are required to evaluate product and discover if there is any error or bugs. The errors and bugs that are discovered in this phase will be identified and solved.

In evaluation phase, there are two types of evaluation which are formative and summative. Formative evaluation is carried out in each of the phase to ensure that it meets the project goals. While summative evaluation is done at the end of the production of the project in order to gather feedbacks from the audiences. The feedbacks are then gathered and then used to fine-tune the application.

## **4-1-2 Development Tools**

### **4-1-2-1 Adobe Director**



Adobe Director is used to integrate the multimedia elements such as texts, images, sounds, animations and videos together and add interactivity into them to become an interactive multimedia project. It includes a scripting language named Lingo that able to perform advanced operations which cannot be obtained by using pre-built functions. It also allows author to make advance animation.

### **4-1-2-2 Adobe Photoshop**



Adobe Photoshop is used to create or edit the raster images that are required to develop the multimedia application.

### **4-1-2-3 Adobe Illustrator**



Adobe Illustrator is used to create or edit the vector images that are required to develop the multimedia application.

#### 4-1-2-4 Online Text-to-Speech Converter



Text-to-Speech is an online text-to-speech application that allows to convert text to audio which can be used as narration in the application.

#### 4-1-2-5 Online MP3 Cutter



Online MP3 Cutter is an online audio editor that used to perform audio editing such as trimming, fade-in, fade-out effects and etc.

#### 4-1-2-6 Adobe Premiere Pro



Adobe Premiere Pro is a timeline-based video editing software application which is used to edit videos that are required in the application.

#### 4-1-2-7 Microsoft PowerPoint



Microsoft PowerPoint is used to create simple vector images and buttons that are required in the application. Due to its capability to save as PNG format.



### **4-1-3 System Performance Definition**

The kiosk multimedia application is expected to deliver the message effectively to the user where user is able to understand the history of each heritage sites well. This is important as the primary goal for this project is to help user to understand the history in an interactive way and for a better retention.

Besides, this project is expected to be user friendly to the user where user is able to use this application without any doubts. There will be a help button to assist the user. User is able to click on it and view what and how the application works. A user friendly interface is able to give user a better impression on the application and willing to use it.

Next, the application is expected to allow user to use the application and get information from it at ease. The usage of the colours in this application should be taken into consideration so that it is comfortable to the user and not distracting user from getting the information.

Furthermore, the application is also expected to be able to respond fast to the user without any delays. This is important as it may affect the progress of the learning. For example, if delays happen quite often in an application, the user is easily to get frustrated and not likely going to continue use it.

## **4-2 Implementation Issues and Challenges**

The first challenge of implementing this project is the user interface design of the project. User interface design is very important as it may affect the effectiveness of delivering the information to the end user. It is a challenge of this project as it requires maintaining the balance between the amount of information and the limited space of the interface. It is a challenge so that only optimum amount of information is fit into a single interface to avoid information congestion. According to the less is more concept, a single user interface should not contain too much of information as it may confusing the user in getting the information.

Next, the choices of multimedia elements are also one of the challenges. The multimedia application need to contain the correct choices of multimedia elements. The elements that used to present particular information should not be redundant as it may not help the user but will distract the user instead. According to modality principle, animation combined better with narration than on-text screen as the user may not visually focus on two things simultaneously.

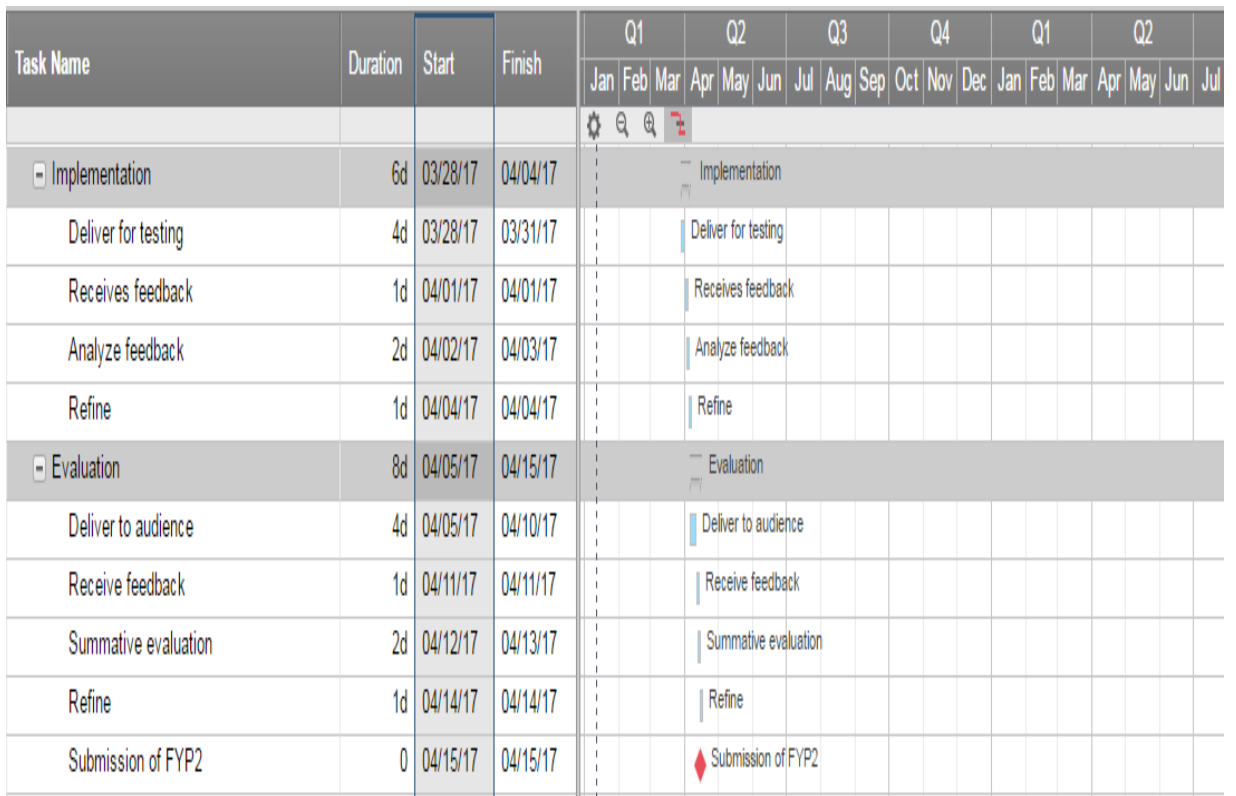
Furthermore, the proposed project is an offline project. Therefore, there are some of the features cannot be done such as Google map tracking. This makes the development of the interactive map difficult and cannot do based on real time tracking of the locations. Besides, the 360 degree virtual tour is also hard to achieve due to this.

**4-3 Timeline**

Task Name	Duration	Start	Finish	Q1		Q2			Q3			Q4			Q1			Q2				
				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
<b>Analysis</b>	6d	12/31/16	01/06/17	Analysis																		
Identify background information, objectives	1d	12/31/16	12/31/16	Identify background information, objectives																		
Identify problem statements	1d	01/01/17	01/01/17	Identify problem statements																		
Find benchmarking module	5d	01/02/17	01/06/17	Find benchmarking module																		
<b>Design</b>	71d	01/07/17	04/15/17	Design																		
Develop gantt chart	2d	01/07/17	01/09/17	Develop gantt chart																		
Design system flow chart	1d	01/10/17	01/10/17	Design system flow chart																		
Design storyboard	3d	01/11/17	01/13/17	Design storyboard																		
Submission of report	0	01/13/17	01/13/17	Submission of report																		
Decide and find multimedia elements	10d	01/14/17	01/26/17	Decide and find multimedia elements																		
<b>Development</b>	42d	01/27/17	03/27/17	Development																		
Develop first module	10d	01/27/17	02/09/17	Develop first module																		
Develop second module	10d	02/10/17	02/23/17	Develop second module																		
Develop third module	10d	02/24/17	03/09/17	Develop third module																		
Develop forth module	10d	03/10/17	03/23/17	Develop forth module																		
Integrate modules	2d	03/24/17	03/27/17	Integrate modules																		

**Figure 4-3-F1:** Gantt Chart part 1

## Chapter 4: Proposed Method / Approach



**Figure 4-3-F2:** Gantt Chart part 2

## **Chapter 5: Multimedia Development Process**

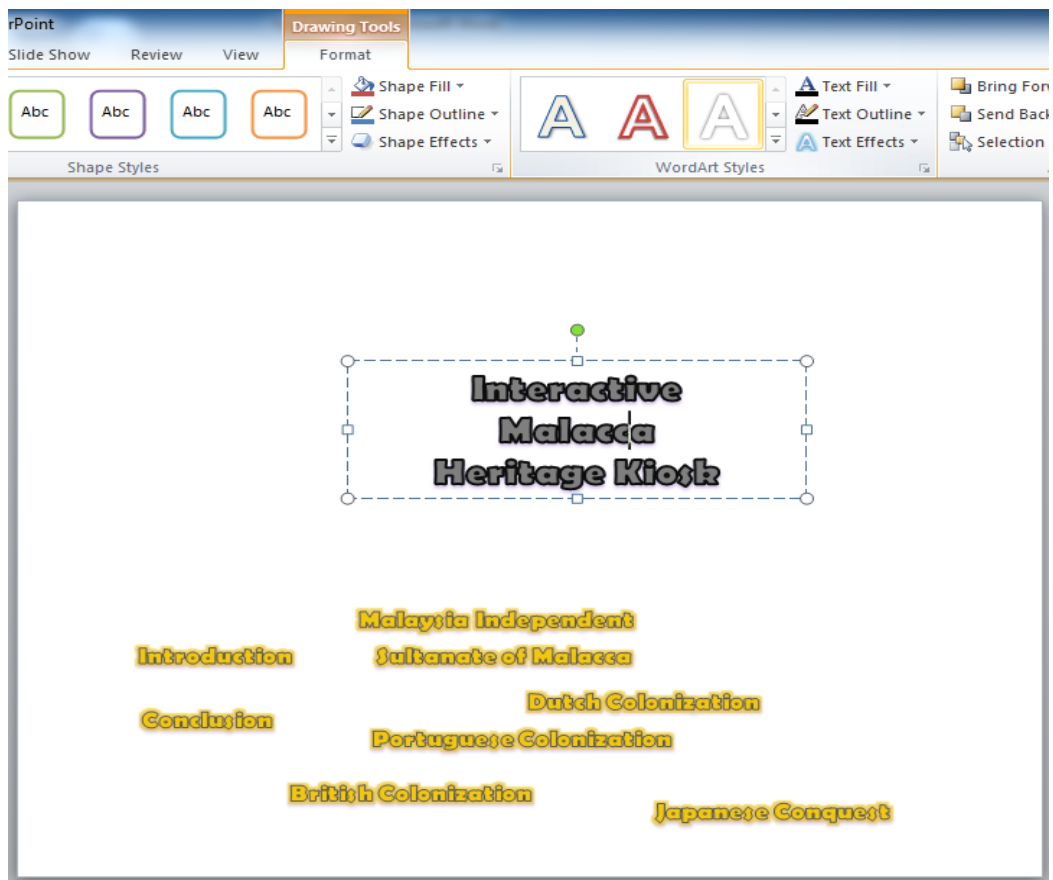
### **5-1 Pre-Authoring Process**

#### **5-1-1 Text**

The text is the most basic element but the most important element of multimedia element. The right usage of the text allows the users of the application to read the content at ease. If the text design used in the application is not appropriate, the users might get a bad experience in using the application and most likely will stop using the application. Therefore, the choices of the font types, colours, sizes are important.

There are two types of font types which are serif and sans serif. Serifs font have the little strokes at the ends while sans serif font does not. In this application, both serif fonts and sans serif fonts have been used. The serif fonts are used in designing the caption, title, tooltips and etc. The reason is because of its simplicity and it has a sharp, clean appearance which makes it suitable for headlines. However, the usage of serif fonts in the application is the subtitle and the lengthy description content. Serif fonts with the strokes help to keep the users' eyes focused on a line of text and thus enhance the ability to identify and read the word faster.

The software used to create the text for this application is Microsoft Power Point. The reason to use this software is that it has many word art to choose from, and it is able to save the text as picture in the format of PNG (Portable Network Graphics) easily.



**Figure 5-1-1-F1:** Various options of word art styles

Figure 5-1-1-F1 shows that how texts for this application are created by using Microsoft Power Point. There are plenty choices of word art styles can be chosen in the selection box. After done designing the text with the appropriate style, colour, and size, the next step is save the text as PNG format to be used in authoring process later on. The process is shown in Figure 5-1-1-F2 and Figure 5-1-1-F3 in the next page.

## Chapter 5: Multimedia Development Process

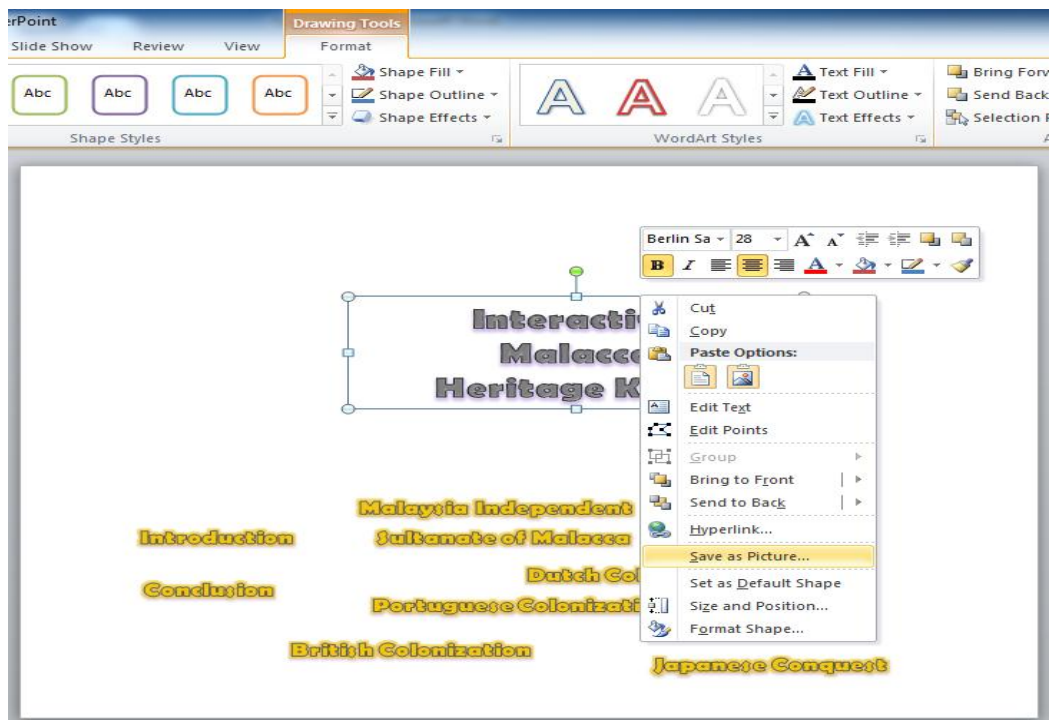


Figure 5-1-1-F2: Save as picture options

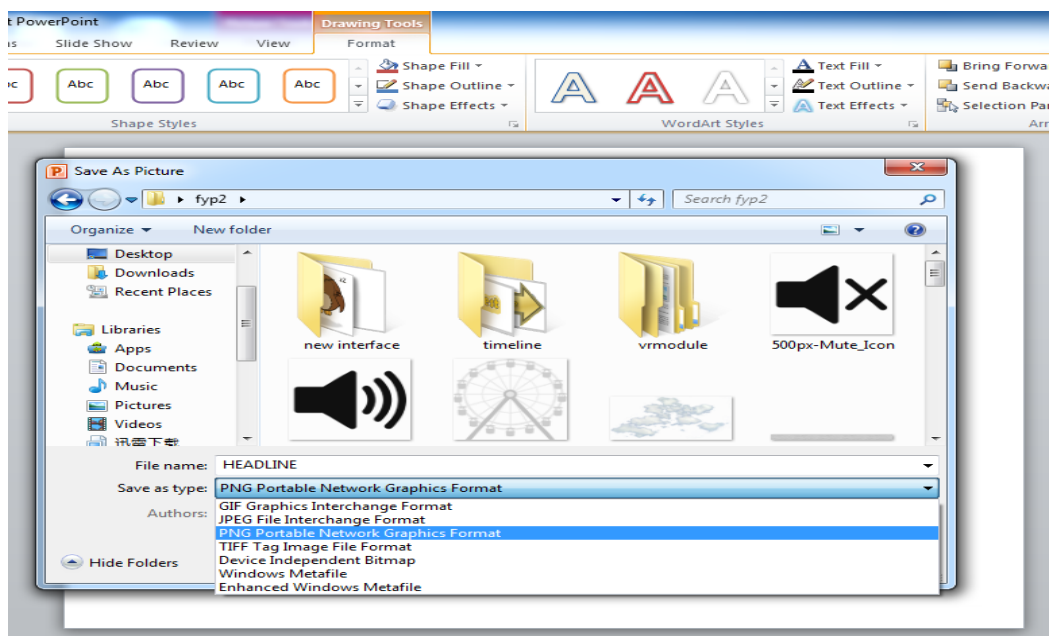


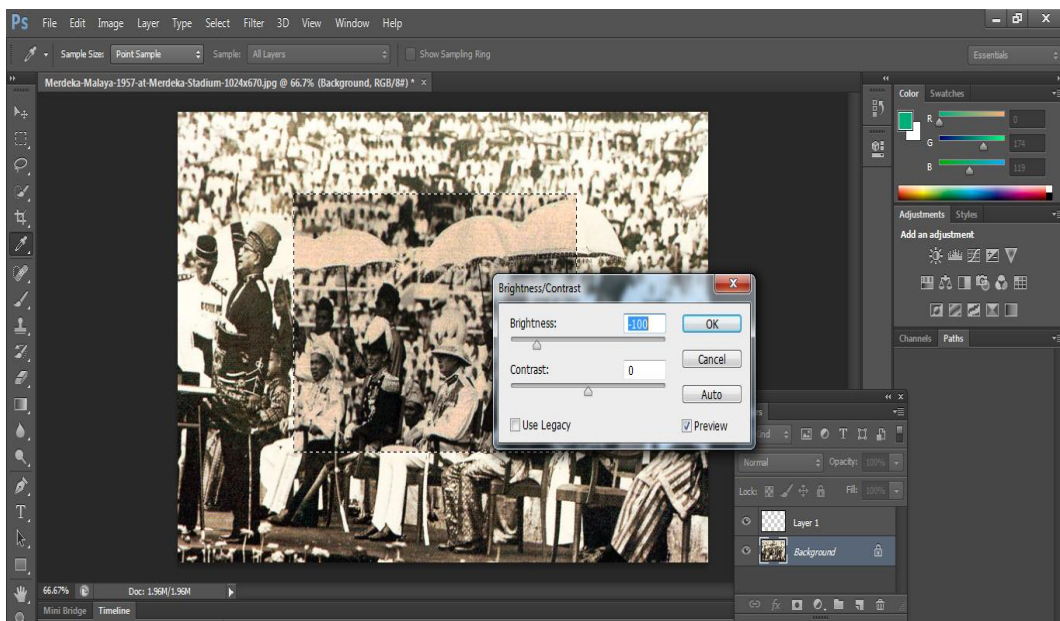
Figure 5-1-1-F3: Save as type of PNG format

### 5-1-2 Graphic

The graphics that have been used in designing this application are both vector and raster (bitmap) images. The vector images are created and edited using Adobe Illustrator and Microsoft Power Point while the raster images are using Adobe Photoshop.

The vector image is formed by drawing lines, curves with the mathematical formulas. Due to this, it is capable to scale up with its quality retained. This synchronizes the button with different sizes but with the same design and quality. The usage of the vector images in this application is the buttons, icons, clip art images and etc. Whereas for the raster images, they are used for the purpose of displaying the photo captured in real life as they have more realistic feel than the vector images.

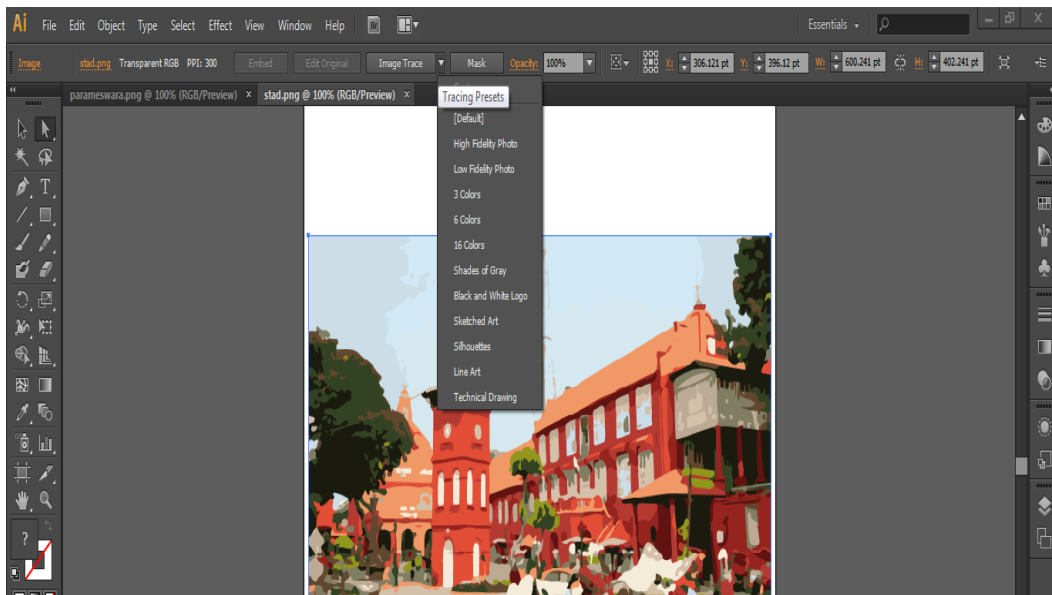
In this application, some of the images are obtained from online and edited using Adobe Illustrator. There is also image converted from raster image to vector image using Adobe Illustrator. For Adobe Photoshop, it is used to adjust the contrast, brightness of the raster images. Below are some of the screenshots of making both vector and raster images.



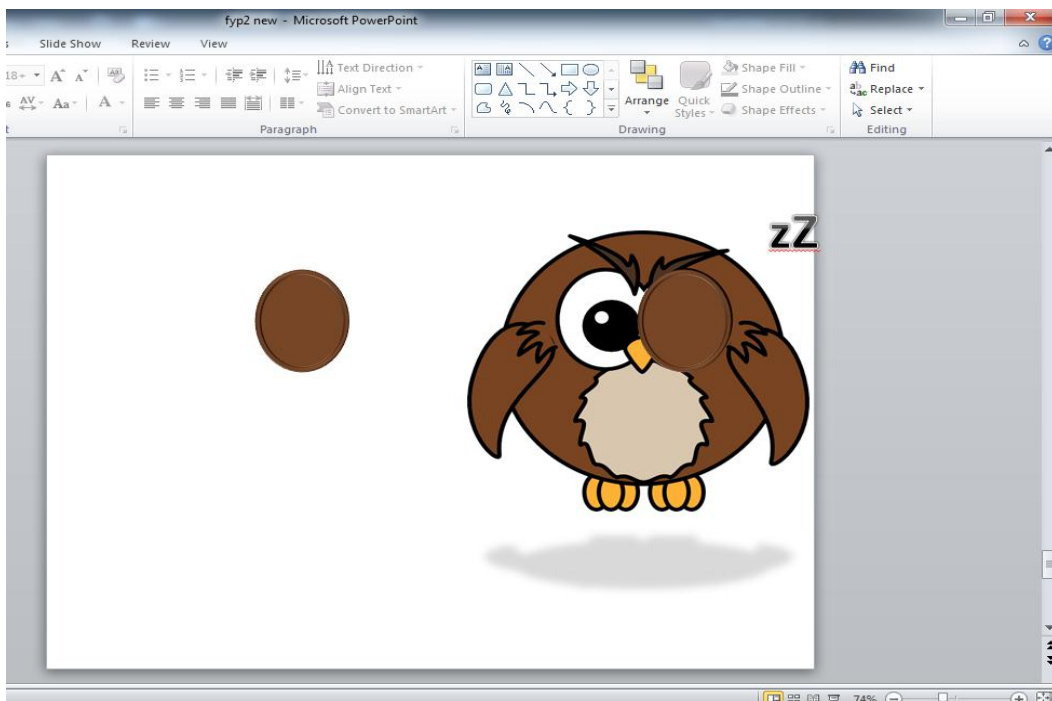
**Figure 5-1-2-F1:** Editing raster images using Adobe Photoshop



## Chapter 5: Multimedia Development Process



**Figure 5-1-2-F2:** Editing vector images using Adobe Illustrator



**Figure 5-1-2-F3:** Editing vector images using Microsoft Power Point

### **5-1-3 Audio / Sound**

The audio is one of the important multimedia elements in designing application. It can be used as special effect sound to get attention, as background music to set the mood, and also as a voice narration to provide instructions and explanations.

In this application, the sound is used as background music, sound effects for button, as well as narration for explanation in the interactive timeline module. The choice of the background music may help to set the mood of the user to the history feels when using the application. The source of the background music is obtained from Youtube. It is then edited via online sound software named Online MP3 (MPEG-3) Cutter by manipulating the fade-in, fade-out, and convert the sound format to MP3.

Next, the sound effects are also used for indicating an action has been performed. For example, when the users mouse over or click a button, it will play a special sound effect. This is to keep users informed that the particular button has been clicked and avoid users from clicking too many times which may cause error happens.

Besides, the narration is also used in the interactive module to explain the history of the Malacca. The narration sound is obtained from online text-to-speech software. Below are the screenshots of the making of the sound elements.

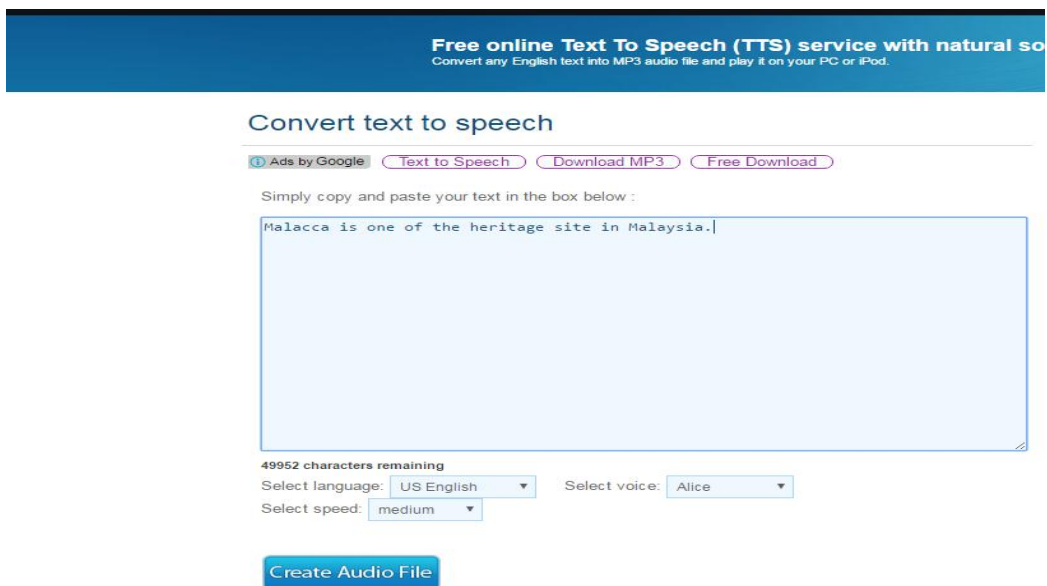


Figure 5-1-3-F1: Online text-to-speech converter

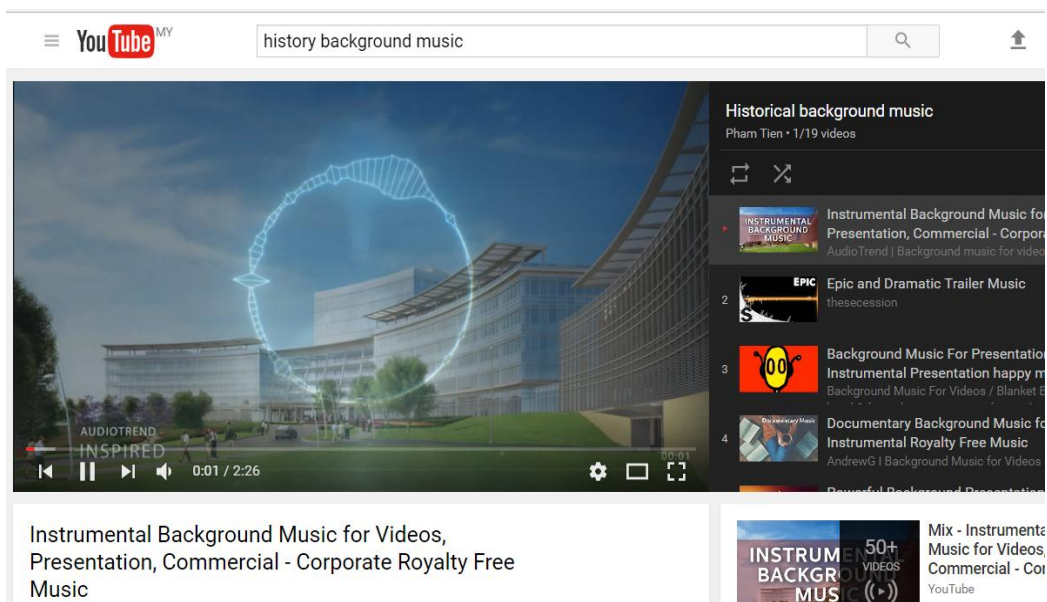
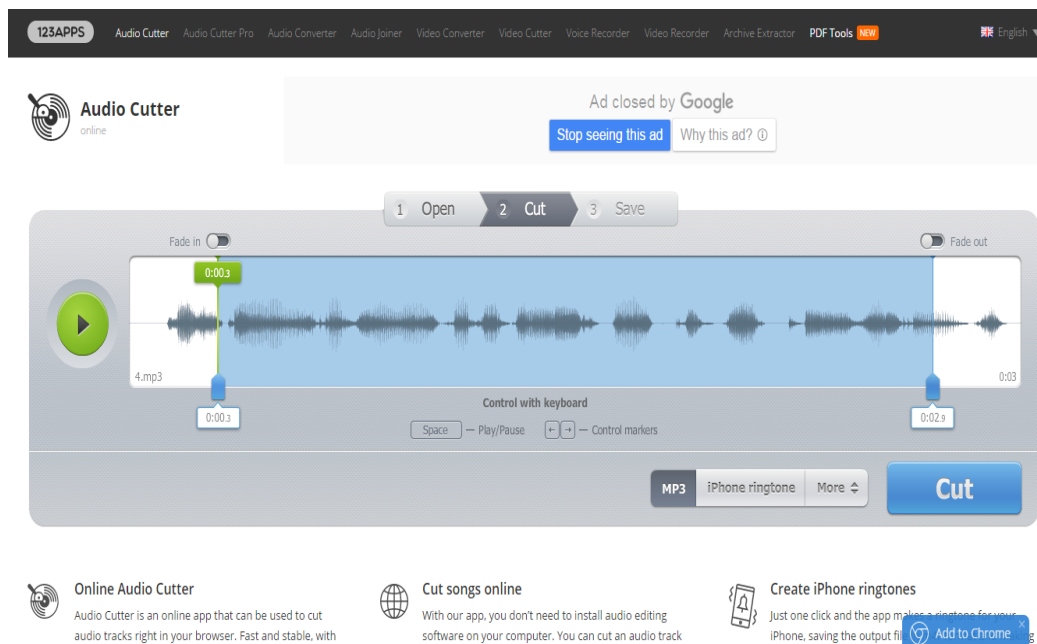


Figure 5-1-3-F2: Background music obtained from Youtube

## Chapter 5: Multimedia Development Process



**Figure 5-1-3-F3:** Online MP3 converter

### 5-1-4 Animation

The animation is used to grab the user attention. There are two types of animations used in developing this application which are cel-based animation and path-based animation. The cel-based animation is used in developing the background of the main menu interface. It is created by using Adobe Photoshop. There are several images arranged in a sequence with each in a new layer, and then export it into GIF (Graphics Interchange Format) format. Some of the process of creating the cel-based animation is shown in Figure 5-1-4-F1, Figure 5-1-4-F2, and Figure 5-1-4-F3.

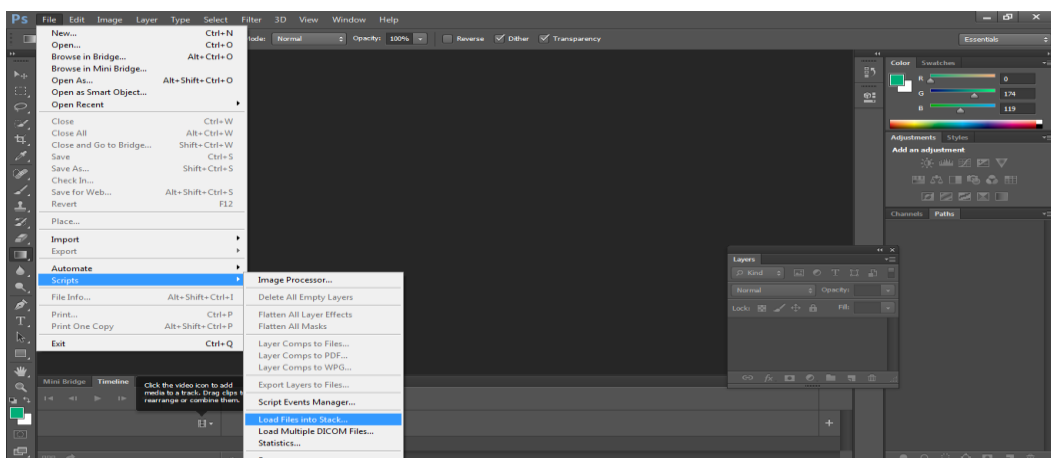


Figure 5-1-4-F1: Creating cel-based animation using Adobe Photoshop part I

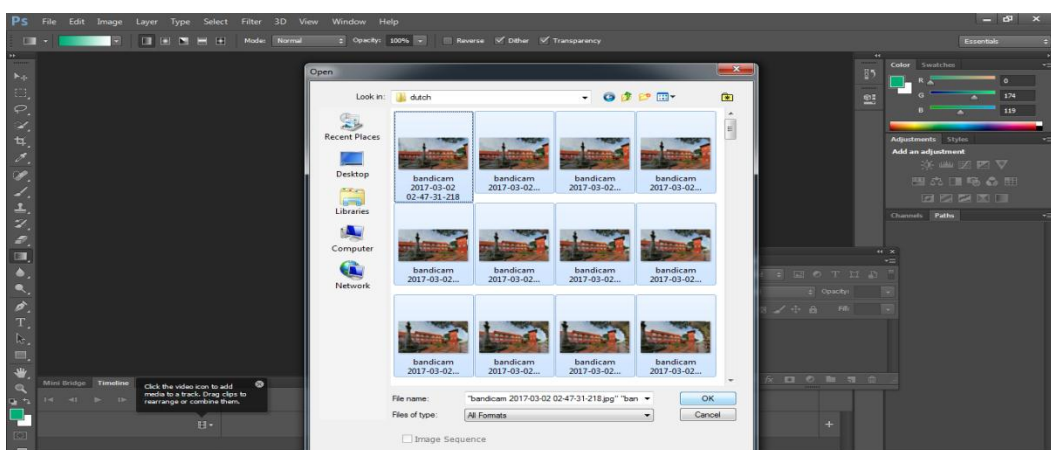
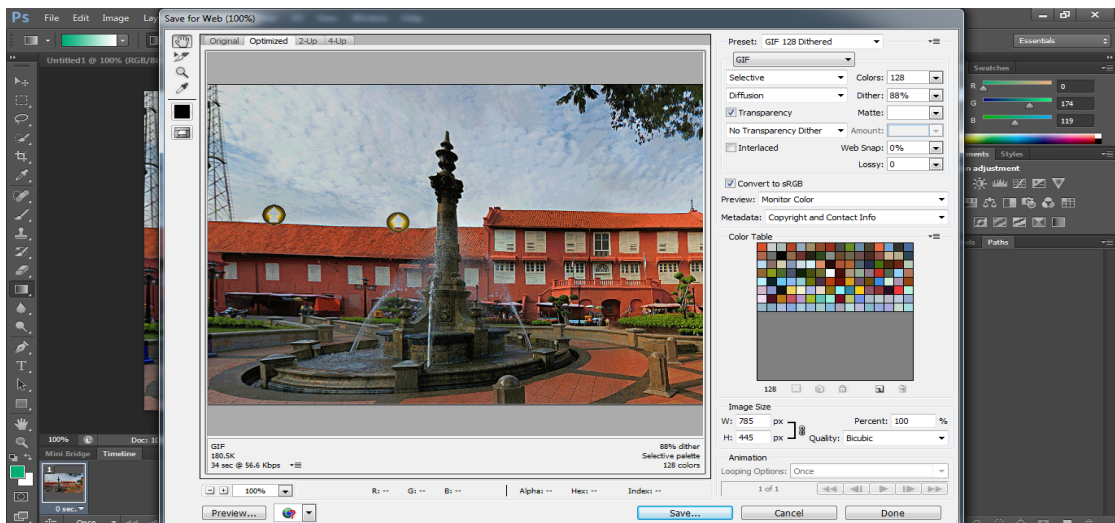


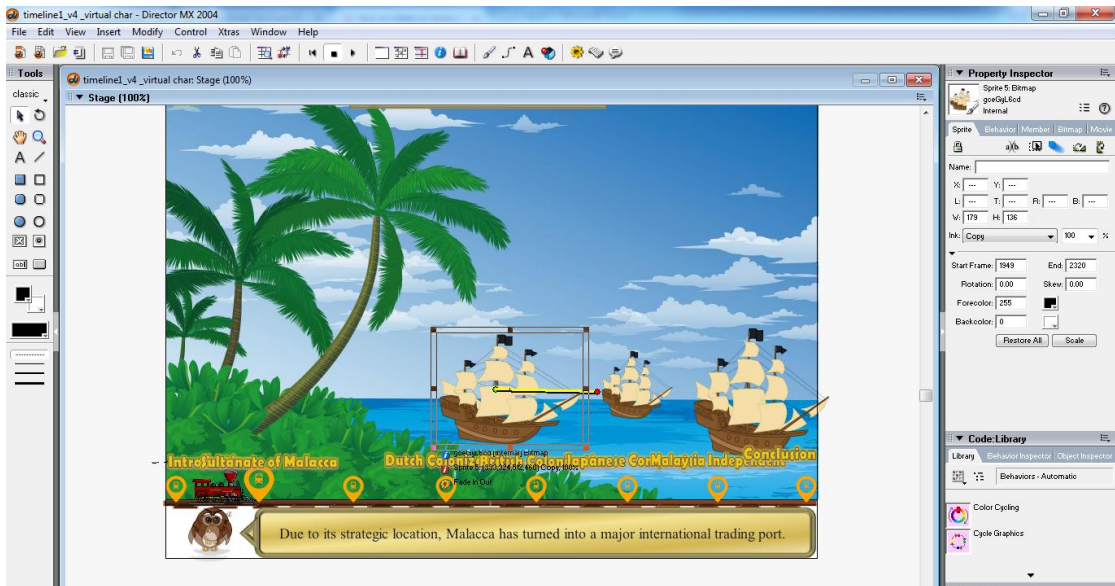
Figure 5-1-4-F2: Creating cel-based animation using Adobe Photoshop part II

## Chapter 5: Multimedia Development Process



**Figure 5-1-4-F3:** Creating cel-based animation using Adobe Photoshop part III

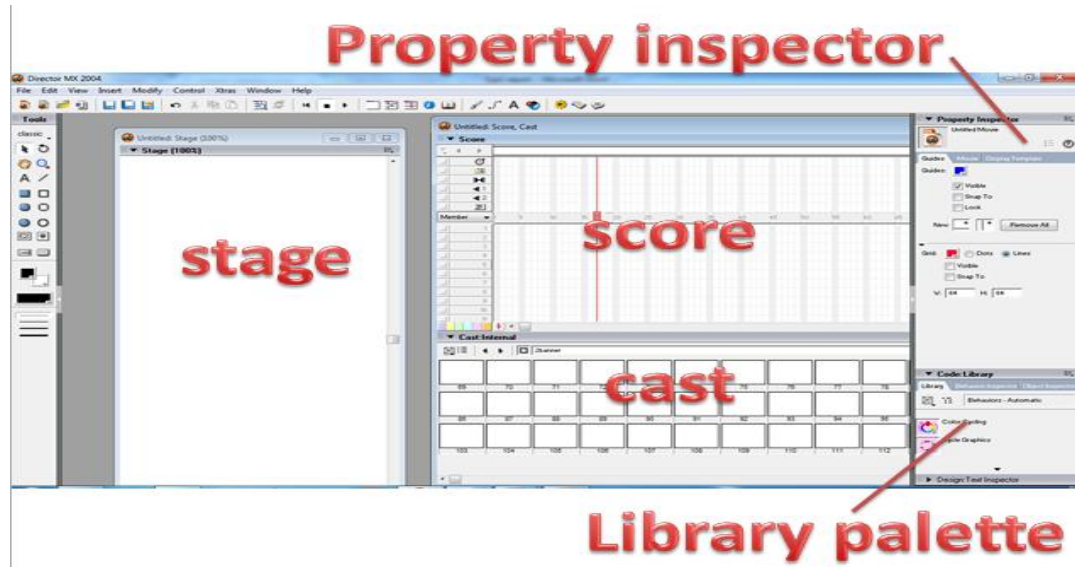
The path-based animation is created on the Macromedia Director MX 2004 during the authoring process. In this application, the path-based animations are used in interactive timeline module which are the animated ships that shown in Figure 5-1-5-F4.



**Figure 5-1-4-F4:** Path-based animation created on Macromedia Director MX 2004

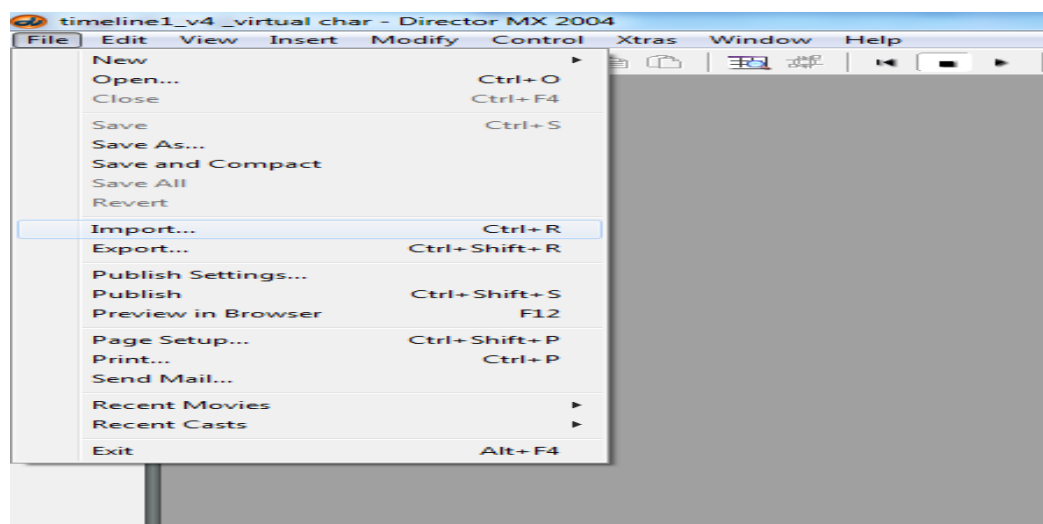
## 5-2 Authoring Process

### 5-2-1 Importing Media Elements

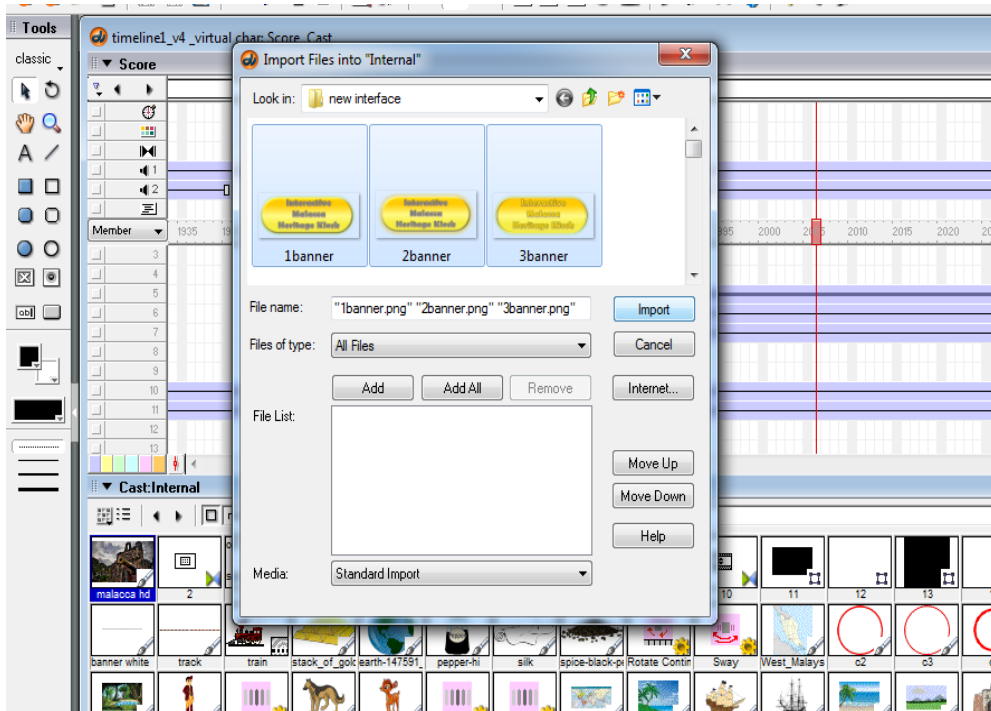


**Figure 5-2-1-F1** Basic interface of Macromedia Director

The figure above showed the basic interface of the Macromedia Director. The first step in authoring process is to import the needed media elements of that particular module into the authoring tool which is Macromedia Director MX 2004 as shown in Figure 5-2-1-F2 and Figure 5-2-1-F3.

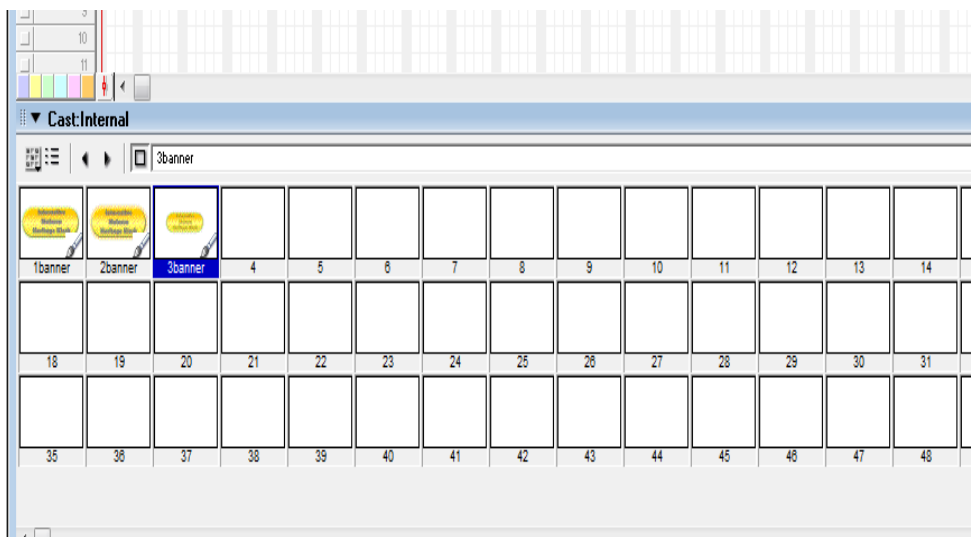


**Figure 5-2-1-F2** Click import button



**Figure 5-2-1-F3:** Choose the media elements to be imported

After importing all the related media elements, they will be shown up in the cast internal as shown in Figure 5-2-1-F4.



**Figure 5-2-1-F4:** Cast internal



### 5-2-2 Integrating Digital Media Elements

After importing all the desired media elements, drag the cast member from the cast internal to the score as shown in Figure 5-2-2-F1.

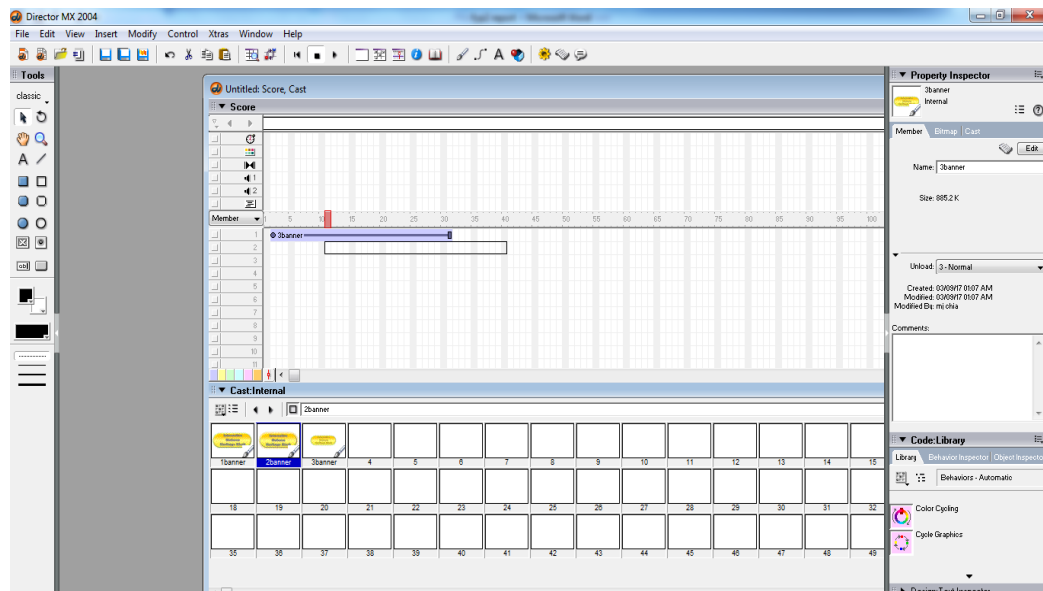
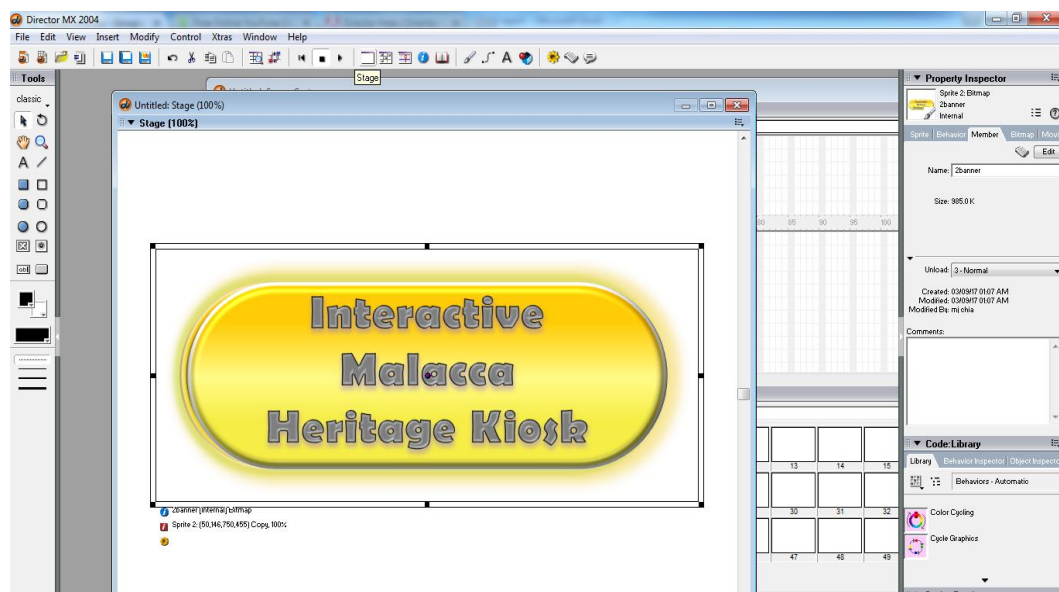


Figure 5-2-2-F1: Dragging cast members into the score

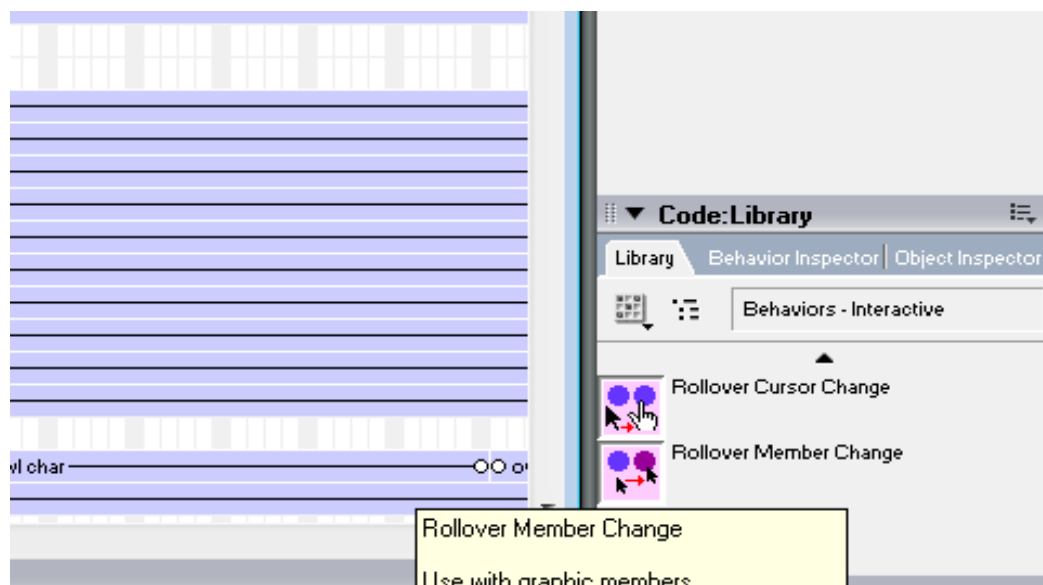
After that, click on the stage and the design of the stage would show up (refer to Figure 5-2-2-F2). Then, design it according to the storyboards that have been designed previously.



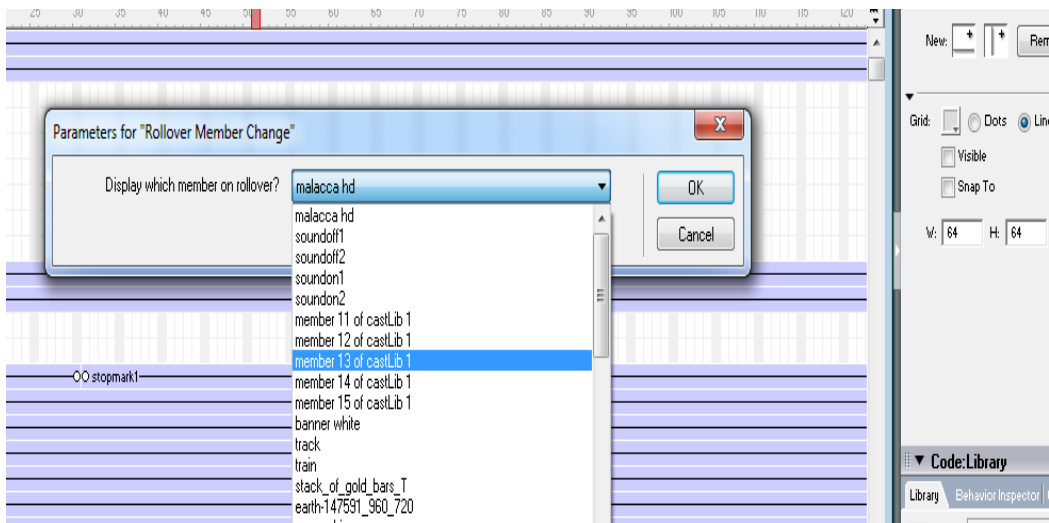
**Figure 5-2-2-F2:** Dragging cast members into the score

### 5-2-3 Adding Interactivity

There are many ways to add interactivity into the application. It could be done by dragging the built-in interactive features from the library palette onto the sprite, or writing lingo script into the sprite's behaviour itself. For the first method, there are lots of built-in behaviour in the library palette, choose any of them and drag it onto the sprite to permit interactivity with the users. The examples of behaviours that are used in this application are Play sound, Rollover Member Change and etc. Figure 5-2-3-F1 shows the ways to add interactivity using the "Rollover Member Change" built-in feature.

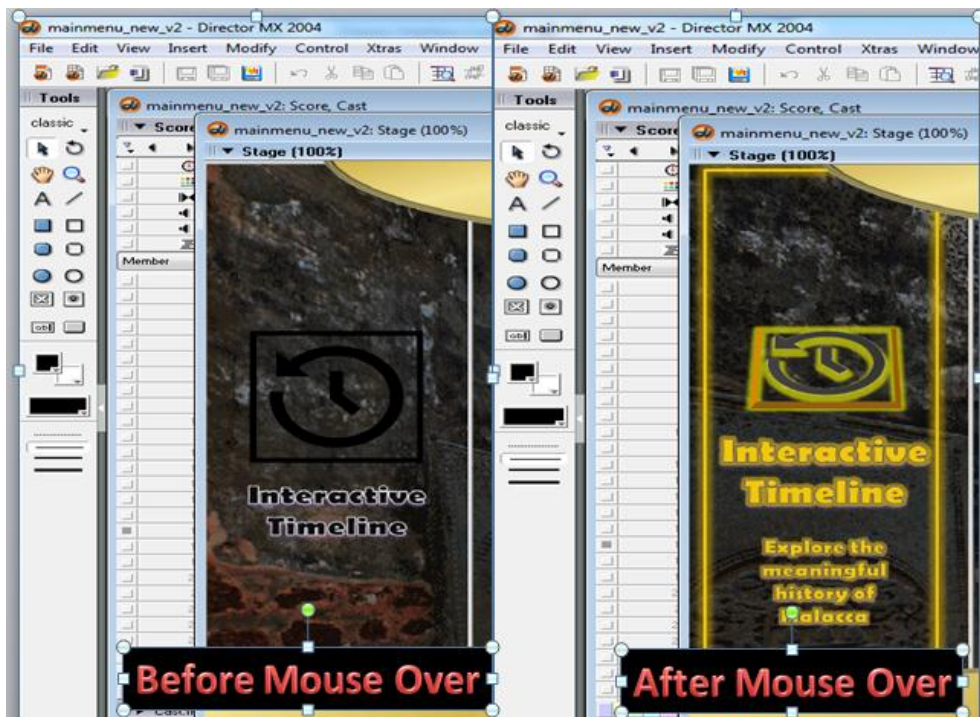


**Figure 5-2-3-F1:** Choose the Rollover Member Change feature



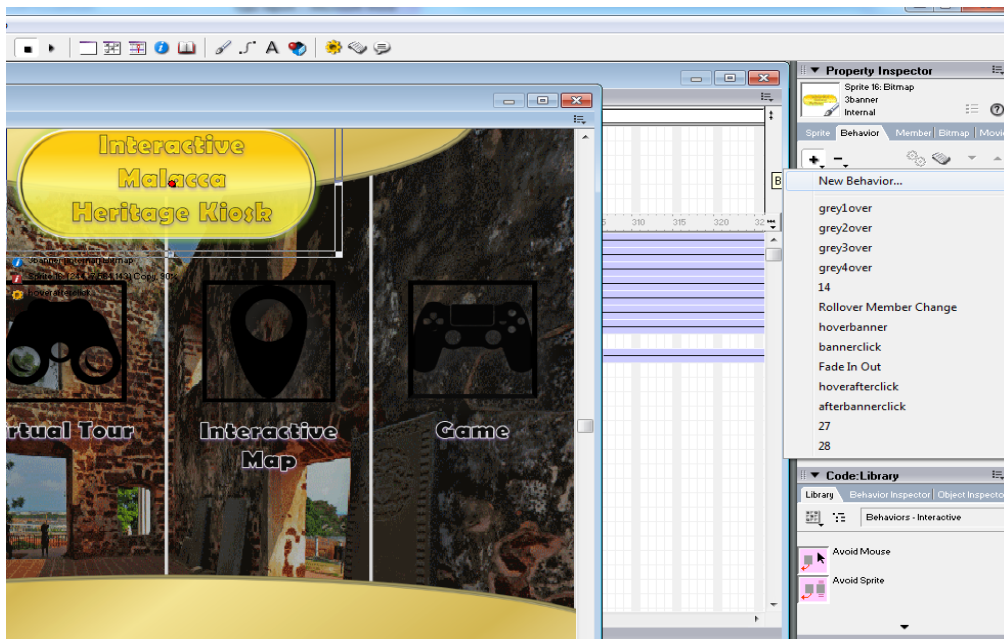
**Figure 5-2-3-F2:** Choose the member to change

The Figure 5-2-3-F3 shows the effects of adding the Rollover Member Change function onto the sprite.



**Figure 5-2-3-F3:** Effect of Rollover Member Change

Next, the interactivity can also be added by writing lingo script. First, click on the sprite that you would like to add interactivity into it. After that, in the property inspector area, go to the behaviour tab, click on the “+” button, and then click on “New Behaviour” (refer to Figure 5-2-3-F4).



**Figure 5-2-3-F4:** Steps to add lingo script into sprite

Next, click on the button shown in Figure 5-2-3-F5 to open up the script window. After that, type the lingo script that you would like the sprite to perform. The example of toggle the sprite visibility is shown in Figure 5-2-3-F6 .

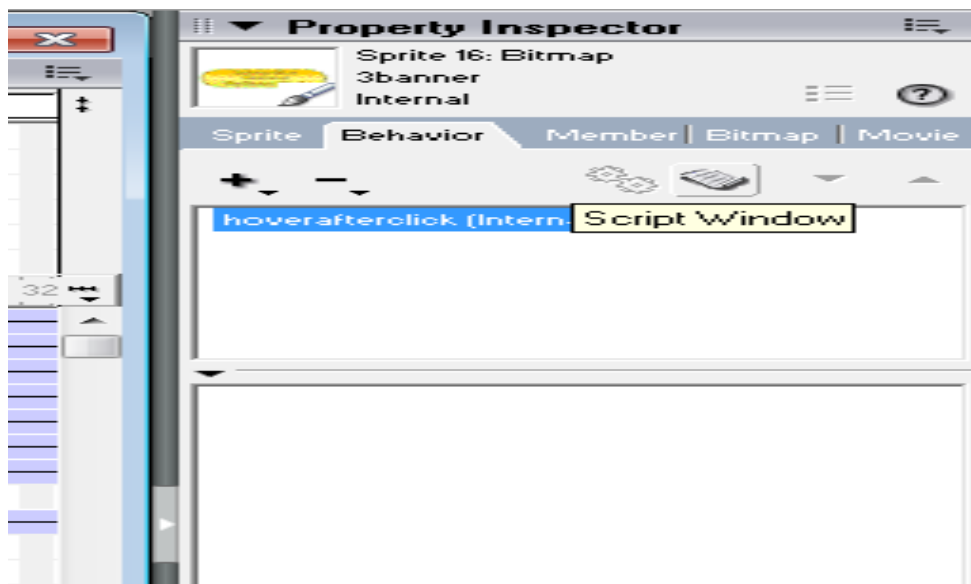


Figure 5-2-3-F5: Click on Script Window

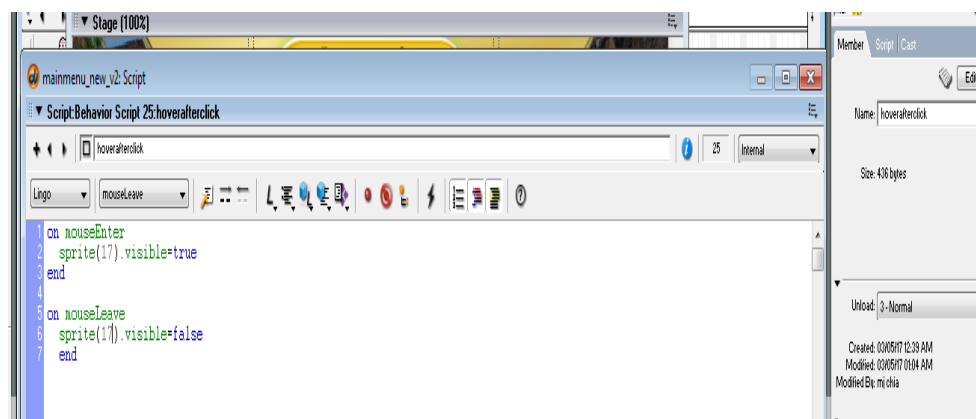


Figure 5-2-3-F6: Sample code for Lingo Script

### 5-2-4 Integrating Modules

After complete all the modules according to the storyboard that done previously, linking all the modules together with the main menu interface. The modules can be linked by selecting the “Play Movie X” built-in feature in the library palette under the “Navigation” tab. This function can be insert onto the sprite, so that the particular sprite has the function to navigate the users to another modules. After this stage, all the individual director files will be linked together and are interconnected with one another which formed a complete application. Figures below show the way to add the “Play Movie X” button to the interactive timeline box to link it to the interactive timeline modules when users click on it.

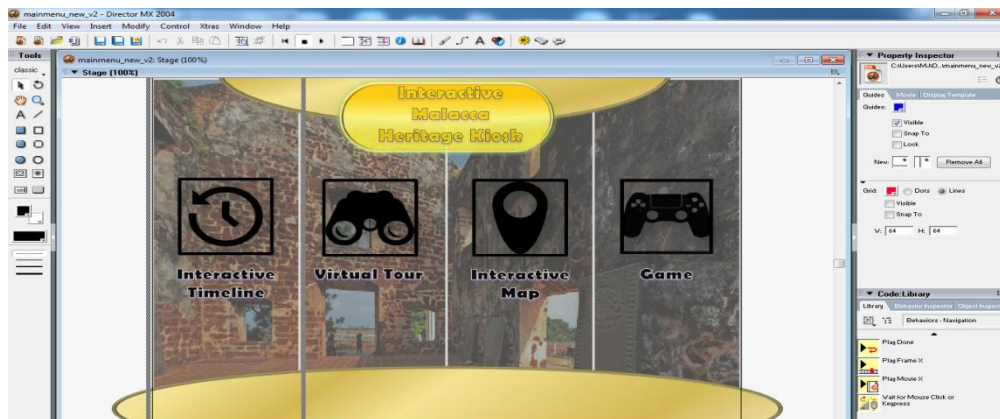


Figure 5-2-4-F1: Drag the Play Movie X button

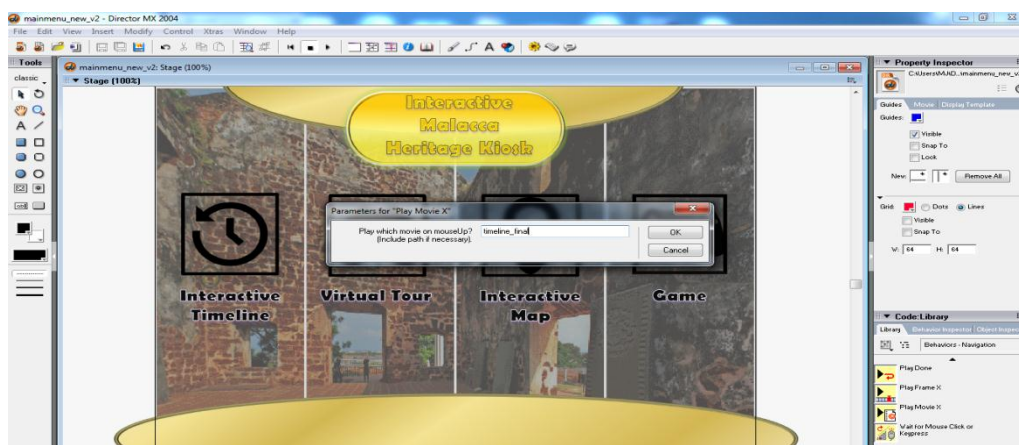


Figure 5-2-4-F1: Type the name of the director file

### **5-3 Post-Authoring Process**

#### **5-3-1 Delivery and Storage Medium**

All the integrated director files will be saved in an executable file extension (.exe) that store in computer. The reason of choosing executable file format as it is capable to be run as an individual program in Windows OS. It can be copied from one machine to another machine, or to another folder, easily. If the OS is being reinstalled, it doesn't break the application. The delivery medium of this application is offline-based where no internet connection is required to run this application. This application will be run on the computers that are set up at each of the attractions in Malacca.

#### **5-3-2 Testing**

The completed application is distributed to 25 respondents to do the testing and get the feedback from them. Each respondent will be given a Google form to be filled in after testing the application. After that, all of the feedback are recorded and analysed.

## Chapter 6: Modules Development Guide

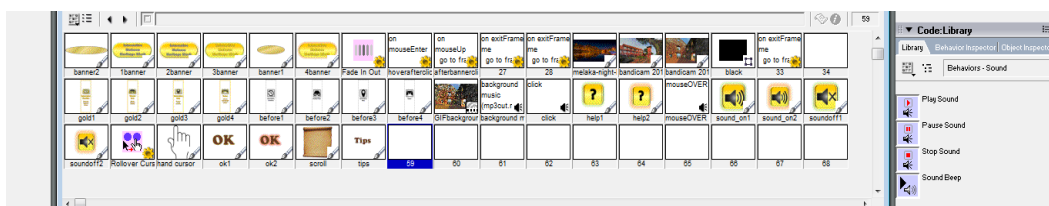
### 6-1 Main Menu Development

Firstly, get all the media elements that required to develop the main menu interface ready in a folder as shown in figure below.



**Figure 6-1-F1:** Media elements for main menu

After that, import all the media elements into Macromedia Director MX 2004. The macromedia director should be looked like in the picture shown in Figure 6-1-F2.



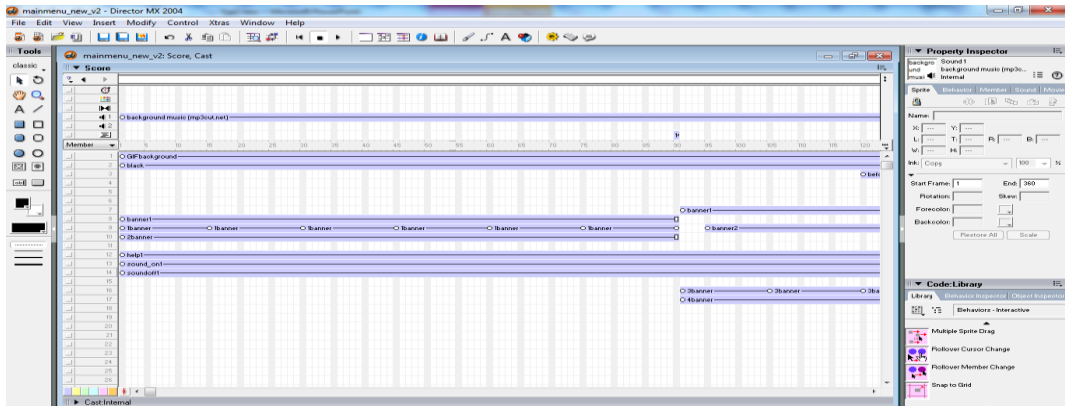
**Figure 6-1-F2:** Main menu cast

Drag the related cast members to the score and arrange it accordingly as shown in figure below. Assign to the “Rollover Cursor Change”, “Rollover Member Change”, “Play Sound” behaviour to the title, help button, and the sound on, off buttons, and OK button. Assign the “Play Sound” behaviour using sound channel 2. On the end of the sprite, insert a frame script “ go to frame X”, where x indicate the frame number that the timer will go when reaches this frame. The example of coding has shown in Figure 6-1-F4 which indicate that it will automatically go back to frame 1 which is the beginning of the sprite after reach this frame. With this, the timer will keep looping back to frame 1 until the user click on the title which will direct the user

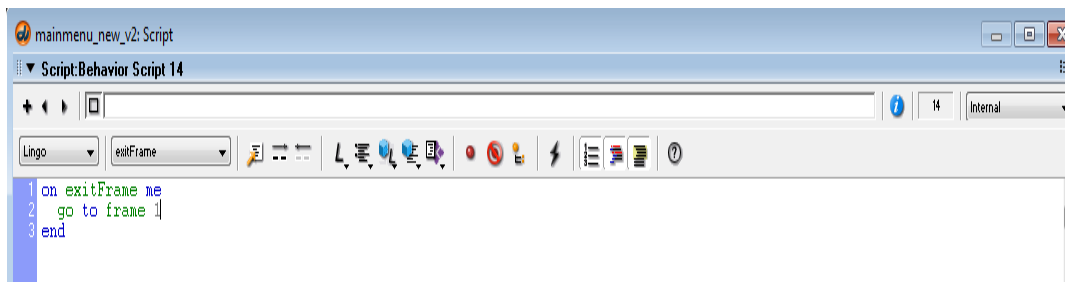


## Chapter 6: Modules Development Guide

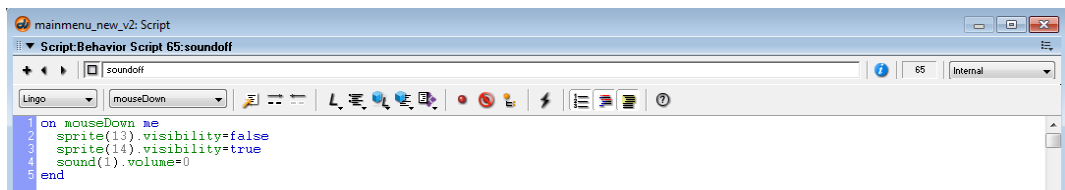
to go to other frame. Insert the background music in to sound channel 1. Make sure that the background music sprite fully covers the whole main menu project's timeline.



**Figure 6-1-F3:** Arrangement of the elements



**Figure 6-1-F4:** Script for looping

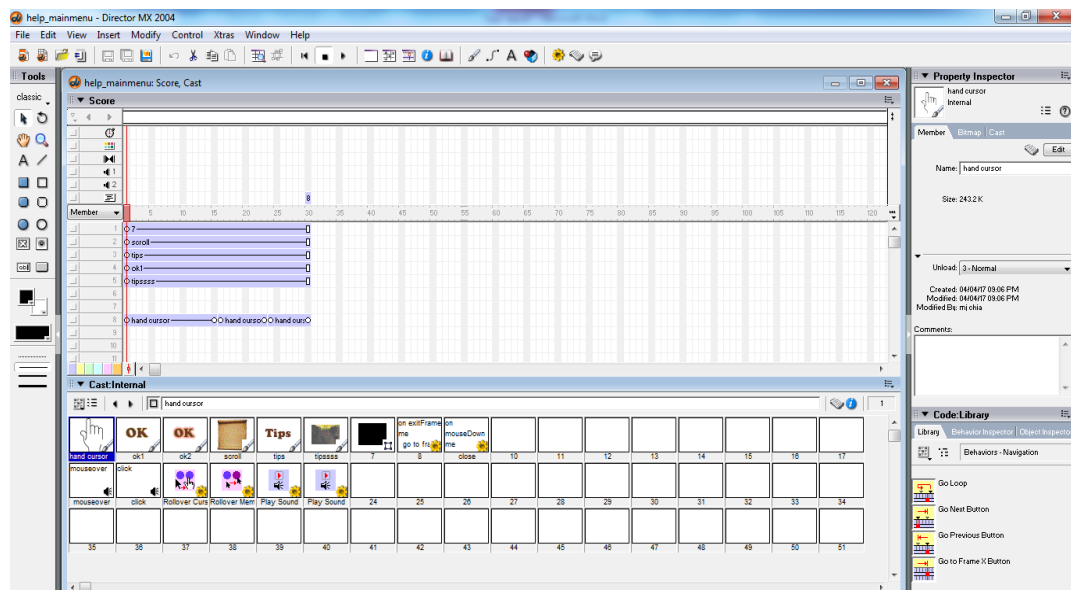


**Figure 6-1-F5:** Script for sound on and off

## Chapter 6: Modules Development Guide

Assign the following script onto the sound on and off button to toggle the volume of the background music. Refer to Figure 6-1-F5. Next, to design the stage for when the user click the title, put the “grey1” , “grey2” , “grey3” , “grey4” . These four act as the button which will link the main menu to different modules. Apply “Fade In/Out” behaviour to all these. After that, assign the “Rollover Member Change” behaviour to grey1,2,3,4 respectively with “gold1” , “gold2” , “gold3” , “gold4” . Next, apply the looping code and hide the gold1,2,3,4 and direct the user back to frame 1 when user click on the title of the application.

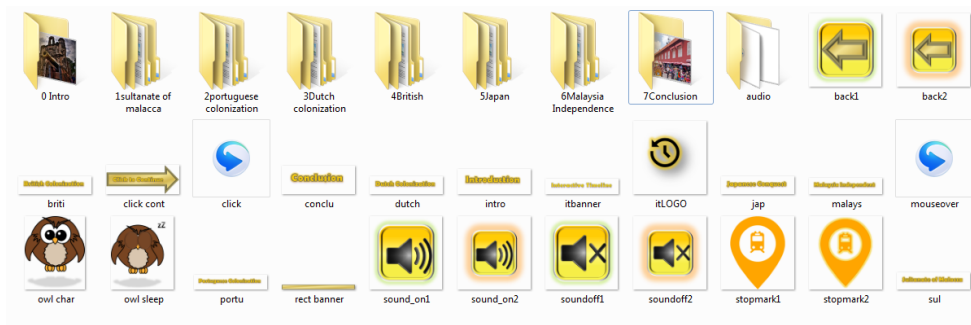
Develop the help guide as an individual director file as shown in Figure 6-1-F6 which will direct the user to this director file whenever user click on the help button using the lingo script command “open help\_mainmenu.exe”.



**Figure 6-1-F6:** Help guide for main menu

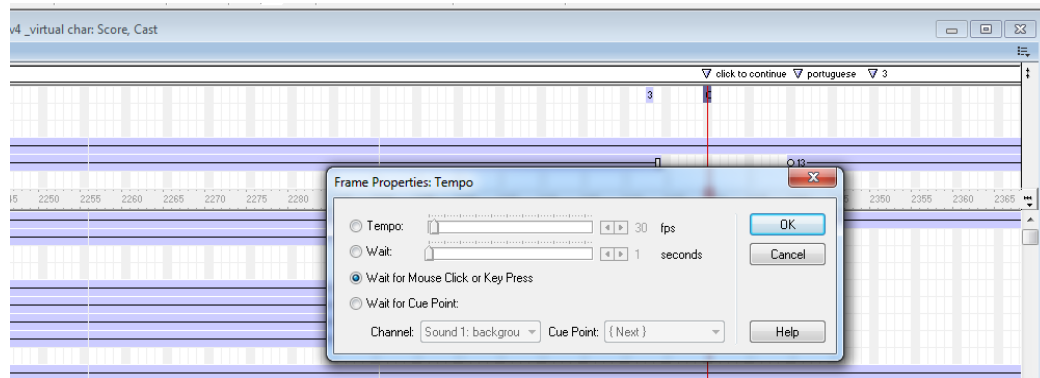
## 6-2 Interactive Timeline Module Development

Prepare and Import all the elements in the folder “module 1” into the Macromedia Director.



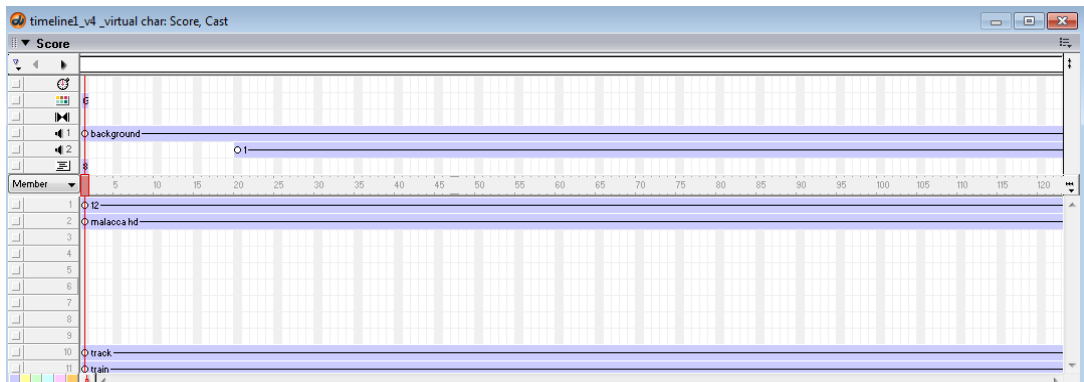
**Figure 6-2-F1:** Media elements for module 1

Drag the media elements into the stage according to the sequence of events happened in Malacca by following the pre-defined number of the folder. In between of the events, edit the tempo at the end of the frame that permit interactivity. It requires user to click in order to proceed to next frame. Refer to Figure 6-2-F2.

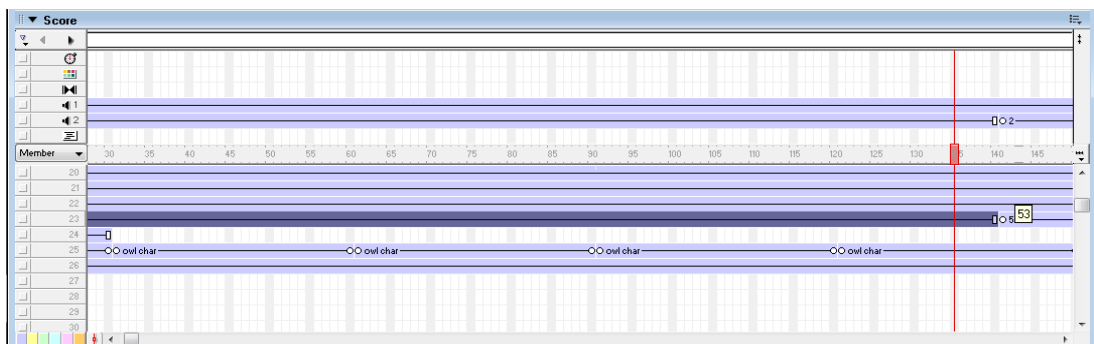


**Figure 6-2-F2:** Tempo for mouse click to continue

Next, insert the background music into sound channel 1, the narration into sound channel 2 and the subtitle to the bottom of the stage. Adjust them so that the narration and subtitle synced with the events that are displayed in that particular of time.



**Figure 6-2-F3:** Background music and narration

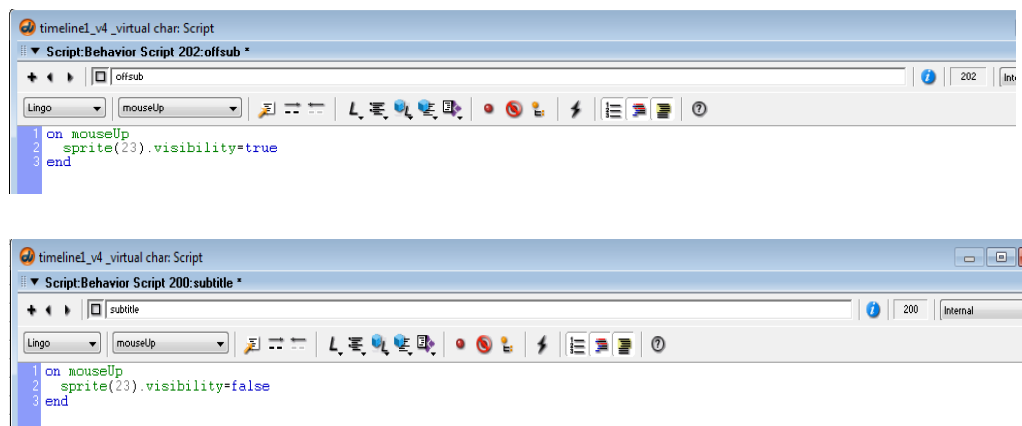


**Figure 6-2-F4:** Subtitle score view



**Figure 6-2-F5:** Subtitle stage view

Put the subtitle at the same row (in the Figure 6-2-F4 it on the row 23). Insert and apply the visibility behaviour to the owl which acts as the virtual tour guide. The “owl char” and “owl sleep” are added with the behaviour to show or hide the visibility of the subtitle as shown in Figure 6-2-F6.



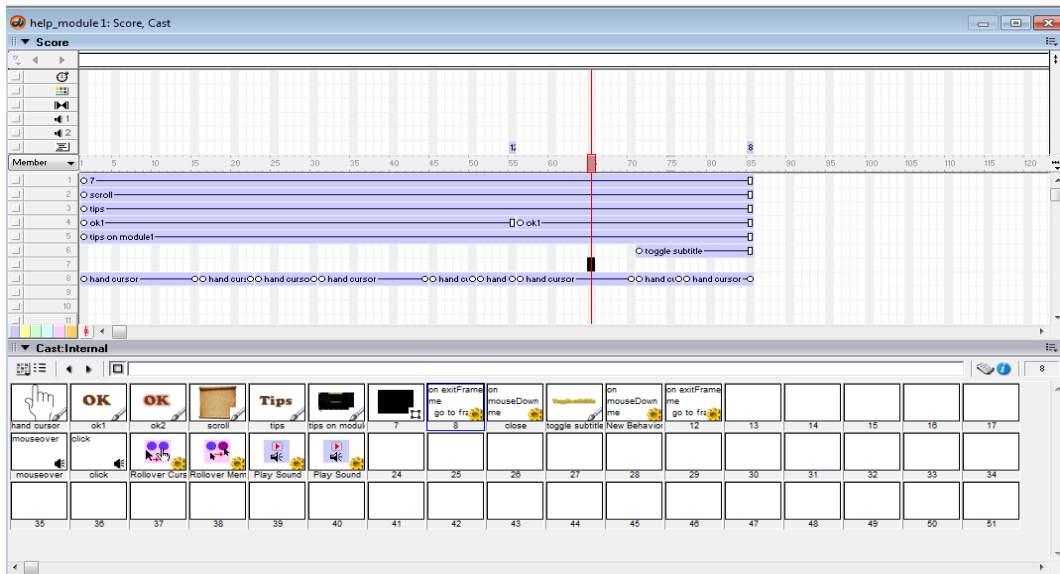
**Figure 6-2-F6:** Script to toggle visibility

After all the events have been sequenced, insert the “track”, “train” , “stopmark” and the words as tooltip for each events into the stage. This is to build a navigation button in which the users may choose the sequence of event that they may preferred to watch first. Hide all other irrelevant tooltip using the visibility behaviour and show it only when the timer reach that particular sequence of event. Refer to Figure 6-2-F7. Next, apply the “Rollover Member Change”, “Rollover Cursor Change”, “Play Sound” behaviour to all buttons.



**Figure 6-2-F7:** Placement of tooltip, train, track, and stopmark

## Chapter 6: Modules Development Guide



**Figure 6-2-F8:** Help guide for module 1

After that, develop a help guide same as the guide developed in main menu to give the instruction for the users to use the application. Refer to Figure 6-2-F8.

### 6-3 Virtual Tour Module Development

Firstly, import all the media elements in the folder “module 2” to the Macromedia director.

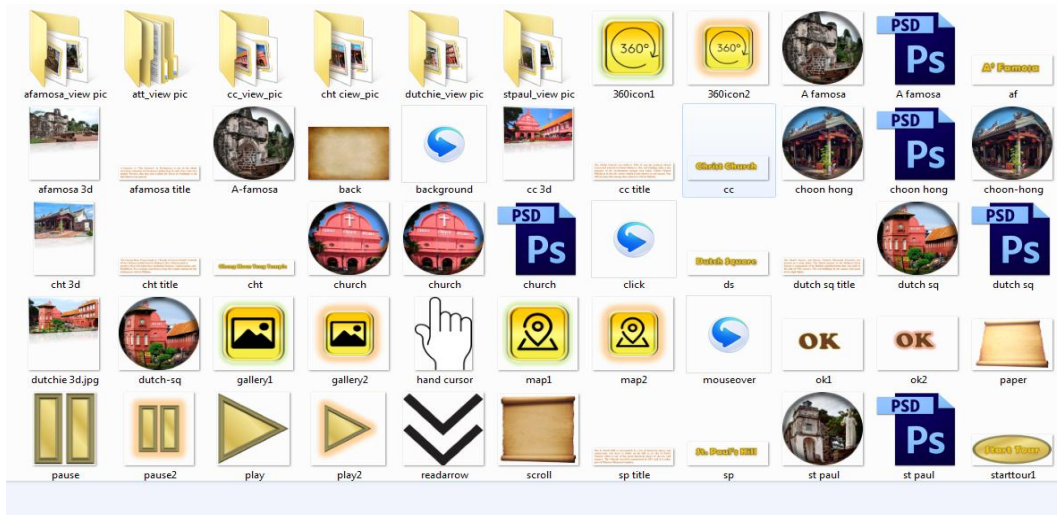


Figure 6-3-F1: Media elements for module 2

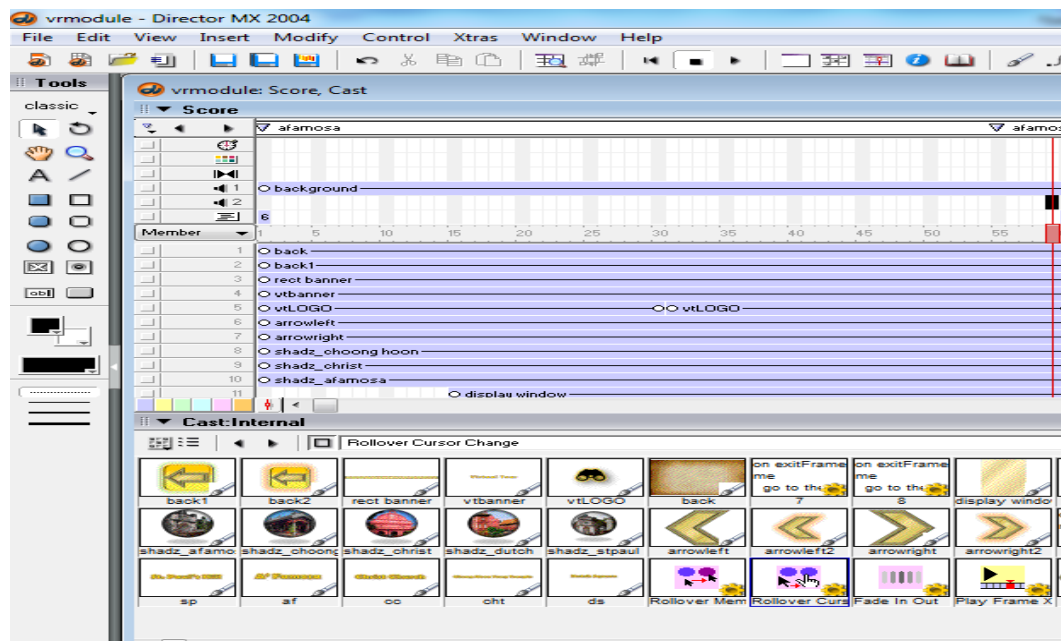


Figure 6-3-F2: Module 2 main interface

## Chapter 6: Modules Development Guide

Design the main interface as shown in Figure 6-3-F2 and repeat the process for the other 4 places which are the A'Famosa, Cheng Hoon Teng Temple, St. Paul Hills, and Dutch Square. The outcome on the stage will be looked like Figure 6-3-F3.

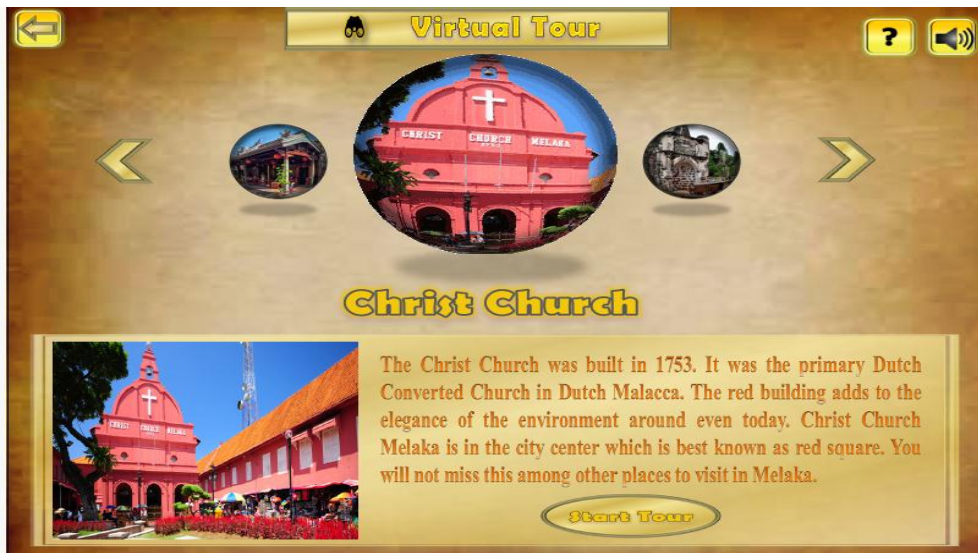


Figure 6-3-F3: Module 2 main interface

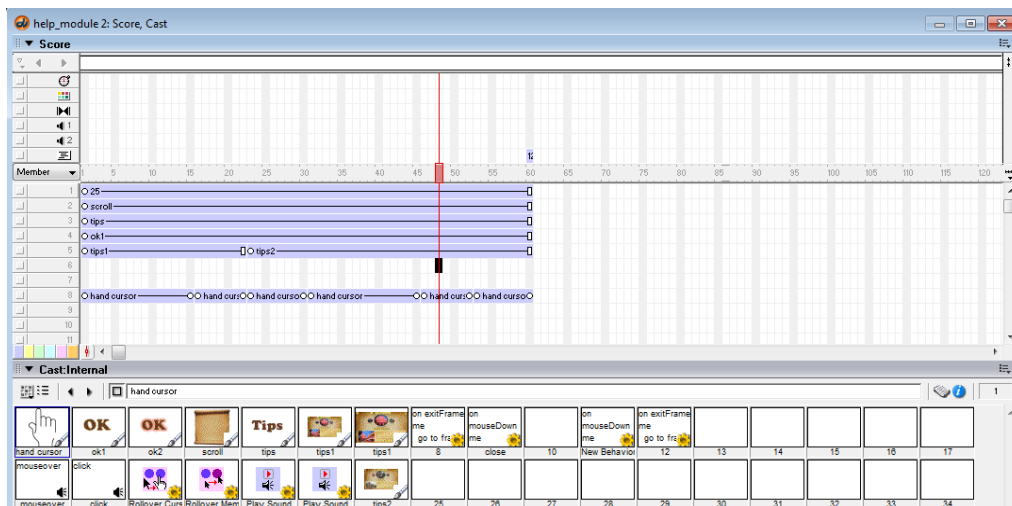
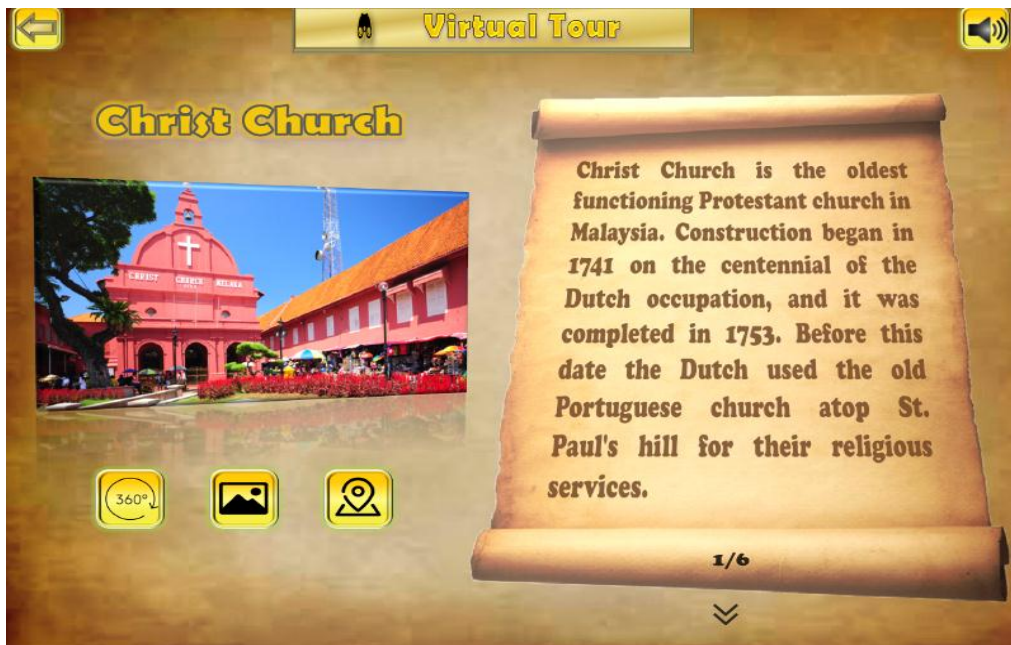


Figure 6-3-F4: Module 2 help guide



After that, create another director file for the help guide as shown in Figure 6-3-F4. Next, create another director file to show the details of each attraction and repeat the process for the other 4 places.



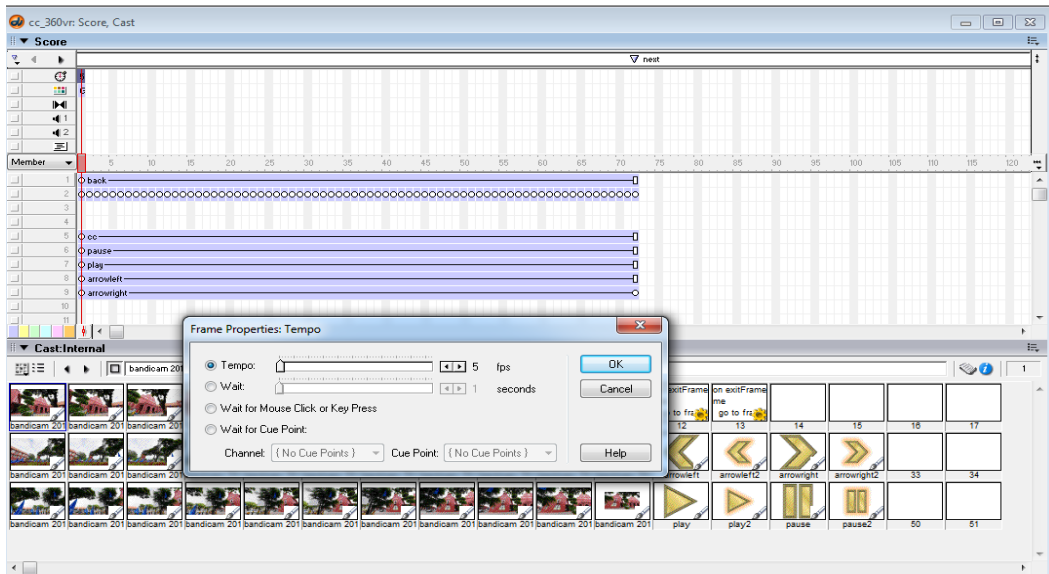
**Figure 6-3-F5:** Christ church details

Figure 6-3-F5 shows an example of the director file that shows the details for the Christ Church. Drag and drop the media elements and design it as shown in the figure above. The arrows at the top and bottom are attached with the code “Play Frame X” in which to direct the user from one page to another for them to read through the details of the particular attraction. Link the 360 panorama button to its own panorama director file using “Play Movie X” behaviour. Link the gallery button to the frame at the back of the original director file using “Play Frame X”. Lastly, link the interactive map button to the interactive map module director file using “Play Frame X” behaviour. Repeat the whole process for the other 4 attractions.

In order to design the 360 panorama director file, first drag all the pictures of that particular attraction from the folder name “360 view pic” into the director file.

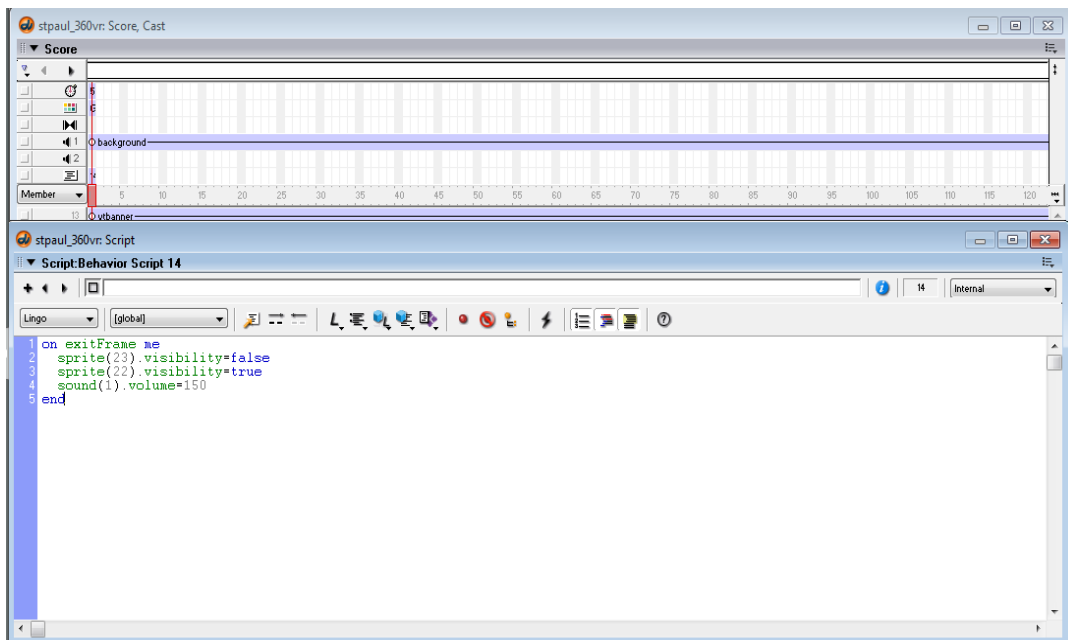
## Chapter 6: Modules Development Guide

Drag each of the pictures and arrange it with 1 picture per frame and edit the tempo to 5 FPS (Frame per second) as shown in Figure 6-3-F6.

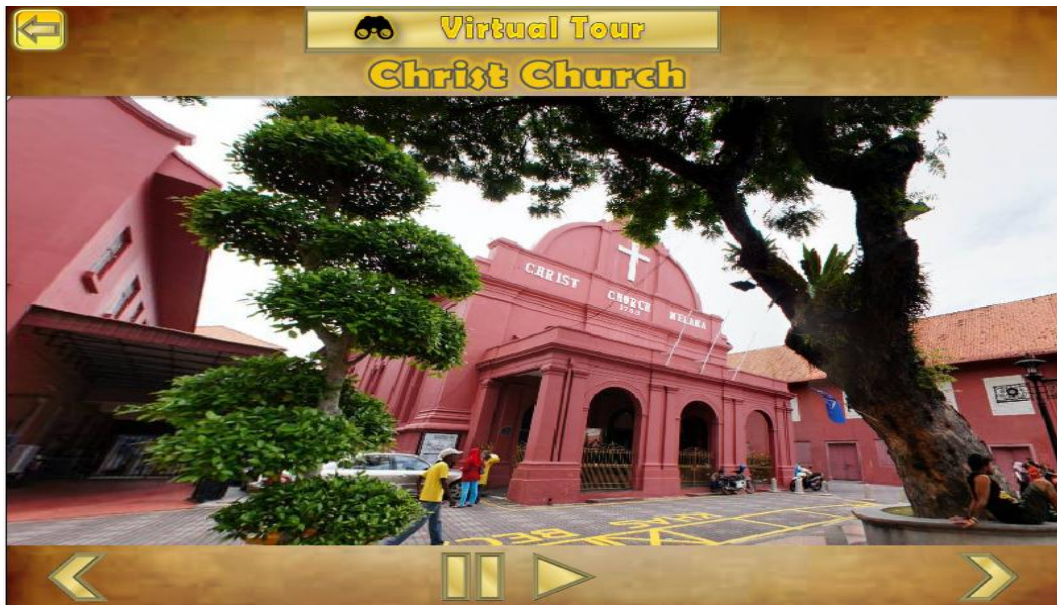


**Figure 6-3-F6:** Arrange picture and edit tempo

At the first frame, insert the lingo script as shown in Figure 6-3-F7.



**Figure 6-3-F7:** Script for first frame



**Figure 6-3-F8:** Stage view of 360 panorama

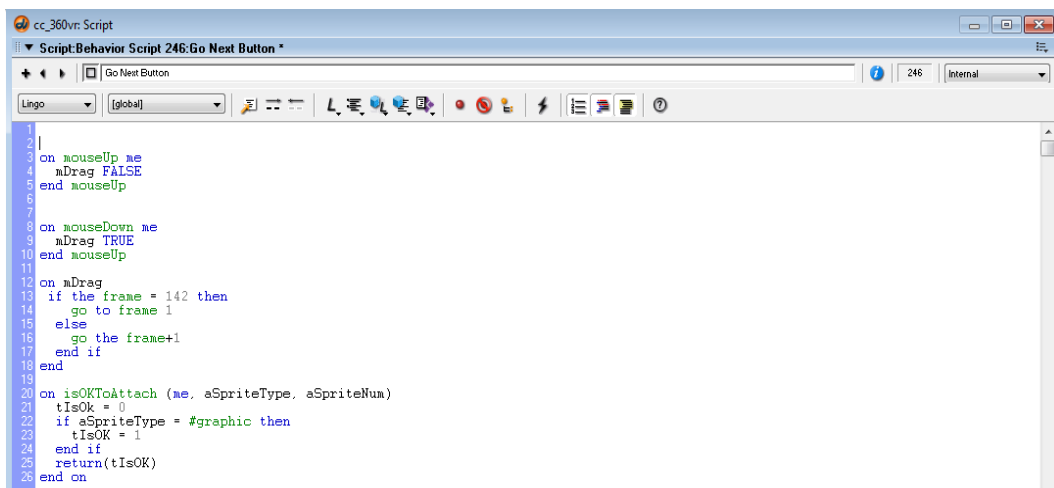
Figure 6-3-F8 shows the stage view of the 360 panorama of the Christ Church. For the left arrow and right arrow, add the new behaviour with the following lingo script as shown in Figure 6-3-F9 and Figure 6-3-F10. Meanwhile for the pause button and play button, add a new behaviour by writing the script as shown in Figure 6-3-F11 and Figure 6-3-F12. Repeat the process for the other 4 attractions.

```

1
2
3
4 on mouseUp me
5   mDrag FALSE
6 end mouseUp
7
8
9 on mouseDown me
10  mDrag TRUE
11 end mouseUp
12
13 on aDrag
14   if the frame = 1 then
15     go #next
16   else
17     go the frame-1
18   end if
19 end
20
21
22
23 on isOKToAttach (me, aSpriteType, aSpriteNum)
24   tIsOK = 0
25   if aSpriteType = #graphic then
26     tIsOK = 1
27   end if
28   return(tIsOK)
29 end on
    
```

**Figure 6-3-F9:** Script for left arrow

## Chapter 6: Modules Development Guide



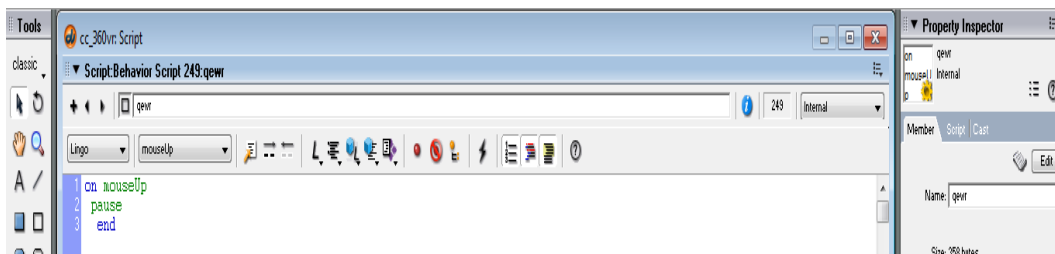
```
1  
2  
3 on mouseUp me  
4   mDrag FALSE  
5 end mouseUp  
6  
7  
8 on mouseDown me  
9   mDrag TRUE  
10 end mouseUp  
11  
12 on mDrag  
13   if the frame = 142 then  
14     go to frame 1  
15   else  
16     go to the frame+1  
17   end if  
18 end  
19  
20 on isOKToAttach (me, aSpriteType, aSpriteNum)  
21   tIsOK = 0  
22   if aSpriteType = #graphic then  
23     tIsOK = 1  
24   end if  
25   return(tIsOK)  
26 end on
```

**Figure 6-3-F10:** Script for right arrow



```
1 on mouseUp  
2   go to frame the frame  
3 end
```

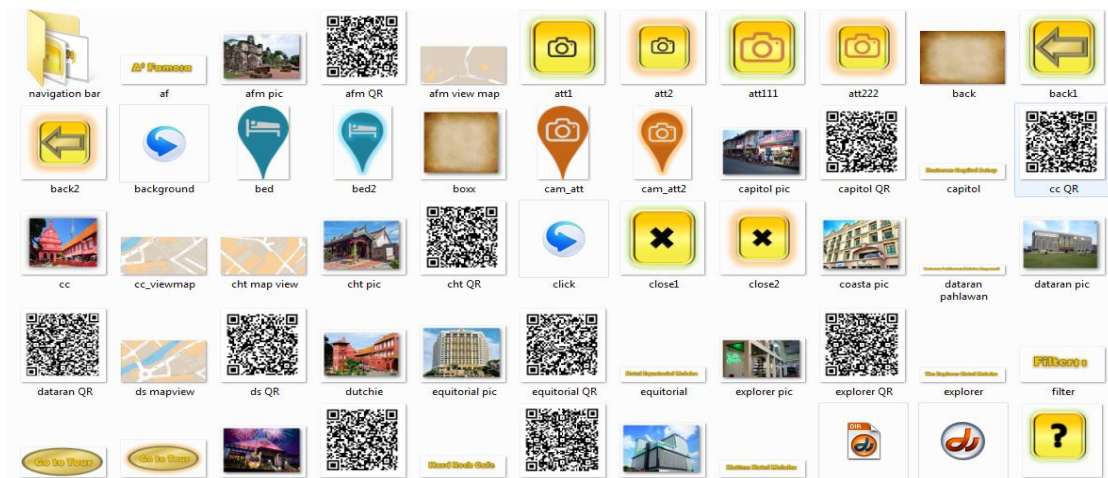
**Figure 6-3-F11:** Script for play



```
1 on mouseUp  
2   pause  
3 end
```

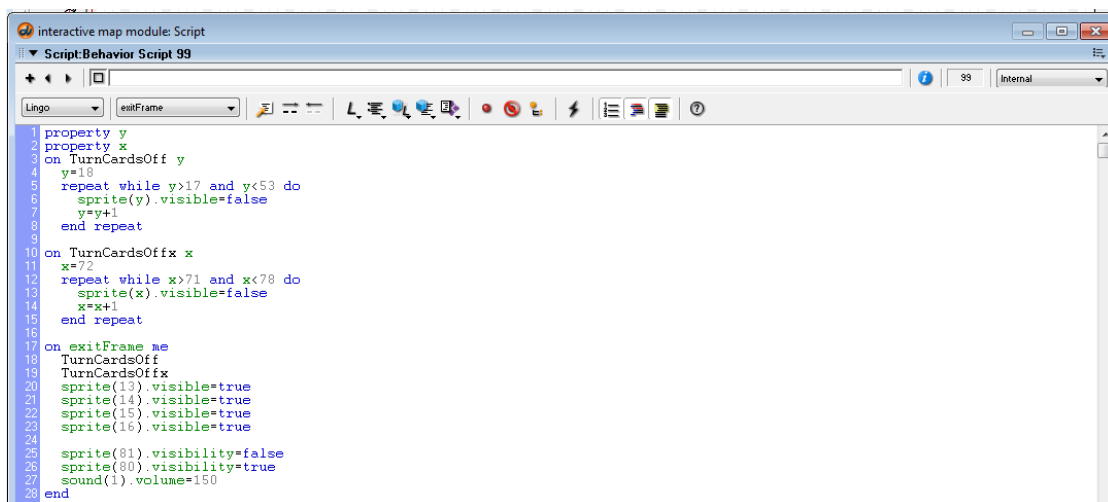
**Figure 6-3-F12:** Script for pause

### 6-4 Interactive Map Module Development



**Figure 6-4-F1:** Media elements for module 3

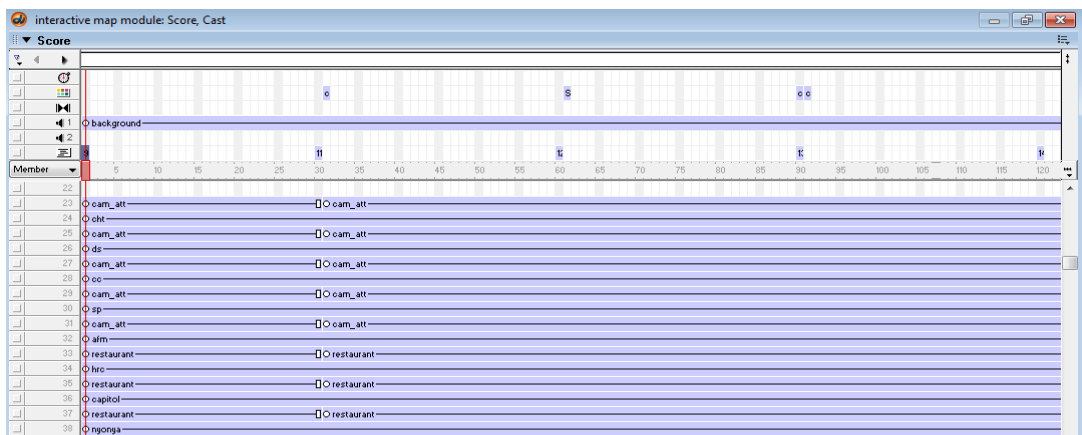
Figure 6-4-F1 shows that all the media elements are put in the folder named “module 4”. Firstly, insert the picture of an empty map, then drag in the symbol for each location one by one in the correct position and insert the tooltip for each attraction. Set all the location symbols to invisible at the beginning of the frame and set the initial volume of the background music. Refer to Figure 6-4-F2.



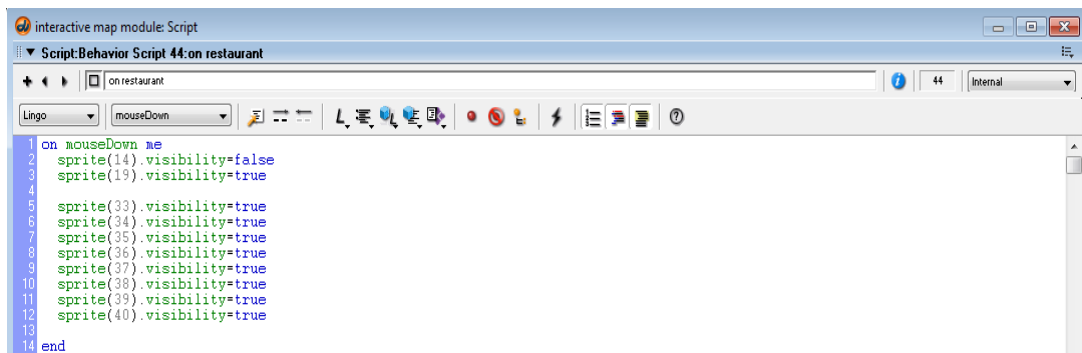
**Figure 6-4-F2:** Script for turning sprites invisible

Figure 6-4-F3 shows the arrangement of all the location symbols in the score view.

## Chapter 6: Modules Development Guide

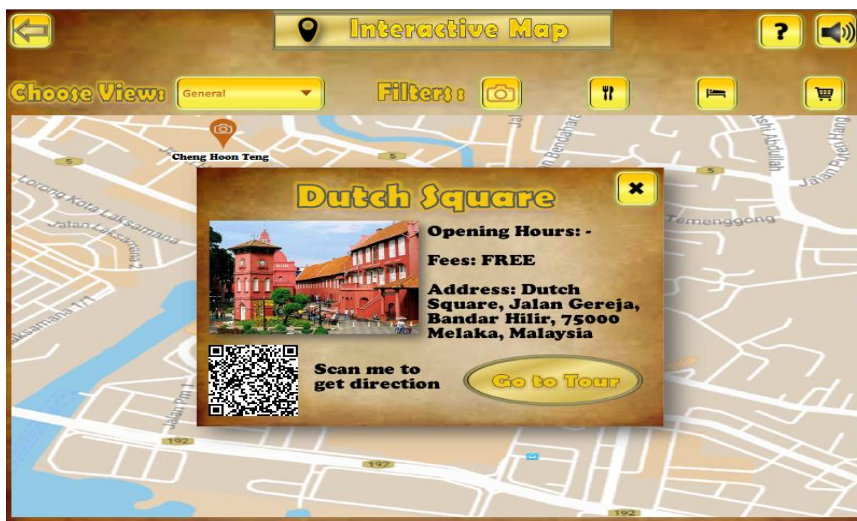


**Figure 6-4-F3:** Score view for arrangement of location symbols



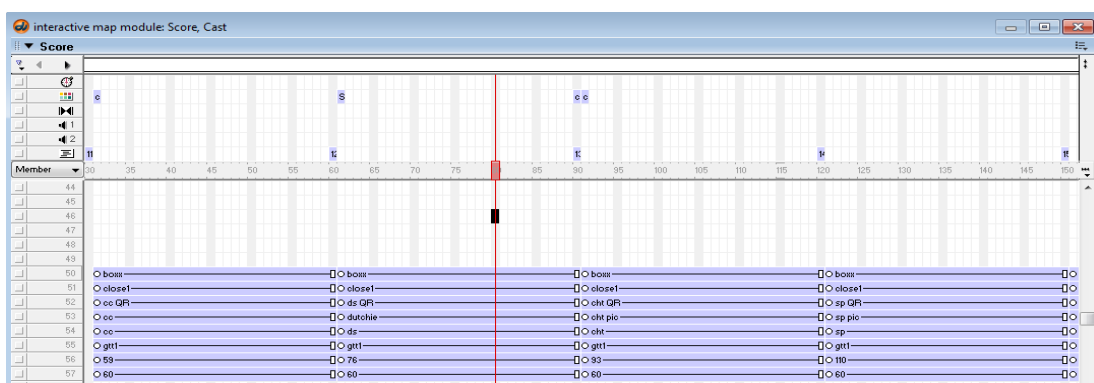
**Figure 6-4-F4:** Script for the filter

Assign each category of the location symbols to their respective filter, so when the user click on that particular filter, the related location will be displayed. For example, when the user click on the attraction filter, the attraction in Malacca will be displayed on the map. Refer to Figure 6-4-F4. Next, create each pop up box for each location symbols to display their location details as shown in Figure 6-4-F5.



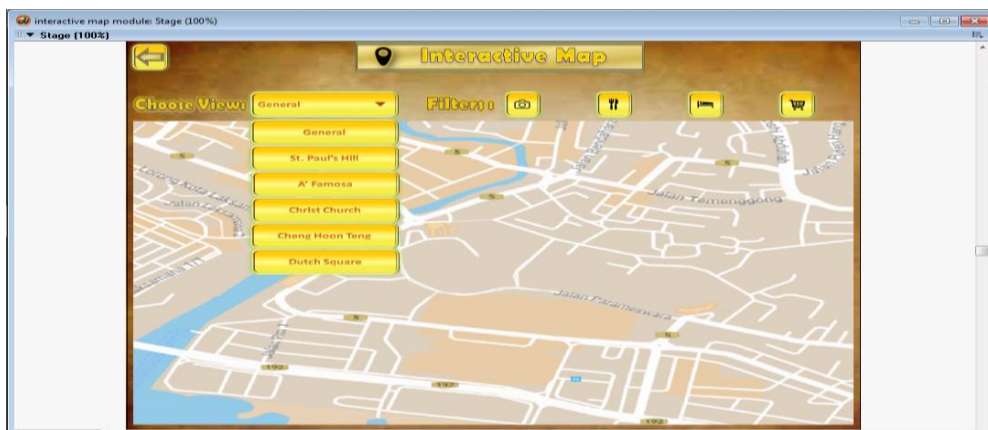
**Figure 6-4-F5:** Score view for arrangement of location symbols

Refer to Figure 6-4-F6 for the arrangement of the pop up box in the score view.



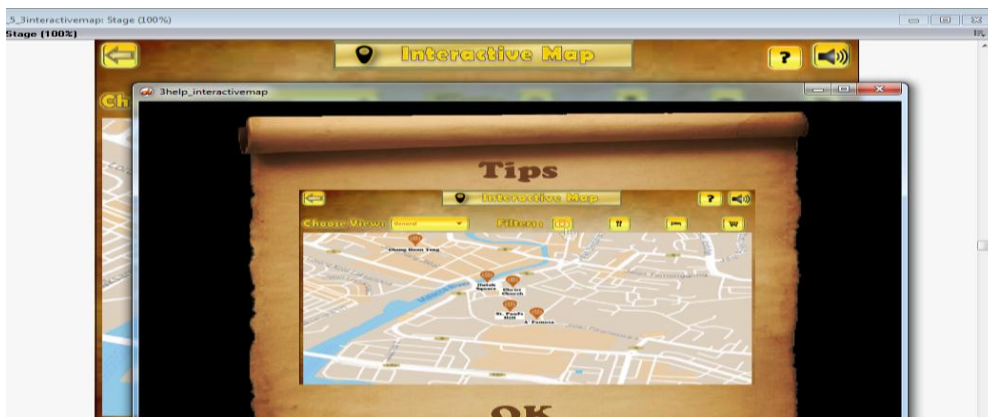
**Figure 6-4-F6:** Arrangement of the pop up box in score view

After that, design a navigational menu using dropdown menu to allow the user to choose to view a particular attraction in more details. By design the navigational menu, insert and arrange the media elements as shown in Figure 6-4-F7. After that, set the child to invisible. Show them to visible only when the user mouse over the parent.



**Figure 6-4-F7:** Navigational menu

Insert the new map for each of the child in the new frame and link each child of the navigational menu to the respective correct frame which displays the particular location in details using “Play Frame X” behaviour. Lastly, link the help button to its help guide that developed in another director file. Insert the script as shown in Figure 6-4-F8 that will pop out the help guide in a new window using the script as shown in Figure 6-4-F9.



**Figure 6-4-F8:** Help guide for module 4 in another window



**Figure 6-4-F9:** Script to open the help guide



### 6-5 Game-Based Learning Module Development

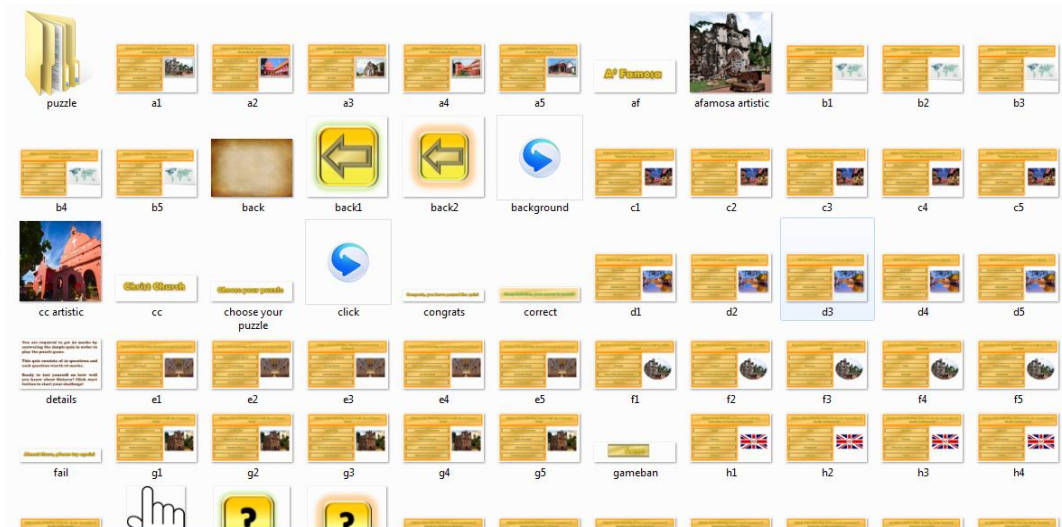


Figure 6-5-F1: Media elements for module 4

Get all the media elements in the “module 4” folder and import into director file. After that, design a start-up guide as shown in Figure 6-5-F2 that tells the users what to do before they start answering the quiz.

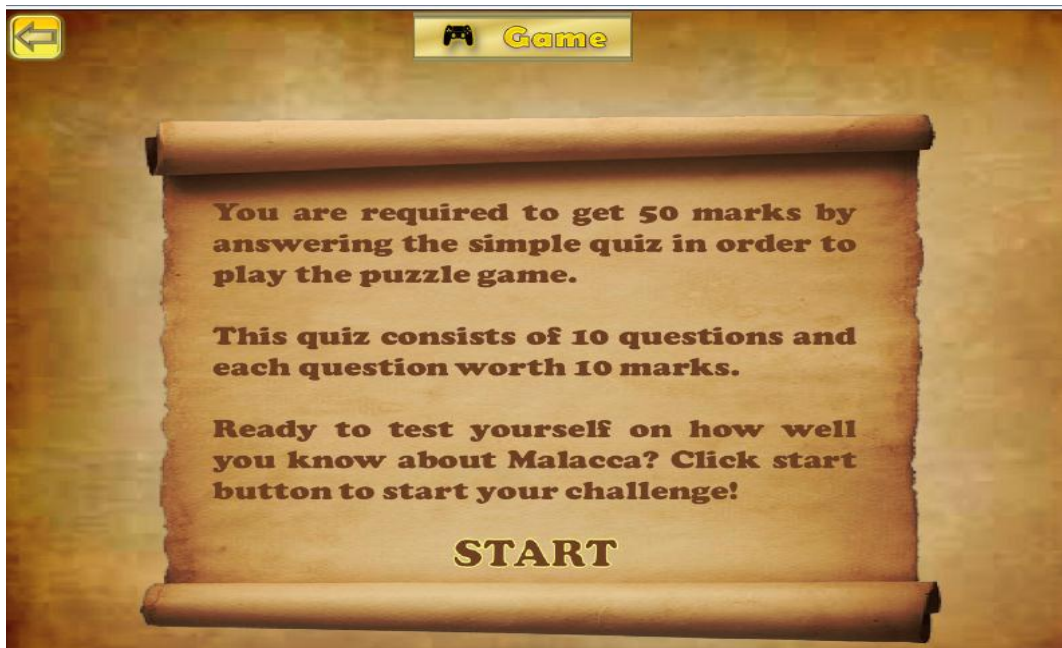
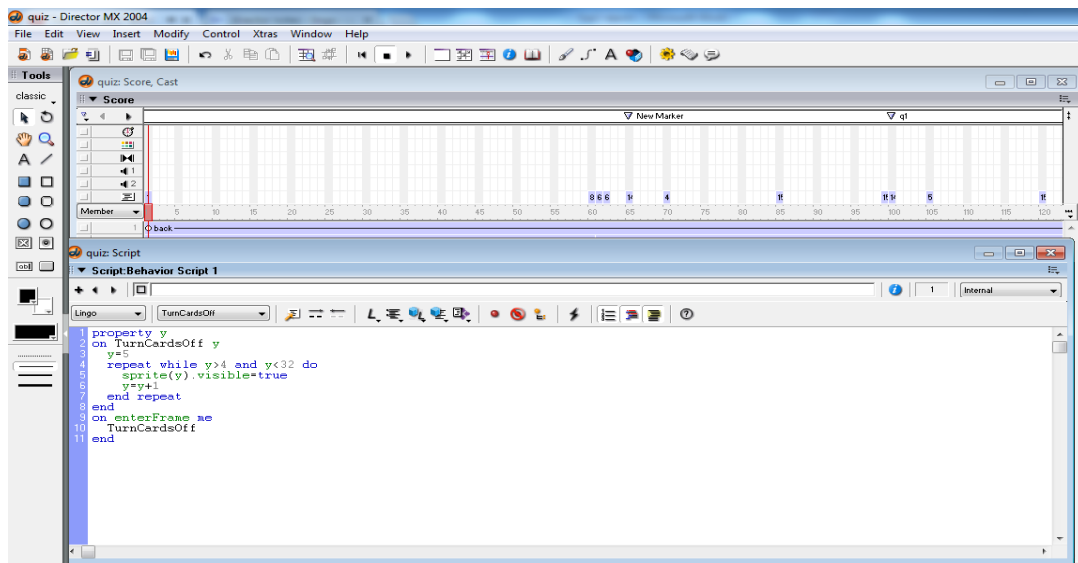


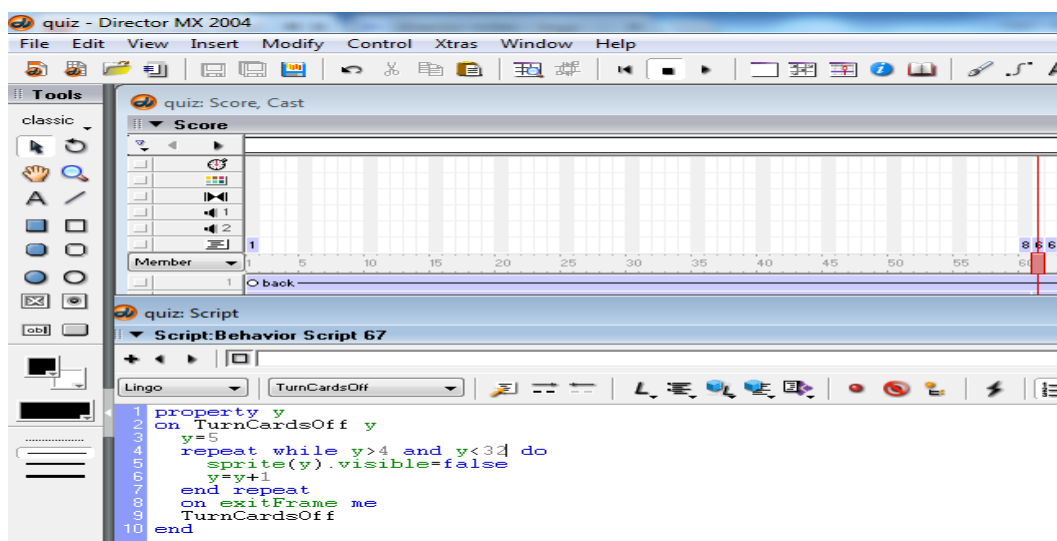
Figure 6-5-F2: Start up guide for module 4

## Chapter 6: Modules Development Guide



**Figure 6-5-F3:** Script for turn all the elements in the score visible

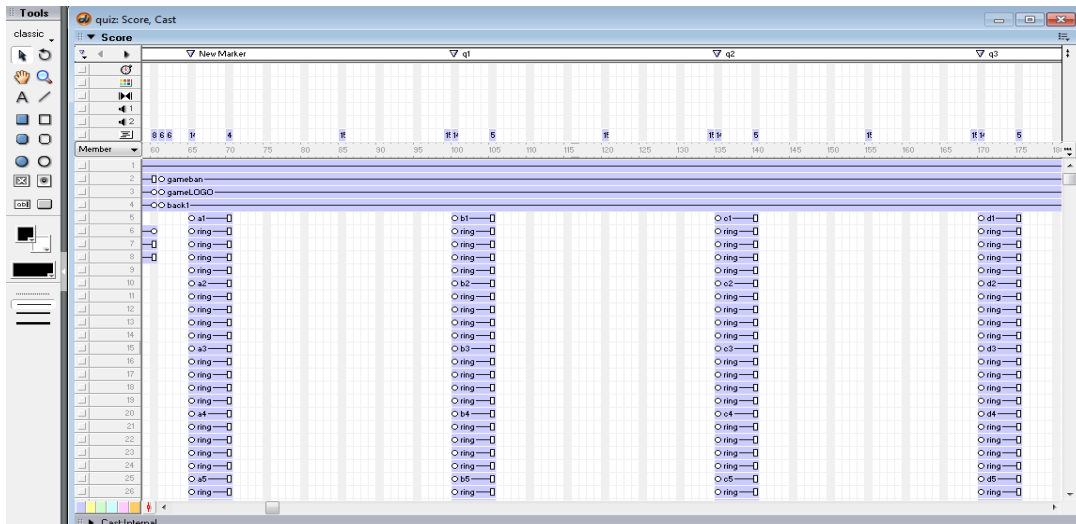
In the beginning of the frame, turn all media elements visible by inserting the script shown in Figure 6-5-F3 at the very first frame. After that, when the user click on the start button, turn all the questions and rings invisible by insert the script on frame 61 (may be vary due to the design of the developer) as shown in Figure 6-5-F4.



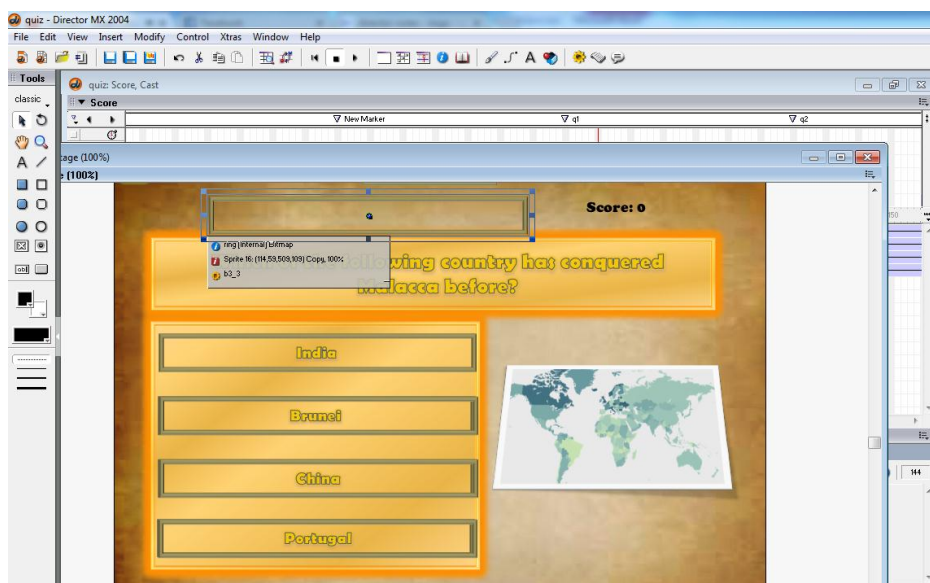
**Figure 6-5-F4:** Script for turn questions and rings invisible

## Chapter 6: Modules Development Guide

The questions and the answers for each set should be arranged in a proper manner as shown in Figure 6-5-F5. Put the “go to the frame” script at the end of each questions to let the users have time to read and answer the question.



**Figure 6-5-F5:** Arrangement of the quiz questions and answers

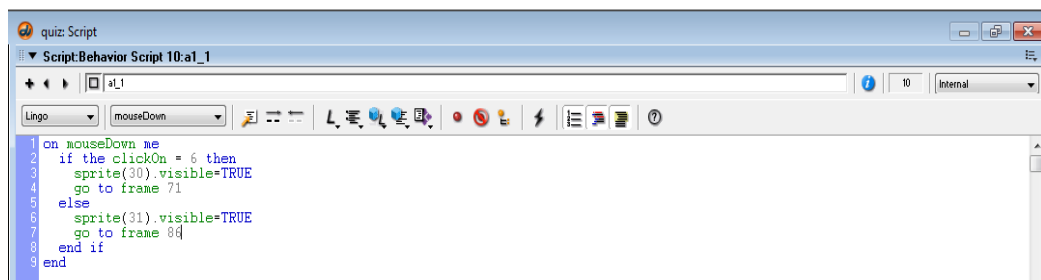


**Figure 6-5-F6:** Rings on each of the answer

The rings are the hotspots. Place it on the picture to cover each of the answer on the picture as shown in Figure 6-5-F6.

- All the Set “1” (e.g. a1, b1, c1, and etc.) and Set “5” (e.g. a5, b5, c5, and etc.) picture have the correct answer in the 1<sup>st</sup> answer.
- All the Set “2” (e.g. a2, b2, c2, and etc.) picture have the correct answer in the 2<sup>nd</sup> answer.
- All the Set “3” (e.g. a3, b3, c3, and etc.) picture have the correct answer in the 3<sup>rd</sup> answer.
- All the Set “4” (e.g. a4, b4, c4, and etc.) picture have the correct answer in the 4<sup>th</sup> answer.

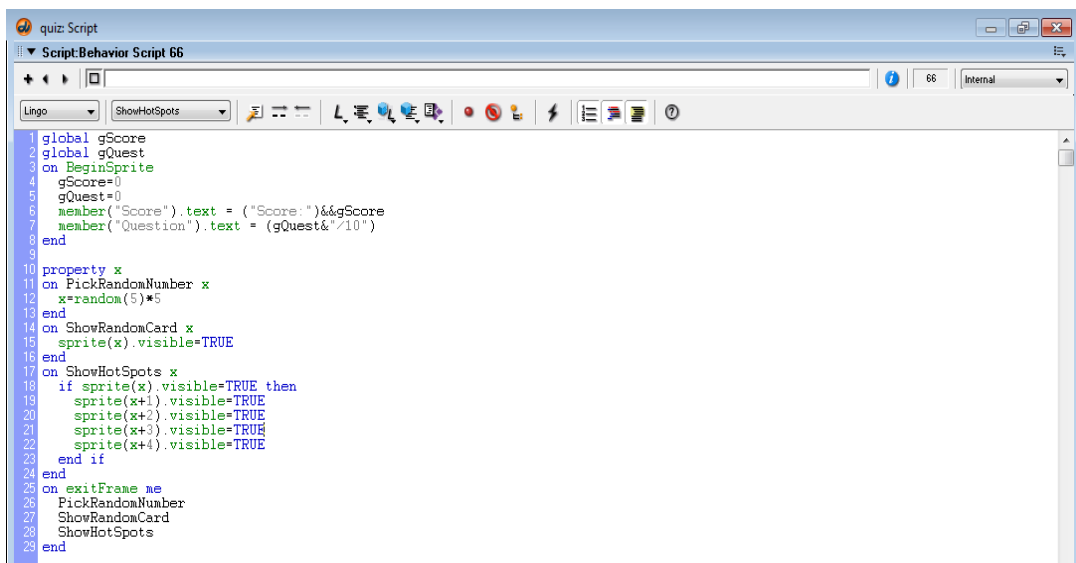
On each of the rings, insert behaviour as shown in Figure 6-5-F7. The code may be vary on each ring depends on the correct answer of that particular set of questions.



**Figure 6-5-F7:** Script on each ring

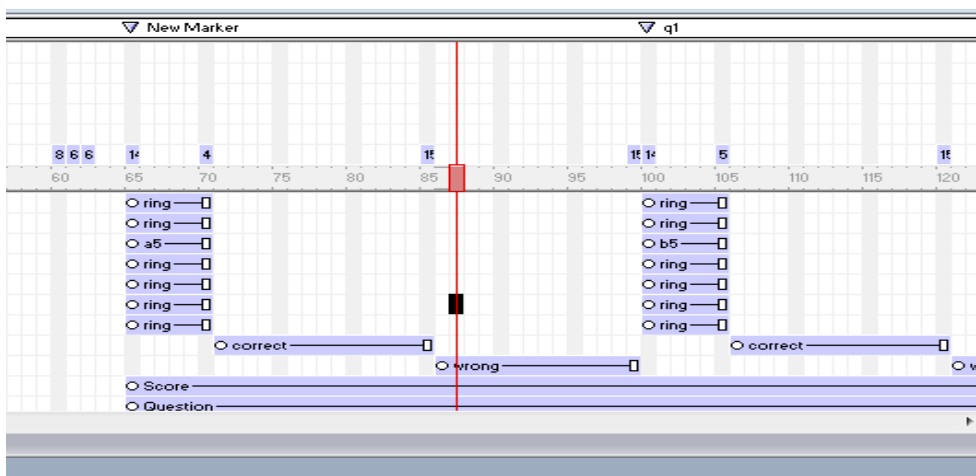
On the 61<sup>st</sup> frame, insert a lingo script that randomizes the questions that will appear to the user and set a global score to keep track of the score and initialize it with 0. Next, set a global question number to keep track of the questions answered. Refer to the Figure 6-5-F8 for the script.

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```
1 global gScore
2 global gQuest
3 on BeginSprite
4   gScore=0
5   gQuest=0
6   member("Score").text = ("Score:")&&gScore
7   member("Question").text = (gQuest&"/10")
8 end
9
10 property x
11 on PickRandomNumber x
12   x=random(5)*5
13 end
14 on ShowRandomCard x
15   sprite(x).visible=TRUE
16 end
17 on ShowHotSpots x
18   if sprite(x).visible=TRUE then
19     sprite(x+1).visible=TRUE
20     sprite(x+2).visible=TRUE
21     sprite(x+3).visible=TRUE
22     sprite(x+4).visible=TRUE
23   end if
24 end
25 on exitFrame me
26   PickRandomNumber
27   ShowRandomCard
28   ShowHotSpots
29 end
```

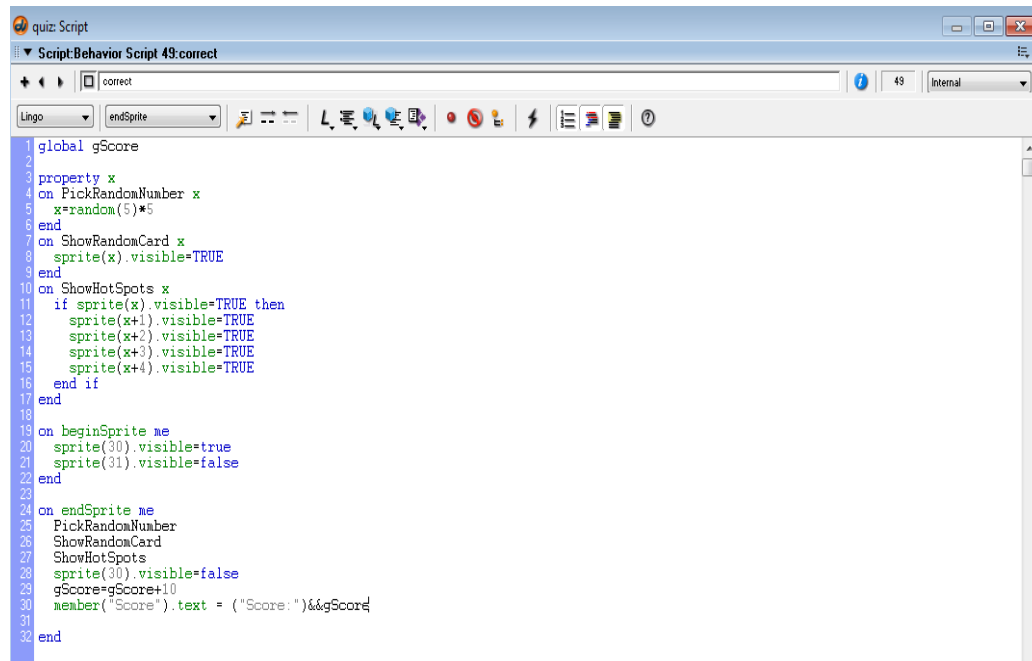
**Figure 6-5-F8:** Script for randomize question and set global variable



**Figure 6-5-F9:** Position of the correct sprite and wrong sprite

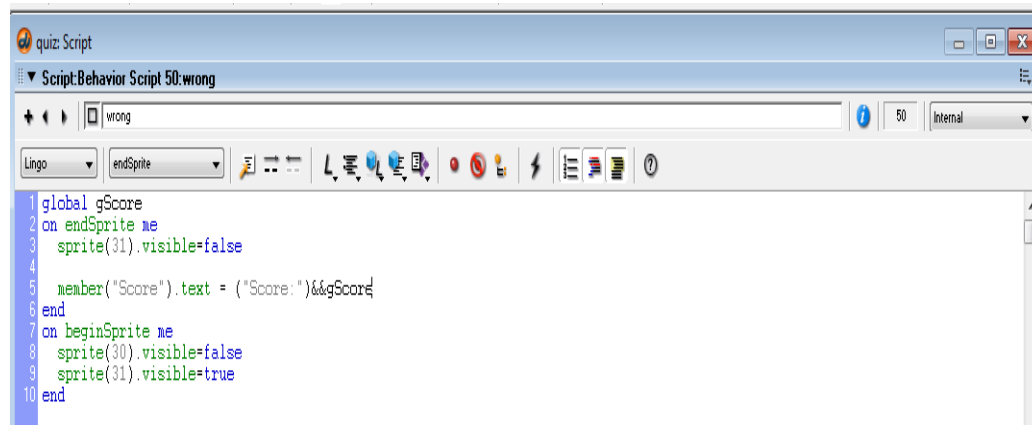
After the users click on the answer, the rings will direct the users to either the correct sprite or wrong sprite which are put right after each of the questions as shown in Figure 6-5-F9, also insert 2 text elements in the director and named “Score” and “Question”. These 2 will keep track of the score and questions attempted. The scripts

to be inserted to both of the sprite are shown in Figure 6-5-F10 and Figure 6-5-F11.



```
quiz: Script
  Script: Behavior Script 49: correct
  correct
  Lingo
  endSprite
  1 global gScore
  2
  3 property x
  4 on PickRandomNumber x
  5   x=random(5)*5
  6 end
  7 on ShowRandomCard x
  8   sprite(x).visible=TRUE
  9 end
  10 on ShowHotSpots x
  11   if sprite(x).visible=TRUE then
  12     sprite(x+1).visible=TRUE
  13     sprite(x+2).visible=TRUE
  14     sprite(x+3).visible=TRUE
  15     sprite(x+4).visible=TRUE
  16   end if
  17 end
  18
  19 on beginSprite me
  20   sprite(30).visible=true
  21   sprite(31).visible=false
  22 end
  23
  24 on endSprite me
  25   PickRandomNumber
  26   ShowRandomCard
  27   ShowHotSpots
  28   sprite(30).visible=false
  29   gScore=gScore+10
  30   member("Score").text = ("Score:")&&gScore
  31
  32 end
```

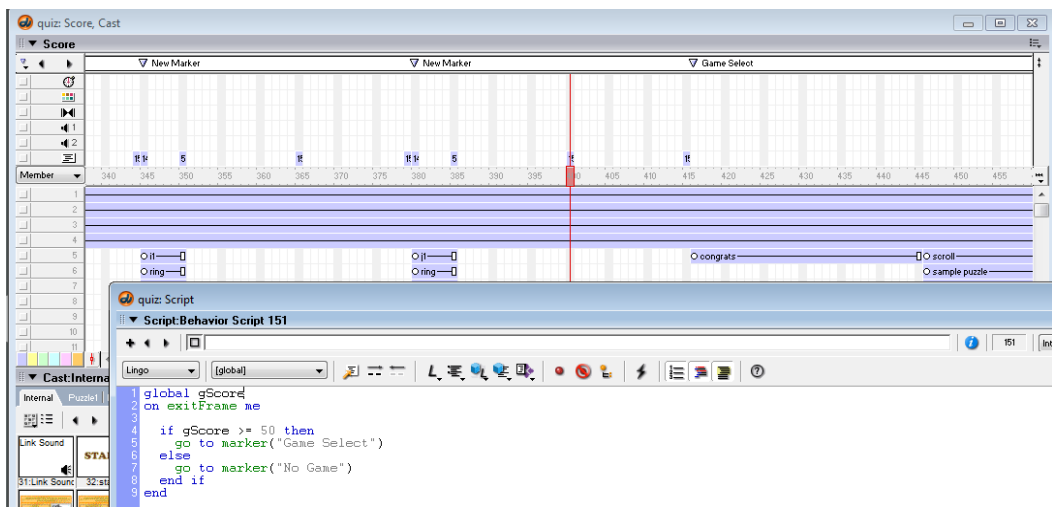
**Figure 6-5-F10:** Script for correct sprite



```
quiz: Script
  Script: Behavior Script 50: wrong
  wrong
  Lingo
  endSprite
  1 global gScore
  2 on endSprite me
  3   sprite(31).visible=false
  4
  5   member("Score").text = ("Score:")&&gScore
  6 end
  7 on beginSprite me
  8   sprite(30).visible=false
  9   sprite(31).visible=true
  10 end
```

**Figure 6-5-F11:** Script for wrong sprite

After all the 10 questions been answered, insert a script to check the user's scores and direct user to the puzzle selection if they got 50 marks or more. The script is shown in Figure 6-5-F12.



**Figure 6-5-F12:** Script to check score

Show the tips to the users to give them the guide on how the puzzle game works before they begin to play as shown in Figure 6-5-F13 and direct the user to the puzzle selection to begin their puzzle games as shown in Figure 6-5-F14.



**Figure 6-5-F13:** Tips on playing puzzle game



Figure 6-5-F14: Puzzle selection interface

Next, create each of the puzzle game as an individual director file and link the puzzle selection to the respective director file. The script for the puzzle frame behaviour is shown in Figure 6-5-F15 and Figure 6-5-F16 and the sprite behaviour for each pieces of the puzzle is shown in Figure 6-5-F17, Figure 6-5-F18, Figure 6-5-F19, Figure 6-5-F20. Figure 6-5-F21.

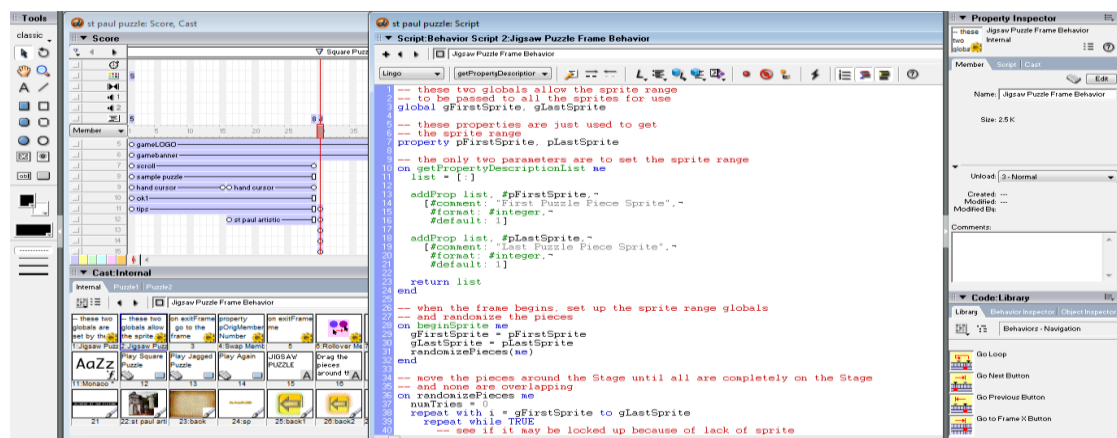


Figure 6-5-F15: Puzzle frame behaviour part I



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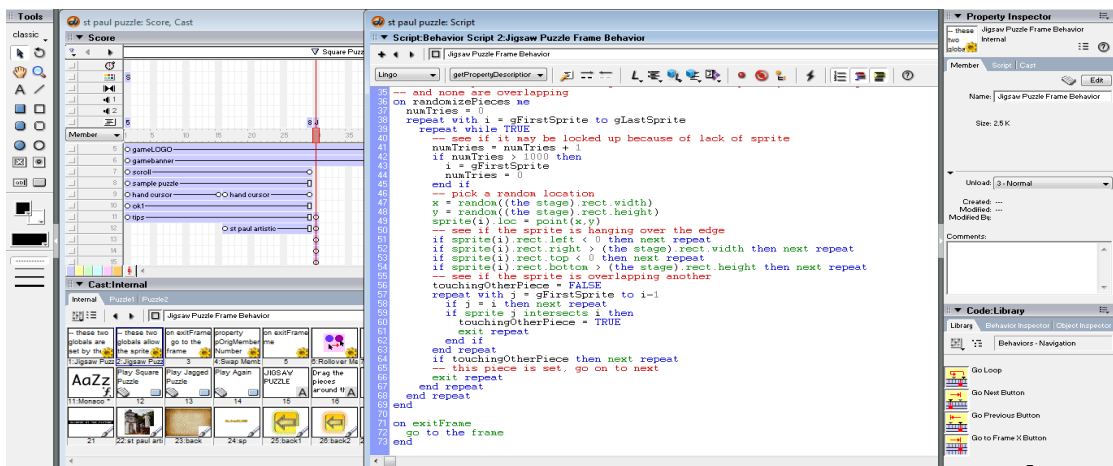


Figure 6-5-F16: Puzzle frame behaviour part II

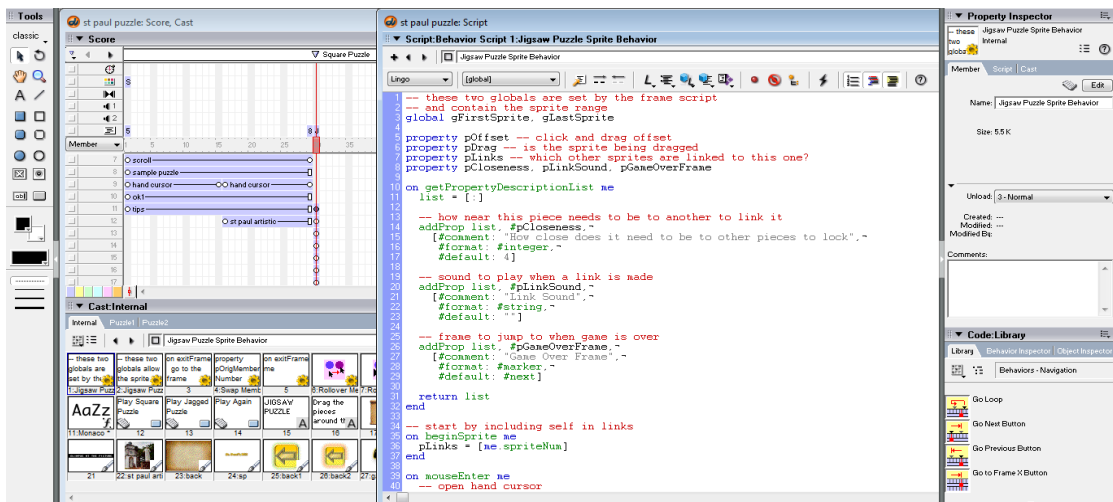


Figure 6-5-F17: Puzzle sprite behaviour part I

## Chapter 6: Modules Development Guide

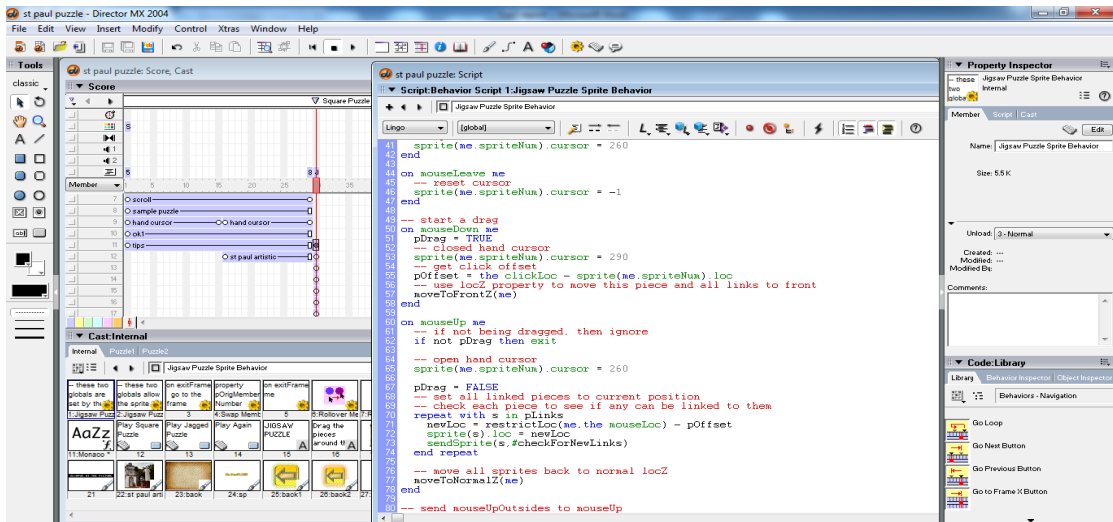


Figure 6-5-F18: Puzzle sprite behaviour part II

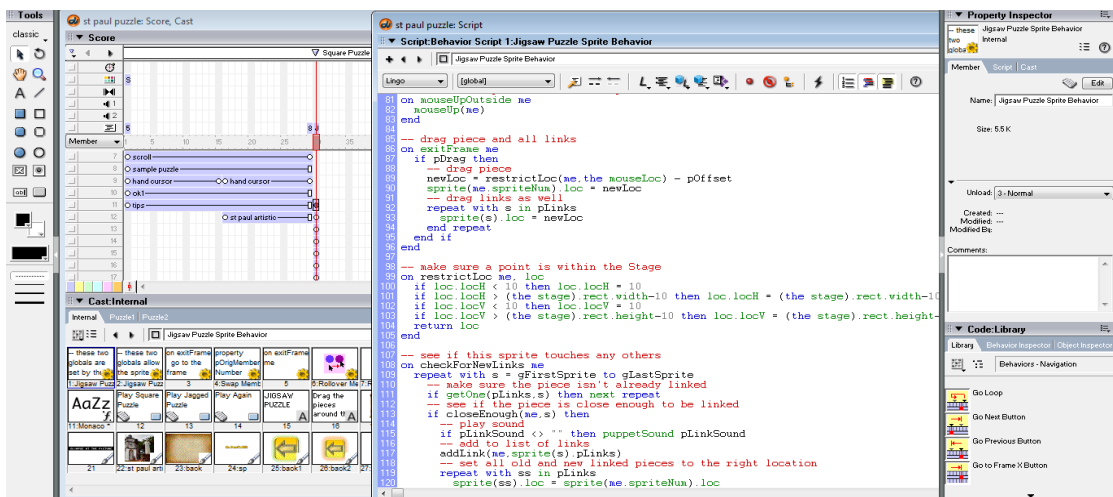


Figure 6-5-F19: Puzzle sprite behaviour part III

## Chapter 6: Modules Development Guide

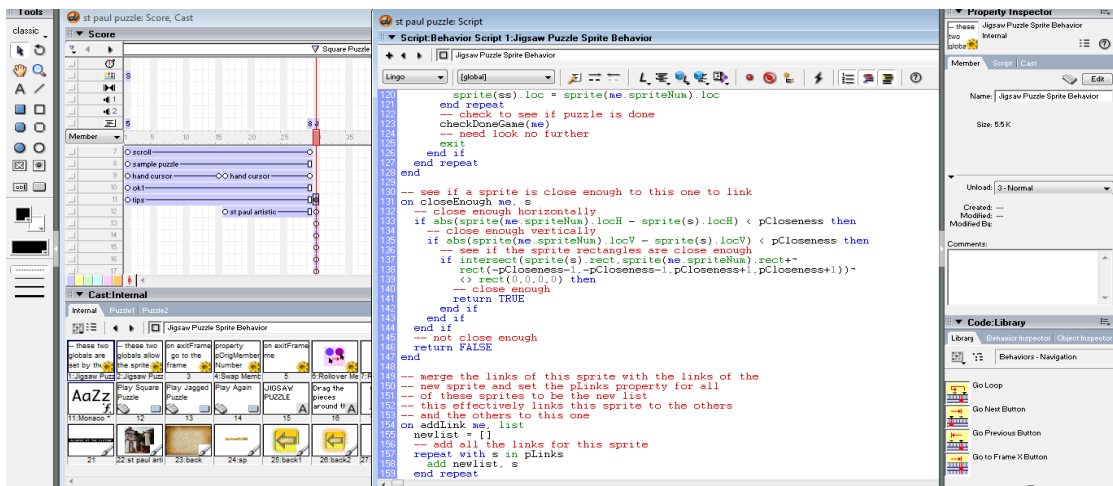


Figure 6-5-F20: Puzzle sprite behaviour part IV

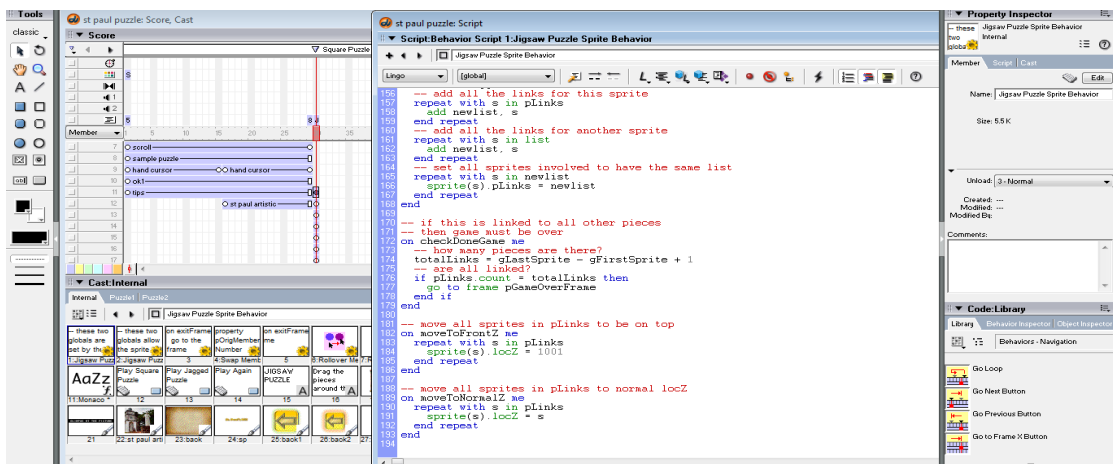



























Figure 6-5-F21: Puzzle sprite behaviour part V









**Chapter 7: Testing**











**7-1 Unit Testing**

Button / Icon	Function	Expected Output	Output	Result
	Display the options link to different modules	4 different buttons that linked to respective modules are shown	All four buttons are shown	Pass
	Hide the options link to different modules	4 different buttons that linked to respective modules are hidden	All four buttons are hidden	Pass
 <p data-bbox="320 931 392 954">Interactive Timeline</p>	Link to first module which is Interactive Timeline module	Go to first module	First module is shown	Pass
 <p data-bbox="320 1234 392 1256">Virtual Tour</p>	Link to second module which is Virtual Tour module	Go to second module	Second module is shown	Pass
 <p data-bbox="320 1536 392 1559">Interactive Map</p>	Link to third module which is Interactive Map module	Go to third module	Third module is shown	Pass




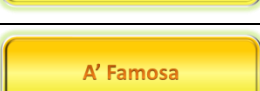
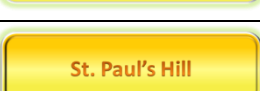




 <p>Game</p>		<p>Link to forth module which is Game-Based Learning module</p>	<p>Go to forth module</p>	<p>Forth module is shown</p>	<p>Pass</p>
		<p>Indicate current background music is off and click to switch on</p>	<p>Switch on the background music on sound channel 1 and set to volume of 150</p>	<p>Background music is switched on and set to volume of 150</p>	<p>Pass</p>
		<p>Indicate current background music is on and click to switch off</p>	<p>Switch of the background music on sound channel 1 and set to volume of 0</p>	<p>Background music is switched off and set to volume of 0</p>	<p>Pass</p>
		<p>Help guide to show tips on respective modules</p>	<p>Open a help guide in an external window</p>	<p>An external window of the help guide is shown</p>	<p>Pass</p>
<p><b>OK</b></p>		<p>Acknowledge and allow the application to continue</p>	<p>Proceed to next frame</p>	<p>The timeline of the project proceeded to next frame</p>	<p>Pass</p>
		<p>Back to previous session where the user linked from</p>	<p>Go back to the previous session</p>	<p>Go back to the previous session</p>	<p>Pass</p>
		<p>Link to other Malacca history events</p>	<p>Jump to other Malacca history events</p>	<p>Other Malacca history events are shown</p>	<p>Pass</p>
		<p>Click to proceed</p>	<p>Continue to resume the application</p>	<p>Resume the application</p>	<p>Pass</p>
		<p>Indicate the subtitle is on and click to turn off the subtitle</p>	<p>Turn off the subtitle</p>	<p>Subtitle is turned off</p>	<p>Pass</p>
		<p>Indicate the subtitle is off and click to turn on the subtitle</p>	<p>Turn on the subtitle</p>	<p>Subtitle is turned on</p>	<p>Pass</p>

	Link to Interactive Map module	Go to Interactive Map module	Interactive Map module is shown	Pass
	Link to photo gallery	Display photos of that particular selected attraction	Photos of the selected attraction is shown	Pass
	Link to 360 panorama view	Go to 360 panorama view of the particular selected attraction	360 panorama view of the selected attraction is shown	Pass
	Go to next page in the virtual tour module	Move to the next page	Next page	Pass
	Go to previous page	Back to previous page	Previous page	Pass
	Resume the paused view and continue auto rotate	Resume auto rotate	Auto rotate 360 panoramas view	Pass
	Stop the auto rotate of the 360 panoramas view	Pause the auto rotate	Auto rotate is temporarily paused	Pass
	Link to the virtual tour module of the selected attraction	Direct to the virtual tour of the selected attraction	Virtual tour of the selected attraction is shown	Pass
	Indicate the current selection is off and click to turn on the attraction filter	Turn on the attraction filter to show the attraction symbols on the map	The attraction symbols are shown on the map	Pass
	Indicate the current selection is on and click to turn off the attraction filter	Turn off the attraction and hide all the attraction symbols on the map	The attractions symbols are hidden on the map	Pass
	Indicate the current selection is off and click to turn on the restaurant filter	Turn on the restaurant filter and show all the restaurant symbols on the map	The restaurant symbols are shown on the map	Pass

	Indicate the current selection is on and click to turn off the restaurant filter	Turn off the restaurant filter and hide all the restaurant symbols on the map	The restaurant symbols are hidden on the map	Pass
	Indicate the current selection is off and click to turn on the hotel filter	Turn on the hotel filter and show all the hotel symbols on the map	The hotel symbols are shown on the map	Pass
	Indicate the current selection is on and click to turn off the hotel filter	Turn off the hotel filter and hide all the hotel symbols on the map	The hotel symbols are hidden on the map	Pass
	Indicate the current selection is off and click to turn on the shopping mall filter	Turn on the shopping mall filter and show all the shopping mall symbols on the map	The shopping mall symbols are shown on the map	Pass
	Indicate the current selection is on and click to turn off the shopping mall filter	Turn off the shopping mall filter and hide all the shopping mall symbols on the map	The shopping mall symbols are hidden on the map	Pass
	Close the pop out box	Turn off the pop out box	Pop out box is turned off	Pass
	Indicate the heritage attractions on the map and click to display the pop out box that contains details of the particular attraction	Display pop out box of the selected attraction	Pop out box of the particular attraction is shown	Pass
	Indicate the restaurants on the map and click to display the pop out box that contains the details of the particular restaurant	Display pop out box of the selected restaurant	Pop out box of the particular restaurant is shown	Pass

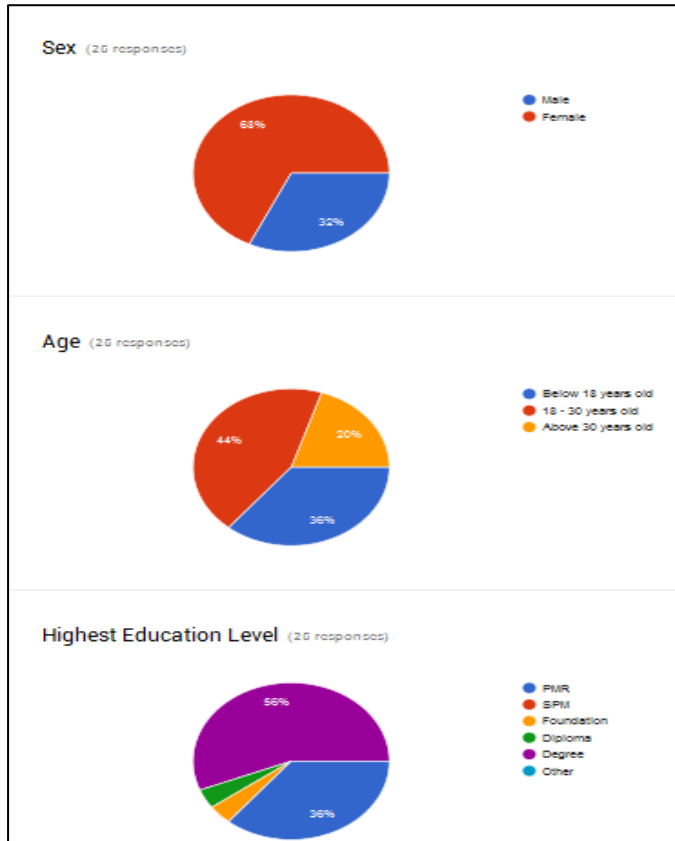
	Indicate the hotels on the map and click to display the pop out box that contains the details of the particular hotel	Display pop out box of the selected hotel	Pop out box of the particular hotel is shown	Pass
	Indicate the shopping malls on the map and click to display the pop out box that contains the details of the particular shopping mall	Display pop out box of the selected shopping mall	Pop out box of the particular shopping is shown	Pass
	Link to the virtual tour module of the selected attraction	Direct to the virtual tour of the selected attraction	Virtual tour of the selected attraction is shown	Pass
	Display the choices of attraction to be selected	Show the available choices	Dropdown menu is shown	Pass
	Display the choices of attraction to be selected	Show the available choices	Dropdown menu is shown	Pass
	Display the choices of attraction to be selected	Show the available choices	Dropdown menu is shown	Pass
	Display the choices of attraction to be selected	Show the available choices	Dropdown menu is shown	Pass
	Display the choices of attraction to be selected	Show the available choices	Dropdown menu is shown	Pass
	Display the choices of attraction to be selected	Show the available choices	Dropdown menu is shown	Pass
	Link to the general view	Display the general view of the map	General view of the map is displayed	Pass



	Link to Dutch Square view	Display the Dutch Square view of the map	Dutch square view of the map is displayed	Pass
	Link to Cheng Hoon Teng view	Display the Cheng Hoon Teng view of the map	Cheng Hoon Teng view of the map is displayed	Pass
	Link to Christ Church view	Display the Christ Church view of the map	Christ Church view of the map is displayed	Pass
	Link to A' Famosa view	Display the A' Famosa view of the map	A' Famosa view of the map is displayed	Pass
	Link to St. Paul's Hill view	Display the St. Paul's Hill view of the map	St. Paul's Hill view of the map is displayed	Pass
	Display whether the answer of the user is correct or not in the Game-Based Learning modules	Indicate correct or wrong answer	Display the result to the user	Pass
	Go to next choices in the puzzle selection interface	Go to next choices of puzzle	Next puzzle selection is shown	Pass
	Go to previous choices in the puzzle selection interface	Go to previous choices of puzzle	Previous puzzle selection is shown	Pass
	Display the original image of the puzzle	Show original puzzle	Puzzle is displayed	Pass

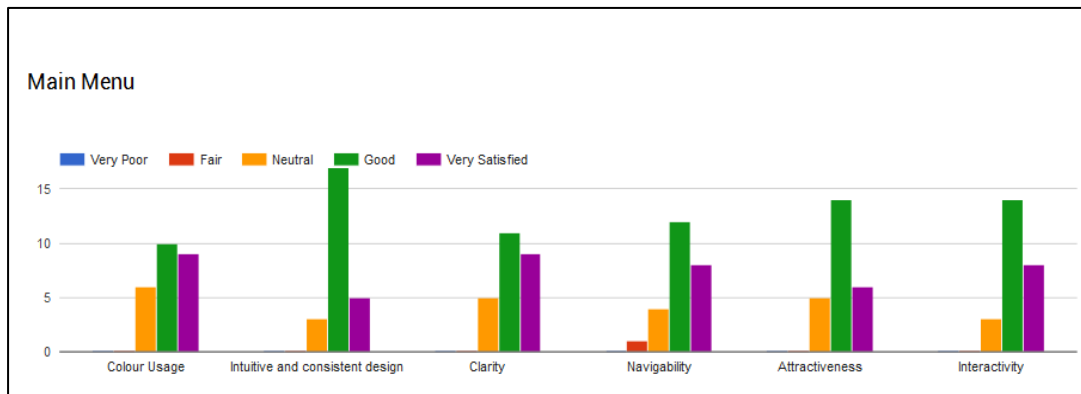
**Table 7-1-T1:** Unit testing table

## 7-2 User Testing Analysis



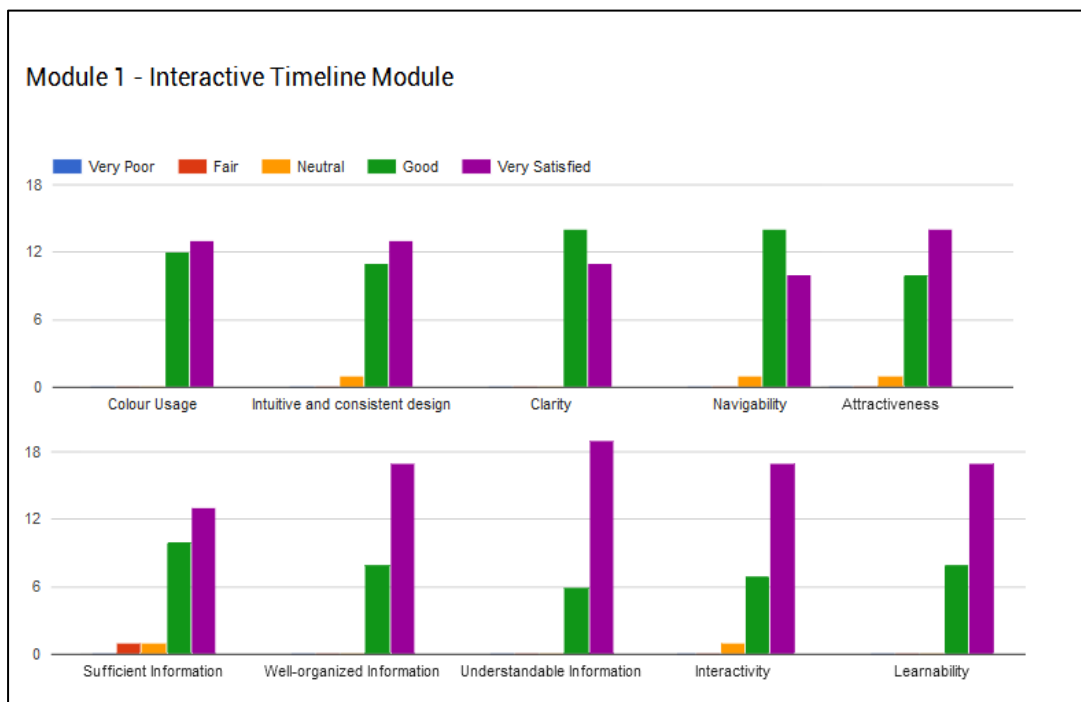
**Figure 7-2-F1:** Demographic profile

The user testing survey is distributed to 25 respondents. Out of the 25 respondents, majority are females (68%) and minority males (32%). Age group that ranged from 18-30 years old has the highest percentage (44%) and most of them are degree students (58%) from Universiti Tunku Abdul Rahman, followed by respondents who aged below 18 years old that are from Pei Yuan High School in Kampar.



**Figure 7-2-F2:** User testing result for Main Menu

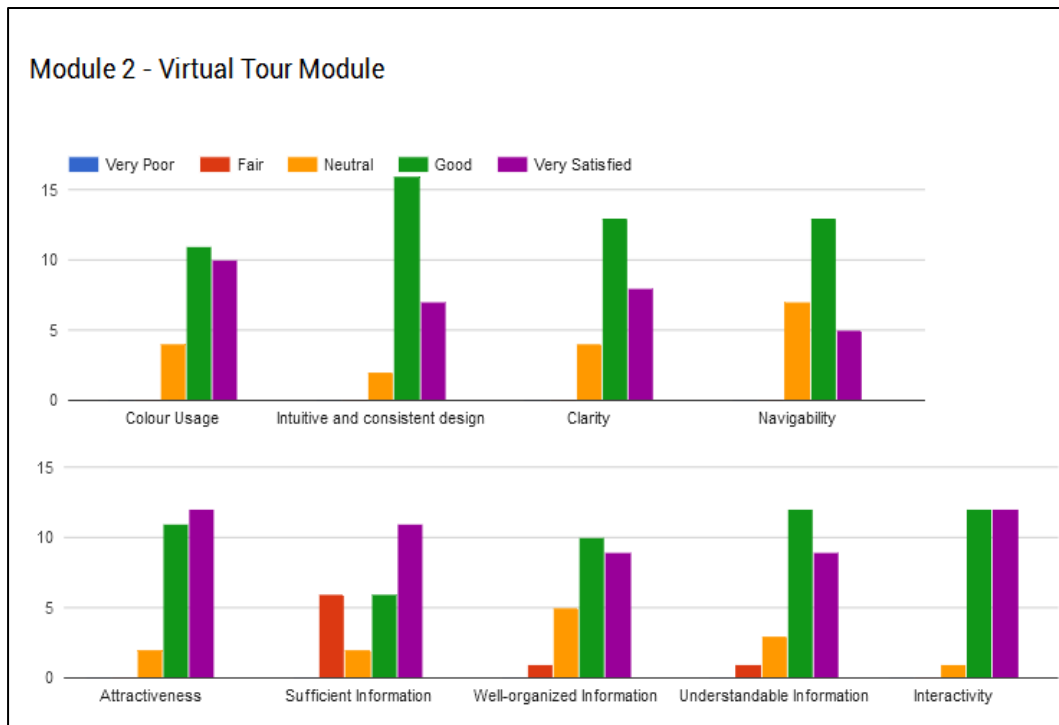
Based on the survey conducted, most of the respondents are satisfied with the main menu design where the respondents given the rate of “neutral” and above. Out of all the aspects, the intuitive and consistent design has the highest rating. This may be due to the consistent design of the buttons and the consistent theme applied.



**Figure 7-2-F3:** User testing result for Module 1

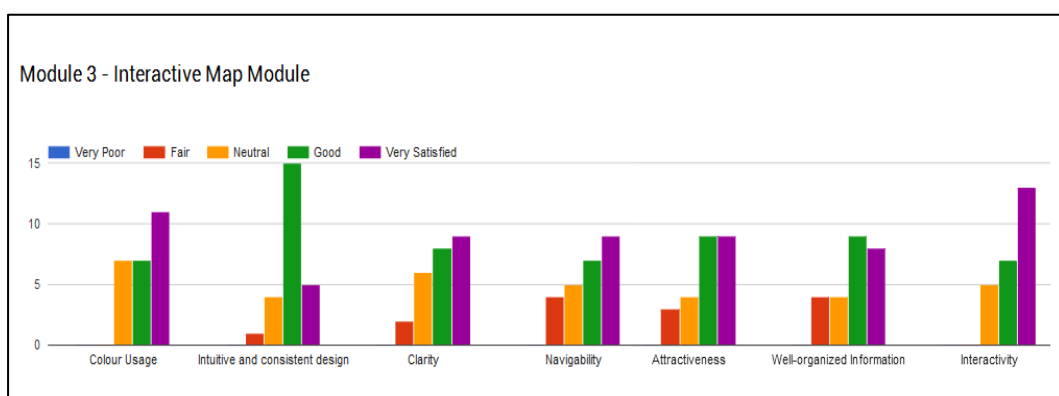
Based on the Figure 7-2-F3, it shows that the module 1 has not much problem as the overall ratings given by 25 respondents are mostly “good” and “very satisfied”.

However, there is 1 respondent think that this module is lack of information. Overall, this module receives mostly the good feedback from the respondents.



**Figure 7-2-F4:** User testing result for Module 2

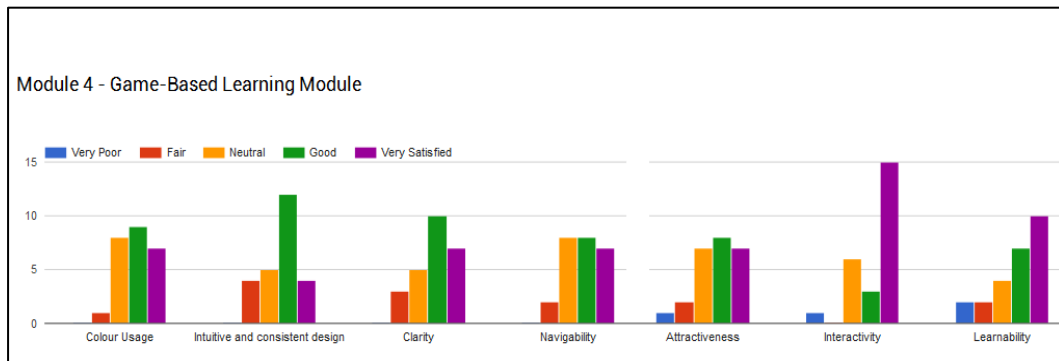
Based on the Figure 7-2-F4, most of the respondents are satisfied with most of the key factor for the design of module 2. However, there are 6 respondents think that this module is insufficient of information. This is due to the lack of Malacca attractions being included in this proposed project.



**Figure 7-2-F5:** User testing result for Module 3

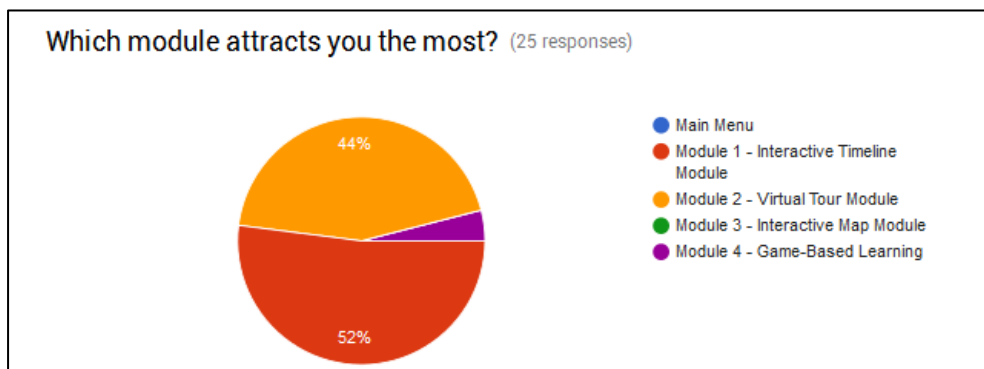
## Chapter 7: Testing

Based on the Figure 7-2-F5, there are 4 respondents says that this module has the navigability problem. 3 respondents think that this module is not attractive enough. 4 respondents think that the information is not well-organized. However, the overall rating for this module still good. In short, there are minority of the respondents think that the navigability, attractiveness and information organization could be improved.



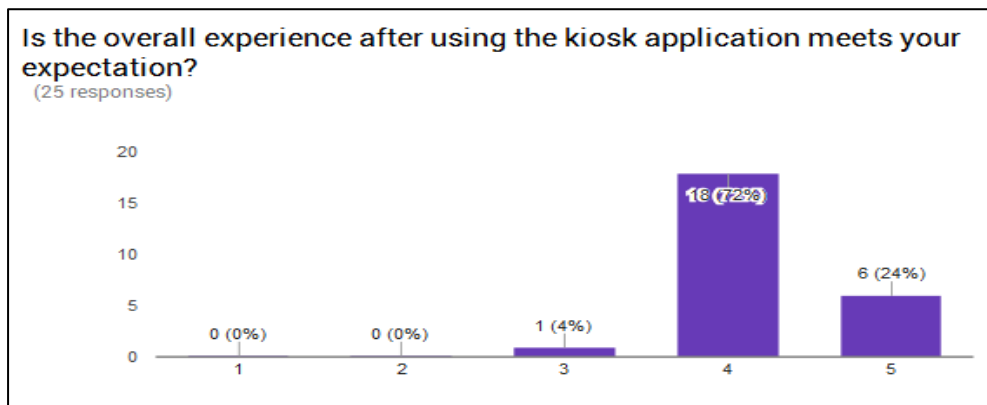
**Figure 7-2-F6:** User testing result for Module 4

Based on the Figure 7-2-F6, minority of the respondents think that this module has the consistent design issue (4 respondents), clarity issue (3 respondents), navigability and learnability issue (2 respondents each). This may due to the help button is not shown in this module but embedded directly in the module itself, since the other 3 modules has the help button in their interface.



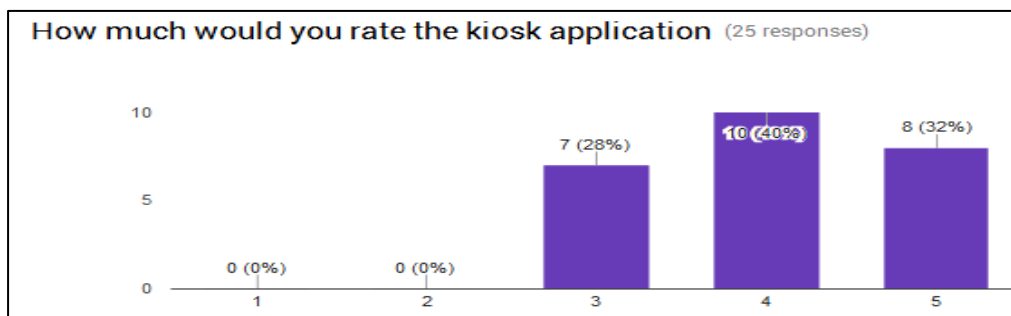
**Figure 7-2-F7:** Module preference

Based on Figure 7-2-F7, most of the respondents liked the first module which is the interactive timeline module. Virtual tour module ranked the second and followed by game-based learning module.



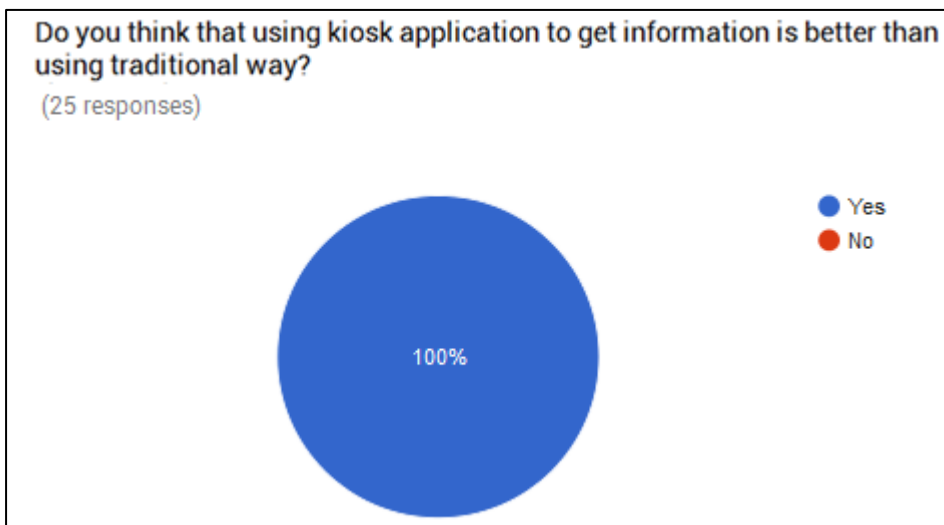
**Figure 7-2-F8:** Overall experience

Based on Figure 7-2-F8, 72% of the respondents think that this application meets their expectation by giving the rate of 4 out of 5. 6 respondents rate with the number of 5 for their experience in using the application. Lastly, 1 respondent rate it with 3.



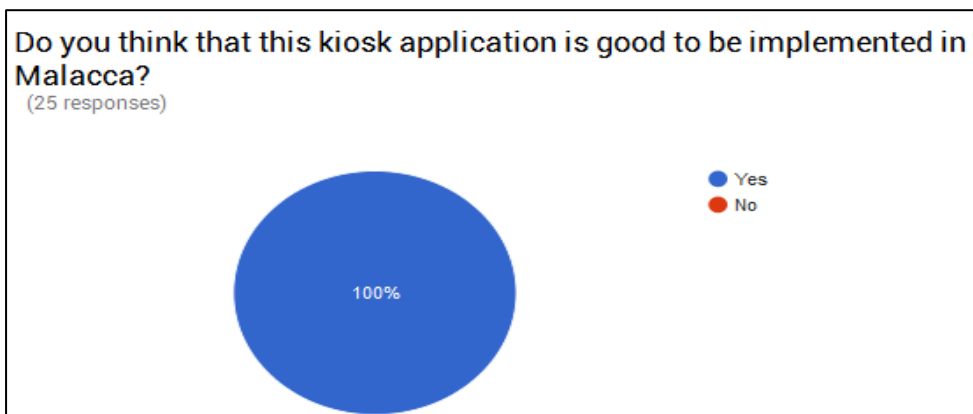
**Figure 7-2-F9:** Application rating

Based on Figure 7-2-F9, 40% of respondents rate this kiosk application with the rating of 4 and 32% of rating 5. However, there are 7 respondents (28%) rate with 3. This shows that most of the respondents are satisfied with the kiosk application.



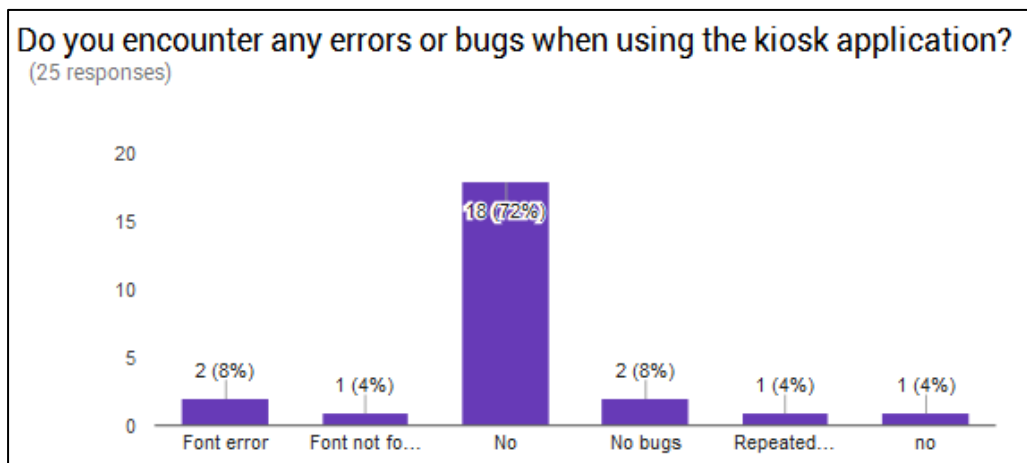
**Figure 7-2-F10:** Preference of using kiosk

Based on the Figure 7-2-F10, all respondents agreed that using multimedia kiosk application to get information is a lot better than the traditional way.



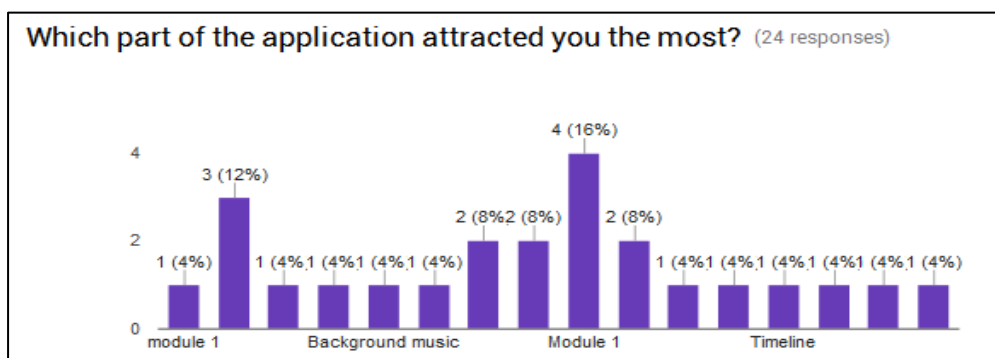
**Figure 7-2-F11:** Implementation of kiosk survey

Based on the Figure 7-2-F11, all respondents agreed that this multimedia kiosk application to be implemented in Malacca city.



**Figure 7-2-F12:** Error or bugs in the application

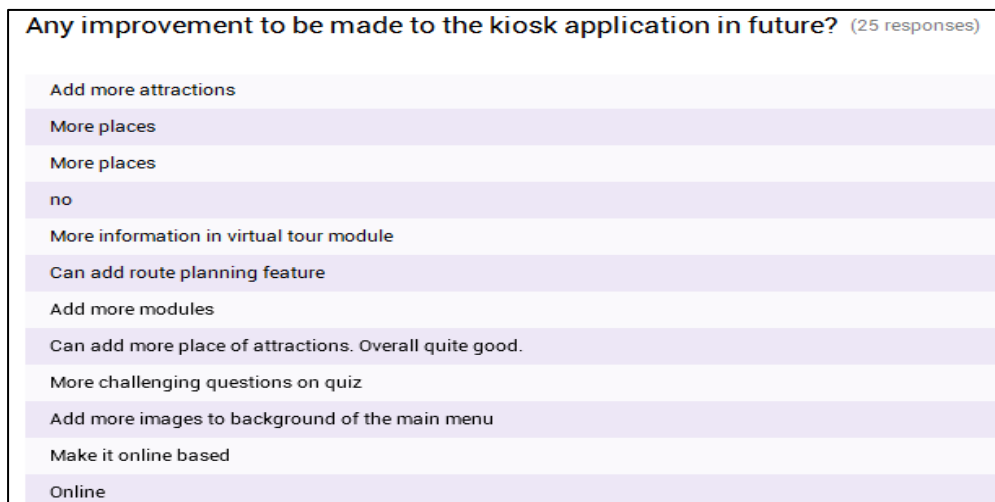
Based on the Figure 7-2-F12, it shows that majority of the respondents did not find any errors or bugs when using the application. However, there are some respondents found some error, which are the “font not found” error and the questions in the game based learning modules are not randomized. All the errors and bugs found will be solved before the final submission of the application.



**Figure 7-2-F13:** Most attractive part of the application

Based on the Figure 7-2-F13, most of the respondents say that the design of the module 1 which is the interactive timeline module attracted them the most. This may due to the reason that the information conveyed in an interactive manner and utilising the multimedia elements to get user attention.





**Figure 7-2-F14:** Improvement of the application

Based on the survey conducted, there are some improvements that are suggested to be made in future. Firstly, it is suggested that more heritage attractions could be added into the application. Next, more questions could be added into the game based learning module. Furthermore, route planning feature is also suggested by respondents. Lastly, the application is suggested to be made in online-based.

## **Chapter 8: Conclusion / Summary**

### **8-1 Project Review, Discussions, Conclusion**

In conclusion, the proposed project is a kiosk multimedia application that is specially design for the heritage in Malacca city. Since Malacca is a place that full of historical and cultural background in the past. Therefore, this project is able to convey information to the tourist in order to let them understand Malacca in a better way.

With the help of this project, it ease the tourists by selecting which attractions to go as all the information are already included in this project. The tourists, as the users of the system able to know what are the attractions in a particular place and need information in details about a particular place. Therefore, with the help of kiosk application, the user's appreciation and knowledge on certain places such as historical sites can be improved. This solves the problem statement which states that there is lack of information on the location of each heritage sites in Malacca.

Besides, it also allows tourists to understand the background of the Malacca city through an interactive way. There will be a timeline where user can drag according to the years to view the events happens on that particular year. It helps the user to know Malacca in details as it is a state in Malaysia that rich of historical and cultural background from previous Portuguese, Dutch and British rule. This solves the problem statement which is the lack of detailed information and tedious way of presenting the history.

Next, with the help of this project, the user is able to find know the popular attractions in Malacca and how they should go by referring to the interactive map. The interactive map provides the location information of the places and the brief information about that place. This solves the problem statement which states that it is inconvenient in getting all the historical information for each heritage sites. User may also view the particular place via virtual tour in order to decide whether or not go to that place. Furthermore, the game-based learning module is able to test the user

understanding about the history of Malacca and attract more people to use this application at the same time.

In short, this kiosk application that is able to display the history of all the historical sites in Malacca, and provide the information of the particular place that visitors need to know, as well as the guide to lead them heading to the desired location.

### **8-2 Novelties and Contribution of the Project**

The novelty of the proposed project is that it is the first multimedia kiosk application that designed for Malacca city. Most of the projects found over the internet do not consist of all the modules proposed in this project. By combining all the features and modules, this becomes the novelty of this proposed project. One of the unique features of this proposed project is the interactive timeline module. The idea of this module is a kind of edutainment which is the combination of education with entertainment. In this module, the history of Malacca city is expressed in the form of animations, images and sounds. Instead of using the traditional way to educate people with the history, it allows the user to understand the history of Malacca in an interactive way.

The application is designed in such a way that the information is organized that follows the Richard Mayer's multimedia principle. The multimedia principle states that people could learn better from words and pictures than from words alone. Therefore, there is button for user to turn on the subtitle.

Besides, the learning is enhanced by providing the narrator, so that the user is able to focus on the animation while listening to the narrator to present the content. The modality principle states that people learn better from graphics and narrations than from animation and on-screen text. Therefore, the subtitle is turned off by default.

The reason that the subtitle feature is there to allow the special people such as people that could not hear to be able to use the application.

The history events of the Malacca are divided into multiple points and represented in the form of timeline. This allows the users to control their pace of learning in which they may choose the particular period of time to know the particular event happened in Malacca during that period of time. They may jump to any of the period of time according to their preference, or otherwise follow the default settings.

In short, the application is designed in such a way that follow the multimedia principle that discovered by Richard Mayer. This ensures the effective and efficient learning of the users.

### **8-3 Future Work**

Currently, this project is an offline-based application. In the future development, it could be turned into online-based. With the online capability, the information could be synchronized and updated from time to time. Besides, the on-going events with its details that are going to be held in Malacca could be updated easily.

Next, the route-planning feature could be added into the application as well. With this feature, the system is able to analyze the attractions that the user chose and suggest a route for the user with the route optimization algorithm. This could ease the tourists to visit to the attractions from one attraction to the next attraction with the least possible time.

Besides, webcam photo capture feature. By using the Augmented Reality (AR) technology, tourists are able to take picture with the virtual view of the particular attractions in front of the kiosk system using webcam. The pictures taken could be sent to their mobile phone via internet connection. It permits interactivity as well.

Lastly, more games should be included in the future version of the application as suggested by the respondents. This may help them to learn better and gain more fun at the same time.

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## APPENDIX A: Survey Form

# Interactive Multimedia Kiosk Application for Malacca Heritage

Dear Respondent,

Warmest greeting from Universiti Tunku Abdul Rahman (UTAR)

I am final year undergraduate students of Bachelor of Information System (Hons) Business Information System, Universiti Tunku Abdul Rahman (UTAR). The purpose of this survey is to conduct a research on interactivity, effectiveness and information sufficient level of Multimedia Kiosk Application for Malacca Heritage. Please answer all statements based on the experience on using the kiosk application. All responses are collected for academic research purpose and will be kept strictly confidential.

Thank you for your participation.

Instructions:

- 1) There are TWO (2) sections in this questionnaire. Please answer ALL statements in ALL sections
- 2) Participants are required to test on the provided kiosk application before answering questions.
- 3) The contents of this questionnaire will be kept strictly confidential.

By proceeding to this survey, you agreed that you have been informed about the purpose of the study and consent to participate in this survey.

**\* Required**

## Demographic Profile

In this section, we would like you to fill in some of your personal details. Please tick your answer and your answers will be kept strictly confidential.

### 1. Sex \*

*Mark only one oval.*

- Male  
 Female

### 2. Age \*

*Mark only one oval.*

- Below 18 years old  
 18 - 30 years old  
 Above 30 years old



**3. Highest Education Level \***

Mark only one oval.

- PMR
- SPM
- Foundation
- Diploma
- Degree
- Other: \_\_\_\_\_

**Module Testing**

This section is seeking your opinion regarding the satisfaction level after using kiosk application. Respondents are asked to indicate the extent to which they are satisfied or dissatisfied with each module using 5-Point Likert scale [(1) = Poor, (2) = Fair, (3) = neutral, (4) = Good and (5) = very satisfied] response framework. Please choose one number per line to indicate the extent to which you satisfied or dissatisfied with the tested modules.

**4. Main Menu \***

Mark only one oval per row.

	Very Poor	Fair	Neutral	Good	Very Satisfied
Colour Usage	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Intuitive and consistent design	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Clarity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Navigability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Attractiveness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Interactivity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**5. Module 1 - Interactive Timeline Module \***

Mark only one oval per row.

	Very Poor	Fair	Neutral	Good	Very Satisfied
Colour Usage	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Intuitive and consistent design	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Clarity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Navigability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Attractiveness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sufficient Information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Well-organized Information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Understandable Information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Interactivity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Learnability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**6. Module 2 - Virtual Tour Module \***

*Mark only one oval per row.*

	Very Poor	Fair	Neutral	Good	Very Satisfied
Colour Usage	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Intuitive and consistent design	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Clarity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Navigability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Attractiveness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sufficient Information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Well-organized Information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Understandable Information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Interactivity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**7. Module 3 - Interactive Map Module \***

*Mark only one oval per row.*

	Very Poor	Fair	Neutral	Good	Very Satisfied
Colour Usage	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Intuitive and consistent design	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Clarity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Navigability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Attractiveness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Well-organized Information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Interactivity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**8. Module 4 - Game-Based Learning Module \***

*Mark only one oval per row.*

	Very Poor	Fair	Neutral	Good	Very Satisfied
Colour Usage	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Intuitive and consistent design	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Clarity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Navigability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Attractiveness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Interactivity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Learnability	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Overall Feedback**

This section is seeking your opinion regarding the feedback after using kiosk application.

**9. Which module attracts you the most? \***

*Mark only one oval.*

- Main Menu
- Module 1 - Interactive Timeline Module
- Module 2 - Virtual Tour Module
- Module 3 - Interactive Map Module
- Module 4 - Game-Based Learning

10. Is the overall experience after using the kiosk application meets your expectation? \*

Mark only one oval.

	1	2	3	4	5	
Very Poor	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Very Satisfied

11. How much would you rate the kiosk application? \*

Mark only one oval.

	1	2	3	4	5	
Very Poor	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Very Good

12. Do you think that using kiosk application to get information is better than using traditional way?

Mark only one oval.

Yes  
 No

13. Do you think that this kiosk application is good to be implemented in Malacca?

Mark only one oval.

Yes  
 No

14. Do you encounter any errors or bugs when using the kiosk application? \*

\_\_\_\_\_


15. Which part of the application attracted you the most?

\_\_\_\_\_

16. Any improvement to be made to the kiosk application in future? \*

\_\_\_\_\_

\_\_\_\_\_



**UTAR**  
UNIVERSITI TUNKU ABDUL RAHMAN

# Interactive Multimedia Kiosk Application for Malacca Heritage

By: Chia Min Jun  
Supervised by: Dr. Doris Wong Hooi Ten & Mr Kesavan a/I Krishnan

### Abstract

This project is a kiosk multimedia application that is specially design for the heritage in Malacca city. It will help the tourists in Malacca to get sufficient information for heritage attractions in Malacca at ease.

### Introduction

Malacca is a state in Malaysia that rich of historical and cultural background from previous Portuguese, Dutch, British and Japanese rule. There are lots of heritage and historical sites which are the attractions in Malacca. It is important to preserve the history of the past of the particular place so that the tourists can understand the meaningful history. This could be done by developing this interactive kiosk application.

### Project Objectives

- To develop a kiosk application that provides interactive map to display the location information for each of the heritage sites in Malacca.
- To develop a kiosk application that contains all the historical sites' information by integrating all the information together so that the visitors are able to view the information at ease.
- To develop a kiosk application that display the historical information in an interactive manner by including other multimedia elements such as video, graphic image, sound rather than just plain text.

### Project Scope

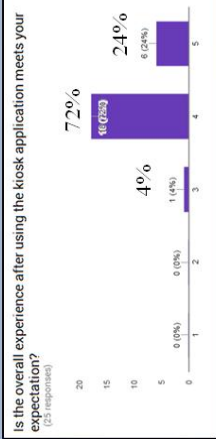
- Interactive Timeline Module
- Virtual Tour Module
- Interactive Map Module
- Game-Based Learning Module

### Literature Review

Module 1 features	Module 2 features	Module 3 features	Module 4 features
Text	360 Panorama	Filter function	Randomize
Animation	Photo Gallery	Background Music	Question
Background Music	Background Music	Map Navigation	Score-Based
Help Guide	Details Linkage	View Selection	Result indication
Virtual Tour Guide			Instruction
Narration			Game
Graphic			
Interactive			

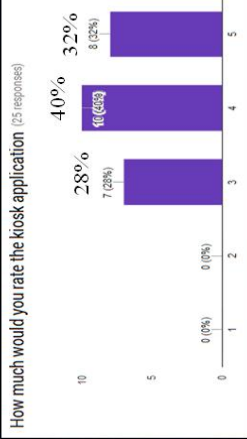
### Survey Result

Is the overall experience after using the kiosk application meets your expectation? (25 responses)



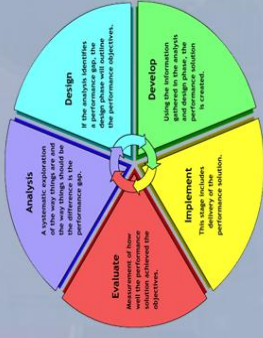
Rating	Percentage	Count
1	0 (0%)	0
2	0 (0%)	0
3	4 (16%)	1
4	72 (288%)	18
5	24 (96%)	6

How much would you rate the kiosk application (25 responses)



Rating	Percentage	Count
1	0 (0%)	0
2	0 (0%)	0
3	28 (72%)	7
4	40 (160%)	10
5	32 (80%)	8

### Methodology - ADDIE



**Analysis:** A systematic exploration of the work that needs to be done that includes the performance objectives. This stage includes performance objectives.

**Design:** A systematic exploration of the work that needs to be done that includes the performance objectives. This stage includes performance objectives.

**Develop:** Using the information from the analysis phase, the design phase will outline the performance objectives.

**Implement:** This stage includes performance objectives.

**Evaluate:** This stage includes performance objectives.

### Conclusion

In a nutshell, this kiosk application that is able to display the history of historical attractions in Malacca, and provide the information of the particular place that visitors need to know, as well as the guide to lead them heading to the desired location which solves all the problem statements stated.

## APPENDIX C: Turnitin Plagiarism Check

The screenshot displays the Turnitin Document Viewer interface. The main document content on the left is titled "Chapter 1: Introduction" and includes a section "1-1 Motivation and Problem Statements". The text discusses the change from the past and how cultural, social, and societal values developed across time in Malacca. It mentions a kiosk application designed to help users visit historical sites in Malacca, but notes that the current application is not user-friendly and lacks sufficient information. Two specific problem statements are listed:

- (i) Lack of information on the location of each heritage sites in Malacca  
Most of the tourists especially the foreign visitors do not know the historical places that they can visit and where are these attractions are located in Malacca. Most of them figured out that the brochure on guiding them when they were not user friendly and it is difficult to find any information kiosk to help them out. (Nur Firdaus et al. 2010)
- (ii) Inconvenient in getting all the historical information for each heritage sites  
The amount of information in the form of interpretation boards is insufficient thus impede the visitors to learn more. It is important to let visitors to get information at ease. (Hasrul Yushairi Johari et al. 2010)

The right sidebar, titled "Match Overview", lists eight matches with similarity percentages all below 1%:

Match Number	Source	Similarity Percentage
1	Submitted to Universiti ... Student paper	<1%
2	Submitted to De Montf... Student paper	<1%
3	blogspot.com Internet source	<1%
4	www.oxfordbibliographi... Internet source	<1%
5	extragreen.com.au Internet source	<1%
6	Submitted to St. Mary's... Student paper	<1%
7	Submitted to University... Student paper	<1%
8	Submitted to University... Student paper	<1%

The interface also shows a total similarity of 2% (SIMILAR) out of 0. The document is identified as "FYP2 JAN2017" and "FYP2 JAN2017 - DUE 30-Apr-2017". The Turnitin logo and "Interactive BY MINJUN CHIA" are also visible.

<b>Universiti Tunku Abdul Rahman</b>			
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Form Number: FM-IAD-005	Rev No.: 0	Effective Date:	Page No.: 1 of



**FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY**

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<b>Similarity</b>	<b>Supervisor's Comments (Compulsory if parameters of originality exceeds the limits approved)</b>
<b>Overall similarity index: _____ %</b>  <b>Similarity by source</b> Internet Sources: _____ % Publications: _____ % Student Papers: _____ %	
<b>Number of individual sources listed of more than 3% similarity: _____</b>	
<b>Parameters of originality required and limits approved by UTAR are as Follows:</b> <b>(i) Overall similarity index is 20% and below, and</b> <b>(ii) Matching of individual sources listed must be less than 3% each, and</b> <b>(iii) Matching texts in continuous block must not exceed 8 words</b> <i>Note: Parameters (i) – (ii) shall exclude quotes, bibliography and text matches which are less than 8 words.</i>	

Note Supervisor/Candidate(s) is/are required to provide softcopy of full set of the originality report to Faculty/Institute

***Based on the above results, I hereby declare that I am satisfied with the originality of the Final Year Project Report submitted by my student(s) as named above.***

\_\_\_\_\_  
Signature of Supervisor

Name: \_\_\_\_\_

Date: \_\_\_\_\_

\_\_\_\_\_  
Signature of Co-Supervisor

Name: \_\_\_\_\_

Date: \_\_\_\_\_