ANIMATED 'L' DRIVING GUIDE

(PANDUAN MEMANDU BERANIMASI)

SITI NUR ASLINDA BINTI MOHAMAD AYOB

WET020162

Faculty of Computer Science and Information Technology
University of Malaya
Kuala Lumpur
Session 2005/2006

ANIMATED 'L' DRIVING GUIDE

(PANDUAN MEMANDU BERANIMASI)

By:

SITI NUR ASLINDA BINTI MOHAMAD AYOB

(WET 020162)

Supervised By:

MISS MAS IDAYU MD SABRI

DEPARTMENT OF SYSTEM AND COMPUTER TECHNOLOGY

Panel:

MR. AMIRUDDIN KAMSIN

DEPARTMENT OF SYSTEM AND COMPUTER TECHNOLOGY

A Final Year Project, submitted as a requirement of the

BACHELOR OF INFORMATION TECHNOLOGY

Faculty of Computer Science and Information Technology

University of Malaya

2006

ABSTRACT

The author hopes that the Animated 'L' Driving Guide courseware will manage to overcome the current accident phenomenon that always happen nowadays because of drivers' lack knowledge and most of all, carelessness.

An Animated 'L' Driving Guide is one of the courseware that help students especially in guiding them about traffic rules, traffic ethics and traffic sign to increase users' interest especially the students ('L' license candidates). The student will better understand the real situations of traffic signs through animation because learning driving theory from books alone is certainly not easy.

The important factors of having this courseware in the education system because currently many students are having the conventional way to learn traffic rules, traffic signs and traffic ethics with lecturers supervised. Sometimes the lecturers cannot ensure whether their students able to achieve their requirement. So the teaching lesson is not convenient and less impressive. It will also enable the lecturers to teach the students as one of teaching tool in more interactive way rather than the conventional way. It also becomes one of the government initiatives to uprising the education level.

ACKNOWLEDGEMENT

Firstly, I would like to thank to ALLAH S.W.T as with his blessings, finally I able to complete my thesis successfully. Alhamdulillah…

The second thanks have got to go to my beloved family. To my beloved mama, papa, my brother and my sisters as without their support and understanding, I do know what happen to me!

Also, I would like to express my gratitude and appreciation to my respected supervisor, Miss Mas Idayu Md Sabri for devoting her precious time in guiding me throughout the semester with patience and dedication. Her guidance, support, and suggestions have helped me a lot to understand the project requirements.

Next, I would like to address my thankful to my panels, Mr Amiruddin Kamsin, Mr Liew Chee Sun and Mrs. Nornazlita Hussin for evaluating the project, and at the same time, forwarding useful suggestions and comments in order for me to come up with a better and updated courseware.

Last but not least; special thanks to all my friends and other numerous individuals who have assisted me in the making of my thesis. Thank You Very Much!

Siti Nur Aslinda binti Mohamad Ayob (WET 020162)

TABLE OF CONTENTS

CHAPTER 1: INTRODUCTION

CHAPTER 2: LITERATURE REVIEW

CHAPTER 3: METHODOLOGY

CHAPTER 4: SYSTEM ANALYSIS

CHAPTER 5: SYSTEM DESIGN

CHAPTER 6: SYSTEM IMPLEMENTATION

CHAPTER 7: SYSTEM TESTING

CHAPTER 8: SYSTEM EVALUATION & DISCUSSION

LIST OF FIGURES

LIST OF TABLES

CHAPTER 1

INTRODUCTION

CHAPTER 1: INTRODUCTION

1.1 Project Definition

Driving test is one critical process of giving one a license to drive. Efficient driver education will produce graduated driver which will not only pass the driving test but at the same time is a safe driver in the road. With the help of science computer technology, we can create a program that will help in driver education. This project is taken up with the intention to improve the user skills and familiarize them with traffic law and road safety in Malaysia in order to schedule and replenish needed to satisfy anticipated demand. Besides, it is also to serve the purpose of maximizing profit with a clear focus on improved efficiency and effectiveness.

Thus, I have planned to develop a courseware (educational software) that an Animated 'L' Driving Guide (Panduan Memandu Beranimasi) using the combination of multimedia element so that it will attract a student attention and also better understand in traffic laws and road signs because learning driving theory from books alone is certainly not easy. If they have access to a multimedia PC and can afford a courseware, they will find this a much easier, more effective and enjoyable way to learn. The major learning medium for all students will be highly interactive multimedia computer-based learning material that will allow us to educate student to the mastery level.

Other than that, I will also provide user with user's manual to enable users to refer when they need any help.

1.2   Project Objective

The objective of this project is concerned with road safety that student will be able to apply knowledge, processes and skills to become safe, competent users of the highway transportation system. Also, this courseware is providing new direction to existing driving education programs in Malaysia as the alternative solution.

1.3   Project Aims

The aims of this project is to make teaching and learning traffic law and road signs in an effective and interesting way for 'L' candidates. It is also a tool that can be used to encourage the use of computers in driver education system and to enhance the computer literacy level of students and lecturers.

1.4   Project Scope

1.4.1 System Scope

The software focusing mainly on rule knowledge of the regulations and maneuvering a car, a safety benefit can hardly be expected. This courseware also is build fully in Malay language as national language that suitable for all level of students so that the students will not be confused by the language used and then the software will be package in CD-ROM that can be implemented by driving schools or it can be purchase personally for self-training. This medium has become so universal that it seems unlikely that it may ever lose its supremacy as a carrier.

1.4.2 User Scope

This project system is not only provides better services for the novice user ('L' candidates) from different background but also helps immensely to the driving school internal management (lecturers). The student can gain more information on traffic signs and provide student with close situation at driving test surrounding. Beside, by having visual-based module, it allows student to see the concept presented. It also contains materials that allow students to explore and learn at their own pace. So every student has the opportunity to learn at their full potential. For lecturers, they can use this software as teaching tool that can be conducted in the classroom and also provide a simple user friendly system to obtain more information about road signs and driving ethics.

1.4.3 Project Scope

The project that I am about to build is divided into several module. There are 3 modules for animation part. For Road Signs Module, the user will know more about road signs with their description. Every road signs has its animation whether in true or wrong situation when the users click on the right or wrong button. In the Traffic Rules Module, there are three (3) traffic rules button with animation and one part for mind test. For Driving Ethics Module, the user can control the car by using the keyboard button and also answers the question in that game. It should be a lot more interesting and effective. In the other hand, my partner will be doing the mock theory test. The mock theory test will covers all the topics learned in the package.

3

1.5   Problem Statement

Driving is a complex activity that involves factors associated with the road and the vehicle, the driver and traffic environment. Traffic accident surveys tend to show that human factors are the most prevalent contributory factor in traffic accidents. The causes of traffic accidents are many and complex but studies show that 96% of all accidents involve some form of driver error in Malaysia. It is a sad fact that the total number of road accidents in Malaysia exceeded 262,235 in 2001. Motorcyclists as being more prone to accidents – of the 6,280 deaths recorded in 2003, 60% of the fatalities involved motorcycles.

President of Association of Malaysian Driving Institutes, Mat Aris Bakar says the top 3 things that may cause drivers on probation to lose their license are consumption of alcohol while driving, not having 'P' stickers on their cars and committing a traffic offence such as speeding or causing a traffic accident. The analysis of road accidents indicates that beginner drivers in are over-represented in road accidents. Lack of attention, reckless driving, lack of proper protection, speeding, bad personal habits, social and behavioral misconduct and inconsiderate drivers of larger vehicles are some of the problems that cause accidents. Thus, the most effective means to prevent accidents from occurring is the improvement of driver skills through training and testing program.

Based on the article of *Saving Teenage Lives: the Case for Graduated Driver Licensing* tell us that the young drivers have a poor driving performance such as inexperience, greater risk exposure, risk-taking behavior and immaturity. From the studies graduated driver licensing has been shown to be effective by

expanding the learning process, reducing risk exposure, improving driving proficiency and enhancing motivation for safe driving.

Director of Road Safety Research Centre, Prof Dr Radin Umar Radin Sohadi from Universiti Putra Malaysia (UPM) says the current road safety education curriculum, although satisfactory, focuses more on the task of driving rather than safety. Motor vehicle crashes are the leading cause of death for teenagers. Novice drivers are inexperienced and immature which are the factors contributing to teenage drivers being over-represented in traffic crashes. There is no simple solution to reducing the crash involvement of the novice and experienced driver.

Conversely, driver education without the aid of computer or the traditional driver education methods will be facing many problems. In many cases crashes are caused by lack of knowledge of basic traffic laws or the lack of basic vehicle handling skills. They just learn all about the traffic rules based on the text book provided by Kurikulum Pendidikan Pemandu (KPP) or in the theory class with the explanation by instructor. The 'L' candidates just imagine all of traffic rules and how its operations. This is an utterly passive environment. This makes the teaching and learning process rather dull and boring. So, from this strengths and weaknesses I will build the courseware that meets the user's needs.

1.6   Motivation

Driver education works better with a graduated driver licensing system which provides interactive computer learning. This learning should not focus on how to pass the test but know how to incorporate the appropriate skills, attitude and behavior to be a safe successful driver. So that, based on the driver education curriculum provided by Department of Motor Vehicles (DMV), I am going to develop the new system that can be engage as an interactive to familiarize all level of users with this learning package to provide 'L' candidates with a detailed understanding of the fundamentals of driving and foster responsible attitudes and behaviors.

As a result of quality traffic safety instruction, candidates will be able to demonstrate a working knowledge of the traffic rules. Other than that, I also wish that through this learning package, more candidates will understand the importance of the traffic rules. In short, a multimedia courseware can be defined as a self-contained to help the student to accomplish certain well defined objectives.

Using computer-simulated tools and manipulative has also been shown to increase achievement when combined with physical manipulative and tools. This case motivate me to create new software that used fully multimedia elements that can give the 'L' driving license candidates' indifferent understanding while creating enjoyable, fun to learn and most of all multi-sensory study environments.

1.7   Expected Outcome

After research and review on current teaching and learning style in driving education and also some other research related to this project that I will explain in the following chapter, this project will have the following expected outcome:

➢ The interface will include multimedia or animation application and clear graphic which will attract candidate's attention and interest.

➢ Enable user to choose any contents.

➢ Helping in motivating users in learning Highway Code (Road Sings) based on their situations.

1.8   Project Limitation

This software needs the higher Random Access Memory (RAM) and higher speed to create the animation and edit picture in Macromedia Director MX and Adobe Photoshop CS because I will use a lot of images, gif animation pictures and sound effects which are loaded into this courseware. In addition, my computer is not suitable for bad weather so that I can't build the courseware when bad weather. Also, the information inside cannot be updated when it packaged as stand-alone file or CD-ROM.

1.9   Project Schedule

The Gantt chart below is the project schedule for the whole project. It can be divided into 9 task.

Num	Task Name	Start	Finish
1	CHOOSE THESIS TITLE	Mon 7/11/05	Fri 7/15/05
2	SEARCH 3 RELEVANT ARTICLE JOURNAL	Fri 7/22/05	Fri 8/5/05
3	REVIEW JOURNAL	Fri 8/5/05	Mon 8/8/05
4	WRITING PROPOSAL	Mon 8/15/05	Fri 9/16/05
5	IDENTIFY APPROPRIATE TOOLS	Mon 9/19/05	Fri 10/14/05
6	BASIC SKILLS IN USING TOOLS (VIVA 1)	Mon 10/17/05	Fri 10/21/05
7	DESIGN OF SYSTEM	Mon 1/23/06	Fri 1/27/06
8	DOCUMENTATION	Mon 1/2/06	Fri 4/7/06
9	COMUNICATIONS OF IDEAS (VIVA 2)	Mon 3/20/06	Fri 4/7/06

Sem 1 Task   Sem 2 Task

Figure 1.1: Gantt Chart

CHAPTER 2

LITERATURE REVIEW

2.1 Overview

Reading of literature has helped me to elaborate the knowledge and information acquired. The main purpose of doing a literature review is to gain a better understanding on the development methodologies used while developing a project.

References, related articles and examples of previous that have been searched and analyze to understand and recognize the existing interactive multimedia available in the market. Investigation and analysis of all these information are very important to ensure to the existing system. It will also avoid from repeating the mistakes and weaknesses in developing the proposed system.

2.2 Multimedia in Education

2.2.1 Ways of Learning

Learning takes place at different levels and in different modes. At the most basic, multimedia can help user recognize words, terms, and their associated meaning. Multimedia application can be designed to support different learning methods and style. Simple vocabulary trainers for foreign languages or technical terms are the multimedia equivalent of multiple-choice test for the learning and testing of contextual meaning. They present, identify, and reinforce information.

CHAPTER 2: LITERATURE REVIEW

2.1 Overview

Review of literature is a background study about the knowledge and information gained to develop this project. The purpose of this literature review is to gain a better understanding on the development methodologies used while developing a project.

References, related articles and examples of previous theses have been searched and analyze to understand and recognize the existing interactive multimedia available in the market. Investigation and analysis of all these information are very important to ensure to the existing system. It will also avoid repeating and carrying the weaknesses of the existing application to the proposed system.

2.2 Multimedia in Education

2.2.1 Ways of Learning

Learning takes place at different levels and in different modes. At its most basic, multimedia can help user recognize words, terms, and theirs contextual meaning. Multimedia application can be designed to support different learning methods and style. Simple vocabulary trainers for foreign languages or technical terms are the multimedia equivalent of multiple-choice test for the learning and testing of contextual meaning. They present, identify, and reinforce information.

At the level, visual perception begins to play a role. Shapes and colors, graphic element, and movement through space and/or time present information in many different ways. The user is empowered to choose a route through the material or ask questions about the content of still pictures or sequences of moving images. Multimedia computing still offers many unexploited possibilities for this kind of learning, especially in art history.

Interactive learning can also be achieved via role-playing and situational games or communication with other users. For example, multiple users govern a simulated medieval town or discuss a picture with a gallery visitor in another location via the Internet.

2.2.2 Multi-sensory Learning

One important principle of didactics is the use of several different channels of sensory information at the same time. It is possible to retain about three times as much information with multi-sensory input as with just one channel. It is though that the retention rate after hearing is on average around 20%, after seeing around 30%, after hearing and seeing together 50%, and after hearing, seeing and touching around 70%. The retention rate, of course, also depends on factors such as motivation, sensitivity, and presentation.

An important element in the use of multimedia computing, especially for the audience, is "action". New information is acquired more quickly and easily if linked to something exciting or attractive.

2.2.3 Users' Choices

Multimedia computing has a decisive didactical advantage in comparison with films or slide shows. Users influence the working of a program and may even communicate with other users. They can choose from a menu or shortcut, repeat or prolong ongoing processes. They may even be able to piece together information and present it to other users. Intelligent interactive programs take note of the users' responses, adjust to their success in learning or to their mistakes, and prepare the subsequent learning units accordingly.

2.2.4 Audience and Goals

The target audience for the multimedia application needs to be defined at the outset of the project. A profile of the audience should be developing, considering such factors as age, education, interests, and computer literacy. The individual steps for learning, the volume of information, and its complexity must be adapted to each user or group of users. If user group consists of people who are intimidated by using computers, a program without too much interactivity may be best. An essential aspect of didactics is to adjust to the learning rhythm of users and to offer them a slower or quicker-paced path through the material.

The right hardware, software, and other additional equipment have to be chosen during the planning phase. An estimate is needed of how many multimedia workstations have to be installed and how many users should be able to work at any unit at the same time. Usually equipment and input devices such as touch screens, mice, or keyboards are appropriate for specific installations. It may even become clear that some didactic aims can be achieved much more

economically with traditional media such as video or slide shows. Multimedia computing should not simply be used because it is modern or available, but because it responds to a specific teaching goal.

Developing effective multimedia teaching application requires active and intelligent collaboration between museum educators and multimedia specialists. Only the continuous exchange of ideas and experiences can ensure progress in this interdisciplinary field.

2.3 Packaging

There are many decisions to be made about the packaging of a multimedia product. CD-ROMs require labels, package-inserts, boxes, and registration cards. Wording should capture the audience's attention and visually appealing.

The type of packaging required is also important. Often CD-ROMs are packaged in a box of the same size as most software boxes. This allows stores to stock it more easily and makes the product appear more substantial and professional. It also allows space to include further documentation if required.

Packaging must be visually appealing while communicating information about the product, its developers, copyright, and technical requirements. This can be a lot of information in a small space, especially if it must be in more than one language. Careful professional design is required.

2.4   Computer Technology in Teaching and Learning Driver Education

2.4.1   Introduction

The growth of the technology had become one of the important roles in the educational process. Technology had been emerged with school curriculum as one of the method used to plant and manure interest towards the growing technology.

2.4.2   CD-ROM Based Learning

2.4.2.1 What is CD-ROM based learning

CD-ROM based learning refers to the use of CD-ROM technologies in delivering a broad array of solutions that enhance performance and knowledge. With CD-ROM which is rich with multimedia content and capability, CD-ROM based learning can simulate a huge number of percentages of classroom training with other added advantages.

2.4.2.2   Advantages of CD-ROM based learning

1. Effectiveness and Retention

   It is normal phenomenon that students lost or forgotten what they have learnt within a period of time. It is human nature to learn by repetition to gain back their memory on what they have learned before. As a result, CD-ROM based learning had played an important role to allow user to refresh or repeat as many times as they had master the material before they proceed to the next topics or modules.

13

2. Anytime and Anywhere

   With the CD-ROM, it allows students to learn virtually anytime, anywhere and whenever they want to. The CD-ROM is portable anywhere the user go and it makes learning process more flexible.

3. Speed and consistency

   With CD-ROM based learning, there is no limit to its scalability and it can be used to train as many people as possible at the shortest possible time-frame at a very attractive cost and consistent training results and in a flexible way.

4. Pacing-Learn at own pace

   Another valuable reason for using CD-ROM based learning is that the control it allows students in the learning process. In an instructor-led course it's hard to address all of the different levels of knowledge students bring to the course. CD-ROM based learning courses allow each and every student to proceed at his/her own pace, skipping material they already know and when necessary, rewinding the material as well as reviewing new concepts.

5. Fits user's schedule

   Other than all the advantages that I state above, there are another benefits that user can gain through CD-ROM based learning. It was the flexibility for the user to use the CD-ROM at home or in school whenever and wherever time permits.

2.4.2.3   Limitation of CD-ROM based learning

Although there are lots of advantages of using a CD-ROM based learning but there are some limitations in using it. One of the limitations is that to run CD-ROM based learning. User will need a multimedia PC and other than that it cannot be installed on the network easily due to the requirement of high bandwidth on most of the CD-ROM based learning content. For CD-ROM Administration it will need to have many CD-ROM for various topics.

2.4.2.4   Consideration on Implementation a CD-ROM Based Learning
           Solution

Having understood the benefits and limitations of CD-ROM based learning, the consideration below is needed when implementing a CD-ROM based learning solution:

1. Interesting and Compelling Content

   The content of the CD-ROM should be interesting and attractive and also compelling for users to continuously using it and will gain benefits from it.

2. Contents and Application

   A lot of information can be put inside the CD-ROMs for various learning needs and for various type of user's level.

2.5   Existing System Review

In Malaysia, there still does not have any courseware regarding Animated 'L' Driving Guide. So I have decided to take overseas existing system as comparison.

Case Study 1

http://www.highwaycode.gov.uk/16.htm

From this learning package, we can find an explanation of the concept about traffic signs. The users will know the true procedures about the traffic laws. In my opinion, I feel that it was very interesting and easy to navigate. But one of the disadvantages that I find was it need some time to load and many advertisements appear. Also, there are no animations for each situation.
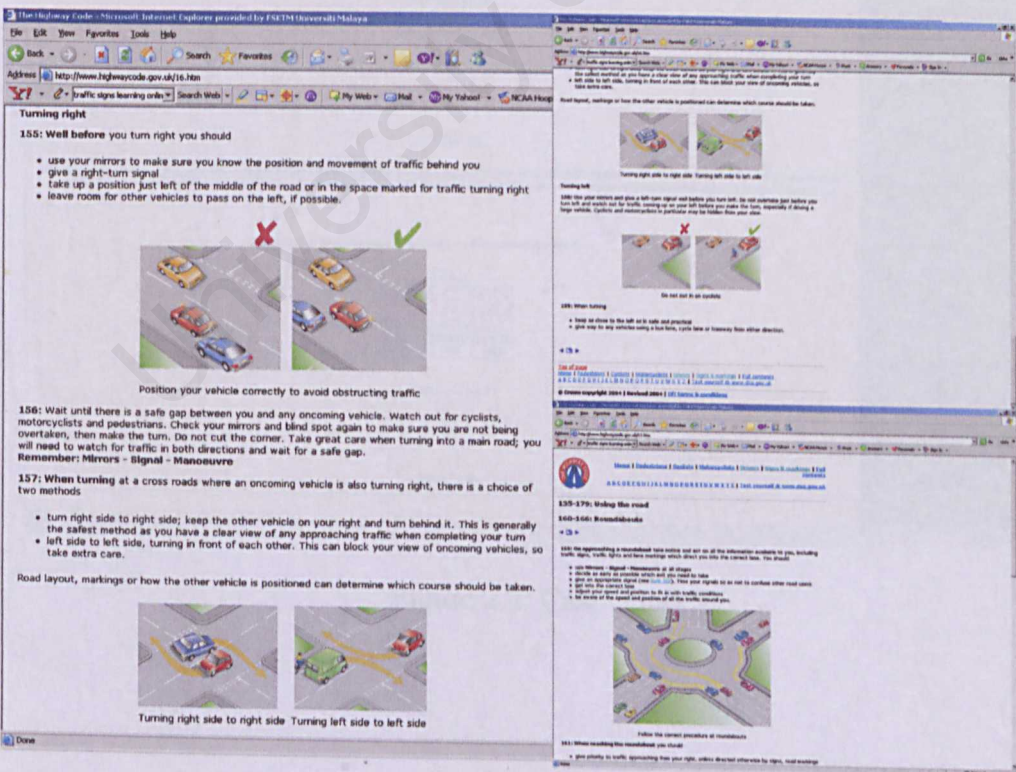
Figure 2.1: Case Study 1

Case Study 2

This website focuses only to learn traffic control signs. It has a little bit explanation about traffic signs. The weakness that I find from this website was not much interactive multimedia and the interface not very attractive and simple. Users may bore after read for several times. Further, there is no animation about traffic signs and it is difficult for users to understand the real situations.
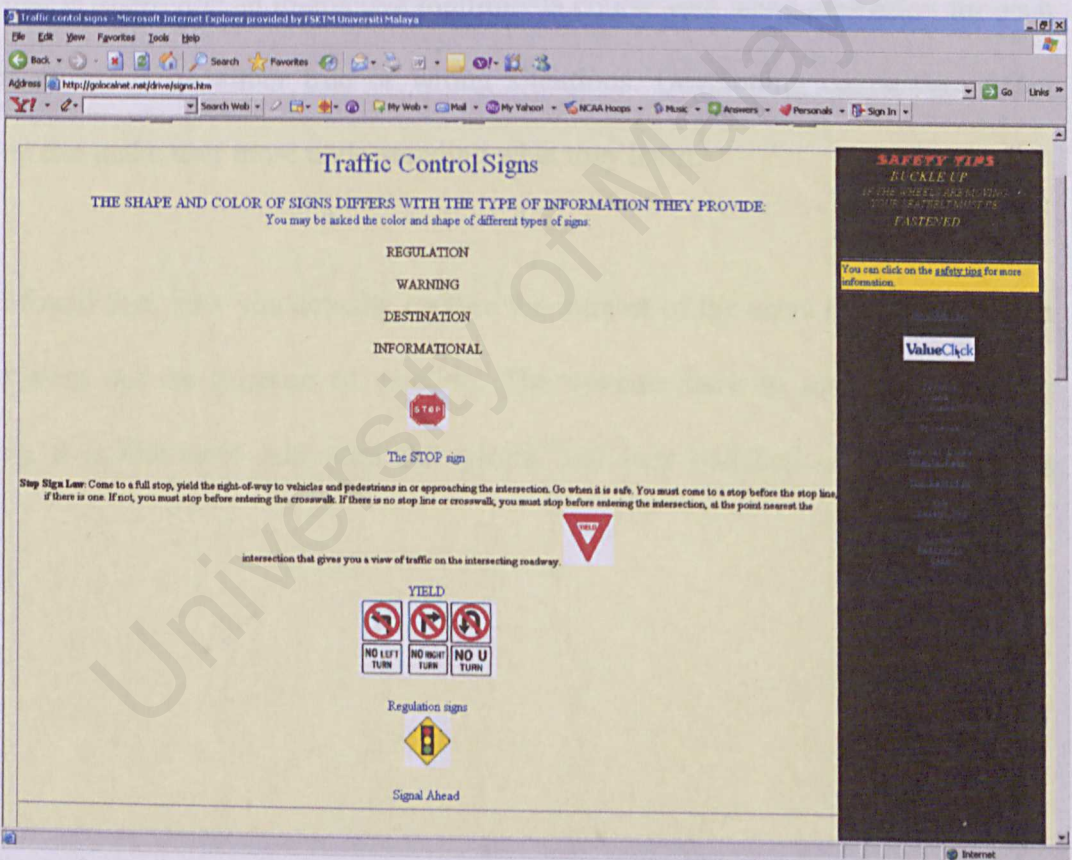
Figure 2.2: Case Study 2

2.6   Summary on Existing System Research

There are many of web-sites based on similar topic to my project **"Animated 'L' Driving Guide"**. But I choose only two for my literature review. I can summarize on these systems as every system have their strengths and weaknesses. So, from this strengths and weaknesses I will build the courseware that meets the users' needs.

However, there is one common purpose between my project and the existing project that is to provide an interactive multimedia courseware using animation for each traffic signs based on either true or wrong situations. Developing courseware using animation can make user more understanding what they learn.

I found that, how you actually capture the interest of the users is what important to the system and its purpose of existing. The systems have to look interesting or intriguing, it is like once user used the system, and they will feel challenged by the system.

CHAPTER 3

METHODOLOGY

CHAPTER 3: METHODOLOGY

3.1 System Development Life Cycle (SDLC)

The System Development Life Cycle (SDLC), which is also identified as Application Development or Information System Development, is the process for developing information system. The processes that involve are investigation, analysis, design, implementation, and maintenance.

The SDLC methodology is applicable, in part or whole, once any system is being developed, modified, or deleted. This methodology is used to apply to computerized systems, and automated or non-automated processes.

Below are the steps that are contained or involved in the SDLC.

```
┌──────────────────────────┐
│     Software Concept     │
└──────────────────────────┘
             │
             ▼
┌──────────────────────────┐
│   Requirement Analysis   │
└──────────────────────────┘
             │
             ▼
┌──────────────────────────┐
│   Architectural Design   │
└──────────────────────────┘
             │
             ▼
┌──────────────────────────┐
│   Coding and Debugging   │
└──────────────────────────┘
             │
             ▼
┌──────────────────────────┐
│     System Testing       │
└──────────────────────────┘
```
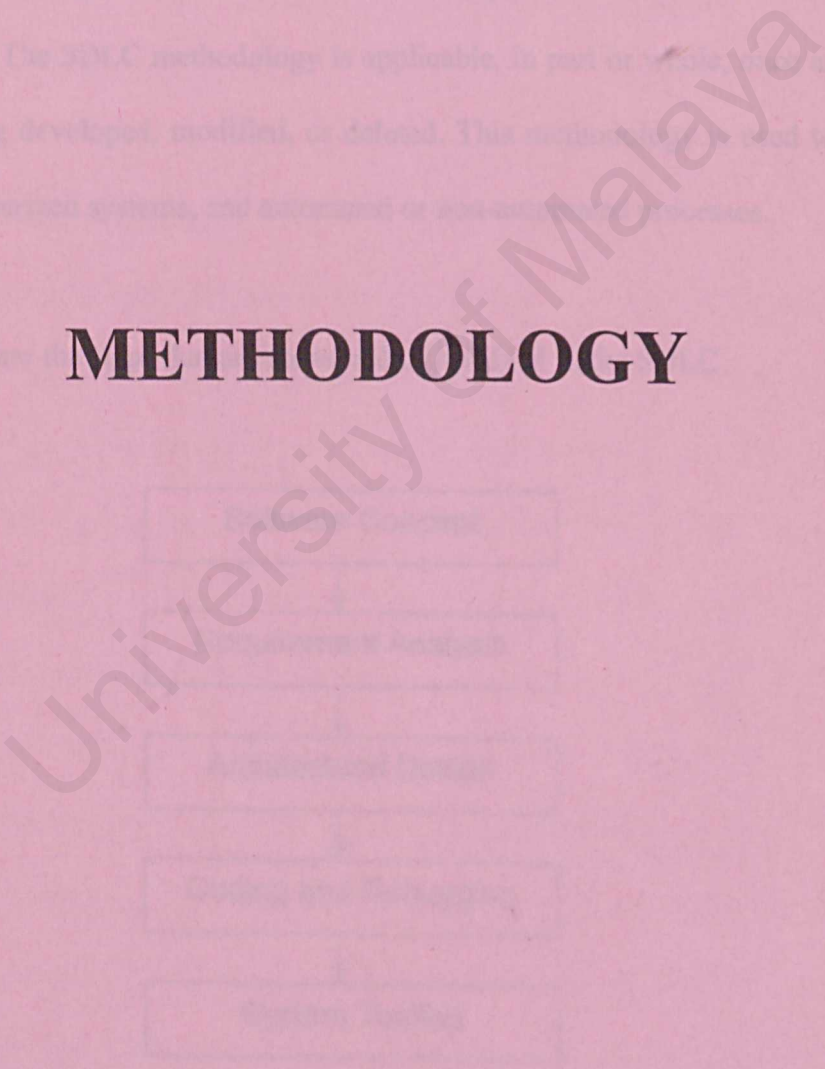
Figure 3.1: System Development Life Cycle steps

19

3.1.1 Software Concept

The first step in this software concept process is to recognize a need for the new system or the system that will be developing soon. For software development company, this process may need the participation of end users who turn up with a suggestion for improving their work or sometimes may only involves those who are Information System people but for 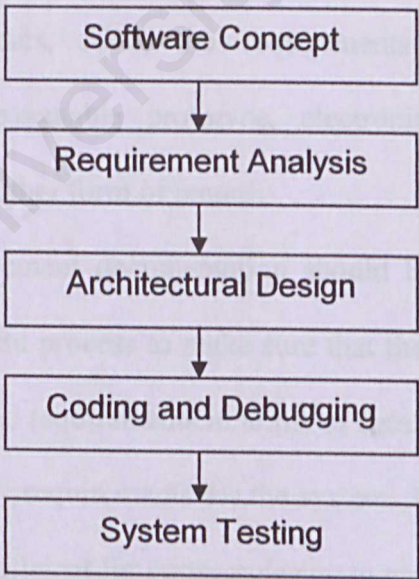my project, I only do some review on existing system (CD-ROM based) and findings from internet to view on existing online educational courseware and some other research that is related to my project.

3.1.2 Requirement Analysis

Requirement analysis is the method of investigating or analyzing the information needs of the end users, and any system currently being used, developing the functional requirements of the system that can meet up with the needs of the users. Also, the requirements should be recorded using documentation, executable prototype, electronic mail, storyboard for user interface or some other form of record.

The requirement documentation should be referred through the whole system development process to make sure that the developing project well-sited with user needs and requirements in terms of data, system performance, security, and maintainability requirements for the system. All requirements are defined to a level of detail sufficient for systems design to proceed.

The activity in this phase includes:

1. Collecting facts and information.
2. Analyzing system requirement.
3. Ranking the requirement.
4. Generating alternatives and selection.

3.1.3 Architectural Design

Once the requirements have been determined, the essential specifications for the hardware, people, and data resources and the information products that will suits the functional requirements of the planned system can be determined. The design will serve as an outline for the system and helps to discover the problems before these errors or problems are constructed into the final system.

3.1.4 Coding and debugging

Coding and debugging is the act of producing or developing the final system. This is the step for developing and preparing for the system to operate. Coding is the most important activities because it was the activity that will make the planning or system successful.

3.1.5 System Testing

To evaluate its actual functionality in relation to expected or intended functionality after the system had been developed, the system will be tested.

3.2   Benefits of a Good Methodology

It is essential to choose a good methodology that suite the project that develops in order to identify the phases that have a clear beginning and end at which milestone can be established. A process is important because it imposes consistency and structure on a set of activities. This helps inconsistencies, redundancies, and omissions in the process, as these problems are noted and corrected the process become more effective.

A good methodology will provide the following benefits:

➢ Provide a standard framework for the developers so that they are in the right track and develop the system consistently.

➢ Provides better understanding of the system requirements.

➢ Able to identify errors and omission during development.

➢ Facilitate and enhance the planned process toward greater effectiveness, efficiency and reliability.

3.3   Characteristic of a Good Methodology

Below are the characteristic of a good methodology:

➢ Easy to use for average analyst and programmers.

➢ Covers all phases of system development.

➢ Well quality documentation is available.

➢ Good vendor support in terms of training and consultancy.

➢ Relevant to the type of application being developed.

3.4   Sawtooth Model

To develop my system, I had chosen the Sawtooth model which it is a similar to waterfall, each activity is completed before to the next activity. This model is an extension of V model which includes client/user view by introducing checkpoints (demo's) that look like "teeth". For previous models focus on developer's view, the client is "out of the loop" until acceptance testing occurs. This model makes process more visible to client.

SDLC such as Waterfall Model is one of linear model. The most important parts of modern projects are all about knowledge acquisition and rationale management. Waterfall Model does not capture that ongoing process of getting feedback from the clients, or accounting for changes. But the Sawtooth Model tries to fix that by drawing a horizontal line (two (2) abstraction level or in other words, swim lanes) and placing actions either above the line (in the clients domain) or below it (in the developer domain). The actions then go back and forth between the two domains.

Sawtooth Model is more like the structure of course project deliverables. Several prototypes precedes final product. The model allows testing on real system as opposed to module by module. In fact, user studies and evaluation using prototypes. This model manages to reduce risk of final product not meeting actual needs of users.

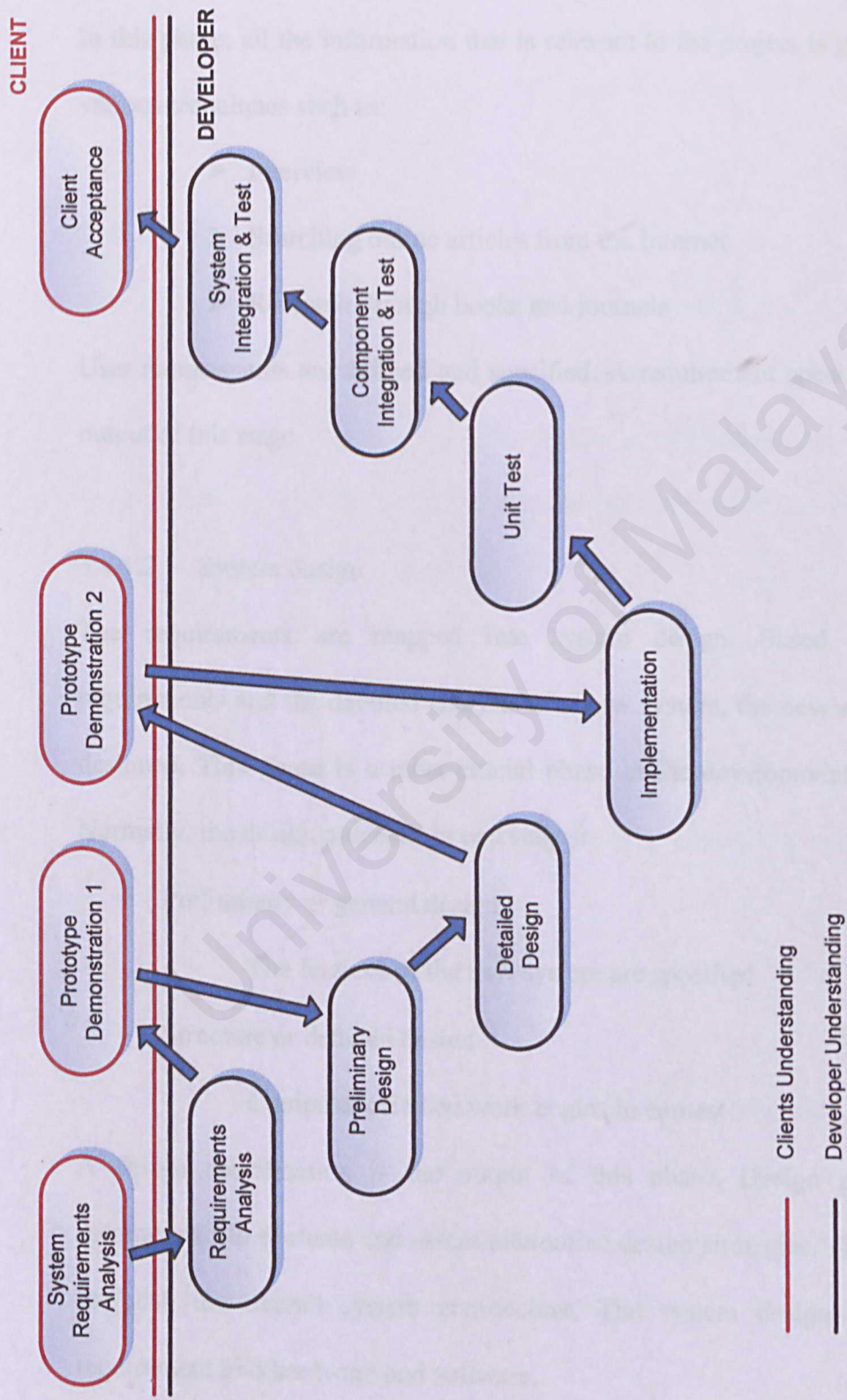Below are the figures showing the model:

CLIENT

DEVELOPER

System Requirements Analysis

Requirements Analysis

Prototype Demonstration 1

Prototype Demonstration 2

Client Acceptance

System Integration & Test

Component Integration & Test

Unit Test

Implementation

Preliminary Design

Detailed Design

Clients Understanding

Developer Understanding

Figure 3.2: Sawtooth Model

3.4.1   Steps on Sawtooth Model

3.4.1.1   Requirement Analysis

In this phase, all the information that is relevant to the project is gathered using various techniques such as:

> ➢ Interview

> ➢ Searching online articles from the Internet

> ➢ Research through books and journals

User requirements are defined and specified. A requirement specification is the output of this stage

3.4.1.2   System design

The requirements are mapped into system design. Based on the user requirements and the detailed analysis of a new system, the new system will be designed. This phase is a most crucial phase in the development of a system. Normally, the design proceeds in two stages:

- Preliminary or general design

  -        The features of the new system are specified

- Structure or detailed design

  -        Computer oriented work begins in earnest

A design specification is the output of this phase. Design prototyping is incorporated to evaluate and assess alternative design strategies. This phase is to establish the overall system architecture. The system design partitions the requirement into hardware and software.

3.4.1.3 Program Design

There will be two level of design. The top level and detail level design will be used to design the interface of each of the web page and the database, functional and non-functional modules for the system. The interface will be designed by using prototypes.

3.4.1.4 Prototyping

Prototype is a working model of one or more aspects of a projected system. It is constructed and tested quickly and inexpensively in order to test our assumptions. A prototype of the system will be build according to the project scope and analysis of the system before the beginning of the building the actual system.

3.4.1.5 Coding

System design is transform into program codes. Prototyping is evolved into a full-scaled final system. Output of this stage is an operational system, which is ready to be tested.

3.4.1.6 Testing

Validation and verification are carried out. Validation ensures that the system has implemented all of the requirements, whereas verification ensures that each function works correctly. Testing involves *unit testing, integration testing, system testing and acceptance testing.* Outcome from this stage is a validated and verified operational system

26

3.4.1.7 Implementation

This phase, system is put into practical use. Changes are made to the system whenever there is a need to correct errors to perfect the system and to adopt changes in requirement or environment.

Table 3.1:   Proposed Methodology

Development Phase	Description	Use of prototype
Requirement Analysis	- To investigate current system - To discover user requirement	- N/A
System Design	- To transform requirement specification into design specification	- To experiment and help in deciding design alternatives
Coding	- To transform design specification into program codes	- To integrate and evolve into final system
Testing	- To validate and verity the final system	- N/A
Implementation	- To put system into practical use - To make change if necessary	- N/A

*N/A: Not Available

27

3.4.1.8   Advantages of Sawtooth Model

- It is simple model and easy to use

- Reduce project time and cost

- Helping developer lay out what they need to do

- Easy to associate and identity each milestone with it's deliver

- Disciplined approach and testing been done in each phase.

- Systematic

- Able to reduce the risk and avoid error during the development process

3.5   Conclusion

Due mainly to the time constraints and nature of the system, the Sawtooth Model was chosen for this project. It presents comprehensive steps on what happen during the development and it suggest to the developer the sequence of the event should deal with. The Sawtooth Model approach has many strengths, including the enforced disciplined approached. It is also tames client-related risks. The depiction of the Sawtooth Model illustrates the difference in understanding of the system between a client or user and the system developer.

CHAPTER 4

SYSTEM ANALYSIS

CHAPTER 4: SYSTEM ANALYSIS

4.1   Introduction

The phase of system analysis includes all the steps involve in information gathering and system's requirements identification. A requirement analysis is carried out to fulfill the system's purpose. Requirements are divided into two categories which are functional and non-functional requirements. A set of requirements defines the system that is to be designed. In terms of software requirements analysis, it defines features, functional capabilities, performance design constraints of a system to fulfill system's objective.

The features and capabilities are in terms of the behaviors and activities of a system. Therefore user studies need to be conducted to gather enough information about system's requirements. The analysis of the results of user studies and the synthesis of a design are two closely related coupled activities. Hence both are describe collectively as analysis and design.

In order to get an overview of the system requirements, an extensive analysis is needed. System analysis is conducted with the following objectives in mind:

➢ To ascertain the functional and non-functional requirements of the system.

➢ To determine the programming language, database and hardware needs of the system.

➢ To determine the mixed of various kinds of tools that will be used to build the system.

4.2 Information Gathering

The system analysis process starts off with the step of information gathering. The methods used to find facts and information in the analysis process of my projects includes:

➤ Reading and reviewing background materials.

➤ Conducting user studies.

4.2.1 Reading and Reviewing Background Materials

I have chosen several types of ways in gathering and seeking the essential information before I start develop my courseware such as:

➤ Research through books, journals, and previous thesis.

➤ Research by searching from the Internet and online articles.

➤ Review on the existing educational courseware.

➤ Discussion with my supervisor.

Through this method of information gathering, all the related background material are gone through and reviewed. Plenty of time spent in the document room in my faculty to refer to the previous theses done by seniors. Besides, research had been conducted via the internet by reading online articles which are related to my projects. Internet is a good source for finding facts and up-to-date information.

Further more, studies of the existing system have been conducted. By referencing and studying others' online demonstration of the educational courseware, I obtain some good ideas to develop the proposed system. Analysis and studies of these existing systems on the internet have been done from various aspects such as layout, design, user interface, the interactions between system and user's scope and etc. all the information is surely the raw data for the courseware that is to be developed.

Another source of research is through my supervisor. Through discussion with my supervisor, I have plenty of ideas regarding how the application should be and how to develop this application.

4.2.2 Conducting User Studies

User study methods provides us with a real life data we need about people's activities, enabling us to design system to support these user, especially design an effective interactive system. This is what we mean when we talk of taking a user-centered approach. After the target group or the main users of the system has been identified, studies have been conducted as a first step towards understanding of the potential for my project.

There are a number of ways of gathering information from the users such as:

➢ Through interviews.

➢ Questionnaire.

In this project, I had an informal interview with my friends and also public sharing of questions and answers in getting information on how and what they need in driver education and using computer to study. I also ask them on how they think about 2D multimedia courseware.

4.3 Requirement Definition

Requirement of the system is the description of the features or functions that the system should provide as well as the constraints of the system. System requirements are generally classified into two; functional and non-functional requirements.

4.3.1 Functional Requirements

The functional requirements for a system describe the functionality or services that the system is expected to provide. It also refers as features that the project should have.

Animated 'L' Driving Guide is based on Deparment of Motor Vehicles (DMV) curriculum and it is divided into four modules, where each topic has an explanation with animation and interactive exercise. Also have one modules for user manual. Users will be given optional to choose the topics.

> Contents

There are five modules in this courseware. Users can choose which topic they want to learn either 'Isyarat Jalan Raya', 'Peraturan Jalan Raya', 'Etika Jalan Raya', 'Ujian' and 'Bantuan'.

> Animation

Users can see all animation whether in true or wrong situations based on the traffic signs when the user click on the right or wrong button. Also the users can do some exercise after learn the traffic signs module.

> Mock Test

The users also can do the mock test or 'Ujian' module to test their understanding about the traffic signs before sitting the real exam. My partner will do this part.

> User Guide/User Manual

Guide the user such as introduction about the courseware and also instruction on how to use the courseware.

> Back/Previous button

User can back to the previous page easily.

4.3.2 Non-functional Requirements

A non-functional requirement is a description of the features, characteristic, and attributes of the system as well as any constrains that may limit the boundaries of the proposed solution. Below are the non-functional requirements that are needed for my courseware:-

1. <u>User Friendly</u>

   I will be developing the courseware that will enable the user to browse the CD-ROM without any problem or frustration. It is very important to make sure that users are comfortable and do not encounter difficulties while using the courseware. The courseware will be based on the easy-to-use concept and there will be a talking wizard to gives the users guide and assist them whenever needed. The graphical user interface will help user in pointing and click their way round easily.

2. <u>Attractive interface</u>

   The interface that I will design will be a very graphical one and colorful so that the user not so bored. Other than that, my reason is to attract and maintain users's interest and attention. The graphics used will be based of cartoon character and a reasonable amount or animation and more real situation would be implemented in this courseware.

34

3. Easy to navigate

The navigation in this courseware will be as simple as possible so that it will suit the ability of the target user. The navigation button and icons will be based on graphical and symbols so that it will be easy to understand.

4. Interactive

This feature will enables interactivity between users and the courseware. The most common from of the interactivity is clicking on the links to navigate around the courseware. Some pages may have input boxes into which the user can enter textual information. As for the input boxes where the user enters the answers for the questions, immediate feedback will be given.

5. Learn ability

Users will be able to understand faster and more effective the most basic comments and navigation option and use them to choose the modules that they prefer. They will be having no difficult in remembering how to use and navigate in the courseware after a period of time of non-use.

6. Use satisfaction

The courseware is designed to be enjoyable to use and pleasing to users. User satisfaction will be within acceptable levels of users cost in terms of tiredness, discomfort and individual effort so that the satisfaction causes continued and enhance the usage of the courseware.

4.4 Software Requirements

According to all the research that has been done, I have choose several software that suitable for developing an Animated 'L' Driving Guide. I have decided using Macromedia Director MX, Swish Max and Adobe Photoshop CS 2 to develop this courseware.

4.4.1 Macromedia Director MX

Macromedia Director MX is one of the tools in the market that provides a high-performance solution for video where it enable user to use long video files in their native format. It also can be use to generate a large application suite for CD or DVD distribution (hundreds of megabyte), customized applications, multiple media formats needed, launching external applications and also can content with many objects on the stage, including high performance games.

Lingo was the scripting language by director. By using it, it can assist the user to include interactivity to a movie and to control a movie in response to a particular conditions and events. Director uses four types of scripts which are behaviors, movie script, parent script, and script attached to cast members.

Features:

- Integrated and streamlined to implement ideas easily and efficiently

- Multimedia tool for building rich, interactive content and application

- Ensure smooth playback with advanced memory management

- Powerful and flexible with an unparalleled list media types

4.4.2 Swish Max

Swish Max can be used to create animation to the objects. Swish Max supports multiple-selection and grouping. Also can select more than one object and convert the selection into a group. Complex effects, such as explode and vortex, can then be applied to the group. Import drawings, diagrams and logos and bring them to life in Swish Max. Swish Max also can read WMF, EMF and SWF files, as well as GIF, JPG, BMP and PNG images. The Swish Max display is now 100% WYSIWYG; it displays all objects, including text, graphics and images, exactly as they appear in the Flash Player. In Swish Max we can also scroll, pan, and zoom to the display window.

4.4.3 Adobe Photoshop CS 2

Adobe Photoshop CS 2 is a state-of-the-art tool with is comprehensive set of retouching, printing, drawing, and web tools. Photoshop complete any image-editing task efficiently. With features like the history palette and editable layer effects, which allow user to experiment freely without sacrificing efficiency.

Photoshop is a technical tool, for advance user, it can almost create any texture, any 2D image and can finely retouch on a photo. As Photoshop become more robust and rich features in every latest released, which makes it the best image editing software in the market.

## 4.5	Hardware Requirements

Hardware requirements describe constraints on computers and peripheral equipment, their capacity and time available for use.. Hardware requirements need to be deciding to determine the feasibility of performance requirements. Hardware requirements are divided into:

➢ Hardware requirements for developer

➢ Hardware requirements for user

### 4.5.1	Hardware Requirements for Developer

• Processor: Pentium IV 1.6 Gigabyte

• Random Access Memory: 128 MB

• Hard disk: 2GB

• 32 MB Graphic card

• Sound card

• Speaker

• CD-RW drives

• Others standard computer peripheral

4.5.2 Hardware Requirements for User

- Processor: Pentium II and higher

- Random Access Memory: 32 MB and above

- 16 MB Graphic card

- sound card

- speaker

- standard input and output

- Others standard computer peripheral

4.6 Delivery Medium

The delivery medium defined by which the application be delivered to the users. Here, the delivery medium that I have chosen is CD-ROM. This medium has become so universal that it seems unlikely that it may ever lose its supremacy as a carrier. When compared to Web-based training, the benefits largely come from the fact that CD-ROMs usually provide a more engaging learning experience, with text, audio, video, and animations all used to convey information.

CHAPTER 5

SYSTEM DESIGN

CHAPTER 5: SYSTEM DESIGN

5.1 System Design

A system design is a description of the structure of the software to be implemented, the data which is part of the system, the interface between system components and sometimes the algorithm used. Designers do not arrive at a finished design immediately but develop the design iteratively and detail as the design is developed, with constant backtracking to correct earlier designs.

The design process may involve developing several models of the system at different level of abstraction. As a design is decomposed, errors and omissions in earlier stages are discovered. These feedbacks to allow earlier design models to be improved.

For Animated 'L' Driving Guide, Data Flow Diagram and structure charts will be used to model the courseware. The structure charts are chosen to show the outline of the Animated 'L' Driving Guide courseware. Data Flow Diagram will be use to provide the graphical illustration which shows the flow data and logic within the courseware. Data Flow Diagram comprise of three basic symbols as show behind.
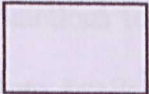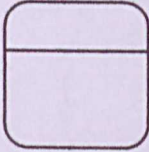
Symbols	Name	Description
☐	Entity	External entities that can send data to ort receive data from the system. Interacts with the system but considered as outside of the boundaries of the system.
→	Flow of data	It is used to show the movement of data from an origin to a destination with the head of arrow pointing towards the destination.
☐	Process	It represents the transformation or processing of information within a system.

Table 5.1: Data Flow Diagram (DFD) basic symbol

CHAPTER 5

SYSTEM DESIGN

CHAPTER 5:   SYSTEM DESIGN

5.1   System Design

A system design is a description of the structure of the software to be implemented, the data which is part of the system, the interface between system components and sometimes the algorithm used. Designers do not arrive at a finished design immediately but develop the design iteratively and detail as the design is developed, with constant backtracking to correct earlier designs.

The design process may involve developing several models of the system at different level of abstraction. As a design is decomposed, errors and omissions in earlier stages are discovered. These feedbacks to allow earlier design models to be improved.

For Animated 'L' Driving Guide, Data Flow Diagram and structure charts will be used to model the courseware. The structure charts are chosen to show the outline of the Animated 'L' Driving Guide courseware. Data Flow Diagram will be use to provide the graphical illustration which shows the flow data and logic within the courseware. Data Flow Diagram comprise of three basic symbols as show behind.

Symbols	Name	Description
	Entity	External entities that can send data to ort receive data from the system. Interacts with the system but considered as outside of the boundaries of the system.
→	Flow of data	It is used to show the movement of data from an origin to a destination with the head of arrow pointing towards the destination.
	Process	It represents the transformation or processing of information within a system.

Table 5.1: Data Flow Diagram (DFD) basic symbol

5.2   Structured Module

System structure is used to depict high level of abstraction of a specific system. The use of system structure is to describe the interaction between independent modules. Major functions form the initial component part of the system structure which can be broken into detailed sub-component.
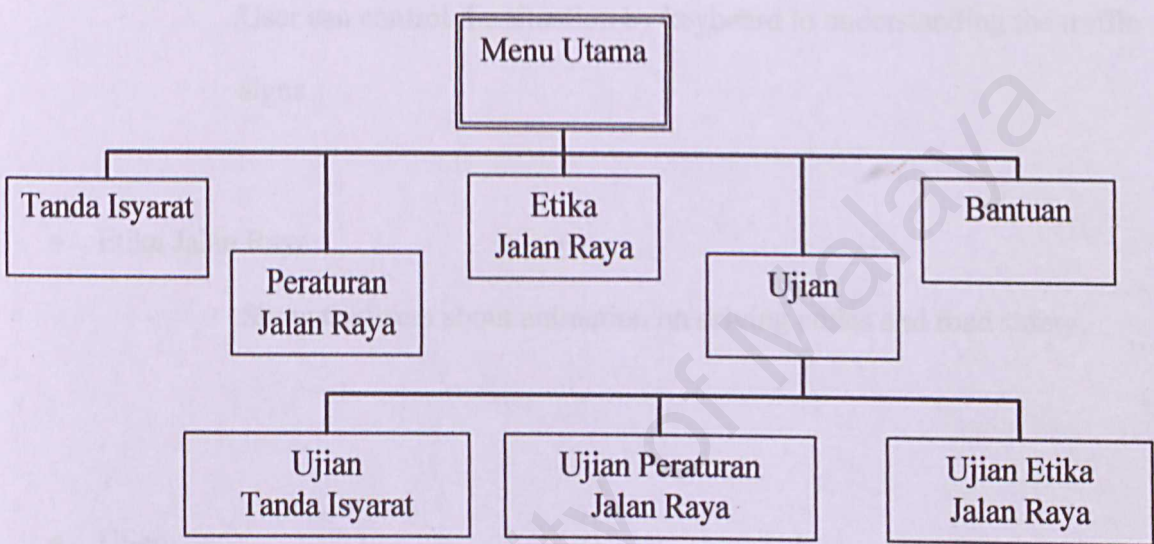
Figure 5.1: System Structure Chart of Animated 'L' Driving Guide

Figure above is a concept map that illustrates the structure of the Animated 'L' Driving Guide module. It will be divided into 4 modules, where each module has an explanation and interactive exercises. Also have help module to guide the users.

- Tanda Isyarat

    - Users will know more about traffic signs (Highway Code) and their

    function based on the animation.

- Peraturan Jalan Raya

    - Users will show the situation which is having speed and lamp control.

    User can control the situation by keyboard to understanding the traffic

    signs.

- Etika Jalan Raya

    - Show the users about animation on driving ethics and road safety.

- Ujian

    - This module has done by my partner where mock test / examination

    have.

- Bantuan

    - Guide the user such as introduction about the courseware and also

    instruction on how to use the courseware.

5.3   Systems Flowcharts

Systems flowcharts are graphic illustrations of the physical flow of information through the entire accounting system. A systems flowchart is commonly used in analysis and design. The symbols of the flowcharts as shown below:
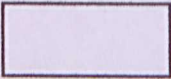
Symbol	Description
▭	Process
⟶	A flow of process represents a pathway of process
◇	Decision
▱	Document

Table 5.2: Flow Chart Symbol
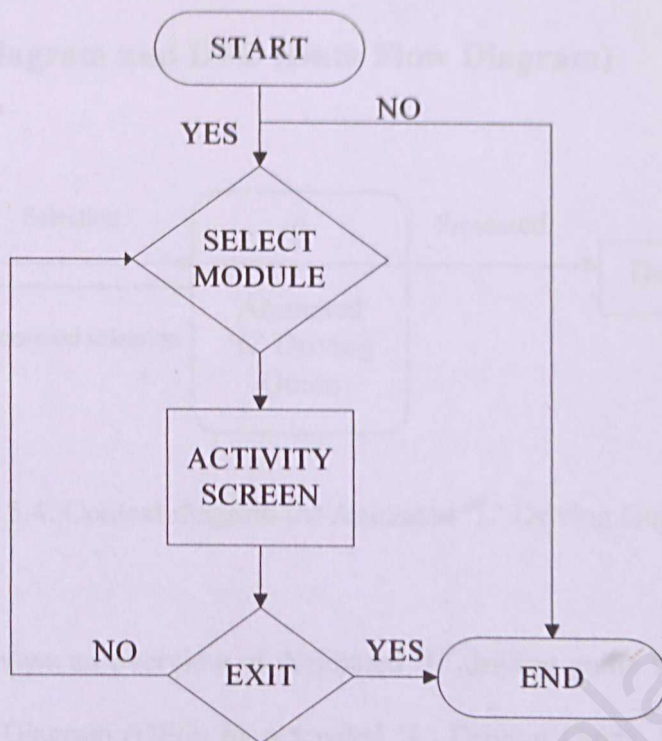
Figure 5.2: Animated 'L' Driving Guide courseware flowchart
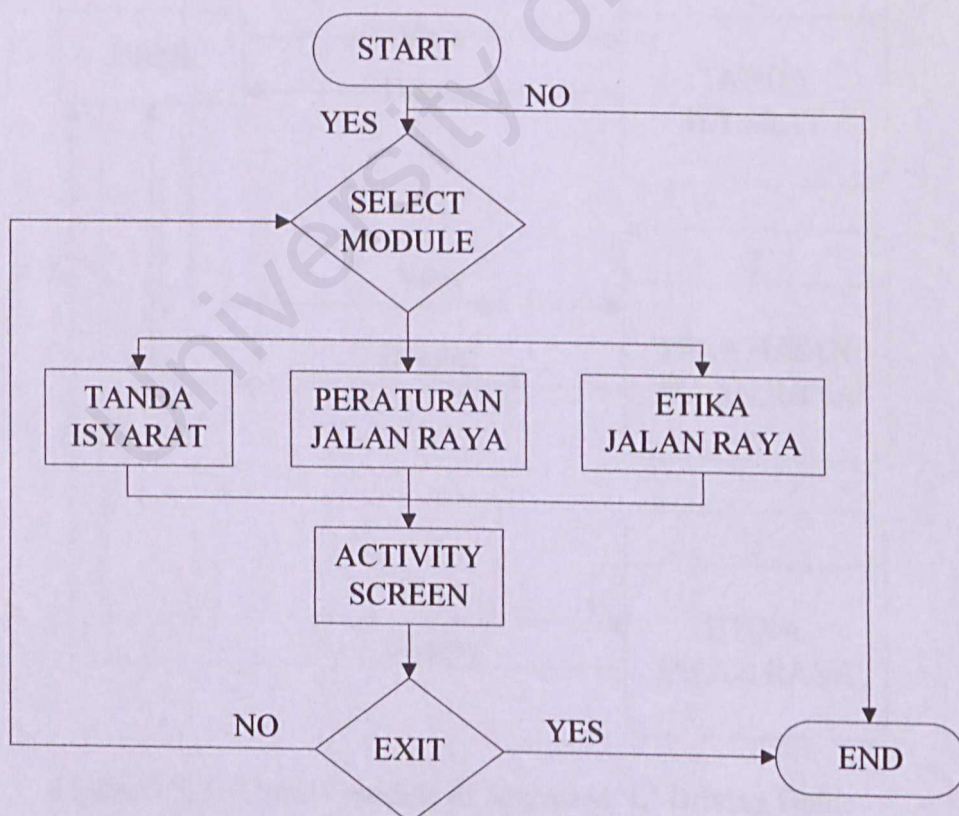
Figure 5.3: 3 Module of courseware flowchart

5.4 Context Diagram and DFD (Data Flow Diagram)
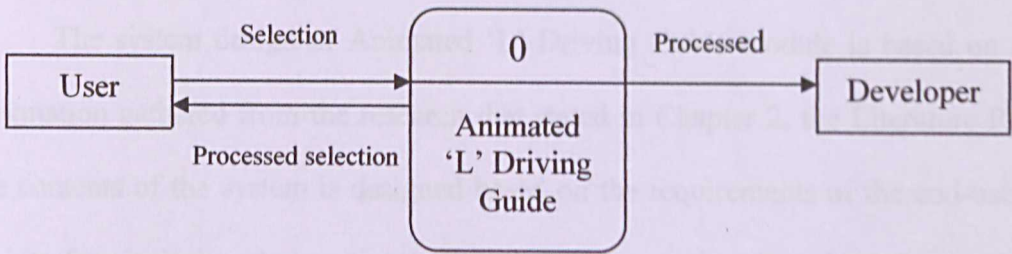
Figure 5.4: Context diagram for Animated 'L' Driving Guide

Figure 5.4 shows an overview of Animated 'L' driving guide which is the high level of Data Flow Diagram (DFD) in Animated 'L' Driving Guide. User can choose whether he or she want to view the content that is available on the screen.
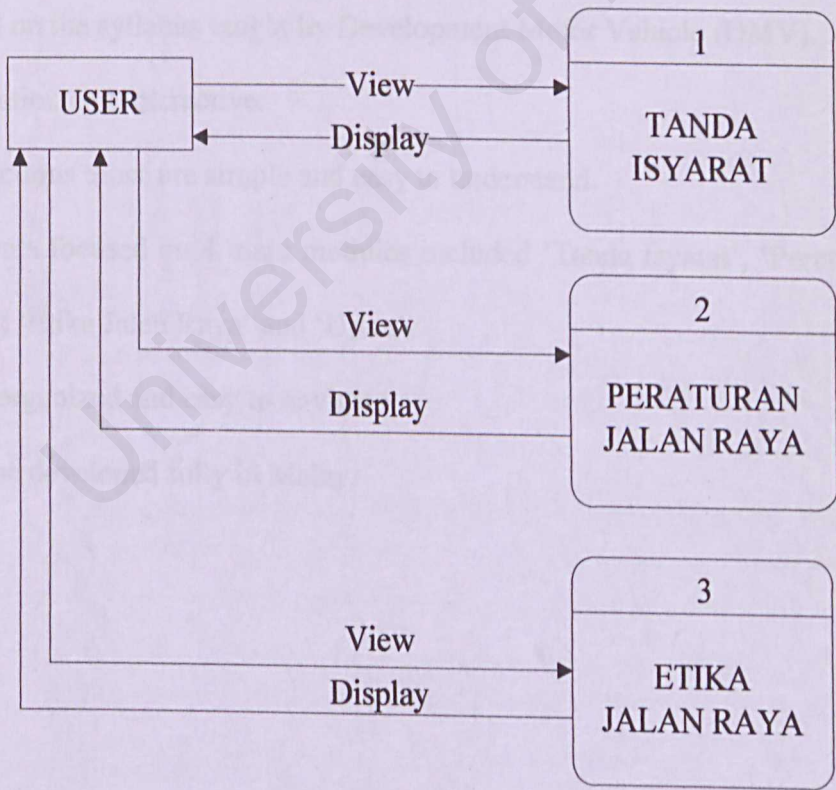

Figure 5.5: DFD for 3 module of Animated 'L' Driving Guide

5.5   Designing Module

The system design of Animated 'L' Driving Guide module is based on all the information gathered from the research that stated in Chapter 2, the Literature Review. The contents of the system is designed based on the requirements of the end-users and the interface is designed according to end-users interest other that taking the requirement of the attractiveness as consideration. Besides, to design a better system, the advantages and disadvantages of the existing systems in the market are taken into consideration.

Basically, these are the characteristic of 'Animated 'L' Driving Guide:

➤ User friendly.

➤ Based on the syllabus taught by Development Motor Vehicle (DMV).

➤ Animation and interactive.

➤ Instructions those are simple and easy to understand.

➤ Contents focused on 4 main modules included 'Tanda Isyarat', 'Peraturan Jalan Raya', 'Etika Jalan Raya' and 'Ujian'.

➤ Well organized and easy to navigate.

➤ Will be developed fully in Malay.

5.6   User Interface Design

The system interface will give the first impression to the user about the system. It is the important part of the system. It will be easy for the user to navigate the whole system when the system interface is user-friendly and easy to understand. Good user interface design is critical to the success of the system. An interface that is difficult to use will, at best, result in a high level of user errors. At worst, users will simply refuse to use the software system irrespective of its functionality.

If information is presented in a confusing or misleading way, users may misunderstand the meaning of information. They may initiate a sequence of actions that corrupt data or even cause catastrophic system failure.

Table 5.3: The Principal Characteristic of Graphical User Interface (GUI).

| Characteristic	Description
Windows	Multiple windows allow different information to be displayed simultaneously on the user's screen.
Icons	Icons represent different types of information. On some systems, icons represent files; on others, icon represents processes.
Menus	Commands are selected from a menu rather that typed in a command language.
Pointing	A pointing device such as a mouse is used for selecting choices from a menu or indicating items of interest in a window.
Graphic	Graphical elements can be mixed with text on the same display.
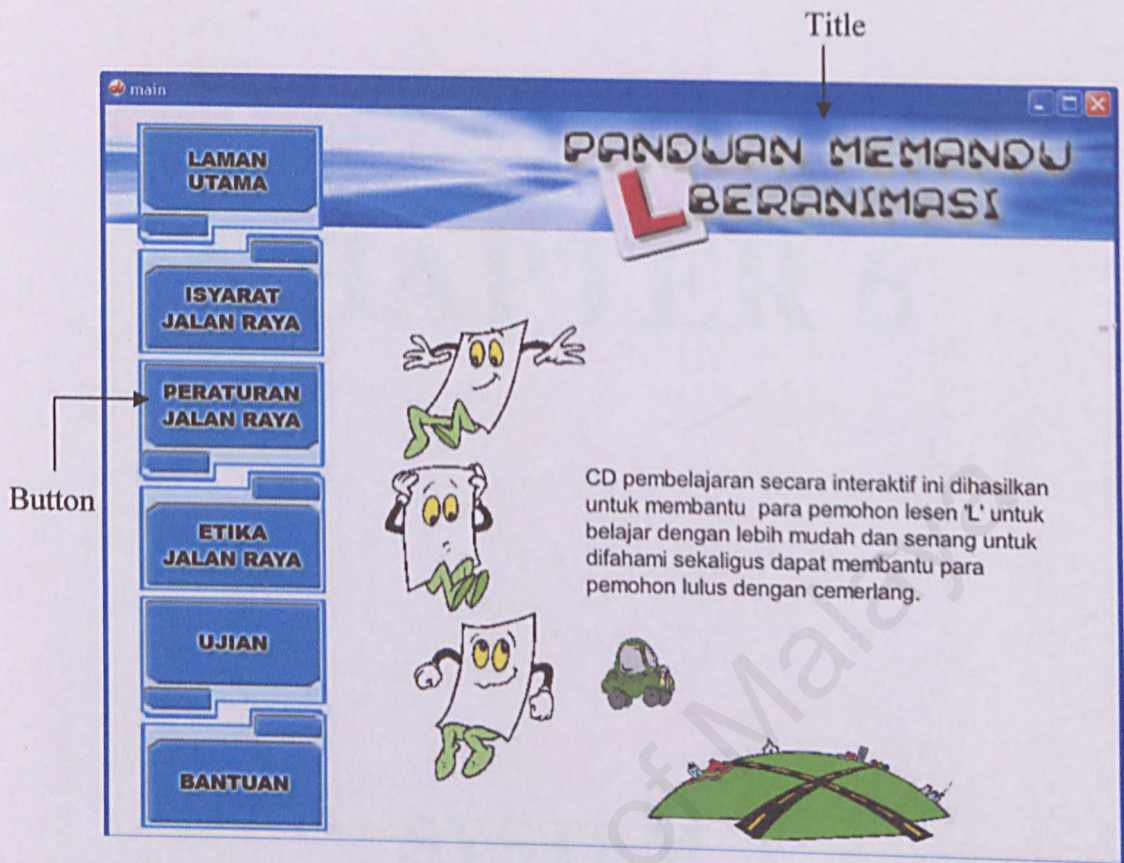
Figure 5.6: Screen design for main page

Figure 5.6 shows the main interface for the Animated 'L' Driving Guide. Animated 'L' Driving Guide is based on the syllabus taught by DMV where each topic has an explanation and interactive animation. Users will be given optional to choose the topics. Besides, they can also take the mock test to test their understanding about the topic. A user guide button provided an introduction about the courseware and also instruction on how to use the courseware.

CHAPTER 6

SYSTEM IMPLEMENTATION

CHAPTER 6: SYSTEM IMPLEMENTATION

6.1   Development Needs

After doing all the research regarding animation and preparing the design, it is about time for the system to be implemented. In this chapter, we will study process of development in Animated 'L' Driving Guide. The main thing that should be prepared before the development process is to prepare a machine which has at least the minimum requirement for a developer. In this case, the machine should have at least a 32MB graphic card, 128MB DDRAM and plenty of hard disk space.

After ensuring the hardware needed are complete (which include speakers, printer, sound card), the next step that should be taken is to ensure that the development tools is installed in the computer. After extensive research and analysis, the development tools were chosen. The software chosen depends on its features to fulfill the system needs.

This software has been installed into the developer's system:

1. Macromedia Director MX

   Provides a high performance solution for video where it enable user to use long video files in their native format. It is use to develop the application.

2. Swish Max

   This authoring tool is use to create the animation and font to display in an attractive and effectiveness way and also use to create button.

3. Adobe Photoshop CS2

   Adobe Photoshop is needed to edit the graphics, design the interface and draw symbol of traffic signs.

4. Microsoft Office Visio 2003

   To draw the map and shapes for traffic signs

5. Microsoft Office Word 2003 and Microsoft Office Project 2003

   Needed for writing thesis report

6.2 Implementation Methods/Techniques
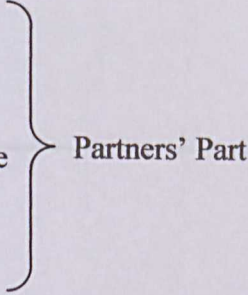
The phase of implementation in this project is concerned with the translation of the set of logical physical designed into program codes that will eventually generic the Animated 'L' Driving Guide and make it functions like it should. The following sections in implementation outlines all the necessary steps and solutions applied into the system to solve problems encountered during the design phase.

51

6.3   System Development

6.3.1   Interface Implementation

The learning application's interface is developed using Macromedia Director MX and have been divided into intro, four (4) modules, main menu and user manual.

- Intro
- 'Laman Utama' page
- 'Isyarat Jalan Raya' module
- 'Peraturan Jalan Raya' module
- 'Etika Jalan Raya' module
- 'Ujian' module
    - 'Ujian Tanda Isyarat' sub-module
    - 'Ujian Peraturan Jalan Raya' sub-module   } Partners' Part
    - 'Ujian Etika Jalan Raya' sub-module
- 'Bantuan' page

Figure 6.1: Intro Page

- This is a intro page as a montage for this courseware will promote the user consist all features of Animated 'L' Driving Guide courseware.
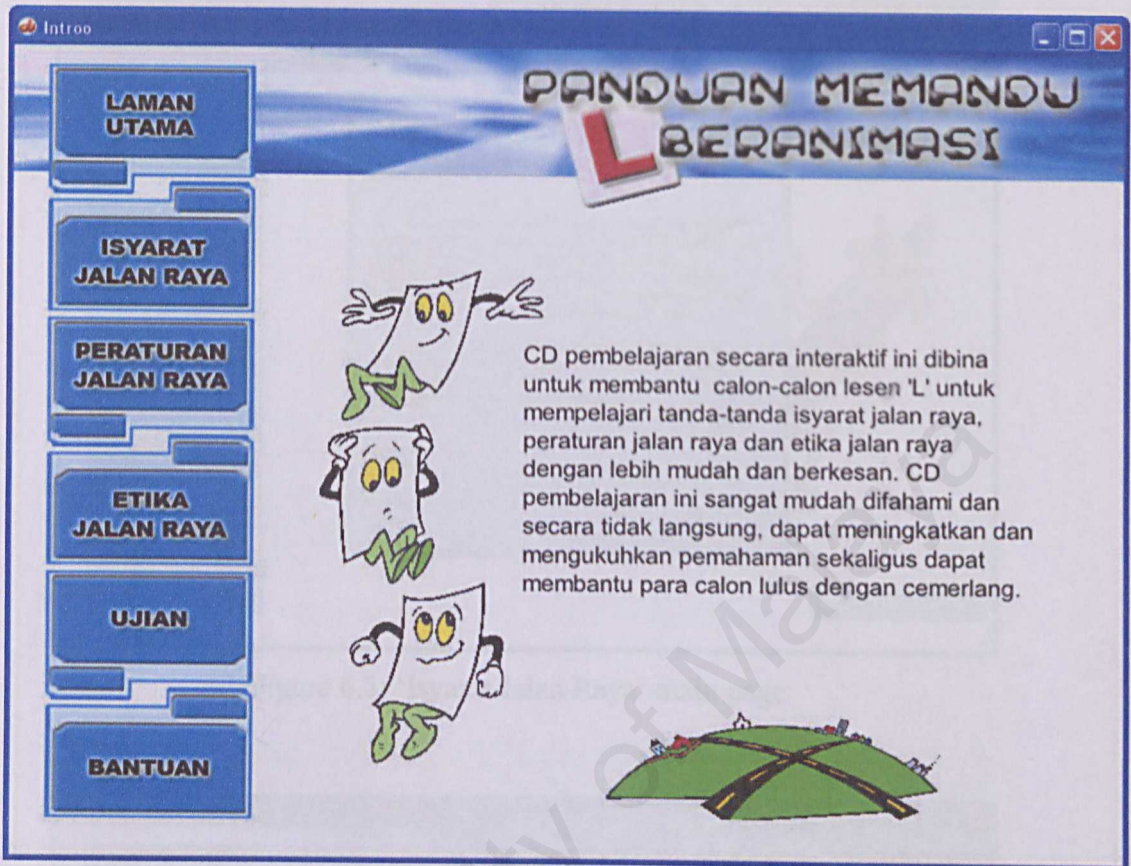
Figure 6.2: 'Laman Utama' Interface

- Laman Utama is the main page of the system. In this page consists four
  (5) other buttons to represent each module develop which are Laman
  Utama button, Tanda Isyarat button, Peraturan Jalanraya button, Etika
  Jalanraya button, Ujian button and Bantuan button. This entire buttons
  allows the users to navigate through the system.

(iii)   'Isyarat Jalan Raya' module
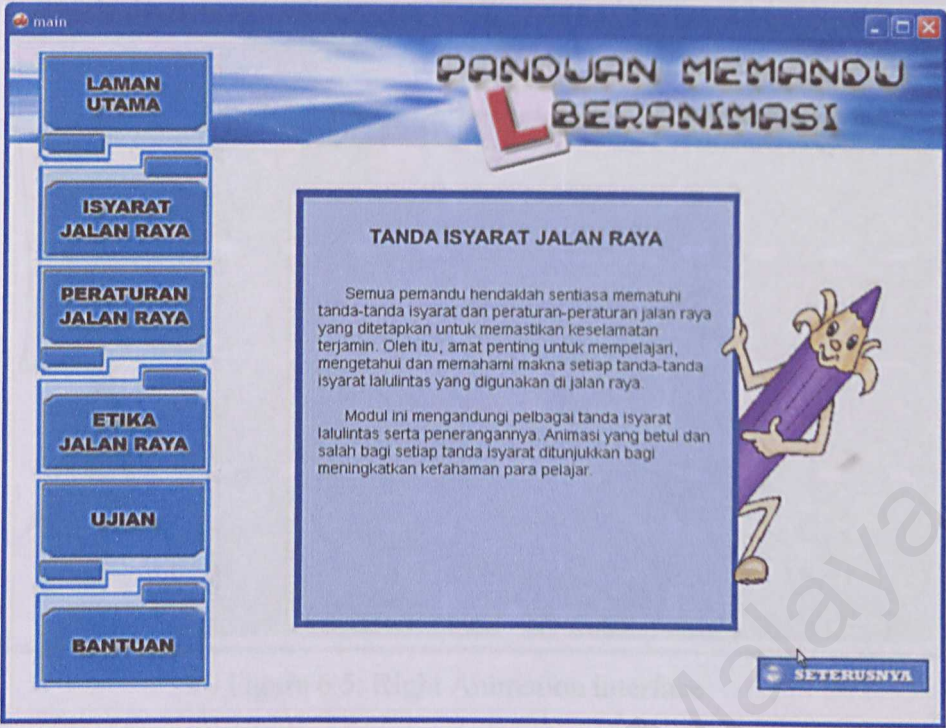
Figure 6.3: 'Isyarat Jalan Raya' main page
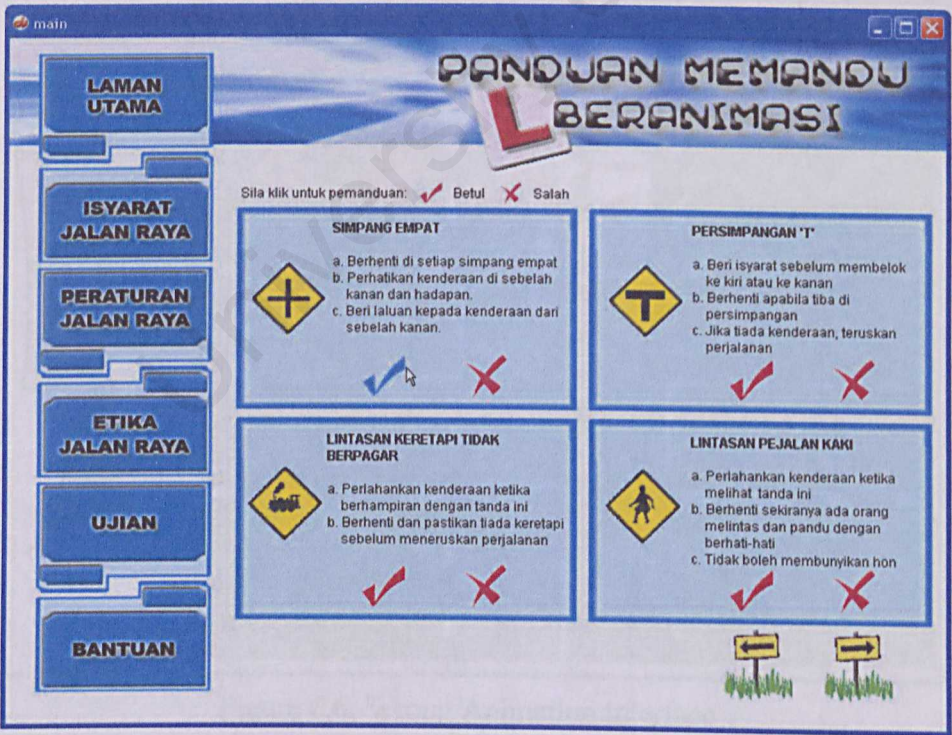
Figure 6.4: 'Isyarat Jalan Raya' interfaces
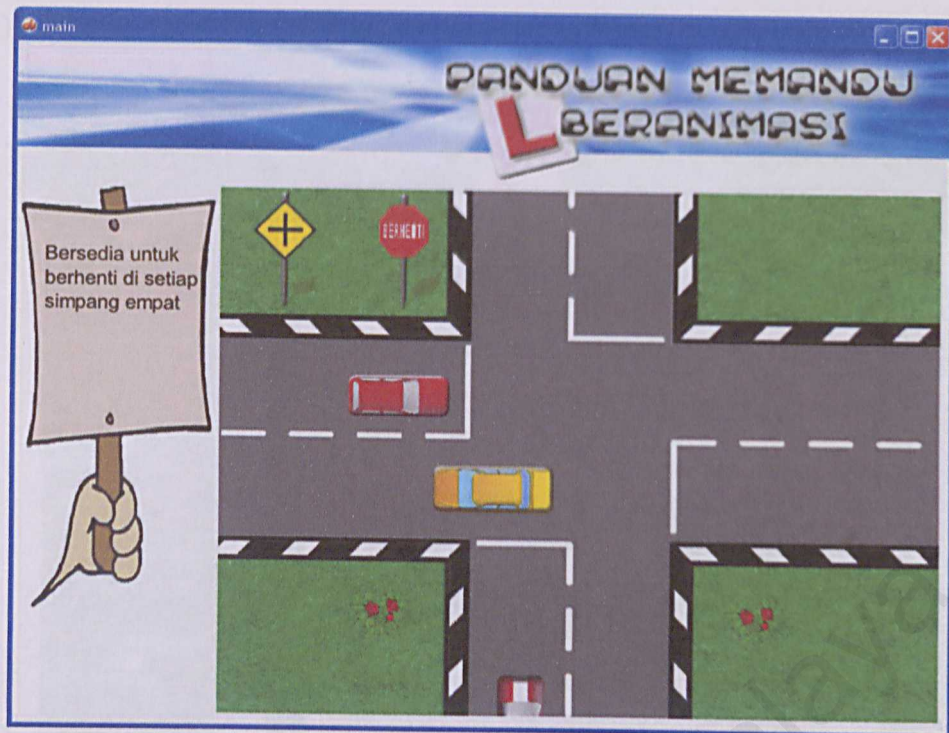
Figure 6.5: Right Animation interface
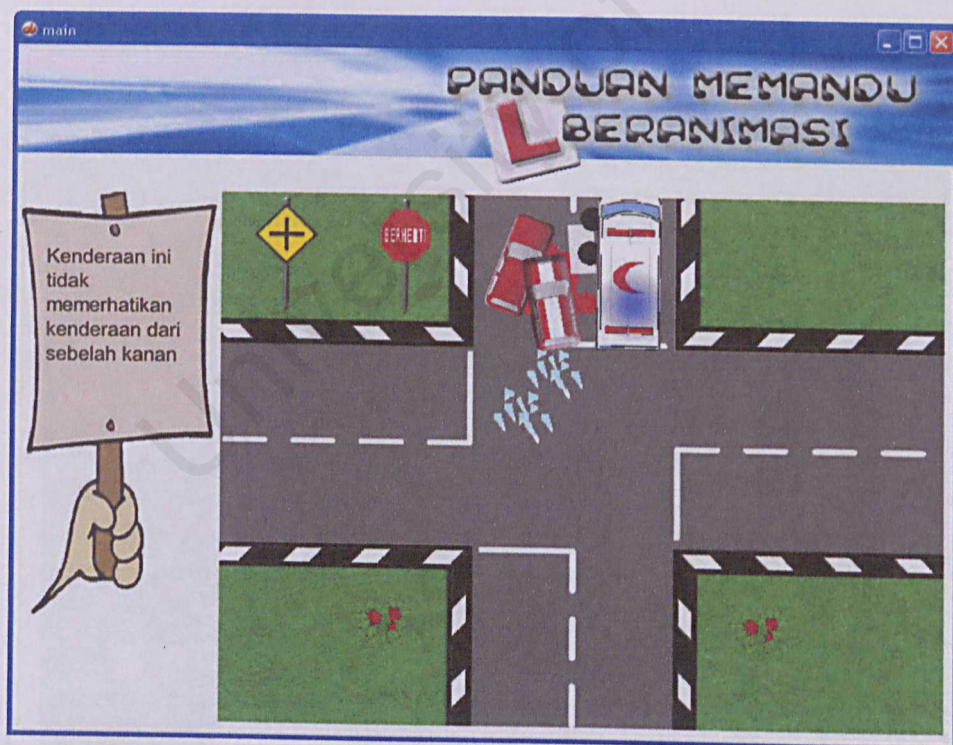
Figure 6.6: Wrong Animation interface

(iv)   'Peraturan Jalan Raya' module
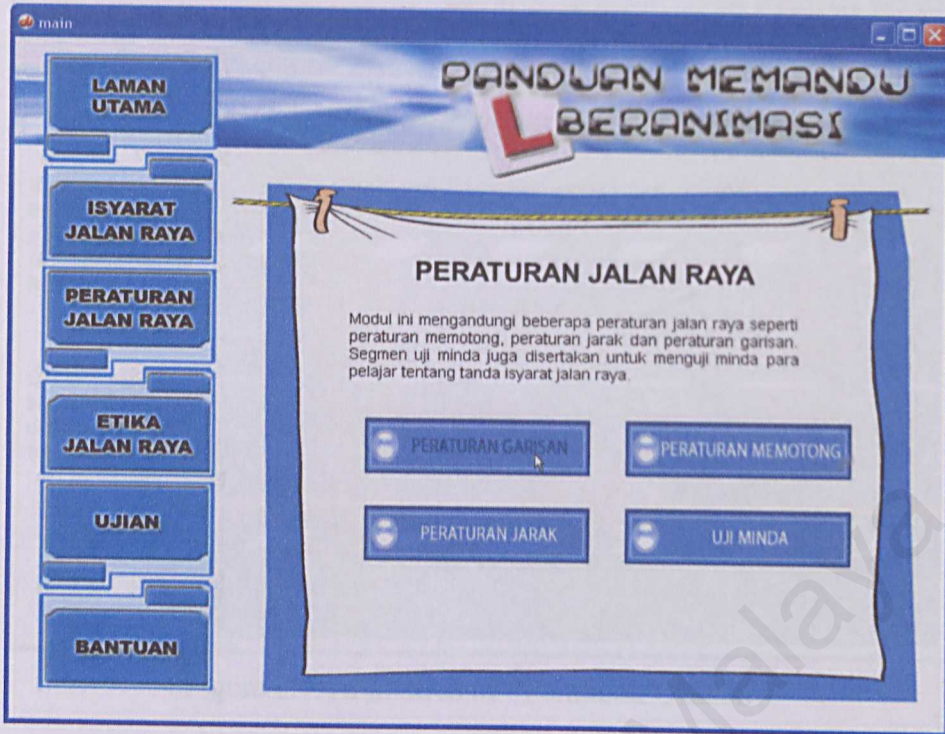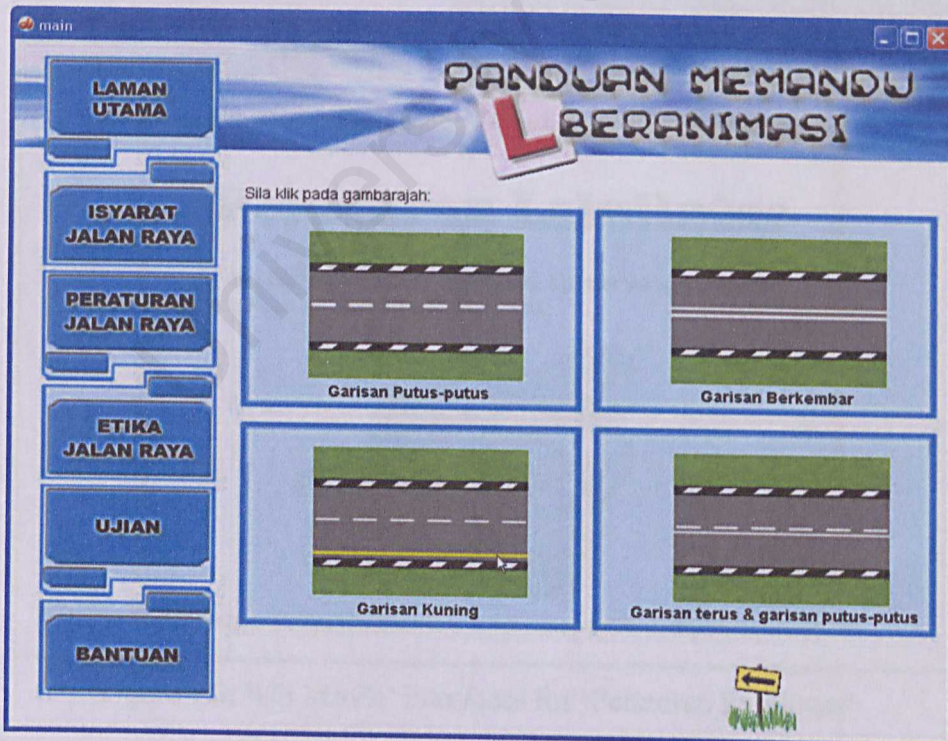

Figure 6.7: 'Peraturan Jalan Raya' main page

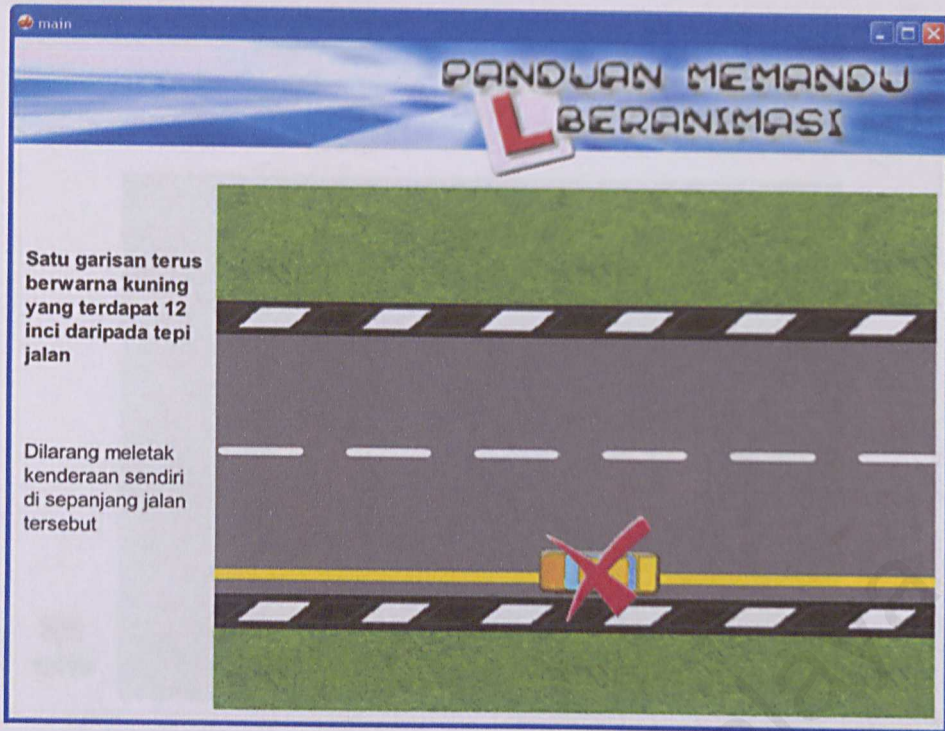Figure 6.8: 'Peraturan Garisan' interfaces

57

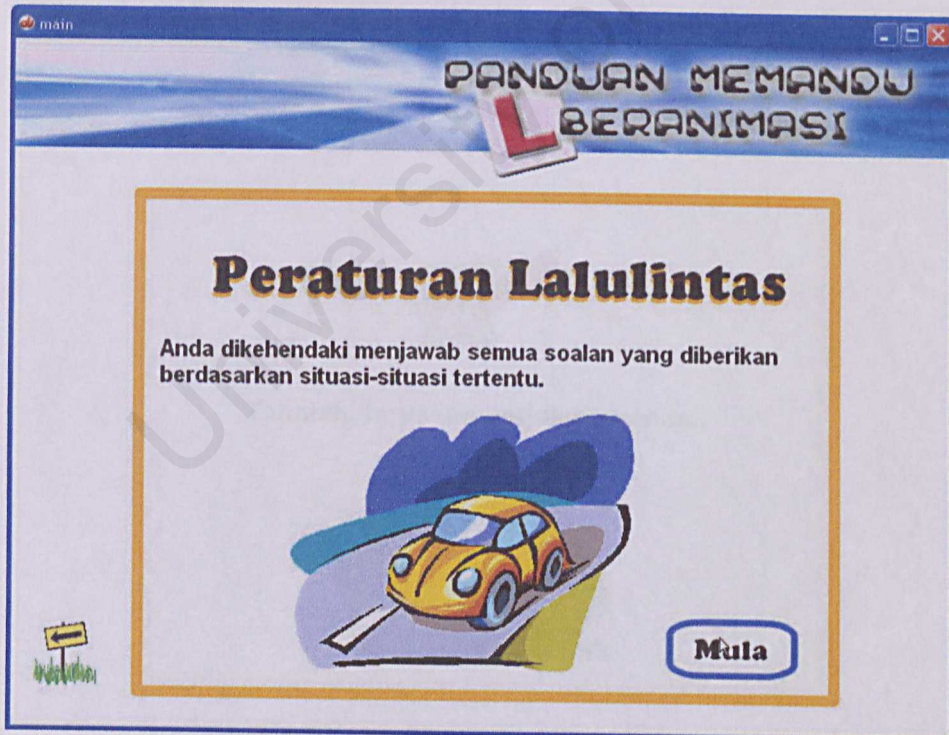Figure 6.9: Animation of 'Peraturan Garisan'

Figure 7.0: 'Uji Minda' interfaces for 'Peraturan Lalulintas'

Figure 7.1: First question for 'Uji Minda' interface

Figure 7.2: Interface for true answer

Figure 7.3: Interface for wrong answer

Figure 7.4: Interface for other questions in 'Uji Minda' part

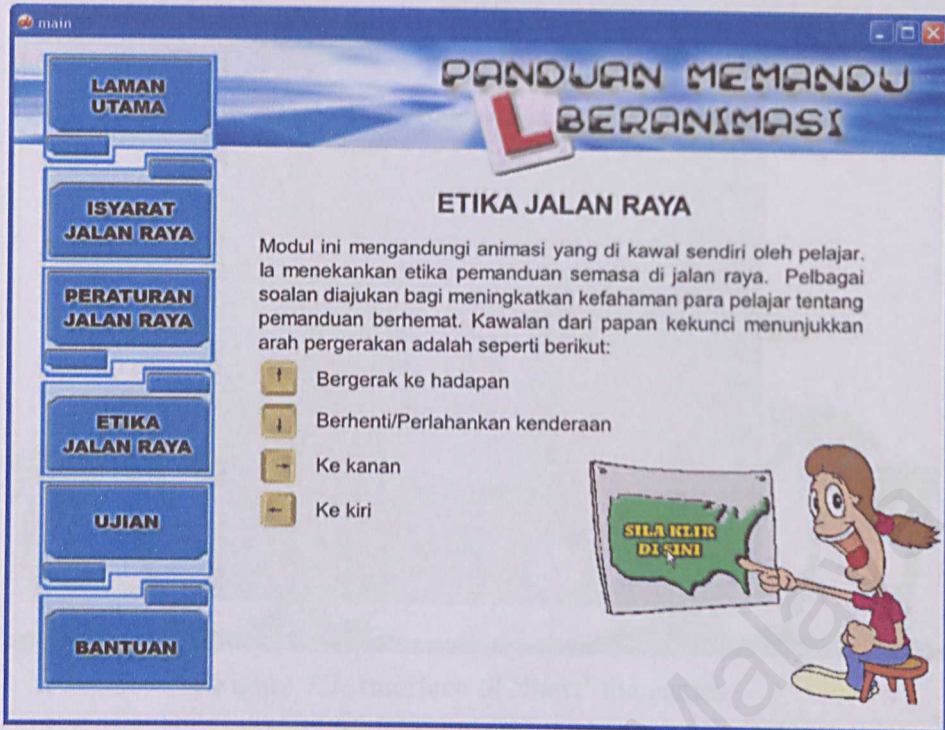(v)   'Etika Jalan Raya' module

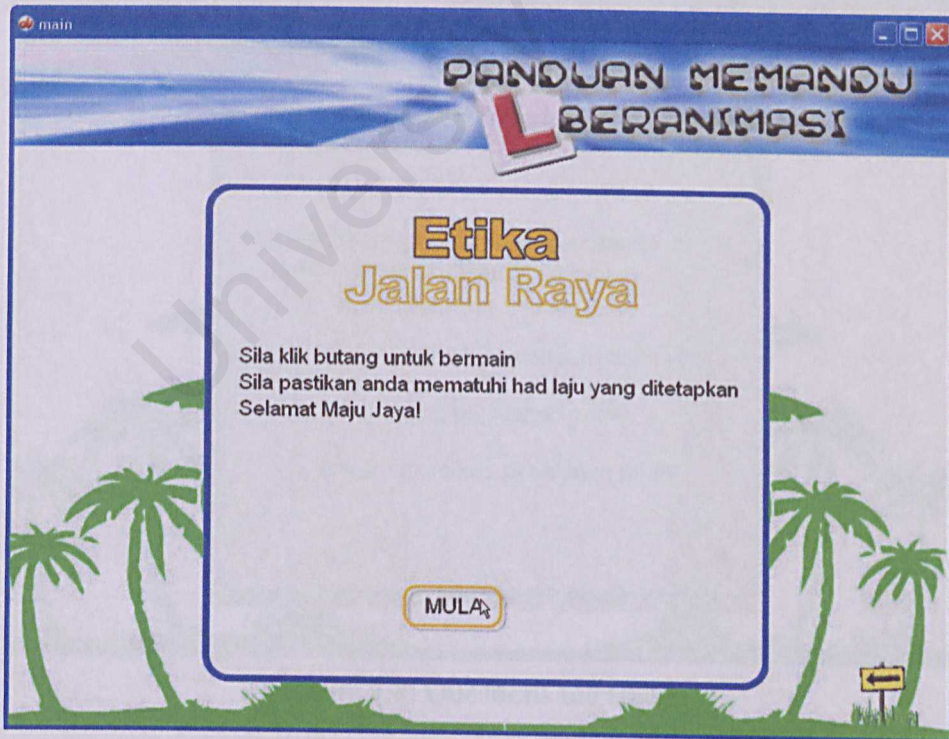
Figure 7.5: 'Etika Jalan Raya' main page

Figure 7.6: Games of 'Etika Jalan Raya' interface
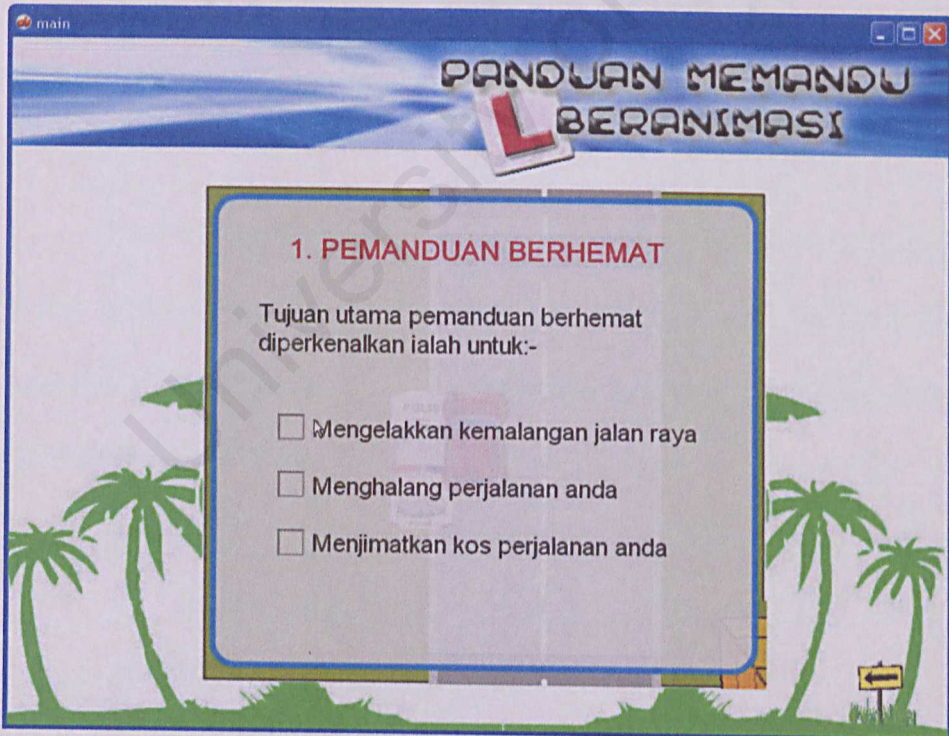
Figure 7.7: Interface of 'Start' the games

Figure 7.8: Questions interface

CHAPTER 7

SYSTEM TESTING

CHAPTER 7: SYSTEM TESTING

7.1   What is testing?

Testing is the exposure of a system to trial input to see whether it produces correct output.

Among alternative definitions of testing are as following:

➢ The process of exercising or evaluating a system or system component by manual; or automated means to verify that is satisfies specified requirements of to identify differences between expected and actual results

➢ Any activity aimed at evaluating that it meets its required results. Testing is the measurements of software quality.

➢ The process of executing a program with the intent of finding errors.

From these definitions, none of it claims that testing shows that software is free from defects. A successful test is one that finds a defect is a good thing. Thus the mind-set for good testing needs to be one in which finding defects is a good thing, not a bad thing.

7.2   Unit Testing

Unit testing usually becomes the earliest method in testing. It involves testing towards each component accordingly. For Animated 'L' Driving Guide, unit testing is done by ensuring these components work:

➢ To make sure the questions are correct and language used understandable and no grammatical mistake.

➢ To make sure the animation of traffic signs works properly with the sound effects and the user will understand with the description.

➢ To ensure all the buttons works properly.

➢ To make sure user can easily move back to the main page of the learning package or go to the other page.

7.3   Integration Testing

Once individual program components have been tested, they must be integrated to create a partial or complete system. This integration process involves building the system and testing the resultant system for problems that arise from component interactions. Integration test should be developed from the system specification and integration testing should begin as soon as usable versions of some of the system components are available.

The main difficulty that arises in integration testing is localizing errors that are discovered during process. There are complex interactions between the system components and, when an anomalous output is discovered, it may be hard to find the source of the error. To make it easier to locate errors, you should always use an incremental approach to system integration and testing. Initially, you should integrate a minimal system configuration and test this system. You then add components to this minimal configuration and test after each added increment.

For Animated 'L' Driving Guide, the method for testing is the Sandwich testing where it combines the technique of top-bottom integration method and also bottom-up integration. This technique is chosen because it has more benefits compared to other techniques.

Sandwich testing allows testing from a very early stage and each component can be tested individually or combined with the other components. This will reduce the errors each program during the development phase. Besides saving time, this technique makes the system runs smoothly.

Generally, during integration testing, testing is done towards a system on how it interacts with each other, which means navigation from each stage to the next stage. All components will be integrated and tested one by one. Though there are problems faced from time to time during testing, these problems can be solved with precise testing towards all components.

7.4   System Testing

This stage of testing is to ensure that the system meets the user requirements. The results from the testing show that the system as an overall works as planned.

By clicking the projector file, the system will straight away show the intro and all menu of the Animated 'L' Driving Guide. System testing was done to all the module of the Animated 'L' Driving Guide. All the button and the audio system are works properly.

To show the animation of traffic signs based on their situations, the users just click the right or wrong button. Users are easily move back to the main menu by pressing back button at each page until found the main menu or click the menu to go the other pages. Also, the users can click the next or back button easily to go the other pages. To quit the program, users just click the exit button at the top right side of the screen or press Esc button on the keyboard.

7.4.1 Functional Testing

Once the unit test is complete, the testing phase is then proceeding to a step further into system functionality testing. Here, the major functions were tested to ensure that they perform the right task as expected. The following descriptions describe in detail some of the major function that was tested.

- User select the module then select sub-module
- Display activity screen

7.4.2 Performance Testing

The purpose of this performance testing is to address the non-functional requirements of the system. Performance test may also compare the system with the remainder of these software and hardware requirements. When the test is performed successfully in a user's actual working environment, it yields a validated system. As for Test module in Animated 'L' Driving Guide system's performance, effectiveness of data manipulation and accuracy of the retrieving data are carefully examined.

7.4.3 Acceptance Testing

When functionality and performance testing have been completed, the system is assumed to have met all requirements specified during initial stages of the software development life cycle. Acceptance testing is then done to obtain the user's approval of the system's overall functionality.

CHAPTER 8

SYSTEM EVALUATION
AND DISCUSSION

CHAPTER 8: SYSTEM EVALUATION AND DISCUSSION

8.1 Introduction

Throughout the software development phrase, various problems were encountered and for the most past were resolved at the testing phrase. There are many techniques which use to evaluate the final Animated 'L' Driving Guide. It was evaluated to identify its strengths, limitations and possibilities for future enhancement of the system.

System evaluation is very important because it provides feedback about the current system that was working with.

8.2 Problem and Solution

Learning something very new needs patient and hard work. Though how hard you try, there always be errors and problems faced. Any problems will have a solution to it.

During the entire development of the Animated 'L' Driving Guide, several problems were encountered. In this section will discuss about the problems that were faced during the development of this courseware.

Limitation of Authoring Tool

There are many authoring tools in the market, but each of them has their strengths and weaknesses. So, I need to use many authoring tools to develop this courseware. For example Macromedia Director MX has quite a limited type of fonts. The fonts can not be displayed in an attractive and effectiveness way. To solve this problem, I have chosen Swish Max to create the font, images, graphics and animation picture and then import to Macromedia Director MX.

Unfamiliarity with development tool

Because of never use scripting in Macromedia Director MX before, there is some problem that the developer encountered in using the software. Less references also make it more difficult to solve the problems occur. So, I have chosen to refer to Director Help and sample files that the developer finds by searching via Internet. Also, seeking advice from supervisor and discuss with my course mate

Lack of Knowledge

Developing an Animated 'L' Driving Guide has been a heavy duty job as I need to equip myself to understand and master all the tools that I have chosen. I was not familiar with the tools as it was quite new to me especially to create the animation based on the traffic signs using Swish Max. The solution for this problem is I try to explore all the tools by myself and do the exercises in the tutorial. I also ask my friends the idea about the animation.

➢ **Difficult to design the interface and graphics**

Problems that faced during the early stages of development are lack of knowledge and experience of real courseware system layout of standard user interfaces. Therefore, it is difficult in designing the most appropriate logic user interfaces and the graphics for each situation of traffic signs. So that, I have chosen to refer internet and do some research on many other system interfaces to helps in designing the user interfaces in more presentable and attractive manner

➢ **Limited Time**

As I am very new to all the tools being used, I need a lot of time to start and complete this courseware especially to deliver a really good and smart courseware that achieves targets and objective of this courseware. I have not enough time to develop this courseware as most of the time is used to learn how to use the tools and find the contents that will be included

8.3   System Strengths

Compare to the other similar courseware in the market that I have been survey; this courseware has it strengths and listed as below:

> **User Friendly**

An Animated 'L' Driving Guide is very easy to use. No installations of software are needed in order to use this courseware. Once the courseware started, it shows the menu where user can choose the contents or the exercises. User also can read the user guide first if they do not know how to use this courseware.

> **Easy to use**

This system is very easy to use. The commands and the layout are simple and well organized. Therefore, it is easy to learn up, use, navigate and remember a certain traffic signs, traffic rules and traffic ethics.

> **Uses of Multimedia elements**

The use of multimedia element such as graphics, sound and animation has enhanced learning process more effective. The usage of animation situations, colors, backgrounds and images make this courseware more attractive. The users will more interest to use this courseware.

> ### Colorful and Attractive

The user loves interface that is full of color and cartoons. This courseware has been design with colorful background and cartoons to attract the users more interested to study using this courseware.

> ### Mobility

The courseware will be delivered in CD-ROM format so the users manage to access the content at any time and place that provides standard computer.

8.4 System Limitations

Although this an Animated 'L' Driving Guide has strengths, but this courseware also has it weakness and listed as below:

> ### Language Limitation

This courseware only has Malay version and not provided in another languages.

> ### Speed Limitation

This courseware might be slow because there are a lot of images, gif animation pictures and sound effects which are loaded into this courseware.

> ### Content update

As the courseware is delivered in CD-ROM format, the content inside cannot been update anymore.

8.5 Future Enhancement

This courseware could be further enhanced in the following way:

> **Enhance User Interface**

User interface should enhance from time to time. Multimedia elements such as animated graphics or animated entities should be added to increase it attractiveness, impressive and interactive.

> **Providing more Contents and Exercises**

By provide more contents in this courseware; user can learn more topics with this courseware such as a program include information on other aspects of transportation safety as pedestrian safety, bicycle safety and cover transportation issue as trip planning, vehicle preparation and actions to take in an emergency. The users can also do more exercises to test their understanding of each topic.

> **Providing more Graphics**

More graphics will be providing to make this courseware more interesting. The text in this courseware will also be lessening as most users find graphics more interesting than text.

> **Develop for Other Platform**

The system should be design web-based to make sure that user can use the system from anywhere and globally for privacy manner.

73

8.6   Knowledge and Experience Gained

During the entire development and design of an Animated 'L' Driving Guide, experience and knowledge gained. The following are some of the knowledge that gained from the project:

➢ **Using Authoring Tools**

Technically I have gained so much of knowledge of using authoring tools such as Macromedia Director MX, Swish Max and Adobe Photoshop CS2.

➢ **Skill of Project Management**

Developing this courseware has taught me in so many management skills. Time management was among the most important thing and while developing this courseware, time was really a big matter as classes and other assignment also need to be accomplished.

➢ **Learn to Work Independently and be patient**

As everyone will face more challenge in a working environment, developing this courseware has actually helped me to work more independently. This is a good practice for me before I really face the world outside which have more challenge and obstacles. Developing this courseware has also taught me to be patient. Patient is very important because it requires time to learn, time to develop and time for success.

> **Report writing Skill**

After each system that has been develop, it is important to write down the documentation. This is for the ease of future or even those maintaining the system. Writing report for an Animated 'L' Driving Guide has enhanced my report writing skill which would be good and essential for future purposes.

8.7 Conclusion

This courseware is aim to provide an opportunity for users more interesting about an Animated 'L' Driving Guide by using newer technologies approach.

As an overall, the Animated 'L' Driving Guide has achieved and fulfilled some of the objectives and requirements. It provides interactive and easy learning for 'L' candidates.

There is a lot of knowledge gained throughout the development of the application. These include multimedia program, multimedia technologies, image editing and so on. Experiences gained during the development of this courseware are indeed a valuable one. Final year project as this could really help students to build up their confidence and to work independently as they are going to face a working environment in future.

REFERENCES

REFERENCES

1. ALPER, C. W., KELLERMAN, A.S. AND MEYER, J., 1996. Interactive on CD-ROM. Design, Video and Sound.

2. HILL, J. (1997). Multimedia [online]. Available from: http://www.interactivehome.com/definition.html [Accessed 15 June 2003].

3. JUDITH, C. B. (1999). Word of Learning [online]. Available from: http://www.webct.edu/enhance/word/definition.html [Accessed 15 July 2003].

4. JUDITHRAMONA. (1997). Courseware [online]. Available from: http://www.andragogie.com/CSR/courseware.html [Accessed 20 July 2003].

5. LINDSTROM, R. L. The Business Week Guide to multimedia Presentations: Create Dynamic Presentations That Inspire. New York: McGraw-Hill.

6. NEO, T. KIN AND MAI, N., 1999. The Multimedia Courseware [online.]. Creating Multimedia Content. Macro/ Compleat sdn Bhd.

REFERENCES

1. AGNEW, P.W., KELLERMAN, A.S. AND MEYER, J., 1996. *Multimedia in the classroom.* Boston: Allyn and Bacon.

2. HILL, L. (1993). *Multimedia* [online]. Available from: http://www.lavenderhillmm.com.au/multadv.html [Accessed 15 July 2005].

3. JUDITH C. R. (1996). *Ways of Learning* [online]. Available from: http://www.udel.edu/bateman/acei/multint9.html [Accessed 26 July 2005].

4. JUPITERMEDIA. (1997). *Courseware* [online]. Available from: http://www.webopedia.com/TERMc/courseware.html [Accessed 26 July 2005].

5. LINDSTROM, R., 1994. *The Business Week Guide to Multimedia Presentations: create Dynamic Presentations That Inspire.* New York: McGraw-Hill.

6. NEO, T, KEN AND MAI, N., 1999. *The Multimedia Sourcebook: Volume 1 Creating Multimedia Content.* Meway Computec sdn.bhd.

7. NIEVERGELT, J., VENTURA, A. AND INTERVENER, H., 1986. *Interactive Computer Programs for Educational\Philosophy, Technique and examples.* Addison Wesley.

8. National Safety Council, 1998. *Saving Teenage Lives: The Case Graduated Driver Licensing.* National Highway Traffic Safety Administration (DOT), Washington, DC.

9. Richmon,VA, 1998. State Oversight of Commercial Driver-Training Schools in Virginia. Report of the Joint Legislative Audit and Review Commission, Virginia.

10. Engstrom.I, Gregersen, N.P, Hernetkosko, K.Keskinen, E.Nyberg.A, 2003. *Young novice drivers, driver education and training.* Literature Review. VTI Report 491A, 2003. Available from: http://catss.engr.ucf.edu/aitfia/main_pages/Driver%20Training.htm

11. Philip Augustine, 2004. Road to Safety. The Star.

12. SCHITAI, A. (1998). *Educational Courseware* [online]. Available from; http://www.westga.edu/~distance/schitai.html#anchor106195 [Accessed 25 July 2005].

13. SHELLY, G.B., CASHMAN, T.J. AND WAGGOREW W.C., 1997. *Discovering Computers: A link to the future.* United States of America: International Thompson Publishing (ITP).

14. Jabatan Pengangkutan Jalan Malaysia (2003). *Buku Panduan Pembelajaran Kurikulum Pendidikan Pemandu (KPP).* Kelab Jabatan Pengangkutan Jalan Malaysia.

15. CS. JMU. (2002). *Methods & Methodology.* [online]. Available from: http://.Cs.jmu.edu/users/foxcj/cs555/unit1/LifeCycles/s1d029.htm [Accessed 3 August 2005].

16. KENDALL, K. E AND KENDALL, J. E., 1999. *System Analysis & design.* 4th Edition. Prentice Hall International, Inc.

17. PFLEEGER, S. L., 1998. *Software Engineering Theory & Practice.* 2nd Ed. United States of America: Prentice-Hall Inc.

18. NEWMAN, W.M. AND LAMMING, M.G., 1995. *Interactive system design.* United States of America: Addison Wesley.

19. PRESSMAN R.S., 2001. *Software Engineering*: A practitioner's Approach. 5th ed. United State of America: McGrawHill.

20. SOMMERVILLE I., 2001. *Software Engineering*. 6th ed. United States of America: Addison Wesley

21. http://director-online.com/ [Accessed 18 September 2005].

22. http://www.swishzone.com/ [Accessed 18 September 2005].

23. http://www.jpj.gov.my [Accessed 18 September 2005].

APPENDIX

PANDUAN MEMANDU BERANIMASI
'Animated L Driving Guide'

Mas Idayu Md Sabri (Supervisor), Siti Nur Aslinda Mohamad Ayob, Wan Norfazlina Wan Mustaffa Kamal

Faculty of Computer Science and Information Technology, University of Malaya, Kuala Lumpur

Introduction

Driving test is one critical process of giving one license to drive. Efficient driver education will produce graduated driver which will not only pass the driving test but the same time is a safe driver on the road.

This project focuses on the development of Animated 'L' Driving Guide devoted for better understanding in traffic laws and road signs using the combination of multimedia element to show the animation about the road signs.

Objectives

- Providing new direction to exist driving education programs in Malaysia as the alternative solution
- The 'L' applicant will be able to apply knowledge, processes and skills to become safe of the highway transportation system

Project Scope

1. Highway Code (Road Signs)
2. Traffic Rules
3. Driving Ethics

- Build fully in Malay language

Conclusion

It can help the users to become good traffic citizens and provide an opportunity for users more interesting about traffic laws and road signs by using newer technologies approach.

Prepared by:
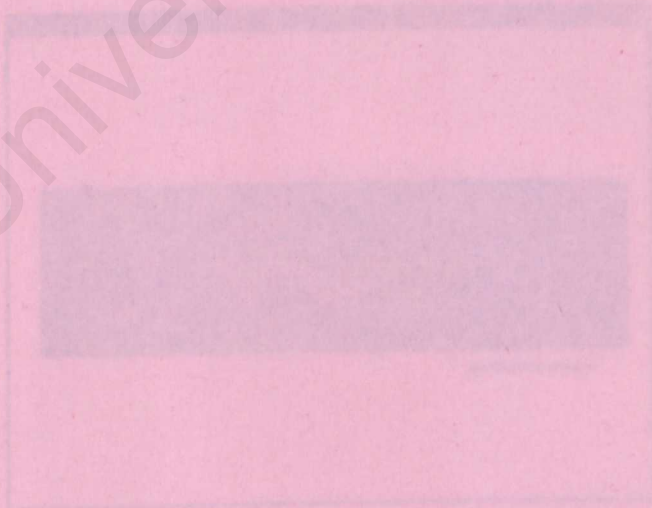
SITI NUR ASLINDA BINTI MOHAMAD AYOB

(WET 020162)

PANDUAN MEMANDU BERANIMASI
'Animated L Driving Guide'

Mas Idayu Md Sabri (Supervisor), Siti Nur Aslinda Mohamad Ayob, Wan Norfazlina Wan Mustaffa Kamal

Faculty of Computer Science and Information Technology, University of Malaya, Kuala Lumpur

Introduction

Driving test is one critical process of giving one license to drive. Efficient driver education will produce graduated driver which will not only pass the driving test but the same time is a safe driver on the road.

This project focuses on the development of Animated 'L' Driving Guide devoted for better understanding in traffic laws and road signs using the combination of multimedia element to show the animation about the road signs.

Prepared by:

SITI NUR ASLINDA BINTI MOHAMAD AYOB

(WET 020162)

Objectives

- Providing new direction to exist driving education programs in Malaysia as the alternative solution
- The 'L' applicant will be able to apply knowledge, processes and skills to become safe of the highway transportation system

Project Scope

1. Highway Code (Road Signs)
2. Traffic Rules
3. Driving Ethics

- Build fully in Malay language

Conclusion

It can help the users to become good traffic citizens and provide an opportunity for users more interesting about traffic laws and road signs by using newer technologies approach.

APPENDIX A

(USER MANUAL)

MAIN PAGE

This is a main page for 'Panduan Memandu Beranimasi'

MODULE 1: 'ISYARAT JALAN RAYA'

1. Click on **'ISYARAT JALAN RAYA'** Button

   - Display **'ISYARAT JALAN RAYA'** Main page where there will be some description about this module
   - User needs to read this description first
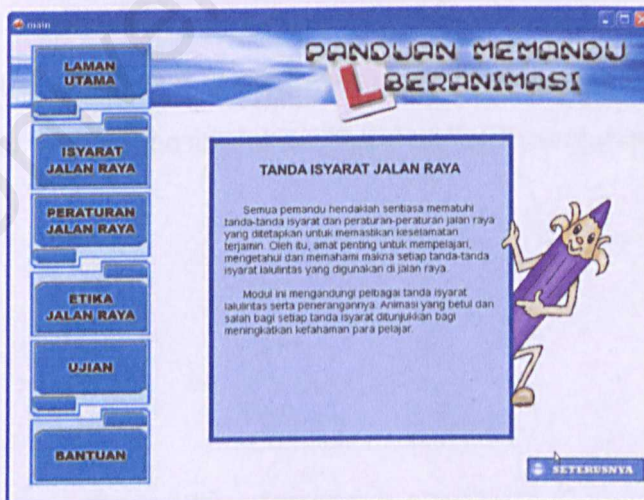
2. If you click on **'SETERUSNYA'** Button, the following interface will be displayed
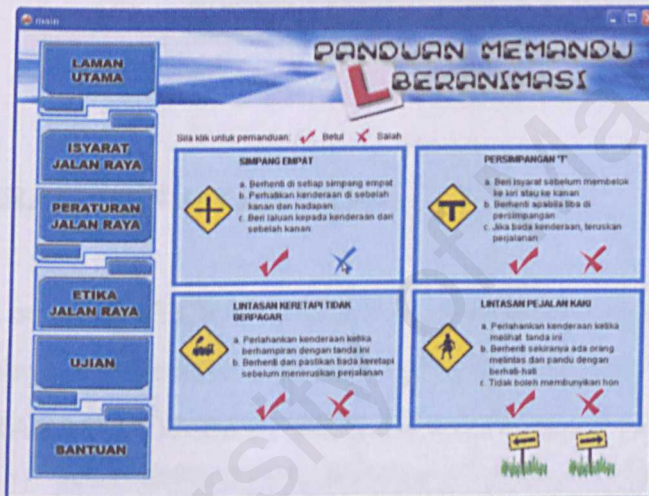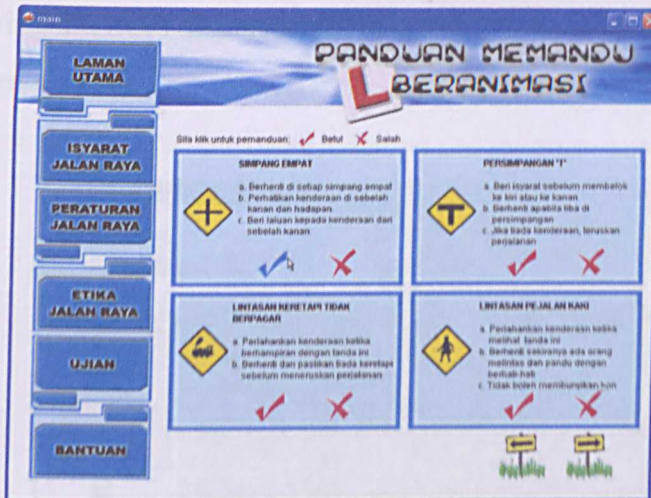
3. There have the description of the traffic signs. You need to click on the right or wrong button to show the animation based on their categories.

4. The following interface displayed with animation. Also have the description of the animated situation.
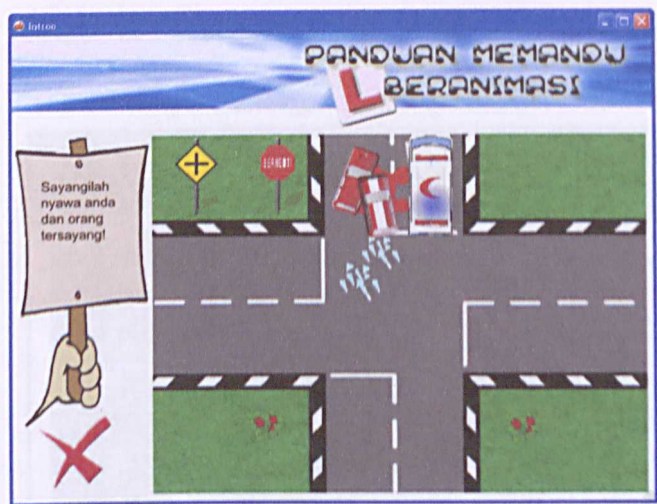
MODULE 2: 'PERATURAN JALAN RAYA'

5. If you click on '**PERATURAN JALAN RAYA**' Button, the following interface will be displayed. There have 4 buttons such as 'PERATURAN GARISAN', 'PERATURAN MEMOTONG', 'PERATURAN JARAK' and 'UJI MINDA'.
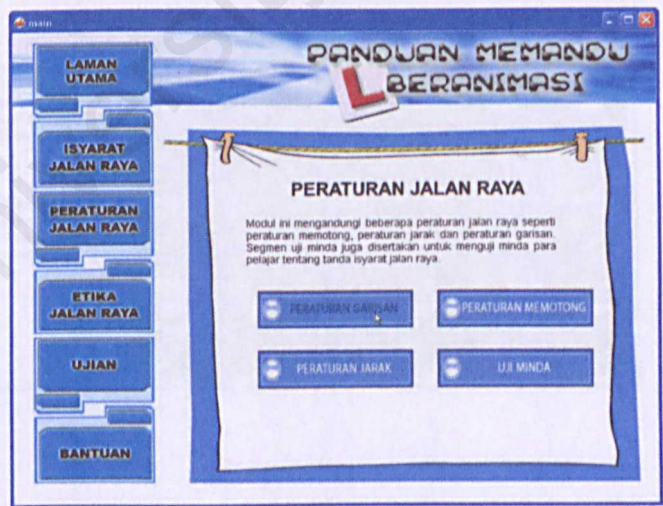
6. You need to read the description given and if you are ready, you just need to click on '**PERATURAN GARISAN**' button for example.

7. The following interface displayed. You need to click on the image and the animation will be show to you. For example, user clicks on the **"GARISAN KUNING"** image.
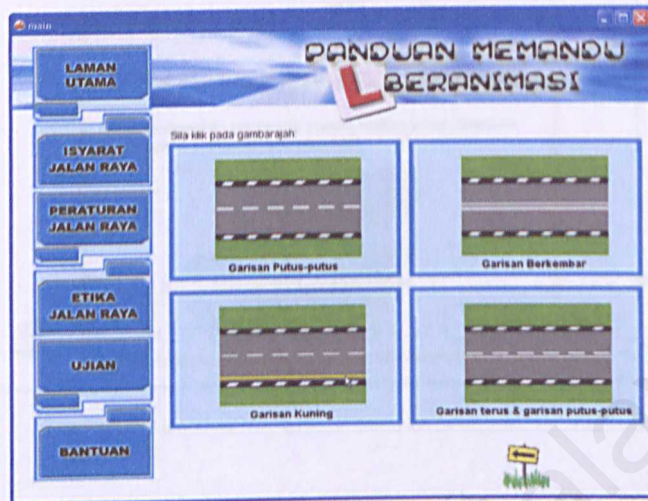
8. After click the button, this interface will be display.
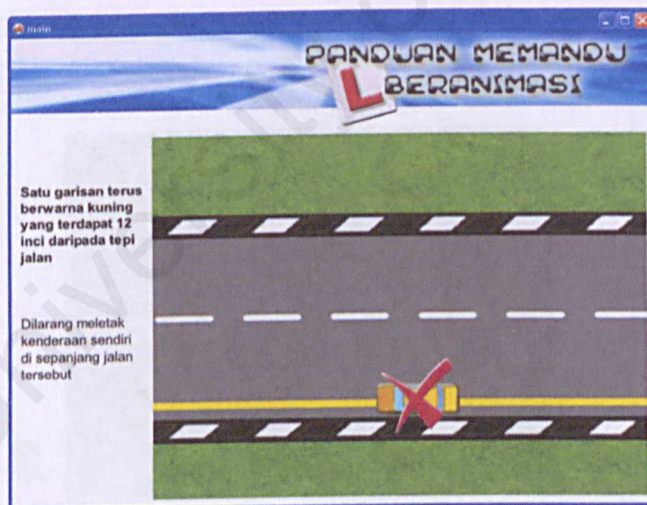
9. For the '**UJI MINDA**' part, user need to click 'MULA' button to start the animation.
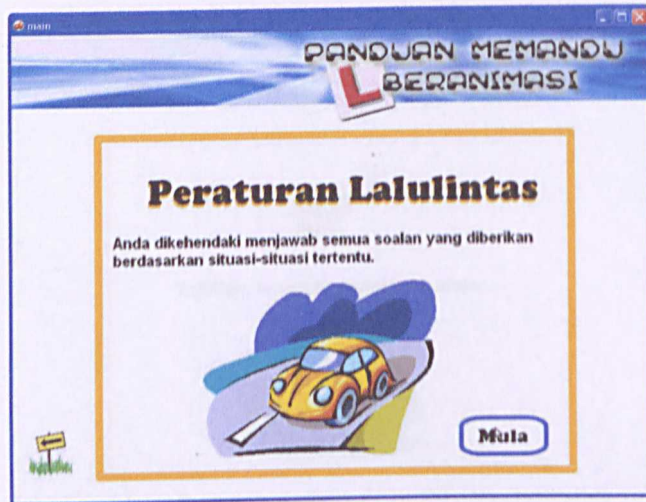
10. Some animation of traffic signs will be displayed and users need to answer the questions by click on the signs.

11. After that, this interface will be displayed whether the users answer right or wrong. Just click on the right or wrong symbol to the next pages.

MODULE 3: 'ETIKA JALAN RAYA'

12. If you click on '**ETIKA JALAN RAYA**' Button, the following interface will be displayed
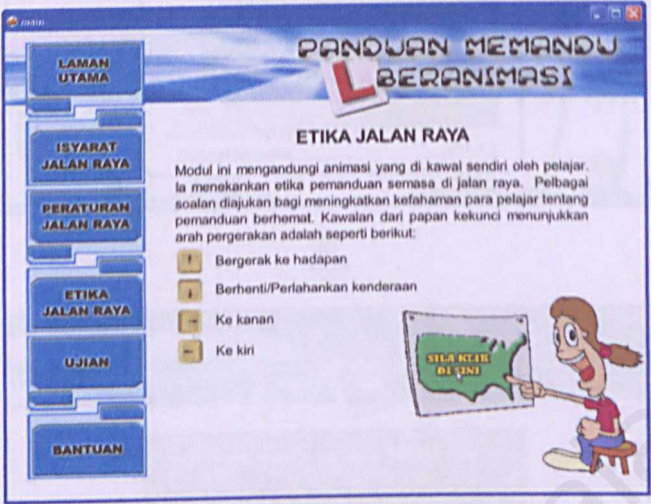
13. You need to read the instruction given and if you are ready to play the games, you need to click on 'MULA' button.
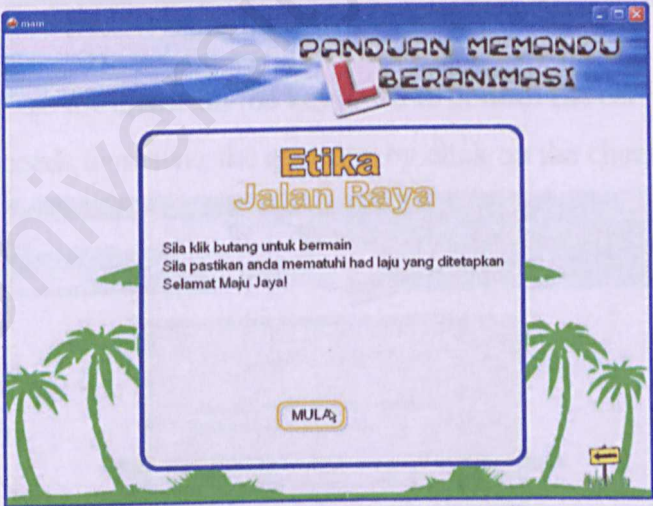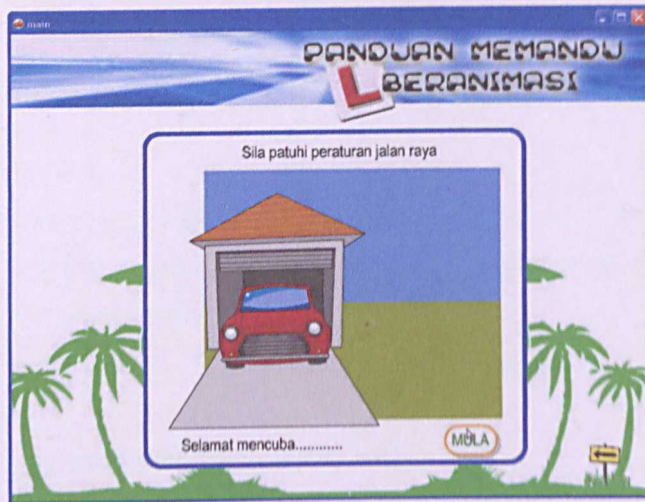
14. The user must use the arrow on the keyboard to control the car.

15. Also the user needs to answer the question by click on the check box

APPENDIX B
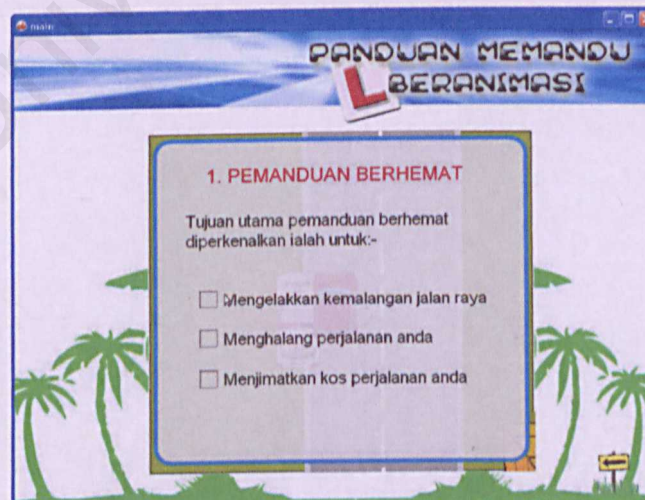
(QUESTIONNAIRE)

QUESTIONNAIRE FORM

Title: <u>Animated 'L' Driving Guide</u>

<u>User Requirement Analysis</u>

User requirement questionnaire were distributed to public. The questionnaire is targeted especially for those who are on going to have a driving license. The purpose of this questionnaire is to get view of how the public accept Animated 'L' Driving Guide courseware.

Part A: Personal Particular

(Instruction: Please tick (✓) on your answer in appropriate box)

1) Gender: ☐ Male ☐ Female

2) Age : ☐ <17 ☐ 18 – 29 ☐ 30 - 49

3) Current working status

☐ Student   ☐ Employed

☐ Unemployed   (Civil servant/private sector/self employed)

Other (please specify) :-------------------------------

4) Level of Education (Highest Level)

☐ PMR   ☐ SPM   ☐ STPM   ☐ DIPLOMA

☐ DEGREE   ☐ MASTER   ☐ NON

1

Part B: Information Awareness

5) Do you have a personal computer at home

□ Yes   □ No

6) How often do you use the computer?

□   7 days a week (everyday)

□   3 – 4 times a week

□   Once a week

□   Once a month

□   None

7) How would you rate your level of computer literacy?

□ Experience   □ Mixed

□ Novice   □ Non-existent

8) Do you have a driving license?

□ Yes   □ No

(Skip question 9 & 10)   (Go to question 9 & 10)

9) How would you rate the current JPJ education?

□   Excellent

□   Good

□   Not good

□   Can be better improved

10) Do you prefer to have **Animated 'L' Driving Guide** courseware before you are to get a driving license?

□ Yes   □ No

11) Do you think **Animated 'L' Driving Guide** courseware can help you to empower your real driving skills and understanding?

□ Yes   □ No

2

Part C: Driving Education Awareness

12) Do you think by using animation presentation will help you to empower your understanding on the course content?

☐ Yes ☐ No

13) Do you prefer to include voice instruction in this courseware?

☐ Yes ☐ No

14) Do you want the presented pictures are relevant to the information?

☐ Yes ☐ No

15) Do you want menu key to go to another module in each screen and key for moving forward and backward in the courseware?

☐ Yes ☐ No

16) Do you want the 'Help' key to get procedural information?

☐ Yes ☐ No

17) How would you prefer the layout for Mock Test in the courseware?

☐ All in one

☐ Different sub-module for different test

(Test for Highway signs, ethics and theory display separately)

18) Would you prefer a timer to go with the Mock Test?

☐ Yes ☐ No

19) Do you want your score automatically saved?

☐ Yes ☐ No

| 1 | 2 | 3 | 4 | 5 |

Less ⟵——————————⟶ High

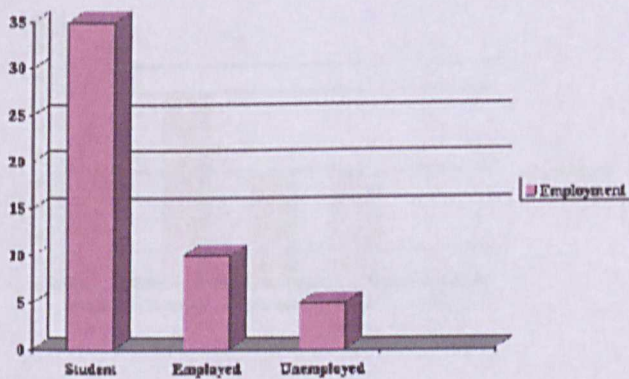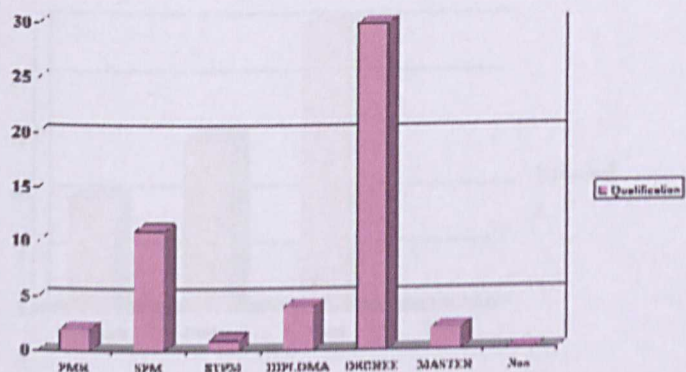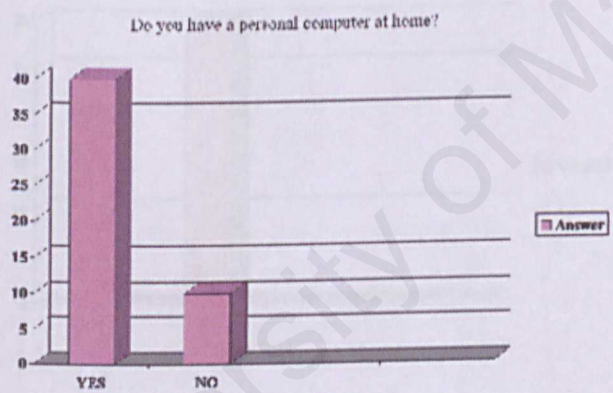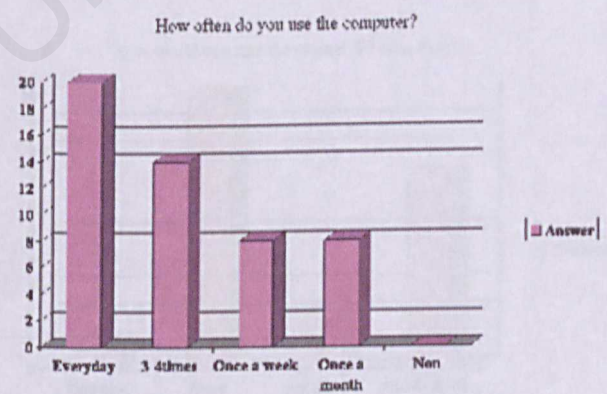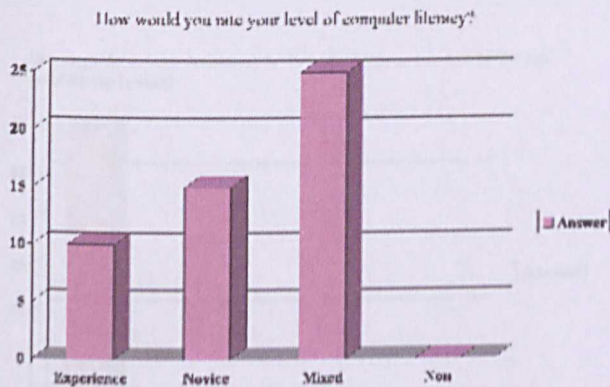20) How would you rate your interest regarding **Animated 'L' Driving Guide** courseware?

☐ _____

Question 1:

Question 2:

Question 3:

Question 4:

Question 5:

Do you have a personal computer at home?

Question 6:

How often do you use the computer?

5

Question 7:

How would you rate your level of computer literacy?

Question 8:

Do you have a driving license?

Question 9:
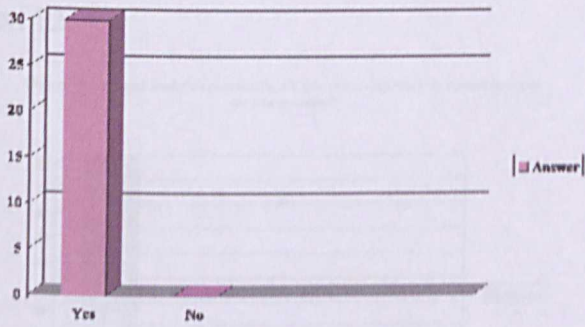
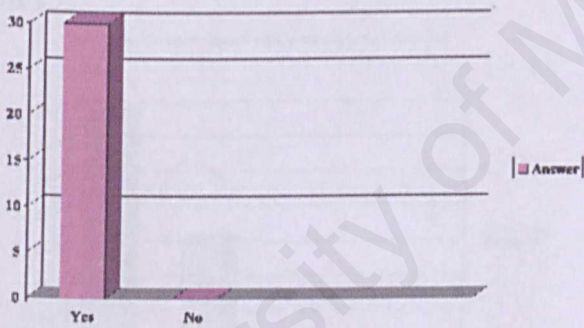How would you rate the current JPJ education?

6
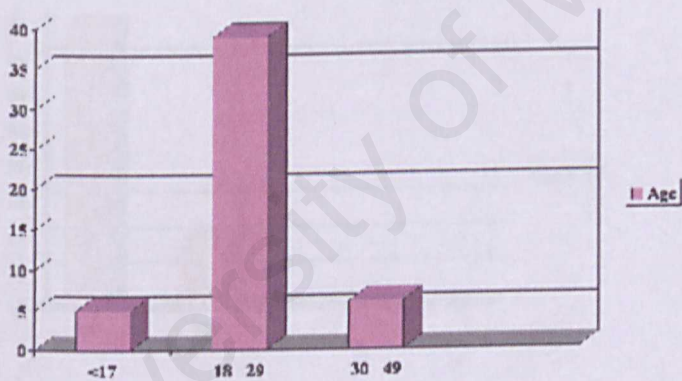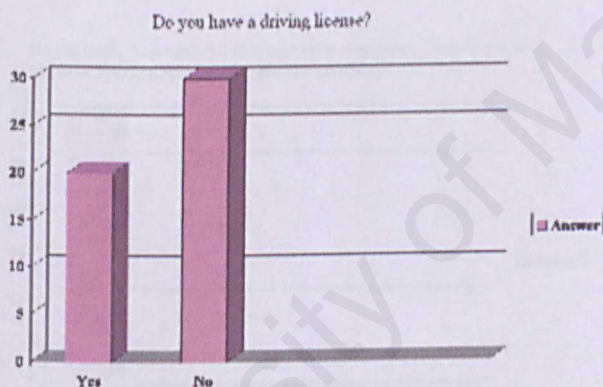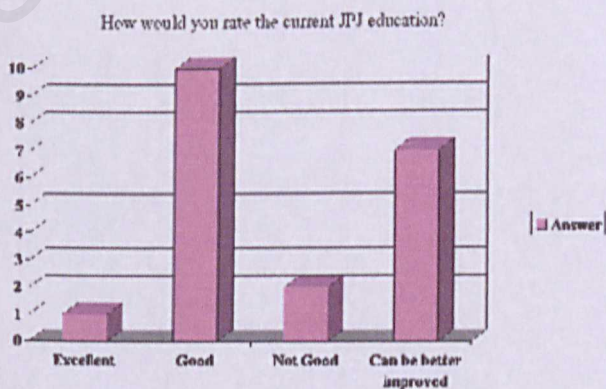
Question 10:

Do you prefer to have **Animated 'L' Driving Guide** courseware before you get a driving license?

Question 11:

Do you think, **Animated 'L' Driving Guide** courseware can help you to empower your real driving skills and understanding?
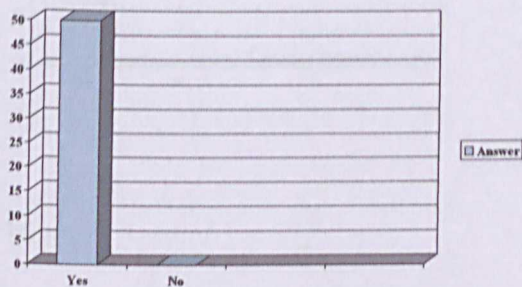
<u>Results: (Question 12 to Question 16)</u>

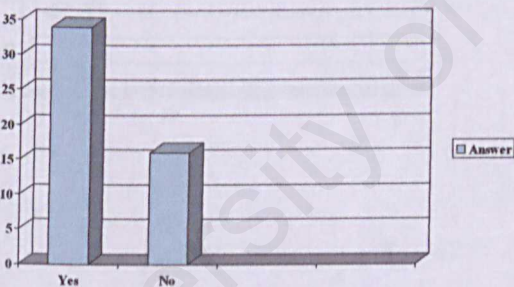(Animated 'L' Driving Guide ('Isyarat', 'Peraturan' & 'Etika' Module))

Question 12:

Do you think by using animation presentation will help you to empower your understanding on the course content?
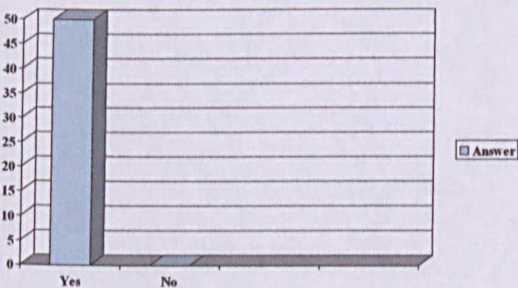

Question 13:

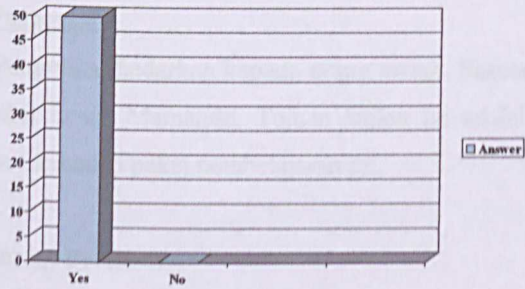Do you prefer to include voice instruction in this courseware?

Question 14:

Do you want the presented pictures are relevant to the information?
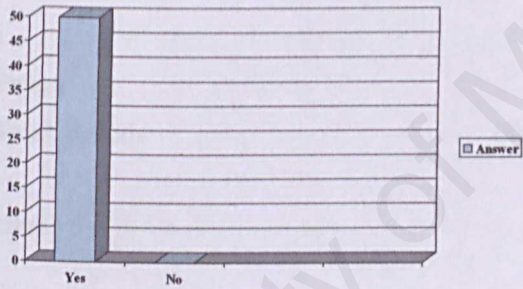
Question 15:

Do you want menu key to go to another module in each screen and key for moving forward and
backward in the courseware?

Question 16 :

Do you want the 'Help' key to get procedural information?

BORANG SOAL SELIDIK
Tajuk: Panduan Memandu Beranimasi

<u>Ujian Penerimaan Pengguna</u>

Ujian Penerimaan Pengguna diedarkan kepada orang awam. Sasaran ujian ini adalah kepada calon-calon yang akan mengambil Lesen Memandu. Tujuan kajian ini adalah untuk memperolehi pandangan dan penerimaan pengguna terhadap pakej pembelajaran ini.

Bahagian A: Maklumat Peribadi
(Arahan: Sila tanda (✓) pada setiap kotak yang disediakan)

1) Jantina: ☐ Lelaki ☐ Perempuan

2) Umur : ☐ <17 ☐ 18 – 29 ☐ 30 - 49

3) Pekerjaan
   ☐ Pelajar ☐ Bekerja
   ☐ Tidak Bekerja (Kerajaan/Swasta/Bekerja Sendiri)

Lain-lain (sila nyatakan) :------------------------------

4) Taraf Pendidikan
   ☐ PMR ☐ SPM ☐ STPM ☐ DIPLOMA
   ☐ DEGRE ☐ MASTER ☐ NON
   E

10

Bahagian B

5) Adakah anda memiliki komputer di rumah?

☐ Ya ☐ Tidak

6) Pada pendapat anda, adakah Pakej Pembelajaran **Panduan Memandu Beranimasi** ini dapat membantu anda dalam meningkatkan pemahaman tentang tanda isyarat, peraturan dan etika jalan raya?

☐ Ya ☐ Tidak

7) Adakah anda memerlukan Pakej Pembelajaran **Panduan Memandu Beranimasi** sebelum mengambil lesen memandu?

☐ Ya ☐ Tidak

8) Sekiranya pakej ini dipasarkan, adakah anda ingin memilikinya?

☐ Ya ☐ Tidak

```
     1        2        3        4        5
  Rendah  ─────────────────────────▶  Tinggi
```
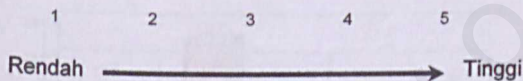
9) Berdasarkan skala di atas, berapakah nilai yang akan anda berikan sekiranya berminat?

☐ _____

10) Sila kemukakan cadangan anda jika ada:-

_____

_____

_____

_____

Result :

Question 1 :

Question 2 :

Question 3 :
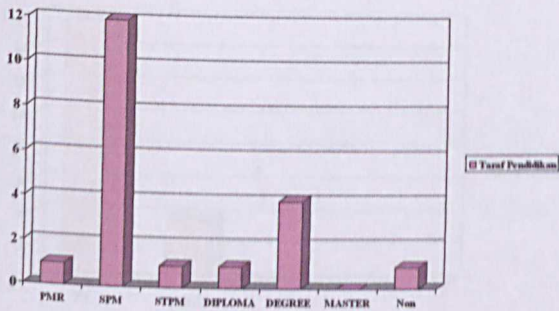
Question 4 :

Question 5 :

Question 6 :
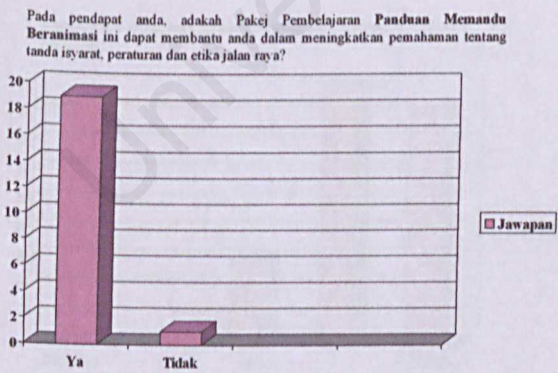
Question 7 :

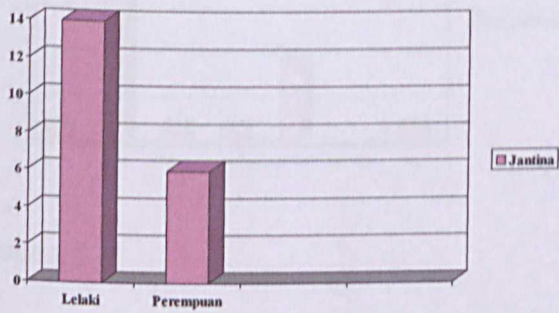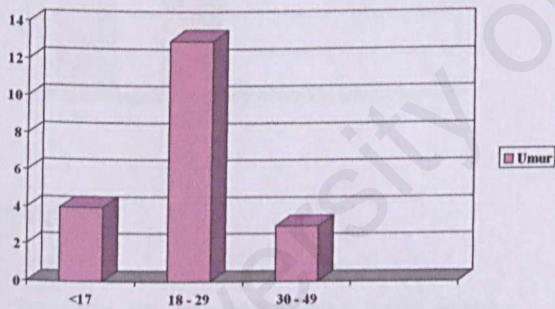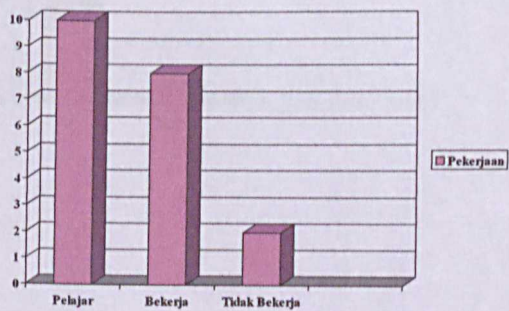Adakah anda memerlukan Pakej Pembelajaran **Panduan Memandu Beranimasi** sebelum mengambil lesen memandu?
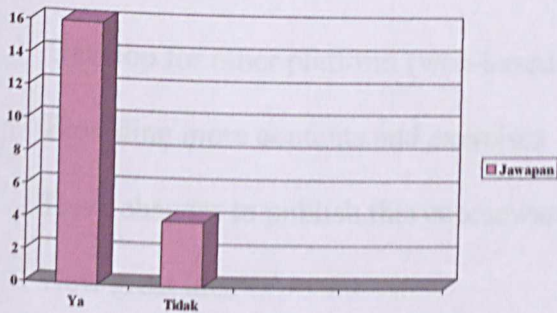
Question 8 :

Sekiranya pakej ini dipasarkan, adakah anda ingin memilikinya?
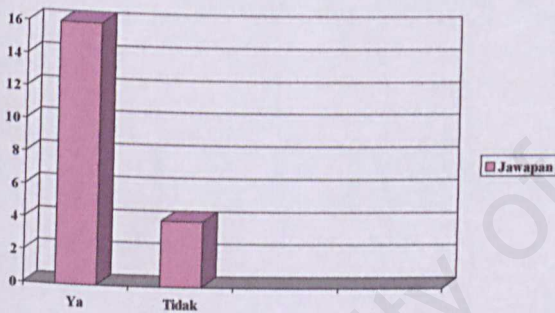
Question 9 :

Berdasarkan skala, berapakah nilai yang anda berikan sekiranya berminat?
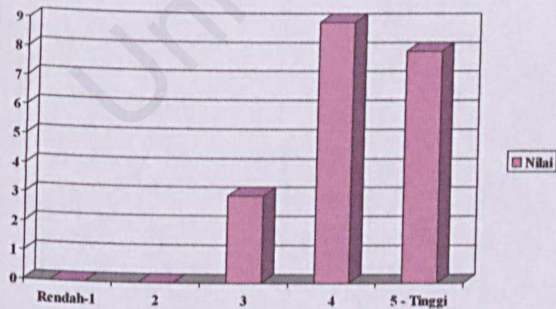
Question 10 :

This is all comments from the public about Animated 'L' Driving Guide courseware

1. Develop for other platform (web-based concept)

2. Providing more contents and exercises

3. Have chances to publish this courseware

4. New great idea

APPENDIX C

(SAMPLE SOURCE CODES)

SAMPLE CODES

(Animated 'L' Driving Guide ('Isyarat Jalan Raya' Module))

To GET 'Isyarat Jalan Raya' module

```
on mouseDown()
go to movie "module1.dir"
end mouseDown
```

To GET other module

```
on mouseDown()
go to movie "module2.dir"
end mouseDown
```

```
on mouseDown()
go to movie "module.dir"
end mouseDown
```

To GET HTML format file

```
on mouseUp
goToNetPage "Bantuan\UserManual.html"
end
```

To stop at each frame and go to other frame (Movie Script)

```
on exitFrame me
  go to the frame
end
```

```
on exitFrame me
  go to frame "tanda isyarat 2"
end
```

```
on mouseDown()
    go to frame "main"
end mouseDown
```

To go to other frame with rollover cursor change (Behavior Script)

```
-- DESCRIPTION --

on getBehaviorDescription me
  return \
    "ROLLOVER MEMBER CHANGE" & RETURN & RETURN & \
    "Change the sprite's cast member when the mouse rolls
over the sprite." & RETURN & RETURN & \
    "PARAMETERS:" & RETURN & \
    "* Rollover cast member"
end getBehaviorDescription


on getBehaviorTooltip me
  return \
    "Use with graphic members." & RETURN & RETURN & \
    "Swaps a sprite's cast member on rollover."
end getBehaviorTooltip


-- HISTORY --

-- 22 October 1998, written for the D7 Behaviors Palette by
James Newton
--
-- Modified 7 January, 2000 by T. Higgins to include the
isOKToAttach
-- event handler along with removing some redundant error
checking.


property spriteNum
property mySprite
property myStandardMember
property myRollovermember


on beginSprite me
  mySprite = sprite (me.spriteNum)
  myStandardMember = mySprite.member
end


on mouseEnter me
  mySprite.member = myRolloverMember
```

```
end mouseEnter


on mouseLeave me
  mySprite.member = myStandardMember
end mouseLeave

on isOKToAttach (me, aSpriteType, aSpriteNum)
  case aSpriteType of
    #graphic:
      return TRUE
    #script:
      return FALSE
  end case
end isOKToAttach

on getPropertyDescriptionList
  if the currentSpriteNum = 0 then exit
  theMember = sprite(the currentSpriteNum).member
  theMemberNumber = theMember.number

  return \
[ \
 #myRolloverMember: \
 [ \
  #comment: "Display which member on rollover?", \
  #format:  #graphic, \
  #default:  member (theMemberNumber + 1) \
 ] \
]
end getPropertyDescriptionList


on mouseDown()
go to frame 11840
end mouseDown
```

APPENDIX D

(TEST CASES
AND
TEST DATA)

Table 7.1: Unit Test Case

Test Case   : 1
Module   : Isyarat Jalan Raya
Unit   : Test
Scenario   : Animation will be displayed for each traffic signs

No	Steps/Fields	Test Data	Expected Result	Test Result
1.	Click on "Isyarat Jalan Raya" button	-	Isyarat Jalan Raya page displayed	Page displayed
2.	Click on "Seterusnya" button	-	Traffic signs page displayed	Pass
3.	Click on right button	-	Animation displayed with description	Pass
4.	Click on wrong button	-	Animation displayed with description	Pass
5.	Click on back and next button	-	Go to other page and displayed	Pass

Status : Pass
Date   : 6 April 2006

Table 7.2: Unit Test Case

Test Case   : 2
Module   : Peraturan Jalan Raya
Unit   : Test
Scenario   : Animation will be displayed for each traffic rules

No	Steps/Fields	Test Data	Expected Result	Test Result
1.	Click on "Peraturan Jalan Raya" button	-	"Peraturan Jalan Raya" page displayed	Page displayed
2.	Click on "Peraturan Garisan" button	-	"Peraturan Garisan" page displayed	Pass
3.	Click on the image of "Peraturan Garisan"	-	Animation displayed with description	Pass
4.	Click on "Uji Minda" button	-	Animation displayed with description	Pass
5.	Click on back and next button	-	Go to other page and displayed	Pass

Status : Pass
Date : 6 April 2006

Table 7.3: Unit Test Case

Test Case : 3
Module : Etika Jalan Raya
Unit : Test
Scenario : Animation will be displayed for this game

No	Steps/Fields	Test Data	Expected Result	Test Result
1.	Click on "Etika Jalan Raya" button	-	"Etika Jalan Raya" page displayed	Page displayed
2.	Click on situation image	-	Animated situation display	Animated situation displayed
3.	Click on "Mula" button	-	Start the game	Animated situation displayed
4.	Click on back button	-	Go to previous page and displayed	Pass

Status : Pass
Date : 6 April 2006

Table 7.4: Integration Test Case

Test Case : 1
Module : Isyarat Jalan Raya, Peraturan Jalan Raya and Etika Jalan Raya
Scenario : Able to integrate with other modules

No	Steps/Fields	Test Data	Expected Result	Test Result
1.	Click on "Laman Utama" Button	-	Laman Utama page, displayed	Page displayed
2.	Click on "Isyarat Jalan raya" Button	-	Isyarat Jalan raya page displayed	Pass
3.	Click on "Peraturan Jalan raya" Button	-	Peraturan Jalan raya page displayed	Pass
4.	Click on "Etika Jalan raya" Button	-	Etika Jalan raya page displayed	Pass
5.	Click on "Ujian" Button	-	Ujian page displayed	Pass
6.	Click on "Ujian Tanda Isyarat" Button	-	Ujian Tanda Isyarat page, displayed	Pass

7.	Click on "Ujian Peraturan Jalan raya" Button	-	Ujian Peraturan Jalan raya page, displayed	Pass
8.	Click on "Ujian Etika Jalan raya" Button	-	Ujian Etika Jalan raya page, displayed	Pass
9.	Click on "Mula Ujian" button	-	System start test	Question displayed on screen
10.	Click on "Keluar" button	-	System exit test	Go to end page
11.	Click on "OK" at alert score box	-	Displayed score file	Score file displayed
12.	Click on "Bantuan" Button	-	HTML file format displayed	Pass

Status : Pass
Date   : 6 April 2006