

Airline Searching System

Ibrahim T.Nather

Universiti Utara Malaysia

2011

Airline Searching System

A project submitted to Dean of Postgraduate Studies and Research in partial
Fulfillment of the requirement for the degree
Master of Science of Information Technology
University Utara Malaysia

By
Ibrahim T.Nather

© Ibrahim T.Nather, February 2011 .All rights reserved



**KOLEJ SASTERA DAN SAINS
(College of Arts and Sciences)
Universiti Utara Malaysia**

**PERAKUAN KERJA KERTAS PROJEK
(Certificate of Project Paper)**

Saya, yang bertandatangan, memperakukan bahawa
(I, the undersigned, certifies that)

IBRAHIM T. NATHER
(804205)

calon untuk Ijazah
(candidate for the degree of) **MSc. (Information Technology)**

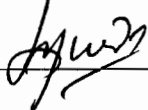
telah mengemukakan kertas projek yang bertajuk
(has presented his/her project of the following title)

AIRLINE SEARCHING SYSTEM

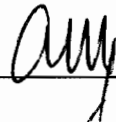
seperti yang tercatat di muka surat tajuk dan kulit kertas projek
(as it appears on the title page and front cover of project)

bahawa kertas projek tersebut boleh diterima dari segi bentuk serta kandungan
dan meliputi bidang ilmu dengan memuaskan.
(that this project is in acceptable form and content, and that a satisfactory
knowledge of the field is covered by the project).

Nama Penyelia
(Name of Supervisor) : **MDM. YUSSALITA MD. YUSSOP**

Tandatangan
(Signature) :  Tarikh (Date) : 1/8/2011

Nama Penilai
(Name of Evaluator) : **DR. YUHANIS YUSOF**

Tandatangan
(Signature) :  Tarikh (Date) : 8/3/11

PERMISSION TO USE

In presenting this project in partial fulfillment of the requirements for a postgraduate degree from Universiti Utara Malaysia, I agree that the University Library may make it freely available for inspection. I further agree that permission for copying of this project in any manner, in whole or in part, for scholarly purpose may be granted by my supervisor(s) or, in their absence by the Dean of Postgraduate and Research. It is understood that any copying or publication or use of this project or parts thereof for financial gain shall not be allowed without my written permission. It is also understood that due recognition shall be given to me and to Universiti Utara Malaysia for any scholarly use which may be made of any material from my project.

Requests for permission to copy or to make other use of materials in this project, in whole or in part, should be addressed to

Dean of Research and Postgraduate Studies

College of Arts and Sciences

Universiti Utara Malaysia

06010 UUM Sintok

Kedah Darul Aman

Malaysia

Abstract

The development of tourism industry and global economy has made flying more and more popular in people's life. While there are many flights that share the same destination and origin, their services and price varies from different airline companies. Passengers are always seeking for ticket at a low cost and services of high quality. Unfortunately, the cheap airline is tend to offer lower quality of their services, such as no beverage supplied, luggage destroy, and so on. In order to find the best choice, users always need to make a balance between the price and service offered by the airline. This project will give the users a complete assist in choosing the best airline ticket for their fly. The flight information will be stored in the database including its price, time, date, origin and destination. Besides that, the website will offer a forum for the users who had experienced this flight to discuss their experience there, so that the potential users can check the comments and have a clearer idea of the services offered by this airline. Searching for the best ticket is time consuming and troublesome, but this system solved this problem and enable users to make the wise decision efficiently. This research used the spiral methodology, and it is expected to make the airline ticketing search easier and more efficient for the customers.

ACKNOWLEDGEMENT

بِسْمِ اللّٰهِ الرَّحْمٰنِ الرَّحِیْمِ

By the Name of Allah, the Most Gracious and the Most Merciful

First of all, I would like to thank Allah, for having made everything possible by giving me strength and courage to do this work.

I would also like to thank to my supervisor of this project, Yussalita bte Md. Yussop for the valuable guidance and advised. She inspired me greatly to work in this project, and her willingness to motivate me contributed tremendously to my project.

An honorable mention goes to my family, especially my father, mother and my brother for their understandings and supports to me in completing my higher education and this project, as well as to all my lecturers at the faculty of Information Technology. They have given to me all the information for completing the requirements of this study, especially to my evaluator Dr. Yuhanis for her advised; to my friends they gave me energy to finish my project. Without the help from all the people mentioned above, I would have faced many difficulties while doing this project.

Finally, I want to dedicate this research to my father and my mother.

Table of Contents

PERMISSION TO USE.....	iii
ABSTRACT.....	iv
ACKNOWLEDGEMENT.....	v

CHAPTER ONE

INTRODUCTION

1. 1 Introduction.....	1
1. 2 Problem Statement.....	2
1.3 Research Question.....	3
1.4 Research Objectives.....	3
1.5 Research Scope.....	3
1.6 Significance of Study.....	4
1.7 Report Structure.....	4
1. 8 Summary.....	5

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction.....	6
2.2 Interface.....	6
2.3 Web Application.....	7
2.3.1 Searching Website.....	9
2.3.2 Forum Website.....	10
2.4 Security.....	11
2.5 Usability Evaluation.....	13
2.6 Airline Industry.....	16
2.7 Summary.....	18

CHAPTER THREE

METHODOLOGY

3.1 Introduction	19
3.2 Research Methodology	19
3.2.1 Understand the Requirements of the Website.....	21
3.2.2 Design the System	21
3.2.3 Build in Stage.....	24
3.2.4 Test and Evaluate	24
3.2.5 Documentation	25
3.3 Summary	26

CHAPTER FOUR

SYSTEM ANALYSIS

4.1 Introduction	27
4.2 Functional Requirement	28
4.3 Non Functional requirements	28
4.3.1 Security:	28
4.3.2 Usability:.....	28
4.3.3 Reliability:.....	29
4.3.4 Understandability:	29
4.3.5 Performance:	29
4.3.6 Availability:	29
4.4 Use Case Diagrams:.....	29
4.5 Use Case Specification.....	32
4.6 Sequence Diagram and collaboration Diagram	42
4.7 Class Diagram	49

4.8 Screen Capture for Database	52
4.9 Summary	57

CHAPTER FIVE

RESULT OF THE SYSTEM

5.1 Introduction	58
5.2 Screenshot of the system	58
5.2.1 User functionalities.....	58
5.2.2 Functionalities for the administrator	65
5.3 Result of the Usability Evaluation.....	71
5.4 Summary	74

CHAPTER SIX

CONCLUSION

6.1 Introduction	75
6.2 Findings.....	75
6.3 Research Limitation.....	76
6.4 Recommended Works	76
6.5 Summary	76
References	77
APPENDIX	82

LIST OF TABLE

Table 2. 1: Searching Website in the Tourism Industry	9
Table 2. 2: Usability Evaluation Techniques.....	14
Table 3. 1: Requirements for web application development	25
Table 4. 1: Use Case Login	32
Table 4. 2: Use Case user search	33
Table 4. 3: Use Case Book	35
Table 4. 4: Use Case Add Manager	36
Table 4. 5: Use Case Delete Manager.....	37
Table 4. 6: Use Case Edit Manager	39
Table 4. 7: Use Case View Passengers	41
Table 5. 1: Usability evaluation Result	72

LIST OF FIGURE

Figure 2. 1: Usability, Effectiveness, Efficiency and Satisfaction.....	13
Figure 3. 1: Spiral methodology	20
Figure 4. 1: Use Case Diagram for the User.....	30
Figure 4. 2: Use Case Diagram for Administrator	31
Figure 4. 3: Sequence Diagram for Login.....	43
Figure 4. 4: Sequence Diagram for Logout.....	44
Figure 4. 5: Sequence Diagram for Add Manager	45
Figure 4. 6: Sequence Diagram for search	46
Figure 4. 7: Sequence Diagram for Edit Manager	47
Figure 4. 8: Sequence Diagram for Delete Manager.....	48
Figure 4. 9: Class diagram for Login.....	49
Figure 4. 10: Class diagram for edit user	50
Figure 4. 11: Class diagram for Edit Manager/User Account	50
Figure 4. 12: Class diagram for Add (user, manager).....	51
Figure 4. 13: User table.....	52
Figure 4. 14: Admin table	53
Figure 4. 15: cities table	53
Figure 4. 16: Companies table.....	54
Figure 4. 17: passengers table.....	54
Figure 4. 18: Travels table.....	55
Figure 4. 19: Log table.....	55
Figure 4. 20: Functions used by the users	56

Figure 5. 1:Home Page.....	59
Figure 5. 2:book flight	60
Figure 5. 3: flight search information	61
Figure 5. 4: homepage of the forum.....	62
Figure 5. 5: Register new users.....	63
Figure 5. 6: post message	64
Figure 5. 7: add new user	65
Figure 5. 8: edit user account.....	66
Figure 5. 9: delete user account	66
Figure 5. 10: add new manager.....	67
Figure 5. 11: edit manager.....	68
Figure 5. 12: delete manager account	68
Figure 5. 13: add new travel	69
Figure 5. 14: edit travel	70
Figure 5. 15: delete travel.....	70
Figure 5. 16: log account.....	71
Figure 5. 17: Graph of the Usability Testing.....	74

CHAPTER ONE

INTRODUCTION

1. 1 Introduction

People use flight for many purposes including tourism, business, study, medical treatment and so on (Becken & Hay, 2007). With the improving of living standard of people's life and the development of technology (Epping, 2009), the airline has become a more and more popular tool for transportation (Fojt, 2006). While the quantity of airlines increased, the service and price offered by them also varies a lot from each other (Shaw, 2007).

Services offered are highly depended on the Airline brand and target market, while the ticket price is also highly depended on the date and time, and the saleable status (Blake, & Sinclair, 2003). In order to find the cheapest price and better services, user need to search all the airline companies to get the information and this is troublesome and time-consuming (Ravelojaona & Chandra, 2008).

In this research, a prototype to help users search for the cheapest ticket is proposed, it also offers a forum to discuss about their experience of the service from those airlines. To achieve this aim, information of selected airline companies were stored in a the prototype, so the user just need to enter the origin, destination, and

date, ticket information in all the airlines stored in the database can come out together.

This research focus only on Airlines Company whose origin is in Malaysia such as Malaysia Airlines, Firefly and Air Asia to build the database. The researcher got all the information needed from the selected airlines company to be stored in the database.

1. 2 Problem Statement

The popularity of flight leads to the rapid development of airline industry, the amount of airline companies are growing continuously in this world to satisfy the growing demand of flight. Such large quantity of flight makes the flight searching a complex work.

In order to find the suitable ticket which can both meet the budget and service requirements, a lot of procedures need to be done.

First, the customer needs to fill in their requirements such as the origin, destination, date, in the airline selected and search for the ticket information. After getting the information, they need to make the comparison to select the cheapest ticket. But this method is very time consuming, and once the customer doesn't know all the airlines available, he will miss the opportunity to find the cheapest ticket.

Secondly, even though he find the cheapest price, if he is not informed of the service offered by this airline, he may regret for his choice once the service cannot reach to his expectation. But if the customer wants to search for the service quality of the airlines, what he see from the internet maybe huge amount of advertisement, the real users' comments are hard to be accessed.

Cheapest ticket takes a lot of energy and time to be found, meanwhile, service is intangible, and it is hard to be known without experiencing it. Therefore, the ticket searching process becomes harder and more time consuming for users. Meanwhile, there is no specific airline searching engine that focuses on Malaysia airlines.

1.3 Research Question

The research questions that need to be solved in this research are:

- How can solve a current problem by implement the Airline searching system?
- What is the response of users to the Airline searching system?

1.4 Research Objectives

The following objectives are hoped to be achieved through this research:

- To solve the current problem by implement Airline searching.
- To evaluate the Airline searching system.

1.5 Research Scope

Data of this research is of Malaysia Airline, Firefly and Air Asia.

1.6 Significance of Study

This study develops a prototype to help the users to search for the cheapest airline ticket while offering a forum for them to discuss and view the service of the airlines. It can save the time and energy for the users in the ticket searching significantly.

1.7 Report Structure

Chapter One: the background of the study is introduced; the problem statement explains the motivation to do this study and the research questions and objectives. The significance of the study was explained together with the report structure.

Chapter Two: literature review is made for the research. The airline industry was discussed from its history and development; its pricing policy was emphasized. Meanwhile, the usability evaluation was also reviewed to find suitable ways for the evaluation of this project. Web application was discussed as well as related works to know better of this project was conducted the interface, security issue and the tools used were also reviewed in this chapter.

Chapter Three: the methodology used in this project is discussed in chapter three, it is the spiral methodology which has five phases: understand the requirement, design the system, build in stage, test and evaluation, and documentation.

Chapter Four: the system was analyzed in chapter four. The collaboration diagram, sequence diagram were used to show the organization and operation of this system, system structure was clearly shown in these diagrams.

Chapter Five: the screenshot was presented in this chapter to explain about the system, its function and operation. The permission level and functions of each level of users were explained in detail.

Chapter Six: as the last chapter of this project, the conclusion was made in this chapter, the researcher makes a review to see whether this project has reached the research objectives, whether the research questions has been answered, after confirmed the goals has been reached, the researcher concludes the limitation of this project, and the suggestions are made for the future researchers as well.

1. 8 Summary

This chapter introduced the background of this research, the problem gives motivation to this research where large quantity of users could not find the suitable tickets to reach their budget and service expectation at the same time. So the objective of this project was to develop a prototype enable users to view both the price and service of the airlines and to evaluate it to ensure the good quality of it. The significance and organization of this project has also been clearly stated together with its scope.

In the next chapter, literature review is discussed.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter discusses the related literature review, information regarding the interface, web application, usability evaluation, security and tools used are all collected in this chapter.

2.2 Interface

Interface is very important in all website or software to ensure the satisfaction of users. The concept of interface has a long history. As an engineering technology term, interface presents to the field of engineering technology from origin. It is used to describe the integrated status of two components (Renping et al., 2009). Effective interface management plays a vital role in success and efficiency for the software development. It is not only the appearance of the system, but also describes the function and relationship between the users and the system (Renping et al., 2009).

Many researchers have paid attention to the field of user interface as the interface has become an important factor in the evaluation of the software. Even though

these researches done on the topic of interface have boosted the development of interface design, but it still facing some challenges (Liu et al., 1998). According to Gao, Li, & Wang (2009), the current interface design pattern is lack of unified standardized description, so it results in significant insufficiency in using nested component of multiple interface design pattern to develop complex user interface, and the need to display the content with a hierarchical structure in the limited area is not meet, either. To solve this problem in interface engineering development, more attention must be paid to the integration mechanism of model-based interface development (Gao et al., 2009).

2.3 Web Application

The website offering services to the guests are experiencing a rapid development since the 20 the century both in scale and complexibility (Zhao & Chen, 1999; Chen, Cheng, & Huang, 2009; Zhu, Wu, & Wang, 2010). Such website has to decide its functionality and access according to different levels of the requirements of the users (Detter et al., 2004). The basic function is to enable communication between the users and website, and the communication is done via the HTTP protocol (Takahashi et al., 2010).

For commercial website, profit is an important element to be considered before application development (Hooi et al., 2008). The Canter for Economics and Business research has stated that U.K online retail sales has reached 82 billions and is expected to reach US \$336 Billion by 2020 (Takahashi et al., 2010).

Different web application has different functions and can generate different revenue, thus the cost to develop it is also various. Cost estimating is very

necessary to be done before the development of the web application to ensure the profitability of the web application (Hooi et al., 2008)

As the increasing demand of web-based application, large numbers of web-based application have been developed and lead to many issues such as scalability, interoperability and application performance, application integration and so on (Dezhgosh & Angara, 2005).

Besides that, the competition of software has pushed the researcher to develop intelligent products to better satisfy users (Tabrizi & Moshkenani, 2008). It is very important for the researcher to evaluate the usability of the web application before putting it into real usage to ensure it is able to satisfy the requested quality and performance (Liu et al., 2000).

Usability evaluation is critical and challenging task (Miao et al, 2008). After developing the web application, expert judgement is frequently applied to ensure the quality and performance of the web application (Hooi et al., 2008).

2.3.1 Searching Website

Websites that provide airline information have got rapid development in recent years (Foijt, 2006). In the tourism industry, there are many related searching website has gain success.

Table 2. 1: Searching Website in the Tourism Industry

Name	Website Address	Product	Description
Hotels.com	http://www.hotels.com/ ?http://www.hotels.com /	Hotel Reservation	130,000 Hotels worldwide 1.8 Million of guest reviews No charge of cancellation fees
Yatra.com	http://www.yatra.com/	Tourism products includes airlines, trains, hotels, etc.	Very complete information, include booking of all kinds of torism products and also the city guide.
Booking.com	www.booking.com	Hotel	More than 30 million of visit every month, the biggest sales of hotel among the entire hotel online booking website.

The entire successful tourism product booking system has their own advantages and disadvantages, but most of them could be seen in more than one language to the users convenient from the worldwide.

2.3.2 Forum Website

Web forum offers plenty of information and valuable resources at a low cost, so it has become an important channel to make knowledge contribution. But the junk and fake information also existed in the forum since it could be offered by any users instead of professional administrator. It has become a challenging task for the users to identify the right and correct information (Fang et al., 2008).

Tourism product is hard to be tangible, especially the airline service. Different people may have totally different view to the same flight, and when they post their view on the forum, the different information may lead confusion the users who saw it. Thus, it is very necessary to have large amount of users who contribute their view to the airline to show the service quality from a fair and complete way (Shi et al., 2009).

Forum is a good channel to offer in-depth views towards the service offered by the airlines. Each forum thread was start with an initial post, which is very short generally, but the reply could be very long or very short, people who has strong feeling towards the topic will write down their experienced in detail and other people may also write down their experienced to make support their view, which is agree or disagree with others. From these detailed information, users can have an in-depth understanding of the airline before they really experience its service. Since airline service is intangible, the forum is very important to supply evidence for the service quality (Shi et al., 2009).

There are many websites offering forum for the users to put their comments to the tourism products they have ever used. Among all of them, the most famous one is Trip Advisor.

Trip Advisor is the platform for the travellers to leave their comments on a specific tourism product according to their experience. For the airlines review, users can leave both comments and mark the points for the airlines. It has already become an important reference for the travellers to read and consider before they finally select the airline (Fang et al., 2008).

2.4 Security

Information Technology has changed people's life significantly, the security of information is very important. There are five main parts of the information security: 1) host security; 2) physical security; 3) data security; 4) network security; and 5) application security. Since the host security is the first floor of the whole information system, and it is depend on operation system (OS) security, so the OS security is the foundation for the whole computer information system security. Operation system security plays also a very important role in this proposed system. Our system will give different authorities to the admin and the users to ensure that the operation system security is ensured.

No software development can ignore the security issue. There are 7 main aspects in the software security mechanism:

- User identification and authentication: the authentication requires users to identify themselves by log in to the system using their own account and password.
- Access control: In computer system, access control is the primary content in security mechanism. Different level of users has different level of permission to access to the application in the software.

- The least privilege management: Administrator's privileges are divided into a group tiny granularity privilege, and given to different system administrators/managers. Make all kinds of system administrators/managers only have the privileges needed for completing their tasks. Then, that can reduce the losing that result from missing privilege user's password, wrong software, malicious software and inaccurate operation, etc.
- Trusted path: In computer system, users interact with OS through untrustworthy middle application layer. OS must make sure that Trojan horse cannot capture information when users and security kernel are communicating, and provide a trusted path.
- Covert channel: The covert channel is the communication channel that process are allowed to transmit information with a manner of harming system security policy. Covert channel should be analysed when design system, adopt measure to restrict or eliminate covert channel at a certain extent.
- Security audit: The audit is to record, check the activities concerning security in system.
- Virus defines: Generally speaking, it is very difficult to prevent computer virus completely. But it could have a certain protection function through security mandatory access control mechanism of security OS.

2.5 Usability Evaluation

Software has its goal to achieve to perform certain tasks, and whether the goals are achieved will be seen by carrying out the usability evaluation. The usability was defined which include three important factors. They were effectiveness, efficiency, and satisfaction (Ramli & Jaafar, 2008).

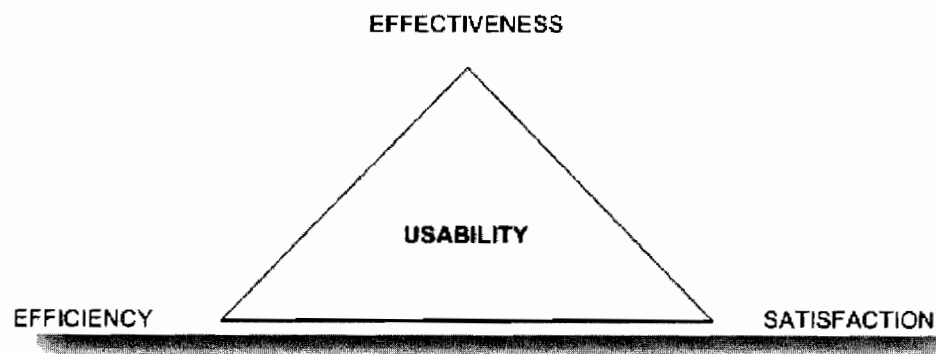


Figure 2. 1: Usability, Effectiveness, Efficiency and Satisfaction (Ramli & Jaafar, 2008)

The development and implementation cannot be done without the involvement of both the developer and the user; the best situation of software development is the win-win situation for both developer and users (Paithankar & Ingle, 2009). There are many methods to run the usability evaluation (Ramli & Jaafar, 2008). The most frequently used are listed in Table 2.2.

Table 2. 2: Usability Evaluation Techniques

Usability Evaluation Techniques	Explanations
Usability testing.	<p>The target users are requested to perform the real task using the software and the process will be observed by the evaluators. This technique can find the problem in real usage but it costs a lot of time and money (Liu, 2008).</p>
Heuristic evaluation	<p>The evaluator will assess the website and evaluate its usability following some principles or heuristics. In heuristic evaluation, Evaluators assess whether a website complies with recognized usability principles or heuristics. The 10 recommended heuristic principles are:</p> <ul style="list-style-type: none"> • visibility of system status • match between system and the real world • user control and standards • consistency and standards • error prevention • recognition rather than recall • flexibility and efficiency of use • aesthetic and minimalist design • error recovery • help and documentation <p>The result of the evaluation is easily affected by the background and the skill of the evaluator (Matera, et al., 2002).</p>

Cognitive walkthroughs	A team of people are gathered to accomplish the defined tasks. They are supposed to be from different background to make sure the software can satisfy different users (Liu, 2008).
Focus groups.	The target users will have a chatting with the experts, thus the problems and the degree of user satisfaction will be known. But it is hard to find the skilful host and the group of target users (Liu, 2008).
Thinking aloud.	Small amount of target users are required to carry out this usability evaluation and state out their thinking while accomplish the assigned tasks (Liu, 2008).
Questionnaire	The questionnaires are very effective tools to get a lot of information in a short time and low cost, so it is very widely used. With the development of internet, the online questionnaire is adopted by many researchers (Liu, 2008).

User satisfaction has been observed to be the most important factor of the software success. More and more attention has been paid to the interaction between the user and the system (Skattor, 2008). Thus, usability evaluation based on user-satisfaction is commonly used in the software development process (Paithankar & Ingle, 2009). There is no need to evaluate the software for so many times and the moral issues must be taken into consideration, the users must be respected though out the process (Liu, 2008). This research adopts the usability evaluation based on user satisfaction to ensure the performance of the software (Shaizan and Li, 2003).

2.6 Airline Industry

In today's world, airline industry has become more and more popular and has promising market (Xiaoli et al., 2006). The development of information technology has also boost its development, cause the travellers are enabled to search tickets online and book in a way of self-service (Strother et al., 2010).

Meanwhile, there are also some challenges and issues for the airline industry (Johnson, 1999). Whenever there is war, disaster, terrorist, disease, and financial crisis, the sales of airlines will decrease significantly (Yun et al., 2009).

But among all the issues, the biggest one is the capacity of the flight is fixed, when the demands is low, it could not cut the capacity to save the cost, when the demand is high, it could not add seats to generate more revenue (Chariton & Min-Hyung, 2004). In order to generate more profit, the pricing policies are very important in the airline industries (Biermann, 2007).

Same as the tourism and telecommunication industry, the airline industry has its peak season, shoulder season and the low season, thus, the pricing policies should be effective to move some demands in the high season to the shoulder season or even the low season.

For this reason, airlines always have promotion packages to encourage people to purchase tickets in the low season to reduce the pressure of the peak season. Besides that, the promotion is also very important to generate new customers who are not affordable to purchase the full-fare ticket currently but has the potential to buy the ticket at high price in future. In a conclusion, it is a strategy of the airlines to have some tickets promotion offering incredible cheap price to the customers (Biermann, 2007).

On the other hand, the cheapest ticket is not always available to the customers. Because the customers of airline industry can be divided into two main categories: the business travellers and the leisure travellers.

- The business travellers: They do not mind to buy the ticket in a high price, because their employers will pay for them, so they only care of the time, date and the service (Biermann, 2007).
- The leisure travellers: they are very price sensitive, cause they need to pay the ticket for themselves and their families from his own hard-earned after-tax salary.

Therefore, airlines must avoid selling cheap ticket to the business traveller, which will decrease its revenue. In order to avoid this problem taking place, the cheap price is always selling during a very short reservation period; because the business travellers are very strict with the flight date, so it is not possible for them to book the ticket in the specific promotion period (Biermann, 2007).

Due to the two characteristics of the pricing policy of the airlines, a conclusion is made that the cheap ticket do exist but is not available for a long period. Therefore, it is very important for the tourists who wish to buy cheap ticket to find out the cheapest ticket in a short time and then book it efficiently.

It has been noted that the airlines prefer travellers to book the ticket via the online reservation system, which will save their operation cost, so the online searching system which can offer real ticket searching service is strongly needed because many cheap ticket are available for online booking only (Alwahaishi et al., 2009).

2.7 Summary

This chapter displays the literature review in this research includes the interface, usability evaluation, tools used, web application and security, the information collected is very important for the system design and development.

In the next chapter, the methodology used in this study will be presented.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter explains the methodology adopted in this study, which is the Spiral Methodology including five steps: 1) Understand the Requirement, 2) Design the System, 3) Build in Stage, 4) Test and Evaluate, and 5) Documentation. The tasks to be done in each step are stated.

3.2 Research Methodology

This research adopts the Spiral Methodology which was introduced by Barry in 1988 (Boehm, 1988). Spiral model has become more popular in the software development than the traditional Waterfall Model (Viravan, 1997), because it is a risk-driven approach (Viravan, 1997), which works well in the risk management (Wolff, 2002).

The Spiral Model of software development starts each cycle of the spiral by performing the next level of elaboration of the prospective system's objectives, constraints, and alternatives (Wolff, 2002). This methodology is very useful to

make the design, development and evaluation of the software (Worff, 1989), as well as the documentation (Yamamichi et al., 1996). Figure 3.1 shows the diagram of Spiral Methodology. There are 5 phases in this methodology. They are Understand the Requirements, Design the System, Build in Stage, Test and Evaluation, Documentation (Wolff, 2002).

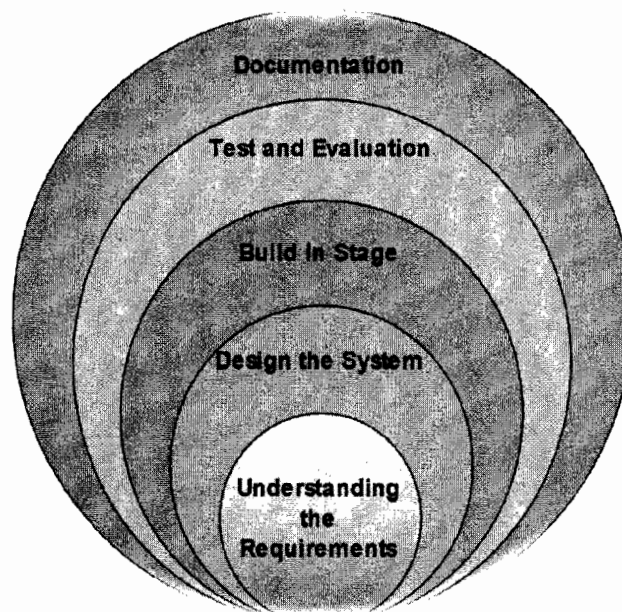


Figure 3. 1: Spiral methodology (Boehm, 1988)

3.2.1 Understand the Requirements of the Website

In this phase, the information of the Airline searching system and forum website was collected. The related websites were studied to know the requirements of the website, their advantages were adopted while their disadvantages were avoided and taken lesson from. Besides that, interviews were conducted to the target users.

In order to get the useful feedback and know the actual requirements of the users, students in UUM who has the history to book tickets and made a comparison between different airlines were selected as the respondents for the interview, their requirement of the system is collected through the interview and questionnaire. Besides the functional requirements, their preferences of the interface, information flow and so on were also collected to develop a satisfactory system for them.

3.2.2 Design the System

The requirements of the system collected in this phase are to be used to design the system. Details of this system are made to attract users and solve the problem. The use case diagram, class diagram, collaboration diagram of this system is drawn to present this system, according to its function and construction shown in these diagrams, the suitable technique is chosen to develop the system.

The design of the system was made according to the requirements collected from previous phase. Based on the requirements collected in last phase, the techniques to develop this system were also selected. PHP , MySQL were used to develop this system, and all the pictures were programmed by using Photoshop.

Tools used

The tools used in this study includes HTML, PHP, Photoshop, Mysql, they have been reviewed.

- HTML has become a vital tool to be used in the system development for a long time (Magel, 1997), the new features added to it recent years make it become more popular in this world (Kim et al., 2007). It works well in the design of layout f every element and the appearance of the web pages (Kim et al., 2007). the design of the appearance of the web pages and the layout of every element (Kim et al., 2007).
- In the area of image processing, Photoshop is the most widely used software. It has powerful function to manipulate the photos and make them integrated to the contents of the web pages and thus better display the topic of the website (Singh & Slous, 1998).
- MySQL Database: MySQL database is widely used in this world; it can make the system dynamic and easy to manage by storing all the information. The Admin table enables the system to give different permission level to different kind of user, and thus the security is ensured, while the management of the software become much easier (Zoratti, 2006).

The code of the system, the database, interface, buttons used, and security issues were all taken into consideration in this phase.

The user data and flight data of three company were stored in database and the user can log in using his personal information to search the available journey in all the company to see the price, meanwhile, the user can read what the user said about

each company in the forum, after that, they can make the final decision of their booking.

In the Airline searching system prototype, users must log in their account first, and then they can use the two main functions:

- a) Search and book the ticket: Users were allowed to login and search any itinerary by writing the Departure and Destination, then the user select the date. After that the system shows the result to the user, tickets were displayed according to its price, the cheapest appears first.
- b) Share the information with the users using the discussion forum. Users can share the information and experience with each other using the discussion forum.

In order to insure the security of this prototype, the following design of users of this system was made:

- Guest : can search and read the information
- User : can login , search , book , post thread
- Employee : can manage his/her trip airline company
- Administrator : can manage user, employee, all trips , and Departure and Arriving city

Since different level of user has different level of permission, the security of the system was ensured.

In the design phase, all the knowledge and skills to be used were studied and obtained by the researcher to prepare for the system development.

3.2.3 Build in Stage

In this phase, the system was developed. According to the design requirements, development was carried out. Selected techniques such as the MySQL, HTML, were used to build the website prototype; contents were filled in relevant pages to enable users to use the functions. The system allows the user to use these buttons:

- a. Login
- b. Choose the Departure and Arriving city
- c. Choose the specific date
- d. Search
- e. Book ticket
- f. Post new thread using discussion forum
- g. Feedback using discussion forum

3.2.4 Test and Evaluate

Evaluation was very important step to ensure the quality of the system. In this research, the researcher follows the requirements for web application development as shown in Table 3.1 to do the evaluation.

Table 3. 1: Requirements for web application development (Shaizan |& Li, 2003)

<i>Test</i>	<i>Description</i>
<i>Usefulness</i>	A Better Choice is easy to manage the travels, managers, and user accounts. The user can find the specific flight information easily. The users can upload their comments in the forum easily.
<i>Ease of use</i>	The interaction within the system is understandable. Navigation method is clear. Errors appear frequently in the system .
<i>Ease of Learning</i>	I learned to use the A Better Choice quickly. I easily remember how to use it. I quickly became skilful with it
<i>Satisfaction</i>	<i>Web based prototype should have Menu/List of key content in the main page (Shaizan and Li, 2003)</i>

3.2.5 Documentation

After the evaluation, the system documentation was made to explain about the system. The screenshots of the system were presented and explained to enable other researchers to access the information. Each function of this system was explained in detail, the diagrams of the system were also drawn to analyze the system organization and operation flow.

3.3 Summary

This chapter discusses about the methodology used in this project. The spiral methodology was very suitable for the software development. Requirements will be collected then design of the software could be made, the development will follow the design, after that, test and evaluation will be done to ensure the quality and performance of the software, finally, documentation will be done to save the information and make this project accessible by other researchers.

In the next chapter, the system will be analyzed.

CHAPTER FOUR

SYSTEM ANALYSIS

4.1 Introduction

In this chapter, the finding was presented using Unified Modelling language (UML). A Unified Modelling language (UML) helps the system developers to better understand of the system (Sengupta & Bhattacharya, 2006). From the UML, outsiders can view the use-case models, classes design, sequence diagrams, actors, and collaboration diagram (Suyono et al., 2006). The Unified Modelling Language (UML) is very popular in the object-oriented software engineering (Hai, 2009).

Besides Unified Modelling Language, the requirements of the system were also explained both in functional and non-functional requirements. Besides that, the system was described by the sequence diagram, class diagram, use case diagram and collaboration diagram.

4.2 Functional Requirement

The proposed Airline searching application provides users to check the ticket information from different airlines without type in their flight information again and again in different airline systems. It also enables the user to check the forum of the airlines to know their service quality.

Admin in this system can manage his own account, the company, users, cities, travels, passengers and view the log table.

4.3 Non Functional requirements

The software industry experienced a rapid development and strong competition between each supplier; the customers' needs are taken good care of. There was a trend that the customers are turning to keep their eyes on non-functional requirements than the functional requirements, because it was highly related to their experience of using this system (Liu, 2010). In this research, the non-functional requirements includes: security, usability, reliability, understandability, performance and availability.

4.3.1 Security:

Login to the system requires the user and admin to insert the account name and the password, so the system can only be accessed by authorized persons.

4.3.2 Usability:

The usability of the system decides the performance of the system and whether it can make the users satisfied. It should be easy to understand and use with useful contents or service which is needed by the users.

4.3.3 Reliability:

The system must be reliable for the users to use, it should be well arranged the information must be reliable.

4.3.4 Understandability:

The system must be easily understood by the users, only in this way, the users can accomplish their tasks in this system. The application must be clear and easy, the procedures must be as simple as possible to build a user-friendly system.

4.3.5 Performance:

The system should be running at a fast speed to better satisfy the users.

4.3.6 Availability:

This system must be available to all the people who want to make the online booking and check the forum.

4 .4 Use Case Diagrams:

Use case diagrams explain the use case in the system flow. Use case can be explained by describing a flow of events in text (Sengupta & Bhattacharya, 2006). The release of the UML specification version 1.1 enables the broad of use case scope to modelling constructs at all levels. Since the scope has been expanded, the representation of use cases becomes more and more important (Sengupta & Bhattacharya, 2006).

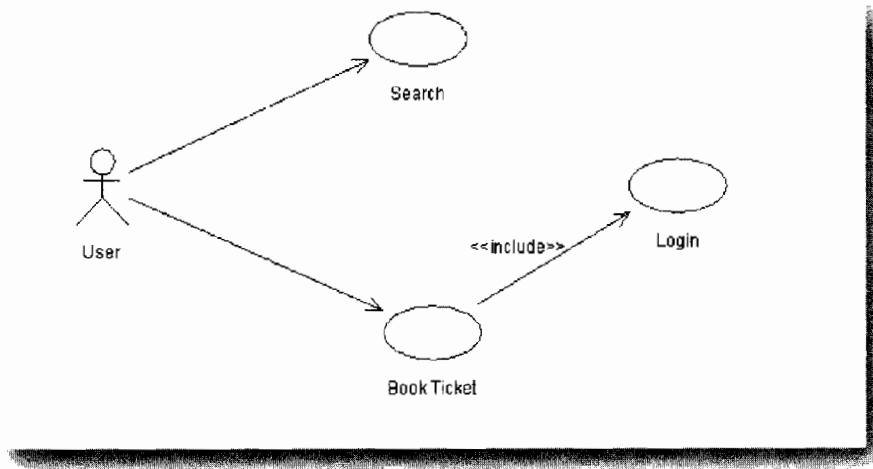


Figure 4. 1: Use Case Diagram for the User

Figure 4.1 illustrates the function that the users can search for the flight ticket information and the forum, but if he needs to do the ticket booking, he must login first to ensure the safety of the system.

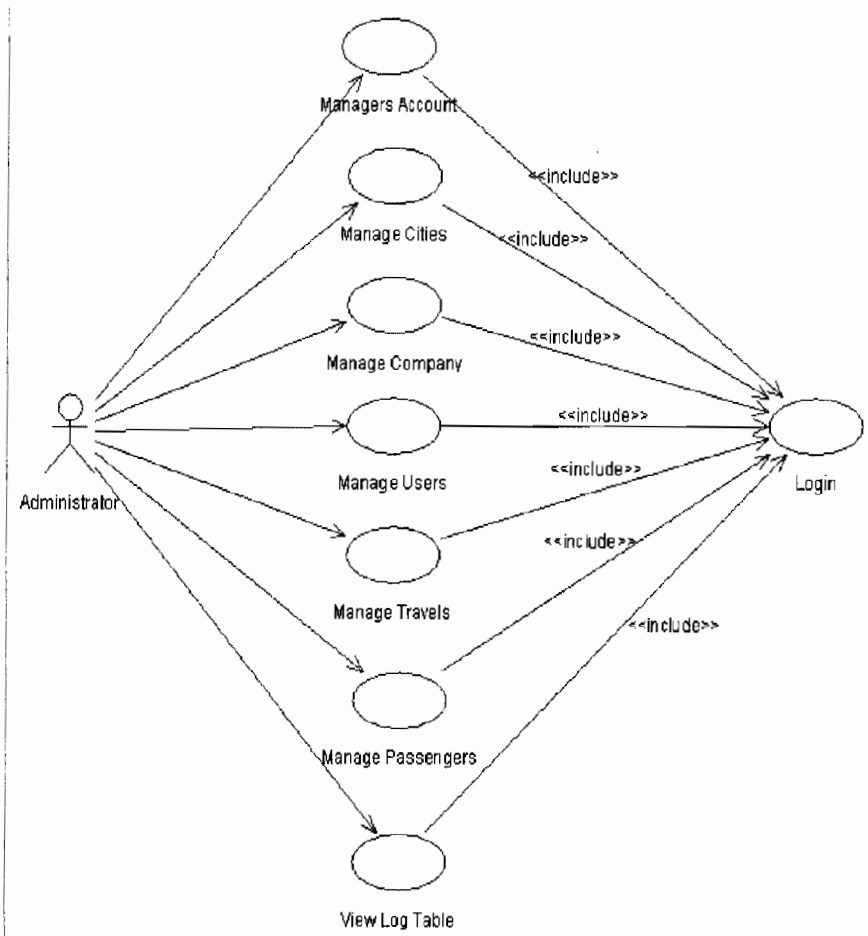



Figure 4. 2: Use Case Diagram for Administrator

Figure 4.2 illustrates the functions to be used by the admin. In order to use these functions, admin must login first. In this system, admin can manage the account, cities, airline companies, passengers, travels, users, and view the log table.

4.5 Use Case Specification

Use case specification explains the detailed information of use case.

Table 4. 1: Use Case Login

Use case Login	 <pre> graph LR Actor[Admin / User] --> UseCase((Login)) </pre>
Brief Description	Both the admin and user need to login first before they start some specific tasks. The ID and password should be inserted and match each other for a successful login.
Pre-Conditions	Insert accurate ID and password.
Characteristic of Activation	Execution depends on user or admin demand (Event driven).
Flow of Event	<p><u>Basic Flow</u></p> <ul style="list-style-type: none"> • User/Admin insert his/her user ID and Password • System analysis the inserted information to see whether they match each other. • The system response to the user based on the


	situation whether the password match the ID.
	<p><u>Alternative Flow .</u></p> <p>Not applicable.</p> <p><u>Exceptional Flow.</u></p> <p>The system shall display the message “wrong login information in case the ID does not match the password.</p>
Post-Conditions	View system page
Rule(S)	Not applicable

Table 4. 2: Use Case user search

Use case Submit Airline searching Application	<pre> graph LR User((User)) --> Search([Search]) </pre>
Brief	This use case is initiated by the user when he starts to

Description	search the flight information.
Pre-Conditions	User already login to the system
Characteristic of Activation	Execution depends on user demand (Event driven).
Flow of Event	<p><u>Basic Flow</u></p> <ul style="list-style-type: none"> • user select submit Airline searching application • The system will display the result of the search.
	<p><u>Alternative Flow</u></p> <p>Not applicable.</p> <p><u>Exceptional Flow</u></p> <p>Invalidate Information: when the information users want to search is not existed.</p>
Post-Conditions	Submit application success.
Rule(S)	Not applicable.

Table 4. 3: Use Case Book

<p>Use Case booking ticket</p>	
<p>Brief Description</p>	<p>This use case is initiated by the user when he wants to book the ticket.</p>
<p>Pre-Conditions</p>	<p>User already login to the system.</p>
<p>Characteristic of Activation</p>	<p>Execution depends on user demand (Even driven).</p>
<p>Flow of Event</p>	<p><u>Basic Flow</u></p> <ul style="list-style-type: none"> • User selects the airline he wants to book and confirm the departure, destination, time, and date.
	<p><u>Alternative Flow</u></p> <p>Not applicable</p> <p><u>Exceptional Flow</u></p> <p>Not applicable .</p>
<p>Post-Conditions</p>	<p>Check Airline searching application status</p>

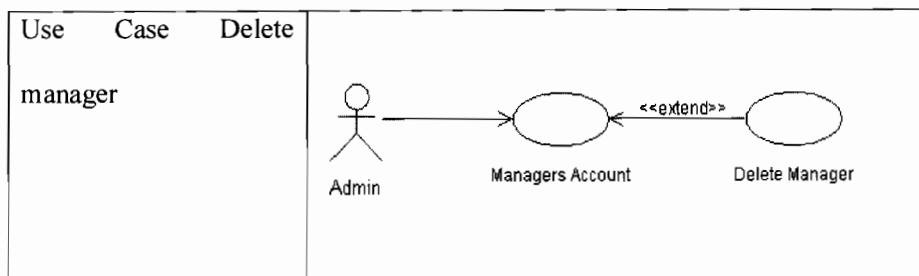
	success .
Rule(S)	Not applicable

Table 4. 4: Use Case Add Manager

Use Case Add	<pre> graph LR Admin[Admin] --> ManagersAccount((Managers Account)) AddNewManager((Add New Manager)) -.-> <<extend>> ManagersAccount </pre>
Brief Description	This use case is initiated by the admin, the system support the admin to add new manger.
Pre-Conditions	admin already login to the system.
Characteristic of Activation	Execution depends on admin demand (Even driven).
Flow of Event	<p>Basic Flow</p> <ul style="list-style-type: none"> • The use case begin when the administrator want to add manger . • Admin can click add new manger, the

	<p>system will response to admin request and display page .</p> <ul style="list-style-type: none"> • Admin fill the form and press add. • Finally , The system will be response to admin request , save info and display the success of the operation .
	<p><u>Alternative Flow</u></p> <p>Admin can click add new manager.</p> <p><u>Exceptional Flow</u></p> <p>Not applicable.</p>
Post-Conditions	Add new manger .
Rule(S)	Not applicable.

Table 4. 5: Use Case Delete Manager



Brief Description	This use case is initiated by the admin, the system support the admin to delete manger, and request .
Pre-Conditions	admin already login to the system.
Characteristic of Activation	Execution depends on admin demand (Even driven).
Flow of Event	<p><u>Basic Flow</u></p> <ul style="list-style-type: none"> • The use case begin when the administrator want to delete event • Admin can click to delete manger • System respond to the admin request and view delete info page. • Admin select any manger and press delete . • Finally ,The system will be response to admin request and modify info .the system display the success the operation
	<p><u>Alternative Flow</u></p> <p>Admin can click to delete manager or delete request</p>

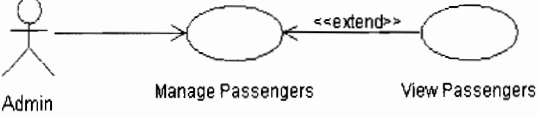
	<u>Exceptional Flow</u> Not applicable .
Post-Conditions	Delete event.
Rule(S)	Not applicable.

Table 4. 6: Use Case Edit Manager

Use Case Edit Manager	<pre> graph LR Admin((Admin)) --> ManagersAccount((Managers Account)) EditManager((Edit Manager)) -- "<<extend>>" --> ManagersAccount </pre>
Brief Description	This use case is initiated by the admin, the system support the admin to edit manager.
Pre-Conditions	Admin already login to the system.
Characteristic of Activation	Execution depends on admin demand (Even driven).
Flow of Event	<u>Basic Flow</u> <ul style="list-style-type: none"> The use case begin when the administrator want to edit manager.

	<ul style="list-style-type: none"> • Admin can click to edit manager • System respond to the admin request and view edit info page. • Admin update info and press edit. • Finally ,The system will be response to admin request , modify info and display success of the operation.
	<p><u>Alternative Flow</u></p> <p>Admin can click edit request , edit manager</p> <p><u>Exceptional Flow</u></p> <p>Not applicable.</p>
Post-Conditions	Edit event.
Rule(S)	Not applicable .

Table 4. 7: Use Case View Passengers

<p>Use Case view</p> <p>Passengers</p>	 <pre> graph LR Admin((Admin)) --> ManagePassengers((Manage Passengers)) ViewPassengers((View Passengers)) -.-> <<extend>> ManagePassengers </pre>
<p>Brief Description</p>	<p>This use case is initiated by the admin, the system support the admin to view passengers.</p>
<p>Pre-Conditions</p>	<p>admin already login to the system.</p>
<p>Characteristic of Activation</p>	<p>Execution depends on admin demand (Even driven).</p>
<p>Flow of Event</p>	<p><u>Basic Flow</u></p> <ul style="list-style-type: none"> • admin select view passengers . • System respond to the admin request and view request control page. • Admin can select any passenger and press view. • The system will be response to admin request and display info.
	<p><u>Alternative Flow</u></p>

	<p>Not applicable .</p> <p><u>Exceptional Flow.</u></p> <p>Not applicable.</p>
Post-Conditions	View info page .
Rule(S)	Not applicable.

4.6 Sequence Diagram and collaboration Diagram

A sequence diagram explains the detailed process of a use case (Suyono et al., 2006). In the sequence diagram, object interaction is arranged in time sequence as well as the messages exchange (Suyono et al., 2006).

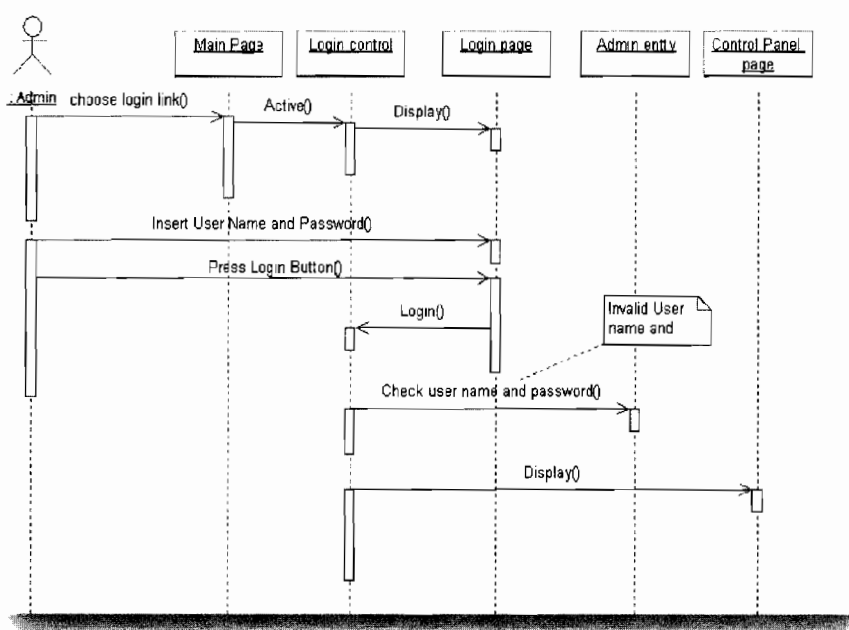


Figure 4. 3: Sequence Diagram for Login

Figure 4.3 illustrates the sequence to Login. Admin or user must insert the user name and password, click on login button, then the request is send, the system will check ID and password, if they match each other, successful message is displayed.

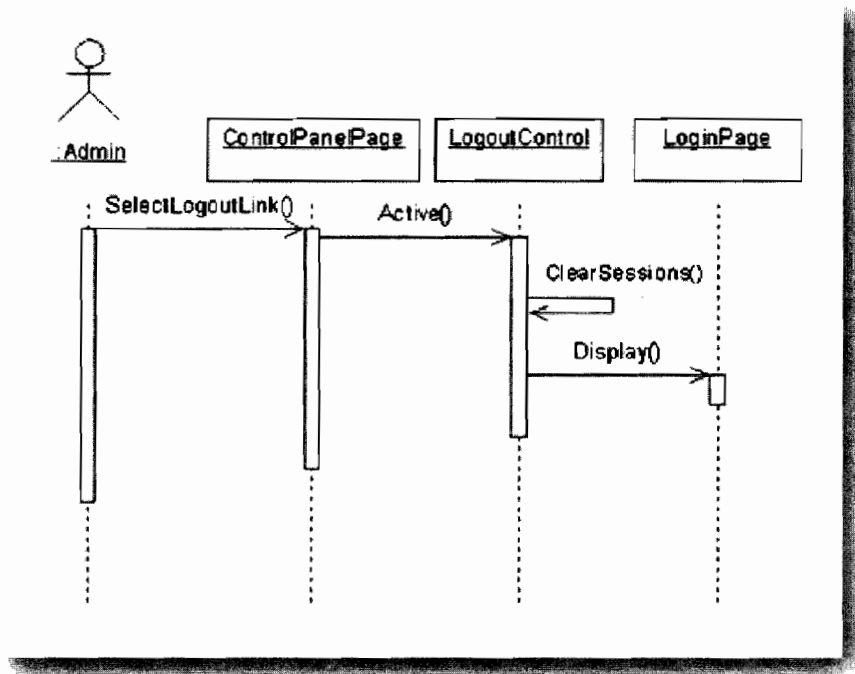


Figure 4. 4: Sequence Diagram for Logout

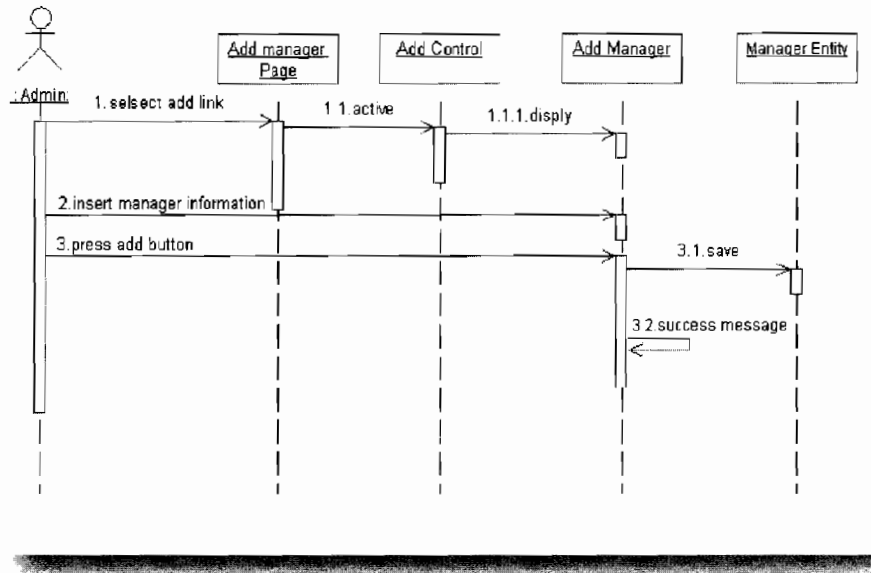


Figure 4. 5: Sequence Diagram for Add Manager

Figure 4.5 illustrate how the admin can add new managers. He must select the add link first, then insert manager information, after he presses add button, the action will be saved and a success message will be sent back to him.

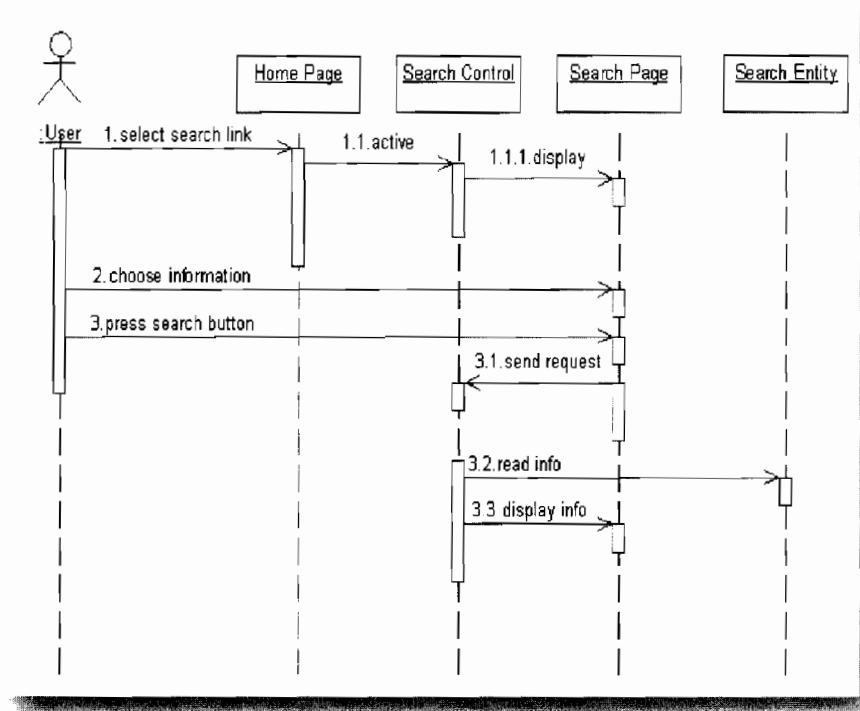


Figure 4. 6: Sequence Diagram for search

Figure 4.6 illustrate how the search can be done. Users need to select the search link, choose information he interested, press the search button, then the request is send, he can read the information.

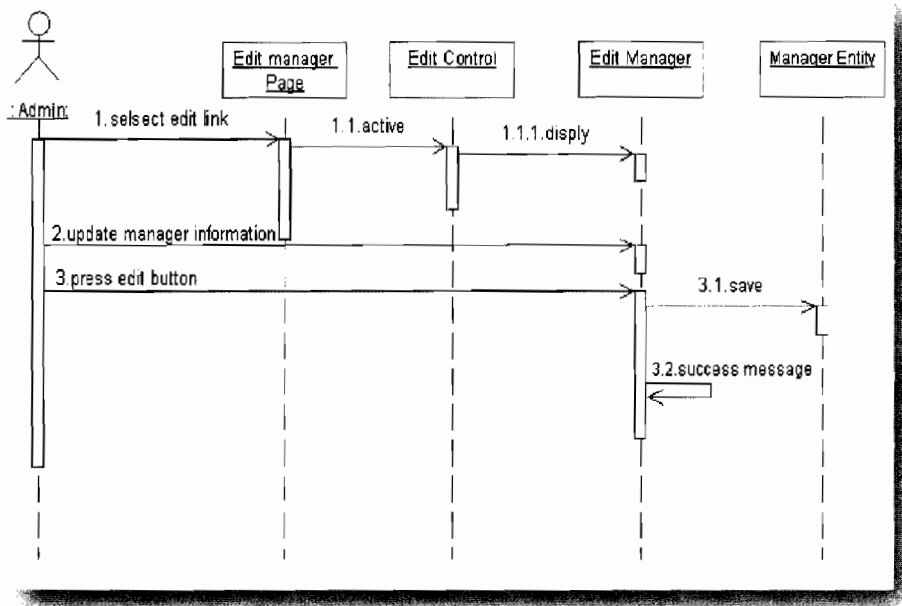


Figure 4. 7: Sequence Diagram for Edit Manager

Figure 4.7 illustrate how the Admin can edit manager information. First, he needs to select the edit link, then update manager information, press edit button to save the changes, then a success message will be sent back to him.

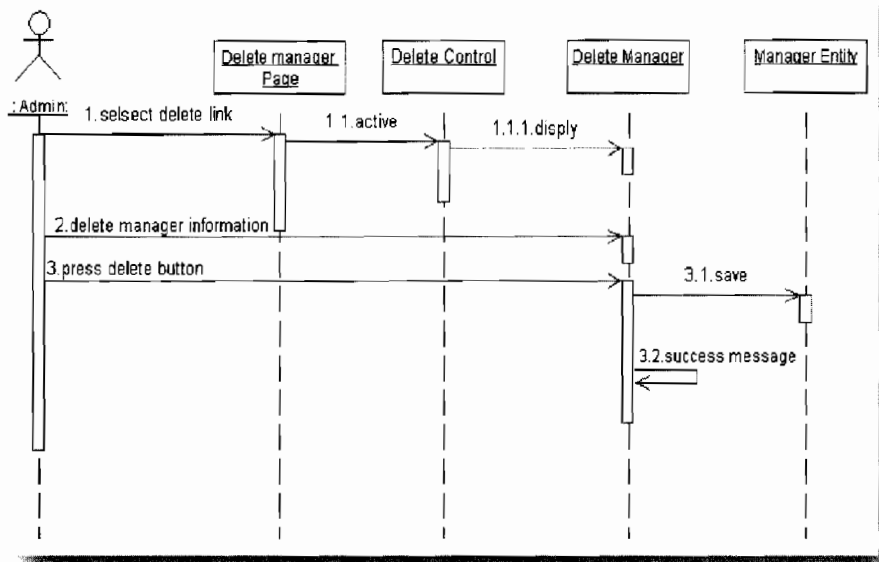


Figure 4. 8: Sequence Diagram for Delete Manager

Figure 4.8 illustrates how can the admin delete manager. The delete link needs to be selected first, then the admin delete manager information and press delete button, the system will save this change and send the success message to the admin.

4.7 Class Diagram

Class diagram describes the system from a static view. It explains the system flow in different classes (Enjo et al., 2009)

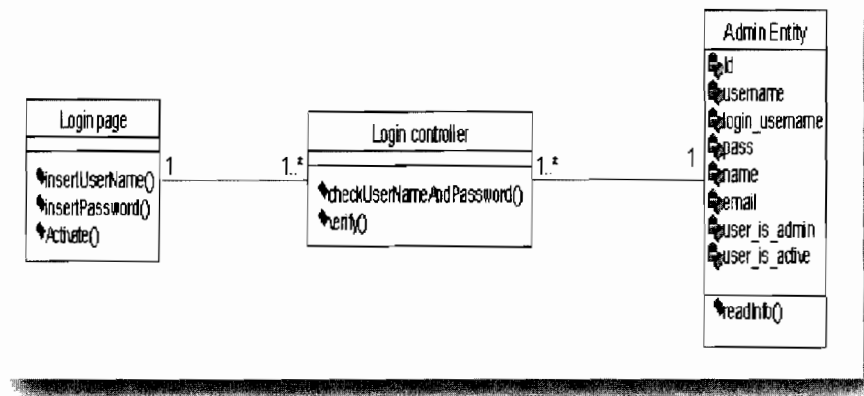


Figure 4. 9: Class diagram for Login

Figure 4.9 shows the class in the login procedure.

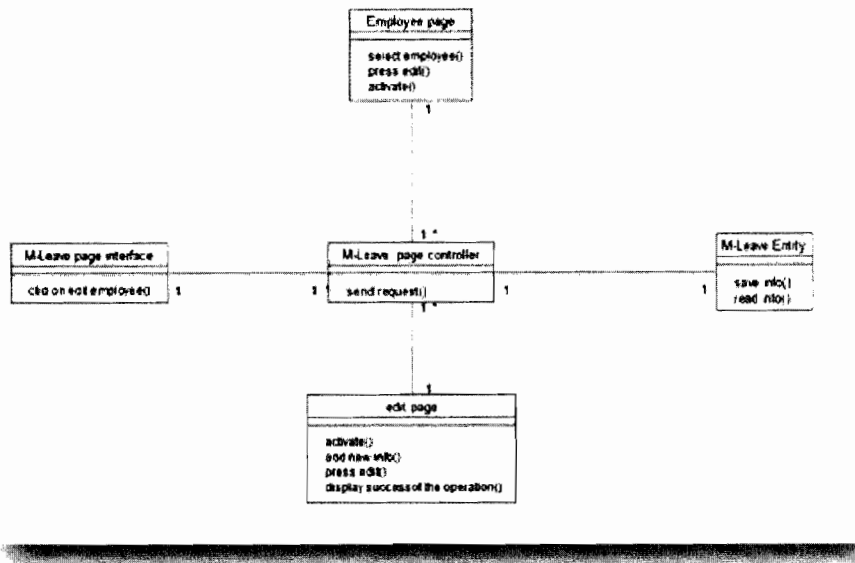


Figure 4. 10: Class diagram for edit user

Figure 4.10 shows how the entities of the system related to each other and the relation between these entities.

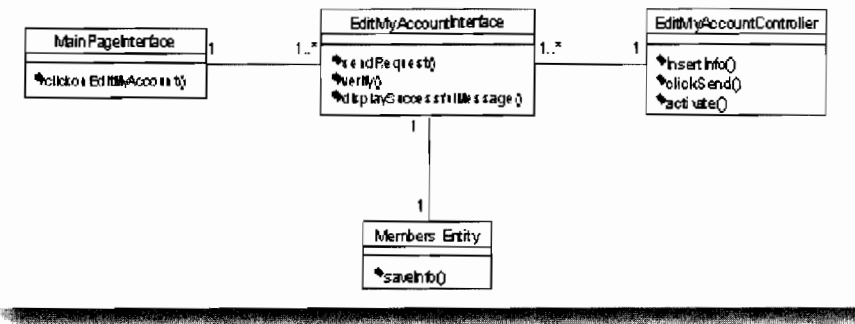


Figure 4. 11: Class diagram for Edit Manager/User Account

Figure 4.11 shows the class diagram for edit manager/user account. In the main page interface, user should click on the button of edit my account, then this request is send after verify, the successful message will be displayed; finally the order will be activated.

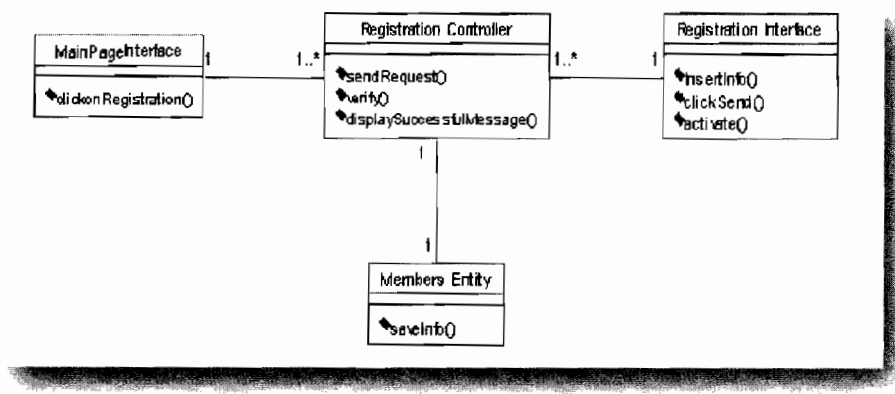


Figure 4. 12: Class diagram for Add (user, manager)

Figure 4.12 displays the class diagram to add user or manager account. The registration button must be clicked first, then the request is send, after verify, successful message will be displayed, the updated information is saved.

4. 8 Screen Capture for Database

tbl_user

Field	Type	Null	Default
usr_id	int(11)	No	
usr_name	varchar(30)	No	
usr_login	varchar(20)	No	
usr_password	varchar(20)	No	
usr_phone	varchar(20)	No	
usr_passport	varchar(20)	No	
usr_active	char(1)	No	1

Figure 4. 13: User table

Figure 4.13 shows the database of user table, the field includes user id, user name, user login, user password, user phone, user passport and user active.

tbl_admin

Field	Type	Null	Default
adm_id	int(11)	No	
adm_com_id	int(11)	Yes	NULL
adm_name	varchar(20)	No	
adm_login	varchar(20)	No	
adm_password	varchar(200)	No	
adm_rank	char(1)	No	
adm_phone	varchar(20)	Yes	NULL
adm_email	varchar(30)	Yes	NULL

Figure 4. 14: Admin table

Figure 4:14 shows the admin table which includes the admin id, admin com id, admin name, admin login, admin password, admin rnk, admin phone and admin email.

tbl_cities

Field	Type	Null	Default
cty_id	int(11)	No	
cty_name	varchar(30)	No	

Figure 4. 15: cities table

Figure 4.15 explains the database of the cities table, it includes the city id and city name.

tbl_companies

Field	Type	Null	Default
com_id	int(11)	No	
com_name	varchar(60)	No	

Figure 4. 16: Companies table

Figure 4.16 displays the database of companies, it includes company id and company name.

tbl_passengers

Field	Type	Null	Default
psn_id	int(11)	No	
psn_user	int(11)	No	0
psn_travel	int(11)	No	0
psn_seats	int(11)	No	1

Figure 4. 17: passengers table

Figure 4.17 displays the database of passengers, includes passenger id, passenger user, passenger travel and passenger seats.

tbl_travels

Field	Type	Null	Default
trv_id	int(11)	No	
trv_company	int(11)	No	0
trv_city_from	int(11)	No	0
trv_city_to	int(11)	No	0
trv_seats	int(11)	No	0
trv_date	varchar(100)	No	
trv_time	varchar(25)	No	
trv_price	int(4)	No	0
trv_state	int(2)	No	0

Figure 4. 18: Travels table

Figure 4.18 displays the database for the travels, includes the travel id, travel company, departure and destination city, seats, date, time, price and state.

trv_log

Field	Type	Null	Default
log_id	int(6)	No	
log_username	varchar(50)	No	
log_datein	text	Yes	NULL
log_dateout	text	Yes	NULL
log_sid	varchar(200)	Yes	NULL
log_ip	varchar(30)	Yes	NULL

Figure 4. 19: Log table

Figure 4.19 displays the log table, it shows the log id, user name, datein, date out, sid and ip.

The users can login, search and book and discuss in forum in this system as shown in Figure 4.20.

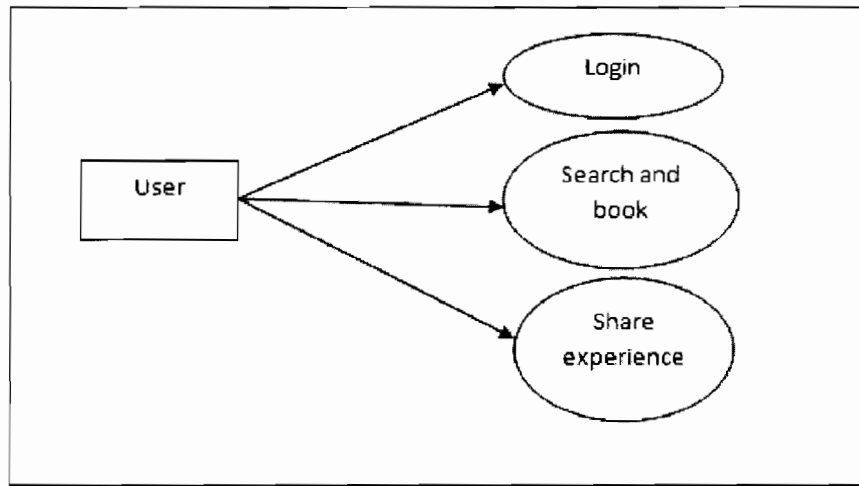


Figure 4. 20: Functions used by the users

4.9 Summary

This chapter analyzed the system design by the system requirements, UML, and the database of the system. Sequence diagram, class diagram, collaboration diagram, use case diagram and use case specification are used to explain the design and structure of the system.

In next chapter, the result of the research will be discussed.

CHAPTER FIVE

RESULT OF THE SYSTEM

5.1 Introduction

In this chapter, the screenshots of the system was explained to present the function of the system. Besides that, the result of the usability evaluation is also discussed.

5.2 Screenshot of the system

The screenshots has covered all the functionalities in this system such as the search and booking function for the users, forum discussion and the function for the administrators includes manager control, travel control, user control and view login table. They are all explained below.

5.2.1 User functionalities

The functionalities for the users includes login, search the flight information, book flight, view the forum and post messages on the forum.



Figure 5. 1:Home Page

In Figure 5.1, the home page of the system was displayed. The users can login from the home page or just simply select the departure and destination and date of his flight to check the information there.

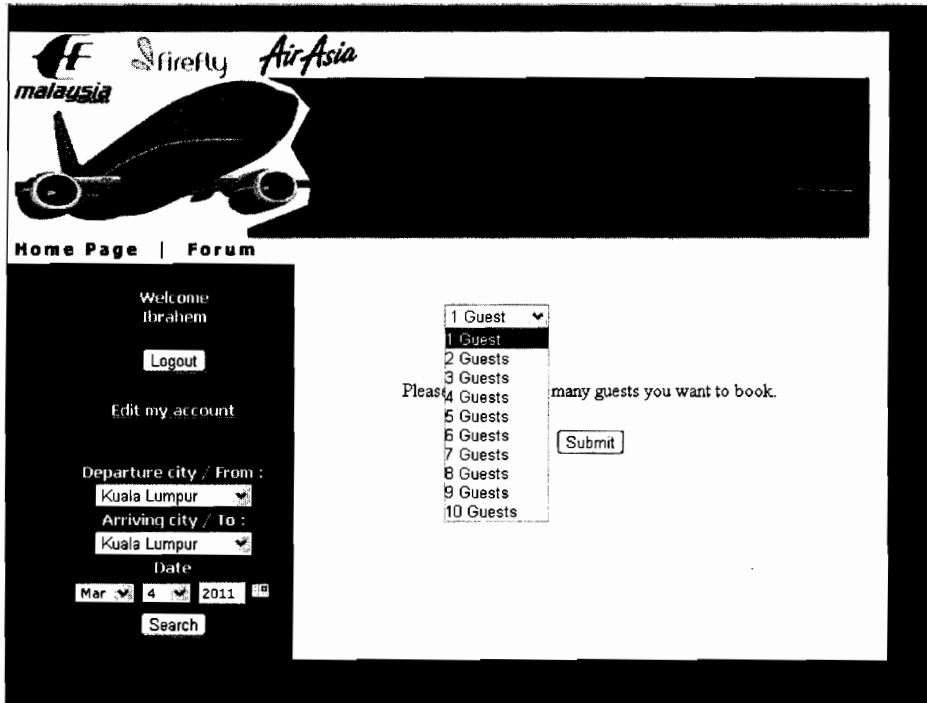


Figure 5. 2:book flight

In Figure 5.2, the book flight screenshot was displayed. The users need to select how many guests want to book this flight in the search process as well as select the departure, destination, and date.

Home Page | Forum

Welcome Ibrahim

[Logout](#)

[Edit my account](#)

Available Travels						
Company Name	Departure city	Arriving city	Date	Time	Cost per one	
Firefly Airline	Kuala Lumpur	Alor Setar	02-AUG-2011	7:00 AM	140 MYR	
Air Asia Airline	Kuala Lumpur	Alor Setar	02-AUG-2011	7:00 AM	160 MYR	
Malaysia Airline	Kuala Lumpur	Alor Setar	02-AUG-2011	7:00 AM	200 MYR	

Departure city / From : Kuala Lumpur

Arriving city / To : Kuala Lumpur

Date : Mar 4 2011

[Search](#)

Figure 5. 3: flight search information

In Figure 5.3, the result of flight search was displayed. After filling in the necessary contents for the search of the flight, the flight information will display the airline name, departure and destination, date and time and the price, these information helps the users the make their decision after comparison between each airlines.

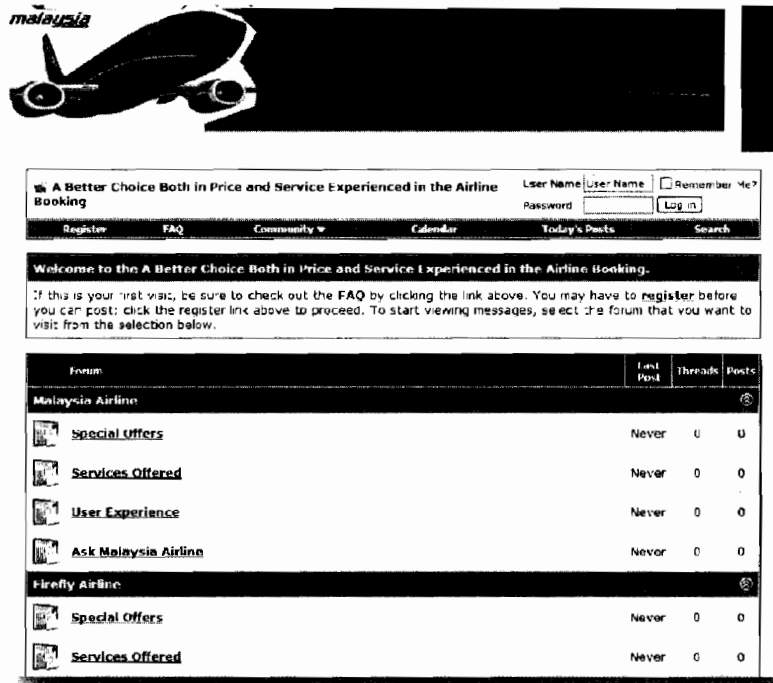


Figure 5. 4: homepage of the forum

In Figure 5.4, the homepage of the forum was shown. There were many popular topic in the forum such as the special offers, services offered, user experience. By viewing the forum information, users can know about service quality of the specific airlines and decide whether they want to take their flight from this airline company or not.

Register at A Better Choice Both in Price and Service Experienced in the Airline Booking

In order to be able to post messages on the A Better Choice Both in Price and Service Experienced in the Airline Booking forums, you must first register. Please enter your desired user name, your email address and other required details in the form below.

User Name:


Password
Please enter a password for your user account. Note that passwords are case-sensitive.

Password: **Confirm Password:**

Email Address
Please enter a valid email address for yourself.

Email Address: **Confirm Email Address:**

Image Verification
Please enter the six letters or digits that appear in the image opposite.



[Refresh Image](#)

Figure 5. 5: Register new users

In Figure 5.5, the register new user's page is shown. In order to ensure the accuracy and reliability of the information posted on the forum, people cannot post any message there until they register in the forum. The information must be fill in to be the user includes user name, password, email and the image verification must be done to ensure the safety of the system.

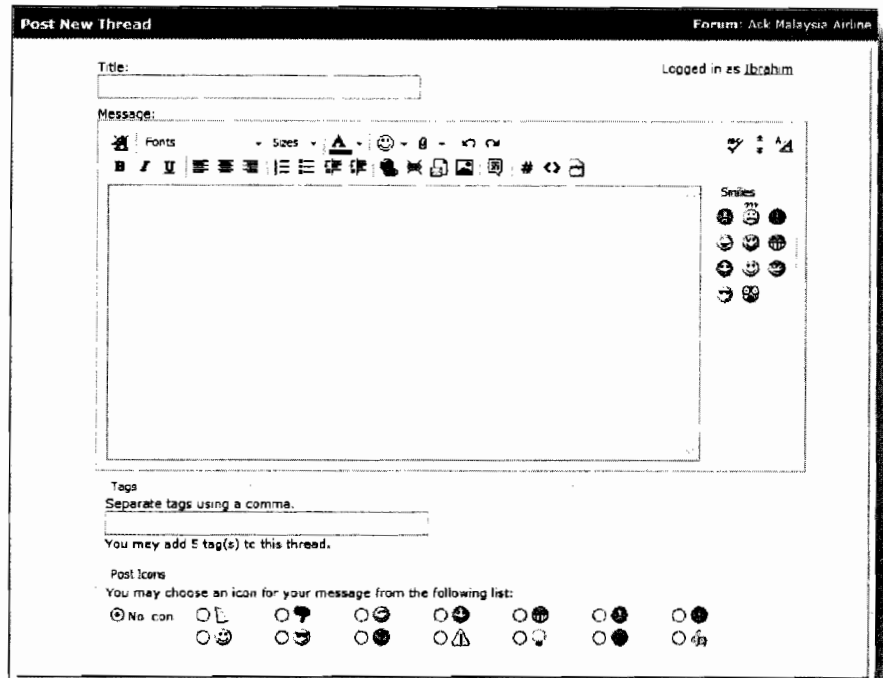


Figure 5. 6: post message

In Figure 5.6, the function to post new message was shown. After registering in the system and login, user can create a new topic in the forum and fill in the contents. He can edit the topic by separate tags as many as five. He can also chose icon for his message from a list offered by the system.

5.2.2 Functionalities for the administrator

The functionalities for the administrator include user control, manager control, travel control and view login table.

Passport Number	<input type="text"/>	*
Full Name	<input type="text"/>	
Login Name	<input type="text"/>	*
Phone	<input type="text"/>	
E-mail	<input type="text"/>	
Password	<input type="text"/>	*
Confirm Password	<input type="text"/>	*

Active
 Not active

Figure 5. 7: add new user

In Figure 5.7, the function for the administrator to add new user was displayed. The information must be inserted for the new user includes his passport number, login name, password and confirm password. Besides that, the full name, phone, email are also welcomed to be inserted to get more detailed information of the user. After filling in all the information needed, administrator just need to select the active button, then the process was successful.

Passport Number	7y687687687	*
Full Name	Ibrahem	
Login Name	user	*
Phone	98798798	
Password		*
Confirm Password		*
<input checked="" type="radio"/> Active <input type="radio"/> Not active		
<input type="button" value="Edite"/> <input type="button" value="Default"/>		

Figure 5. 8: edit user account

In Figure 5.8, the function to edit user account was shown. Whenever there were some changes or update of the user information, administrator can edit it in this page to ensure the information saved in the database is accurate.

1	Ibrahem	Delete
---	---------	--------

Figure 5. 9: delete user account

In Figure 5.9, the function to delete user account was shown. By simply click the delete button, the user account can be deleted by the administrator.

Company Name	Malaysia Airline ▾
Full Name	Malaysia Airline
Login Name	Firefly Airline *
Phone	Air Asia Airline *
E-mail	
Password	
Confirm Password	

Set As Administrator
 Set As Company Manager

* Fields required .

Figure 5. 10: add new manager

In Figure 5.10, the function to add new manager was shown. Administrator just need to fill in the company name such as Malaysia airline, firefly airline or Air Asia airline for the manager, then insert the login name and password. After that, the administrator must select to set the manager as company manager or as administrator before the adding process completed.

administrator	797897	administrator@website.com		General Manager	Not allowed
Malaysia Airline Man	987897	bjhh2@sdc.com	Malaysia Airline	Company Manager	Edit
Firefly Manager	7876786	efwefwe@dcvd.com	Firefly Airline	Company Manager	Edit
Air Asia Admin	006098766555	huhui@hotmail.com	Air Asia Airline	Company Manager	Edit

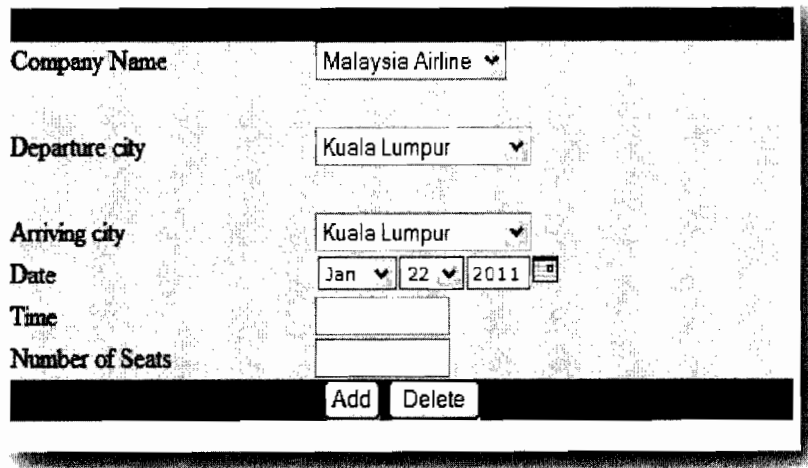
Figure 5. 11: edit manager

In Figure 5.11, the function to edit manager was shown. Administrator can go to the manager accounts, select the manager account he wants to edit and click the edit button, then the following page will come out for the administrator to edit the manage account.

administrator	797897	administrator@website.com		General Manager	Not allowed
Malaysia Airline Man	987897	bjhh2@sdc.com	Malaysia Airline	Company Manager	Delete
Firefly Manager	7876786	efwefwe@dcvd.com	Firefly Airline	Company Manager	Delete
Air Asia Admin	006098766555	huhui@hotmail.com	Air Asia Airline	Company Manager	Delete

Figure 5. 12: delete manager account

In Figure 5.12, the function to delete manager account was shown. Administrator must go to the manager accounts page and select the manager he wants to delete and click the delete button.



The screenshot shows a web form with the following fields and controls:

- Company Name:** A dropdown menu with "Malaysia Airline" selected.
- Departure city:** A dropdown menu with "Kuala Lumpur" selected.
- Arriving city:** A dropdown menu with "Kuala Lumpur" selected.
- Date:** Three separate dropdown menus for month ("Jan"), day ("22"), and year ("2011").
- Time:** An empty text input field.
- Number of Seats:** An empty text input field.
- Buttons:** Two buttons labeled "Add" and "Delete" are located at the bottom of the form.

Figure 5. 13: add new travel

In Figure 5.13, the function to add new travel was shown. Administrator must fill in the information of the travel regarding its company name, departure, arrival, date, time and number of seats.

Malaysia Airline	Kuala Lumpur	Alor Setar	228	Open	<u>Edit</u>
Air Asia Airline	Kuala Lumpur	Alor Setar	300	Open	<u>Edit</u>
Firefly Airline	Kuala Lumpur	Alor Setar	256	Open	<u>Edit</u>
Firefly Airline	Alor Setar	Kuala Lumpur	333	Open	<u>Edit</u>

Figure 5. 14: edit travel

In Figure 5.14, the function for the administrator to edit travel is shown. Administrator must go to the travels account and then select the travel he wants to edit and click edit button, then the relevant page will come out for the administrator to edit the flight information.

Malaysia Airline	Kuala Lumpur	Alor Setar	228	<u>Delete</u>
Air Asia Airline	Kuala Lumpur	Alor Setar	300	<u>Delete</u>
Firefly Airline	Kuala Lumpur	Alor Setar	256	<u>Delete</u>
Firefly Airline	Alor Setar	Kuala Lumpur	333	<u>Delete</u>

Figure 5. 15: delete travel

In Figure 5.15, the function for the administrator to delete travel was shown. Administrator must go to the travels account page and select the travel he wants to delete then click the delete button at the right side.

user name	28- 3 - 2009 --> 03:01:08 pm	127.0.0.1
user name	28- 3 - 2009 --> 07:32:43 pm	127.0.0.1
user name	29- 3 - 2009 --> 11:11:23 pm	127.0.0.1
user name	29- 3 - 2009 --> 11:12:19 pm	127.0.0.1
Ibrahim	22- 1 - 2011 --> 08:17:03 pm	127.0.0.1

Figure 5. 16: log account

In Figure 5.16, the function for the administrator to check the log account was shown. Administrator can go to this page and see the user name, login time and login IP to protect the safety of the system.

5.3 Result of the Usability Evaluation

There are 15 respondents who have the experience to book the selected airline tickets online selected for the usability evaluation of the Airline Searching System, they are from different gender, nationalities and background, thus the result can cover the different opinion of people from different background. The questionnaire is developed based on the requirement of web application development and requirements collected from the literature review.

The respondents gave their feedback to the researcher by filling in the questionnaires after testing the proposed prototype. The result of the questionnaire is listed in Table 5.1.

Table 5. 1: Usability evaluation Result

Attributes of Usefulness		average	Percentage
1	It is easy to manage the travels, managers, and user accounts..	3.9	78%
2	The user can find the specific flight information easily.	4.1	82%
3	The users can upload their comments in the forum easily.	4	80%
		TOTAL	80%
Attributes of Ease of Use			
1	The interaction within the system is understandable.	4.1	82%
2	Navigation method is clear in Airline Searching System	4	80%
3	Errors appear frequently in Airline Searching System	4.1	82%
		TOTAL	81.33%

Attributes of Ease of Learning			
1	I learned to use Airline Searching System	3.9	78%
2	I easily remember how to use Airline Searching System	4.1	82%
3	I quickly become skilful with Airline Searching System	4	80%
		TOTAL	80%
Attributes of Satisfaction			
1	I am satisfied with Airline Searching System	4.1	82%
2	Airline Searching System works the way I want it to work	3.7	74%
3	Airline Searching System is acceptable to use	3.6	72%
4	Airline Searching System is helpful to use	3.9	78%
		TOTAL	76.5 %

According to the questionnaire result, the percentage was 80% for Attributes of Usefulness, 81.33% for Attributes of Ease of Use, 80% for Attributes of Ease of Learning and 76.5% for Attributes of Satisfaction. Since the percentage was almost above 76% for all dimensions, so the proposed Airline Searching System is considered to be satisfactory by the users. Figure 5.17 shows the result for four dimensions in the usability evaluation. The graph for the four dimensions is shown in Figure 5.17.

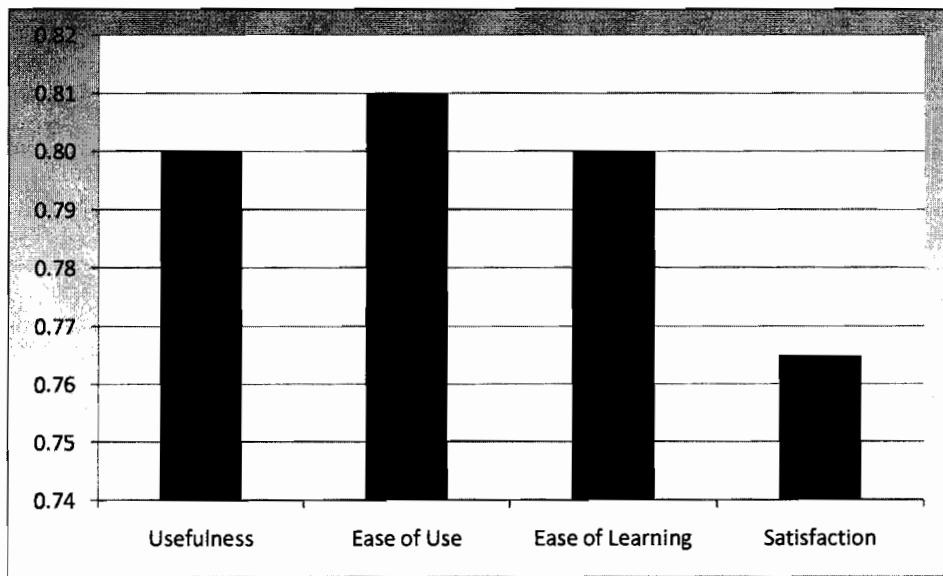


Figure 5. 17: Graph of the Usability Testing

5.4 Summary

This chapter explains the functionalities of the system and discuss the result of the usability evaluation. In next chapter, the conclusion will be made

CHAPTER SIX

CONCLUSION

6.1 Introduction

As the last chapter in this project, this chapter makes a conclusion of the whole research. The findings of the research were discussed and the limitation was also presented as well as the suggestion for future research.

6.2 Findings

As described in this research, the objective of this study was to develop the system of A Better Choice of the Flight both in Price and Service, The specific objectives were:

Research Objective 1:

- To solve the current problem by implement Airline searching. .

This system was developed in this study; the system design and analysis are discussed in chapter four, including the list of functional requirements and non-functional requirements, the display of use case diagrams, use case specifications, class diagram, sequence diagrams, and collaboration diagrams.

The explanation of the screenshots of the system is displayed in chapter five, each functionality of the system is explained with its screenshot.

Research Objective 2:

- To evaluate the proposed prototype.

The proposed system is evaluated after the development phase; the results are discussed in chapter five. The evaluation result shows that this system has satisfied the requirements and performs at a satisfactory level.

6.3 Research Limitation

The limitation of the research is that the research focuses on the three airlines: Malaysia Airlines, Air Asia Airlines, and the Firefly Airlines. Where the research store the information obtained from Malaysia Airline, Firefly and Air Asia website into the prototype data base to let the user search and find the cheapest ticket but the research did not support Electronic Payment via visa or master card

6.4 Recommended Works

In future, the researcher can make the system directly connected to the airlines.

6.5 Summary

This chapter concludes the findings of the research. All the research objectives has been achieved. Meanwhile, the research also has its limitation which is the airline included in the system is so limited, so the suggestion is made to add more airlines in future.

References

- Alwahaishi, S., Snasel, V., & Nehari-Talet, A. (2009). *Web site assessment in the airline industry: An empirical study of GCC airline companies*. Applications of Digital Information and Web Technologies. London. (pp.193-198).
- Becken, S., & Hay, J. E. (2007). *Tourism and climate change: risks and opportunities*. Clevedon, UK: Multilingual Matters Ltd.
- Biermann, T. (2007). *Yield management in the airline industry*. Logistics and Industrial Informatics LINDI. Wildau. (pp.147-150).
- Blake, A., & Sinclair, M. T. (2003). TOURISM CRISIS MANAGEMENT:: US Response to September 11. *Annals of Tourism Research*, 30(4), 813-832.
- Boehm, B., & Bose, P. (1994). *A collaborative spiral software process model based on theory W*. applying the software process. Third international conference, Reston. (pp. 59-68).
- Boehm, B. W. (1988). A spiral model of software development and enhancement. *Computer*, 21(5), 61-72.
- Bondo, J. (2009). *iPhone User Interface Design Projects*. CA, USA: Apress Berkely.
- Bultan, T., Ferguson, C., & Fu, X. (2009). *A Tool for Choreography Analysis Using Collaboration Diagrams*. Web Services ICWS. Los Angeles, CA. (pp. 856-863).
- Chariton, C., & Choi, M. H. (2005). *Enhancing usability of flight and fare search functions for airline and travel Web sites*. Information Technology: Coding and Computing ITCC. Las Vegas, NV, USA. (pp. 320-325).
- Chen, Y., Cheng, X. Q., & Huang, Y. L. (2009). *A Wavelet-Based Model to Recognize High-Quality Topics on Web Forum*. Web Intelligence and Intelligent Agent Technology WI-IAT. Sydney. (pp. 343-351).
- Detter, R., Mooney, M., & Fatig, C. (2004). *XML-James Webb space telescope database issues, lessons, and status*. Aerospace Conference. MD, USA. (Pp.3306-3312).
- Dezhgosha, K., & Angara, S. (2006). *Web services for designing small-scale Web applications*. Electro Information Technology. Lincoln. (pp. 4-8).

- Fang, F., Zhao, N., & Fan, L. (2009). *Ontology-Based Automatic Feedback Design for the Learning Forum*. Advanced Computer Theory and Engineering ICACTE. Phuket. (pp.462-466).
- Epping, R. C. (2009). *The 21st Century Economy--A Beginner's Guide*. New York: Vintage.
- Fojt, M. (2006). *The airline industry*. Bradford, England: Emerald Group Publishing.
- Gao, T., Li, Q., & Wang, S. (2009). *A Complex Interface Modeling Approach Based on Design Pattern*. Communication Software and Networks ICCSN. Macau. (pp. 191-195).
- Goeldner, C. R., & Ritchie, J. R. B. (2008). *Tourism: Principles, practices, philosophies*. New York Wiley.
- Hooi, T. C., Yusoff, Y., & Hassan, Z. (2008). *Comparative Study on Applicability of WEBMO in Web Application Cost Estimation within Klang Valley in Malaysia*. Computer and Information Technology Workshops. Sydney. (pp. 116-121).
- Johnson, M. (1999). *VXI synchro/resolver measurement and simulation COTS hardware for commercial airline industry ATE*. IEEE Systems Readiness Technology Conference. San Antonio. (pp. 203-206).
- Kohli, N., & Verma, N. K. (2010). *Performance issues of hospital system using MySQL*. Computer Science and Information Technology (ICCSIT). Chengdu. (pp. 497-501).
- Liu, C. H., Kung, D., Hsia, P., & Hsu, C. T. (2002). *Structural testing of web applications*. Software Reliability Engineering ISSRE. San Jose, CA. (pp. 84-96).
- Liu, F. (2008). *Usability evaluation on websites*. Computer-Aided Industrial Design and Conceptual Design CAID/CD. Kunming. (pp.141-144).
- Liu, P., Cheng, L., & Zhang, Y. (2002). *Thin film failure using an interface delamination law*. Electronics Packaging Technology Conference. Singapore. (pp. 43-48).
- Magel, K. (2002). Is it too late to put the user back into HTML? *Computer*, 30(12), 131-132.

- Matera, M., Costabile, M. F., Garzotto, F., & Paolini, P. (2002). SUE inspection: an effective method for systematic usability evaluation of hypermedia. *Systems, Man and Cybernetics, Part A: Systems and Humans, IEEE Transactions on*, 32(1), 93-103.
- Miao, H., Qian, Z., & Song, B. (2008). *Towards automatically generating test paths for Web application Testing*. Theoretical Aspects of Software Engineering TASE. Nanjing. (pp. 211-218).
- Paithankar, K., & Ingle, M. (2009). *Characterization of Software Projects by Restructuring Parameters for Usability Evaluation*. Computer and Electrical Engineering ICCEE. Dubai. (pp. 436-441).
- Ramli, R., Jaafar, A., & Mohamed, H. (2010). *Remote Usability Evaluation System (e-RUE)*. Computer and Electrical Engineering ICCEE. Dubai. (pp. 639-643).
- Ramli, R., & Jaafar, A. (2008). *e-RUE: A cheap possible solution for usability evaluation*. Information Technology ITSIM 2008. Kuala Lumpur. (pp. 1-5).
- Ravelojaona, E. (2008). *Optimal Strategies Using Financial Options in Airline Booking*. Pennsylvania, USA: Pennsylvania State University.
- Ryan, C., & Rao, U. (2008). Holiday users of the Internet-ease of use, functionality and novelty. *International Journal of Tourism Research*, 10(4), 329-339.
- Shaw, S. (2007). *Airline marketing and management*. Aldershot: Ashgate Pub Co.
- Shi, L., Sun, B., Kong, L., & Zhang, Y. (2009). *Web Forum Sentiment Analysis Based on Topics*. Computer and Information Technology CIT. Xiamen. (pp.148-153).
- Skattor, B. (2008). *Training and Deployment as a Basis for Usability Engineering of Mobile Systems*. Advances in Computer-Human Interaction. Sainte Luce. (pp. 277-284).
- Strother, J. B., Fazal, Z., & Rettich, K. (2010). *From full-service to self-service: The airline industry takes off*. Professional Communication Conference (IPCC). Enschede, Netherlands. (pp. 191-194).
- Tabrizi, A. T., & Moshkenani, M. S. (2008). *Evaluation of Web Applications According to Intelligence Parameters*. Computational Intelligence for Modelling Control & Automation. Vienna. (pp. 698-702).

- Takahashi, H., Mori, K., & Ahmad, H. F. (2010). *Autonomous Short Latency System for Web Application Layer Firewall*. Services 6th World Congress. Miami, FL. (pp. 447-452).
- TripAdvisor. (2011). Reviews and advice on hotels, resorts, flights, vacation rentals, travel packages. Retrieve March 1, 2011 from <http://www.tripadvisor.com/>
- Viravan, C. (2002). *Lessons learned from applying the spiral model in the software requirements analysis phase*. Requirements Engineering. Annapolis, MD. (pp. 40-46).
- Wolff, J. G. (2002). The management of risk in system development: Project SP and the New Spiral Model. *Software Engineering Journal*, 4(3), 134-142.
- Xiaoli, X., Yinghong, W., Zhijian, H., Hui, L., 2006. The impact of service quality, satisfaction, value and switching barrier on customer loyalty in Chinese airline industry. *International Conference on Service Systems and Service Management*. China. (pp.1316-1321).
- Xu, R., Wang, K., Shu, X., & Zhang, C. (2010). *Interface management for industrial design*. Computer-Aided Industrial Design & Conceptual Design CAID & CD. Wenzhou. (pp. 116-119).
- Yun, W., Hong-bing, O., & Zong-cheng, Z. (2009). *An empirical research of Chinese Airline Industry determinants of passenger load factor*. Management Science and Engineering ICMSE. Moscow. (pp. 686-695).
- Zhao, W., & Chen, J. (1999). *CoOWA: A Component Oriented Web Application Model*. Technology of Object-Oriented Languages and Systems. Nanjing. (pp. 191-197).
- Zhihui, L. (2010). *An Evaluation of the Internet Tourism Information of Local Governments' Official Tourism Websites*. E-Business and E-Government (ICEE). Guangzhou. (pp. 3672-3679).
- Zhu, T., Wu, B., & Wang, B. (2010). *Extracting relational network from the online forums: Methods and applications*. Emergency Management and Management Sciences (ICEMMS). Beijing. (pp. 424-427).

Zoratti, I. (2007). *MYSQL Security Best Practices*. Crime and Security, 2006. The Institution of Engineering and Technology Conference. London. (pp. 183-198).

APPENDIX

Faculty of Information Technology

Universiti Utara Malaysia

QUESTIONNAIRE

SECTION A: General Information

1. Optional information:

Name :

Email :

2. Gender:

- 1. Male
- 2. Female

3. Education background

- 1. Certificate
- 2. Diploma
- 3. Degree
- 4. Master
- 5. PhD.
- 6. Other (please mention) _____

4. Nationality

- 1. Arab
- 2. Malay
- 3. Chinese

4. Indian
5. Other (please mention) _____

Section B: Perception on current system

This part is planned to get your opinion on the system aspects of the A BETTER CHOICE system. Please state [√] where is appropriate to your answer.

1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree

Attributes of Usefulness		Measurement				
		1	2	3	4	5
1.	A better choice is easy to manage the travels, managers, and user accounts.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.	The user can find the specific flight information easily.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.	The users can upload their comments in the forum easily.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Attributes of Ease of Use		Measurement				
		1	2	3	4	5
1.	The interaction within the system is understandable.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.	Navigation method is clear	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.	Errors appear frequently in the system .	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Attributes of Ease of Learning		Measurement				
		1	2	3	4	5
1.	I learned to use the a better choice quickly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.	I easily remember how to use it	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3.	I quickly became skillful with it	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Attributes of Satisfaction	Measurement				
		1	2	3	4	5
1.	I am satisfied with it	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.	It works the way I want it to work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.	It is acceptable to use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.	It is helpful to use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>