

BULAN RESTU BUS TICKETING SYSTEM (ONLINE)

SARAWANAKUMAR A/L SEGAR

A thesis submitted in partially fulfillment of the requirements for the award of degree of
Bachelor of Computer Science (Software Engineering)

Faculty of Computer System & Software Engineering
Universiti Malaysia Pahang (UMP)

JUN 2012

SUPERVISOR'S DECLARATION

“I hereby declare that I have read this thesis and in my opinion this thesis is sufficient in terms of scope and quality for the award of the degree of Bachelor of Computer Science (Software Engineering)”

Signature :.....
Supervisor : En WAN MUHAMMAD SYAHRIR BIN WAN HUSSIN
Date : Jun 13th, 2012

STUDENT'S DECLARATION

I declare that this thesis entitled “Bulan Restu Bus Ticketing System (online)” is the result of my own research except as cited references. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

Signature :

Name of Candidate : Sarwanakumar a/l Segar

Date : Jun 13th, 2012

DEDICATION

Special dedication to my beloved parent,
Segar a/l Manickam,
Jothee a/p Arumugam,

To all my lectures especially my PSM Supervisor,
En. WAN MUHAMMAD SYAHRIR BIN WAN HUSSIN,

ACKNOWLEDGEMENT

I am deeply indebted to many people who, directly or indirectly, are responsible for this project coming into being. I am most grateful to Mr. En Wan Muhammad Syahrir Bin Wan Hussin as my supervisor for his constructive criticism of my research in this project, and most of all his guidance and support for the whole project.

I also thank my Software lecturers who helped me a lot in completing this Bulan Restu Bus Ticketing System (online).

And finally, thanks to parents, and numerous friends who endured this long process with me, always offering guidance and supports.

ABSTRACT

Traveling is a large growing business in Malaysia and other countries. Bus reservation system deals with maintenance of records of details of each passenger who had reserved a seat for a journey. It also includes maintenance of information like schedule and details of each bus. We observed the working of the Bus reservation system and after going through it, we get to know that there are many operations, which they have to do manually. It takes a lot of time and causes many errors. Due to this, sometimes a lot of problems occur and they were facing many disputes with customers. To solve the above problem, and further maintaining records of items, seat availability for customers, price of per seat, bill generation and other things, we are offering this proposal of reservation system. One of the bus company which have same kind of problem is Bulan Restu .In Bulan Restu bus ticketing system there has been a collection of buses, agent who are booking tickets for customer's journey which give bus number and departure time of the bus. According to its name it manages the details of all agent, tickets, rental details, and timing details and so on. It also manages the updating of the objects. In the tour detail there is information about bus, who has been taking customers at their destination, it also contain the detailed information about the customer, who has been taken from which bus and at what are the number of members he or she is taking his/her journey. This section also contain the details of booking time of the seat(s) or collecting time of the tickets, this section also contain the booking date and the name of agent which is optional, by which the customer can reserve the seats for his journey. In Bus no category it contains the details of buses which are old/new. New buses are added with the details with bus no, from city to the city, type of the bus, rent of a single seat, if the bus has sleeper than the cost of sleeper, if the cabin has the facility for sitting than the cost of cabin seats, tour timings of the new bus has also been stored. The main objective of this project is to provide the better work efficiency, security, accuracy, reliability, feasibility. The error occurred could be reduced to nil and working conditions can be improved. By using this

software, we can reserve tickets from any part of the world, via internet. This project provides and checks all sorts of constraints so that user does give only useful data and thus validation is done in an effective way.

ABSTRAK

Industri pengangkutan adalah perniagaan yang besar berkembang di Malaysia dan negara-negara lain. Sistem tempahan bus berkaitan dengan penyelenggaraan rekod dan butir-butiran setiap penumpang yang telah menempah tempat duduk untuk perjalanan. Ia juga termasuk penyelenggaraan maklumat seperti jadual dan butir-butiran bus. Setelah memerhatikan setiap kerja sistem tempahan Bas selepas , mendapat tahu bahawa terdapat banyak operasi yang mereka perlu untuk melakukan secara manual. Ia mengambil banyak masa dan menyebabkan banyak kesilapan. Disebabkan ini, kadang-kadang banyak masalah berlaku dan mereka telah menghadapi pertikaian dengan pelanggan. Untuk menyelesaikan masalah di atas, dan seterusnya mengekalkan rekod item, kekosongan tempat duduk untuk pelanggan, harga tempat duduk per, generasi rang undang-undang dan perkara-perkara lain, kami menawarkan cadangan ini sistem tempahan. Salah satu syarikat bus yang mempunyai masalah yang sama adalah Bulan Restu. Dalam sistem bus Bulan Restu tiket, ada maklumat tentang ejen bus, yang menempah tiket untuk perjalanan pelanggan yang memberikan nombor bus dan masa berlepas bus. Menurut namanya menguruskan butiran ejen semua, tiket, maklumat sewa, dan butir-butir masa dan sebagainya. Ia juga menguruskan pengemaskinian objek. Secara terperinci pelancongan terdapat maklumat mengenai bus, yang telah mengambil pelanggan di destinasi mereka, ia juga mengandungi maklumat terperinci tentang pelanggan, yang telah diambil dari mana bus dan apakah bilangan ahli dia mengambil beliau / seksyen journey. This juga mengandungi butir-butir tempahan masa tempat duduk atau mengumpul masa tiket, seksyen ini juga mengandungi tarikh tempahan dan nama ejen yang merupakan pilihan, di mana pelanggan boleh menempah kerusi untuk Bas journey. In kategori tidak mengandungi butir-butir bus yang lama / baru. Bas baru ditambah

dengan butir-butir dengan tiada bas, dari bandar ke bandar, jenis bas, sewa kerusi satu, jika bas mempunyai penidur daripada kos penidur, jika kabin mempunyai kemudahan untuk duduk daripada kos kerusi kabin, pewartuan pelancongan bas baru telah juga stored. The Objektif utama projek ini adalah untuk menyediakan kerja kecekapan yang lebih baik, keselamatan, ketepatan, kebolehpercayaan, kebolehlaksanaan. Kesilapan yang berlaku dapat dikurangkan kepada sifar dan keadaan kerja yang boleh diperbaiki. Dengan menggunakan perisian ini, kita boleh menempah tiket dari mana-mana bahagian dunia, melalui internet. Projek ini menyediakan dan memeriksa pelbagai kekangan supaya pengguna yang tidak hanya memberikan data yang berguna dan dengan itu pengesahan dilakukan dengan cara yang berkesan.

TABLE OF CONTENTS

CHAPTER	TITLE	PAGE
	SUPERVISOR'S DECLARATION	ii
	STUDENT'S DECLARATION	iii
	DEDICATION	iv
	ACKNOWLEDGEMENT	v
	ABSTRACT	vi
	ABSTRAK	vii
	TABLE OF CONTENTS	viii
	LIST OF FIGURES	xii
	LIST OF TABLES	xiv
	LIST OF APPENDICES	xv
1	INTRODUCTION	1
	1.1 Introduction	1
	1.2 Problem Statement	2
	1.3 Objective of Research	2
	1.4 Scope	3

1.5	Thesis Organization	4
2	LITERATURE REVIEW	5
2.1	Existing System	5
2.1.1	Bulan Restu Bus Company, Terminal Makmur Kuantan (Manual)	5
2.1.2	Terminal Bersepadu Selatan (Manual)	8
2.1.3	Transnasional Online Ticketing System	10
2.1.4	Comparison of the existing bus ticketing systems	14
2.2	Technique/method/equipment/Technology	16
2.2.1	Technique	16
2.2.1.1	Web Application	16
2.2.1.2	Operating System	17
2.2.1.2.1	Mac	17
2.2.1.2.2	Windows	17
2.2.1.2.3	Linux	17
2.2.1.2.4	Comparison Between Linux, Mac and Windows	18
2.2.1.3	Web Browser	19
2.2.1.3.1	Google Chrome	19
2.2.1.3.2	Mozilla Firefox	19
2.2.1.3.3	Internet Explorer	19
2.2.1.3.4	Comparison Between Chrome , Mozilla and IE	20
2.2.1.4	Context Management System Software	21
2.2.2	Software Approach	21
2.2.2.1	Web Development tools	21

	2.2.2.1.1 PHP	21
	2.2.2.1.2 ASP.net	22
	2.2.2.1.3 JSP	22
	2.2.2.1.4 Comparison Between PHP, ASP.net and JSP	22
	2.2.2.2 Database Language	23
	2.2.2.2.1 MySQL	23
	2.2.2.2.2 Oracle	23
	2.2.2.2.3 Comparison Between MySQL and Oracle	24
	2.2.2.3 Visual Studio 2010	25
	2.3 Summary	25
3	METHODOLOGY	26
	3.1 Introduction	26
	3.2 Rapid Application Development (RAD)	27
	3.3 Planning Phase	27
	3.4 Design Phase	29
	3.4.1 Unified Modeling Language (UML)	29
	3.4.1.1 Context Diagram	30
	3.4.1.2 Data Flow Diagram	31
	3.4.2 Database Design	44
	3.5 Construction Phase	50
	3.6 Cutover Phase	50
	3.7 System Requirement	51
	3.7.1 Hardware Requirement	51
	3.7.2 Software Requirement	52
4	IMPLEMENTATION & TESTING	53

4.1	Declaration of Variable in SQL Statement using ASP.Net	57
4.1.1	Insert SQL Statement	58
4.1.2	Delete SQL Statement	59
4.1.3	Update SQL Statement	59
4.2	Database Design	60
4.3	Testing	65
4.3.1	Steps	65
4.3.2	Strategies	65
4.3.2.1	Unit Testing	66
4.3.2.2	Integration Testing	66
4.3.2.3	Validation Testing	66
4.3.2.4	System Testing	66
4.3.2.4.1	Security Testing	66
4.3.2.4.2	Performance Testing	67
4.3.2.5	Criteria for completion of testing	67
4.3.2.6	Validation Checks	67
5	RESULT, DISCUSSION AND CONCLUSION	69
5.1	Introduction	69
5.2	Output of BRBTS (Online)	70
5.3	Constrains	84
5.4	Further Research	84
5.5	Conclusion	85
	REFERENCES	86
	APPENDIX	88

LIST OF FIGURE

FIGURE	TITLE	PAGE
2.1	The Bulan Restu bus company's bus	6
2.2	The older version of bus ticket used by Bulan Restu (paper)	6
2.3	The new version of bus ticket by Bulan Restu (print)	7
2.4	The main view of Terminal Bersepadu Selatan	9
2.5	Main page of the website	11
2.6	Interface to choose the trip	11
2.7	Agreement page	12
2.8	Customer's Details	12
2.9	Confirmation and Payment part	13
3.1	Diagram of Rapid Application Development Model	27
3.2	Context diagram for Bulan Restu Bus Ticketing System (Online)	30
3.3	Data Flow Diagram Level 0 for Bulan Restu Bus Ticketing System (online)	31
3.4	Data Flow Diagram for login part	32
3.5	Data Flow Diagram for send feedback	33
3.6	Data Flow Diagram for view status	34
3.7	Data Flow Diagram for buying bus ticket user based	35
3.8	Data Flow Diagram for view details	36
3.9	Data Flow Diagram for forget password	37
3.10	Data Flow Diagram for change password	38
3.11	Data Flow Diagram for canceling the ticket	39

3.12	Data Flow Diagram for buying bus ticket from agent and admin side	40
3.13	Data Flow Diagram for create agent	40
3.14	Data Flow Diagram for add deposit	41
3.15	Data Flow Diagram for bus list	42
3.16	Data Flow Diagram for view feedback	43
4.1	Main interface for Bulan Restu Bus Ticketing System	56

LIST OF TABLE

TABLE	TITLE	PAGE
1.1	Scopes of the system	3
2.1	A comparison of the existing bus ticketing systems	14
2.2	Comparison between Linux, Window and Mac	18
2.3	Comparison between Chrome , Mozilla and IE	20
2.4	Comparison between PHP,ASP.NET and JSP	22
2.5	Comparison between MySQL and Oracle	24
3.1	Data dictionary for <i>AgentBasicInfo</i> table	44
3.2	Data dictionary for <i>feedback</i> table	45
3.3	Data dictionary for <i>passengerinfo</i> table	46
3.4	Data dictionary for <i>States</i> table	47
3.5	Data dictionary for <i>Time-list</i> table	48
3.6	Data dictionary for <i>UserInfo</i> table	49
3.7	The list of Hardware Requirement	51
3.8	The list of Software Requirement	52
4.1	Explanation of the system interface	54
4.2	<i>AgentBasicInfo</i> table	60
4.3	<i>Feedback</i> table	61
4.4	<i>Passengerinfo</i> table	61
4.5	<i>States</i> table	62
4.6	<i>Time-list</i> table	64
4.7	<i>UserInfo</i> table	64

LIST OF APPENDICES

APPENDIX	TITLE	PAGE
A	Project Gantt chart	73

CHAPTER 1

INTRODUCTION

1.1 Introduction

Public transport (also **public transportation** or **public transit**) is a shared passenger's service which is available for use by the general public, as distinct from modes such as taxicab, car pooling or hired buses which are not shared by strangers without private arrangement.[1] Public transport modes include buses, trolleybuses, trams and trains, rapid transit (metro/subways/undergrounds etc) and ferries. Public transport between cities is dominated by airlines, coaches, and intercity rail. High-speed rail networks are being developed in many parts of the world.

Same goes to our Malaysian citizens. Using public transports becoming a huge helpful to student's, worker's traveler's and much more. Public transportation provides personal mobility and freedom to the people to move, saves fuel, provides economics opportunities and growth and of course save money. The main public transportation used by Malaysian is bus. There are lots buses companies providing these services such as Transnational, Consortium, and Mara liner express, and these are the big bus companies. These companies are occupied with full equipments or facilities for their customer to buy ticket. But, there also some small bus companies who trying to compete and upgrade them with other big companies' example like Bulan Restu Bus Company.

As I mentioned before, Bulan Restu is one the small companies which tries compete with big companies by upgrading. This bus company only has two branches, one at Kuala Lumpur and another one at Kuantan. They are planning to expend their services to few other states and they only have stand alone application to sell their ticket's and customer have to go their counter to buy it. They also are planning to create agents to rapid their sales. To fulfill all these needs, they need a web based application.

Bulan Restu Bus Ticketing system (online) is a web based application that developed for Bulan Restu bus companies. This application is developed for three types of user: 1) User/Customer 2) Agent & 3) Admin. For user part , the customer can view agent information, information about Bulan Restu, Contact details ,

Privacy and Policy , Terms and Conditions, send Feedback, check information about tickets, FAQ, and finally buy tickets. For agent part, the agent can login, change password, cancel the bought ticket, and send feedback to admin. For admin part, admin will do exactly as same as agent but there will be extra features such as create agent, add deposit for agent and for himself, search agent list, view basic information about company, add destination, and view the feedback.

1.2 Problem Statement

Bulan Restu Bus Company trying to upgrade their services all the over Malaysia. There are going to establish new branches, there will be new agents, more bus services, so they need a proper and web based application to connect and communicate with admin and agents. Meanwhile, the admin no need to use stand alone application to check all is work, he can use this application to check his work from wherever he want as long there is a internet connection. Other than that, the customers have to the come to the counter to buy the ticket. It will be waste of time and energy because they have to come to the terminal again for take their bus. More over, their will be difficult to get bus ticket while holiday season. Using web application, they not only can buy ticket on time but they can buy the ticket with few clicks from the pc.

1.3 Objectives of the Research

- i) To develop a prototype for Bulan Restu Bus Ticketing System (online).
- ii) To implement Software Engineering documentation for this system

1.4 Scopes

In this section, scopes of the Bulan Restu Bus Ticketing system will be defined. They are several elements that involves which are System, User, Admin and Agent. This element is important to make sure that the scopes of the system did not override the boundaries of the system.

This system is a web based application .It can be accessed via the Internet so that the management can view the progress of the company everywhere. It has security elements whereas only authorized user can view the content of this web based application. In database framework, its contains a few tables that record the data, history, Information, agent details and add deposit that can be accessed and update by admin.

The Scopes are:

- i) This system specially design for “Bulan Restu” bus company
- ii) The admin only limited to adding destination, canceling ticket , booking ticket and adding agent.
- iii) The agent only limited to canceling ticket and booking ticket
- iv) The user need credit card to purchase the ticket
- v) Other functions such as report generating and calculate total sales are not include in

1.5 Thesis Organization

This thesis consists of six (6) chapters. Chapter 1 will discuss on the Introduction of the system/research. This chapter explains about overall system, problem statement that cause newly systems develop, objectives, scopes and thesis organization for the project.

Chapter 2 will discuss about Literature Review. In this chapter will describe about the technology and tools that suitable to apply in the system development based on the existing system and researches.

Software methodology is chapter 3 will explains about Methodology has been used in the development of the project. Besides that, this chapter also includes the Unified Modeling Language (UML) diagram such as use case and sequences diagram and approach hardware and software need.

Chapter 4 will discuss about Implementation and testing which the main purpose is to document all process involved in system development and will test all the system so is it function properly. Generally, this chapter upon the system development has been designed.

Meanwhile in chapter 5: Result and Discussion will describe the analysis of the result obtained and the constraint in completing the development of the project.

Lastly, Chapter 6, is the last parts of the thesis that will be summarizing the project that has been developed.

CHAPTER II

LITERATURE REVIEW

This chapter briefly describes the review on existing techniques related with **“Bulan Restu Bus Ticketing System (Online)”** that will be developed later. This chapter comprises two sections: The first section describes the comprehensive review on existing related systems. The second section describes the review on method, equipment, and technology previously used in the same domain.

2.1 Existing Systems

This section reviews the current and the existing systems related to bus ticketing system.

2.1.1 Bulan Restu Bus Company, Terminal Makmur, Kuantan (Manual)

Bulan Restu is one of the bus companies that available at Kuantan. This bus company do not have online system or any other source to sell their ticket. The only way to buy this bus company ticket is by approaching at their counter. According to their Kuantan manager, this bus company maybe do not have online system but there are lots of customers using their bus services everyday. More than that, this company also have their own way or procedure to sell the bus ticket's.



Figure 2.1: The Bulan Restu bus company's bus. This figure shows the image of the bus that used by Bulan Restu Bus Company

Their manager also said that, this bus company is still in developing stage. For a example, he showed a old version of bus ticket and new version bus ticket. More over , they planning to increase their destination time.

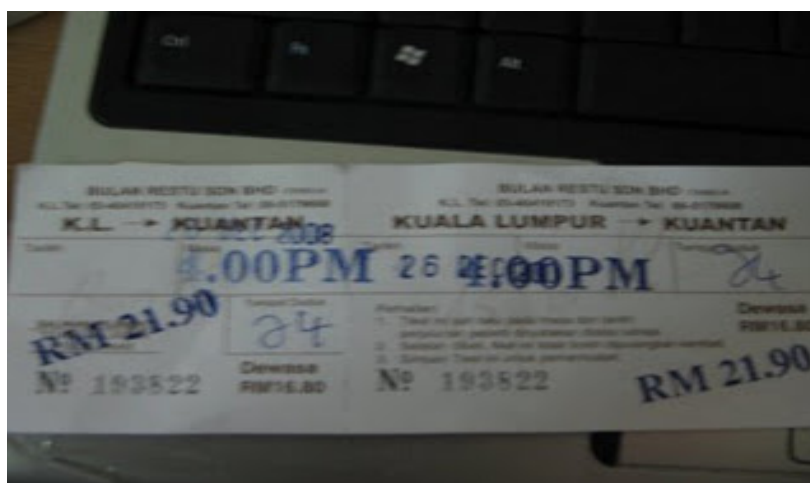


Figure 2.2: The older version of bus ticket used by Bulan Restu (paper)



Figure 2.3: The new version of bus ticket by Bulan Restu (print)

2.1.2 Terminal Bersepadu Selatan (Manual)

Terminal Bersepadu Selatan is the bus terminal where the place customers can buy all kind of bus ticket at same counter. Its integrated with bus, taxi, LRT and KTM. This terminal uses state-of-the-art technology to provide the utmost comfort and convenience for all South-bound bus passengers and users of our terminal. Easily accessible via road or rail, TBS-BTS has over 60 specialty outlets for all your 'shopping while travelling' needs. While you wait for your bus, kill time by shopping at the numerous boutiques and fashion outlets located within the terminal. If you're feeling famished or just need a drink to cool down, head on down to one of the many food and beverage outlets available. Various facilities and services are also available within the terminal – just enquire at the Information Counter if you require any assistance or check it out for yourself at one of our touch screen information kiosks. [2]

Services that are provided:-

- Information Counters
- POLIS & SPAD
- Public Information Display System (PIDS)
- Self-Service Kiosks
- Taxi Ticket Counter
- 19 Ticket Counter
- Wi-Fi



Figure 2.4: The main view of Terminal Bersepadu Selatan

2.1.3 Transnational Online Ticketing System

Transnational, a Malaysian icon and the leader of the express bus industry, is one of the most prominent and popular household brand names in Southeast Asia region, serving more than 200 destinations, covering all major cities and towns with 1,000 daily departures across Peninsular Malaysia and Singapore. Using the latest advancement in bus technologies, design and comfort, Transnational provides safe, enjoyable and affordable travel. [3]

This online system using a standard procedure to sell their ticket. First the user must login to the main page. Then figure will be your main page. After that, the user can search the desire trips at “plan your trip” column. After search, the user will be shown a list of trips available at time. From there, user can choose which trip they want to go. After choose, user will be direct to the agreement page. The further part only will continue if the user, agree to the agreement. Next, the user will ask to input the personal details for verification and contact purpose only. After input the details, the next page will the conformation and payment page. Here the user must do conformation and pay for bus ticket using Maybank2u or credit card. Finally, a computerized receipt will come out and the user can use it to travel on that day.



Figure 2.5: Main page of the website

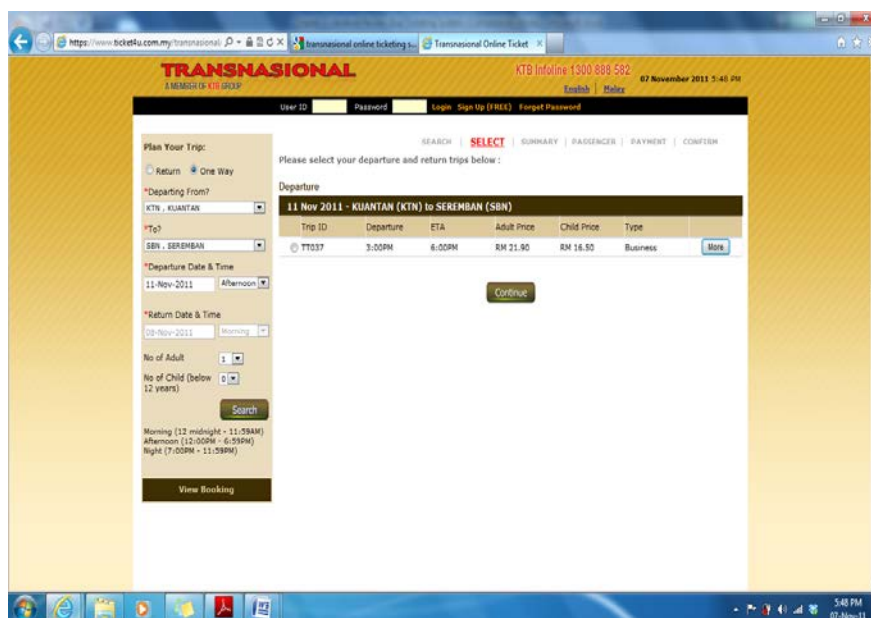


Figure 2.6: Interface to choose the trip

TRANSNASIONAL
A MEMBER OF KTM GROUP

KTB Infoline 1300 888 582
07 November 2011 5:45 PM

User ID: _____ Password: _____ Login Sign Up (FREE) Forget Password

SEARCH | SELECT | **SUMMARY** | PASSENGER | PAYMENT | CONFIRM

Departure: KUANTAN to SEREMBAN (11-Nov-2011)

Trp ID	Type	Departure Terminal	Departure	ETA	Adult	Child	Total
77157	Business	T. MAKJUR JLN STD	3:00PM	6:05PM	1	0	1
							Price (RM): 21.90 0.00 21.90

Payment	Amount (RM)
Fare(s)	21.90
Insurance Coverage - LHM	0.20
Ground Handling Fee	1.10
Total Fare	RM73.30

NOTE: Seat(s) is not guaranteed until purchase is completed. Upon successful in transaction, the selection of seat for passenger will automatically be selected by the system.

Please check this box to confirm that you understand and accept Transnasional's [Terms and Conditions](#) of Coach and Price Rules to continue.

Figure 2.7: Agreement page

Nota: Tidak jaminan tempat duduk selagi proses pembayaran belum selesai. Setelah transaksi berjaya, pilihan tempat duduk penumpang dipilih secara automatik oleh sistem.

Adakah anda ingin mendaftar sebagai ahli TRANSNASIONAL? Dengan bayaran RM10 anda akan menjadi ahli TRANSNASIONAL dan boleh menikmati tawaran dan diskaun yang menakjubkan! [Sign Up](#)

BUTIRAN PENUMPANG

Saya merupakan salah seorang daripada penumpang

Gelaran:

Nama Penumpang:

Nombor KRP/ Pasport:

No Telefon:

Alamat Email:

Peringatan: Maklumat penumpang di atas digunakan untuk pengesahan identiti dan untuk menghubungi penumpang. Sila pastikan semua maklumat di atas adalah sah.

Sila pilih tempat naik dan tempat turun

Bertolak: KUANTAN ke SEREMBAN (11-Nov-2011)

Tempat & masa naik:

Tempat turun:

Figure 2.8: Customer's Details

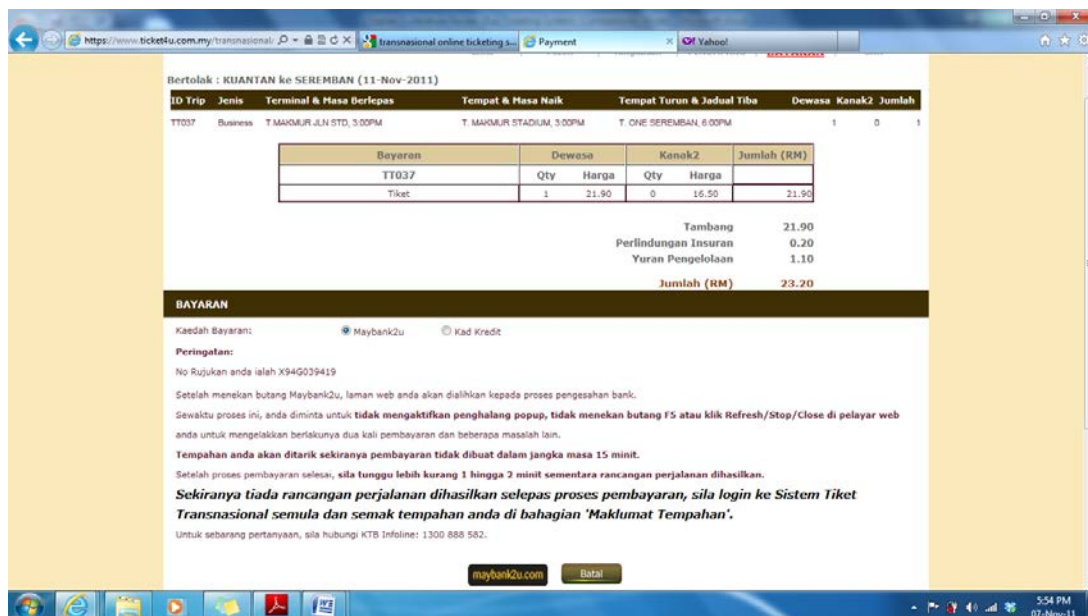


Figure 2.9 : Confirmation and Payment part

The advantages of this system :-

- Simplicity and efficiency
- Speed and Flexibility

The disadvantages of this system:-

- Only credit card or maybank2u holder's can use
- Must login to perform the transaction
- Must have skills in using internet and computer's

Table 2.1: A comparison of the existing bus ticketing systems

Parameter	Bulan Restu (Manual)	Terminal Bersepadu Selatan (Manual)	Transnational (online)	Your Proposed Model
Application used	Only simple stand alone application which access able by worker at counter	An advanced stand alone application which access able by worker at counter	Web application	Web application.
Type of system	Manual	Manual	Online	Online
Advantages	-Direct contact with bus company -Low risk of cheated	-Can buy all kind of bus tickets -Low risk of cheated	-Quick to do(no need to line up) -No need to travel anywhere	-Quick to do -No need to travel to the counter -Real time process

			<ul style="list-style-type: none"> -Real time process -Could be cheaper 	<ul style="list-style-type: none"> -Cheaper expenses
Disadvantages	<ul style="list-style-type: none"> -Have to travel to the counter -Its quite hard to get ticket on holiday season -Very old method and waste lots of time and extra expenses 	<ul style="list-style-type: none"> -Have to go the counter -Only available for Kuala Lumpur and nearby station -Still have to queue up to buy ticket 	<ul style="list-style-type: none"> -Need internet and PC experience -Need a credit/debit card -Virus/Trojan maybe can steal information -If website is down , wont able to purchase -Every time have to login to purchase 	<ul style="list-style-type: none"> -Need internet and PC experience -Need a credit/debit card -Virus/Trojan maybe can steal information -If website is down , wont able to purchase
Payment Method	-Cash payment	-Cash/credit/debit payment method	-credit/debit payment method	-cash(via agent) / credit card method

2.2 Technique/method/equipment/Technology

2.2.1 Techniques

This section will review on the current technique on the web application, operating system, web browser, content management system software and touch screen.

2.2.1.1 Web Application

A web application is an application that is invoked with a web browser over the Internet. Web application development requires agility, the use of standard components, interoperability and close attention to user needs. Web Application is support user participation to add value to the application and collaborate with other users. It has brought new emphasis to the role of (unstructured) data in applications (Jazayeri, 2007) [4]. Web prefetching is a technique that is commonly applied to reduce the access latency perceived by web user. This technique enables a web application to prefetch data from the server so that it is immediately available upon user actions. Web application must prefetch using accurate information in order to achieve reasonable performance that justifies the additional resources consumed (bandwidth, extra server load) (Dahlan & Nishimura, 2008) [5].

2.2.1.2 Operating System

An operating system is the program that after initially loaded into the computer by a boot program, manages all the programs in a computer. All major computer platforms (hardware and software) require and sometimes include an operating system. Linux, Window, Mac are the most popular operating systems in computer field (SearchCIOMidmarket.com) [6]. An operating system's principal purpose is to manage sharable resources (Reynolds, 2002) [7].

2.2.1.2.1 Mac

Macintosh computers come preloaded with the Mac OS X. it is only can be installed on the Mac. This computer is more expensive than other PCs (liutilies.com) [8].

2.2.1.2.2 Windows

The Windows operating system is pretty versatile, and can be installed on PCs having variable amounts of resources. Windows user get good choices for their operating systems based on the system resources they have. The benefit of Windows users is the userfriendliness of the operating system. The graphical user interface is surprisingly easy to work with and many complicated tasks on Windows can be performed with a few clicks of a mouse only. Windows has the highest user base and most software vendors develop software packages, tools and utilities based on Windows (liutilies.com) [9].

2.2.1.2.3 Linux

Linux has become popular in the domestic market with its security and efficiency. However, the lack of Linux talented persons has restricted Linux development. Currently, professional training of Linux software is seriously lagging behind and the gap is big. The Linux professionals are insufficient in quantity and in levels, structure, and quality. The Linux professionals' abilities cab be divided into four grades: ability of office automation, ability of website building and maintenance, ability of programming and website design and the ability of embedded development and application (Kong, Li, & Wang, 2010) [10]. Linux users have the benefit of having low resource requirement. Linux can be installed on a PC just having the bare

minimum resources. Linux is versatile that almost any type of computer and console can probably support it. However, Linux is lack of user friendliness.

While Linux does have a good graphical user interface, users still have to use the command line to perform many tasks. Command lines only accept textual commands that must be typed by hand. It is complicated for novice users (liutilities.com) [11].

2.2.1.2.4 Comparison between Linux, Mac and Windows

Table 2.2 Comparison between Linux, Window and Mac (TuxRadar, 2009) [12]

DETAILS	Linux	Mac	Windows
PERFORMANCE	<ul style="list-style-type: none"> · Faster booting. · Less memory usage. · Smaller install size. · Broader hardware compatibility. 	-	<ul style="list-style-type: none"> · Better at synthetic benchmarks. · Faster transfer of large files. · Final version likes to improve. · Suspend/resume works
COST	Very cheap or free	Very expensive compare to Linux and Windows	Expensive than Linux

2.2.1.3 Web Browser

Web browser is a software application for retrieving presenting and traversing information resources on the World Wide Web.

2.2.1.3.1 Google Chrome

Google chrome is compatible with Window XP, Vista and Windows 7. It is initially designed for speed and generally faster browsing from double clicking on the icon on desktop, we can potentially be browsing in less than a few seconds flat. Besides, it is a simple design with rather no clutter in the toolbar and includes an auto update and a built-ins malware.

2.2.1.3.2 Mozilla Firefox

Some of the features include tabbed browsing, integrated search box, add-ons and custom skins. Security wise includes anti-spyware, anti-virus, anti-phishing, pop-up blocker and private mode. Configurations are supported with Window Vista, XP and MAC.

2.2.1.3.3 Internet Explorer (IE)

Internet Explorer 9 is the current version with more features than ever before including a neat tool that allows us to pin sites that we regularly visit and have access to them directly from the toolbar. Other features include a more powerful download manager, enhanced tabbed browsing, search using the address bar as appose to an integrated search box and hardware acceleration to name just a few.

2.2.1.3.4 Comparison between Chrome, Mozilla and IE

Table 2.3: Comparison between web browsers (Gube)[13]

Aspects	Google Chrome	Mozilla Firefox	Internet Explorer
JavaScript Speed	542.3ms	1230.6ms	6305.5ms
CPU Usage (Under Stress)	3.0%	7.6%	13.1%
DOM Selection Speed	39ms	73ms	137ms
CSS Rendering Speed	91ms	359ms	793ms
Page Load Time	1.45s	1.34s	1.61s
Browser Cache Performance	0.71s	0.75s	0.87s
Overall Performance	First	Second	Third

2.2.1.4 Content Management System Software

A content management system (CMS) is a system providing a collection of procedures used to manage work flow in a collaborative environment. Content management system is the tool used to ease the process of creating, publishing, and updating web site content. The most CMS applications have features that user that can create the whole web site with limited web programming knowledge (Kiatruangkrai, Phusayangkul, Viniyakul, Prompoon,22 & Kanongchaiyos, 2010) [14]. The most common CMS is PHP.Fusion, PHP-Nuke, mambo, Joomla and XOOPS.

2.2.2 Software Approach

There is a wide range of selection for software approach with each featuring different type and advantages. Few of the software approach features that are using in development process.

2.2.2.1 Web Development Tools

There are many tools can be used to create dynamic and interactive web pages. PHP, ASP.NET and JSP is the most popular programming tools for develop web pages.

2.2.2.1.1 PHP

PHP is a powerful tool for making dynamic and interactive Web pages. It is the widely used, free and efficient (W3Schools.com) [15]. According to Yu, X.S. and Yi C., PHP and MySQL has been the main web development tool for it is free and open sources. They take PHP as the development language because: free, small size of project, strong supporting, good portability, simple grammar and rapid development (Yu & Yi, 2010) [16].

2.2.2.1.2 ASP.net

ASP.NET is a web application framework developed and marketed by Microsoft to allow programmers to build dynamic Web sites, Web applications and Web services (Wikipedia) [17].

2.2.2.1.3 JSP

Java Server Pages (JSP) technology provides a simpler, fast way to create dynamic web content. JSP technology enables rapid development of web-based applications that are server and platform independent (Oracle)[18].

2.2.2.1.4 Comparison between PHP, ASP.NET and JSP

Table 2.4: Comparison between PHP, ASP.NET and JSP (Yu & Yi, 2010) [19]

Aspects	ASP.NET	PHP	JSP
Security	Safety is good, but there is exist certain degree of security vulnerabilities.	PHP is a recognized safety performance.	Safety is the highest.
Platform Incompatibility	Single Platform	Multiple Platform	Multiple Platform
Operating Efficiency	High	Higher	Highest
Cost	High	Free	High

2.2.2.2 Database Language

Database languages are dedicated programming languages, tailored and utilized to define a database, manipulate its content and query it. Database languages are data-model-specific.

2.2.2.2.1 MySQL

MySQL is a relational database management system (RDBMS) that runs as a server providing multi-user access to a number of databases (Naim, Yassin, Zamri, & Sarnin, 2011) [20]. MySQL is welcomed by most of the developers for it is open source, free and efficient. MySQL is perfect database server software for medium and small application system, support many platforms, multi-thread and provide a series of supports. MySQL is relatively light-weight and extremely fast when applications leverage architecture. Lots of database \stay free as the database servers grow (Trujillo, 2008) [21].

2.2.2.2.2 Oracle

Oracle offers lots of feature/functionality for solving complex problems (Trujillo, 2008) [22]. It is the most widely used large-scale database in business society at present and its performance influences the efficiency of application directly (Li, Honglin, & Yan, 2009) [23].

2.2.2.2.3 Comparison between MySQL and Oracle

Table 2.5: Comparison between MySQL and Oracle (Trujillo,2008)[24]

Features	MySQL	Oracle
Strengths	Great performance when application leverage architecture	Aircraft carrier database capable of running large OLTP and VLDBs.
Application Domains	<ul style="list-style-type: none"> • Web(MySQL excels) • Data WareHouse • Gaming • Small/Medium OLTP environments 	<ul style="list-style-type: none"> • Medium/Large OLTP and Enterprise applications • Oracle excels in large business applications. • Medium/large data warehouse.
Development Environment	PHP, Java, Ruby on Rails, .NET,Perl	Java, .NET, APEX, Ruby on Rails, PHP
Export/Import	Easy, very basic	More Features
Stored Procedures	Very basic featured, limited scalability	Advanced features , extremely scalable.

2.2.2.3 Visual Studio 2010

This is an introduction to programming using Microsoft's Visual Studio.NET 2010, intended for novice programmers with little or no programming experience or no experience with Visual Basic. The text emphasizes programming logic and good programming techniques with generous explanations of programming concepts written from a non-technical point of view. It stresses input, processing, and output and sequence, selection, and repetition in code development. File I/O and arrays are included. Later chapters introduce objects, event programming, and databases. By taking a slow and steady approach to programming ideas, this book builds new concepts from what the reader has already learned.

VB tips and quips inject both humor and insight. The book includes numerous programming examples and exercises, case studies, tutorials, and "fixing a program" sections for an in-depth look at programming problems and tools. Quizzes and review questions throughout each chapter get students to think about the materials and how to use them. Each chapter has a summary and glossary for extra review. The accompanying Web site, www.cambridge.org/us/McKeown, has code downloads, I/O, and database files from small, simple files to large files with thousands of records, flowcharts, desk checks and audits to aid with program design, coding, and debugging; PowerPoint files for every chapter; and hundreds of ideas for programs and projects.[25]

2.3 Summary

As conclusion after the research related to this chapter is done, this chapter is one of the important element that need to be understand before develop the system. To develop this system, the main source is needed that is a Bulan Restu Bus Company, Terminal Makmur, Kuantan .This system based courseware application using ASP.NET language. For database development, this application will use MySQL to store a data information..

CHAPTER 3

METHODOLOGY

3.1 Introduction

This chapter will describe about the methodology chosen to develop a web based prototype Bulan Restu Bus Ticketing System (Online).A methodology is a structure imposed on the development of a software product. It consist a set of method used to produce complete software from the requirements acquiring phase till the maintenance phase. It provides a framework for the development of software. The processes are done iteratively and incrementally. Rapid Application Development (RAD) methodology has been implemented during the development process of this project.

3.2 Rapid Application Development (RAD)

Rapid Application Development (RAD) is a software development process that initially develops in the 1980s by James Martin. This methodology focuses on building applications in very short period time. The methodology is development lifecycle designed to give much faster development and higher-quality results than those achieved with the traditional lifecycle. The key objectives of RAD are high speed, high quality, and low cost. The RAD lifecycle composes of four stages. They are planning phase, design phase, construction phase, and cutover phase. Figure 3.1 show the phases that implementation in RAD Methodology.

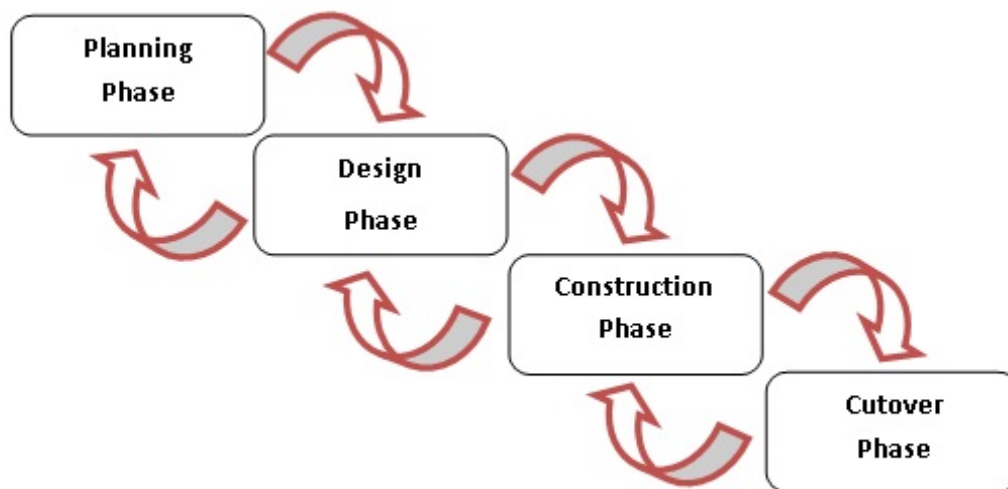


Figure 3.1: Diagram of Rapid Application Development Model

The RAD planning phase is initialized process to gather the specific requirement of the system that will develop. In additional, the phase defines the business functions and data subject areas that the system will support and determines the system's scope. Planning is the key of successful of a system development. So, this phase should be conducted properly.

During the design phase, analysts convert the description of the alternative solution into logical and then physical system specification. Complete the analysis by creating action diagrams defining the interactions between process and data. System procedures are designed and preliminary layouts of screens are develops. The programmers are ready to be return over for construction phase.

In the construction phase, the code will be generated as well as the database descriptions for the final product. The design that created during the design phase is added.

The last phase is cutover phase. When the cutover phase occurs, a variety of actions are needed, comprehensive testing, training of the end-users, organizational changes and the operation parallel with the previous system until the new system settle in.

3.3 Planning Phase

In the planning phase, the problem of the system is identified. Before developing the system project, there must be understand what actually the system is will be. In addition, the tasks that involved are make some research on the current system, define requirement and finalize the requirement. The first phase begins with research on the current system Bulan Restu Bus Company, Terminal Makmur, Kuantan (Manual), Terminal Bersepadu Selatan (Manual) and Transnational Online Ticketing System. The purposed of this task to identify the problem and detailed out the scope to propose a new system.

From the research on the current manual way and existing online system , the user have to come the bus station to buy the ticket and the user or customer have to spend more money to come back again to the bus station to take the bus. This objective of this research are to get a better understanding of the existing system then collect the information and idea for the project development.

3.4 Design Phase

The user design phase in RAD include analysis phase. It also requires the users to participate strongly in the nontechnical design of the system. At the beginning development of the Bulan Restu Bus Ticketing System (Online) design of the system using UML is done. Besides that, developer must make the database design based on the system requirement.

3.4.1 Unified Modeling Language (UML)

The Unified Modeling Language (UML) is developed as a graphical language for visualizing, specifying, constructing, and documenting the artifacts of a software-intensive system. The Unified Modeling Language offers a standard way to write a system's blueprints, including conceptual things such as business processes and system functions as well as concrete things such as programming language statements, database schemas, and reusable software components. It can provide better and clear understanding about the process flow of the system.

3.4.1.1 Context Diagram

A use case diagram is type of behavioral diagram defined by Unified Modeling Language (UML). Its purpose is to present a graphical overview of the functionality provided by a system in terms of actors and use cases.

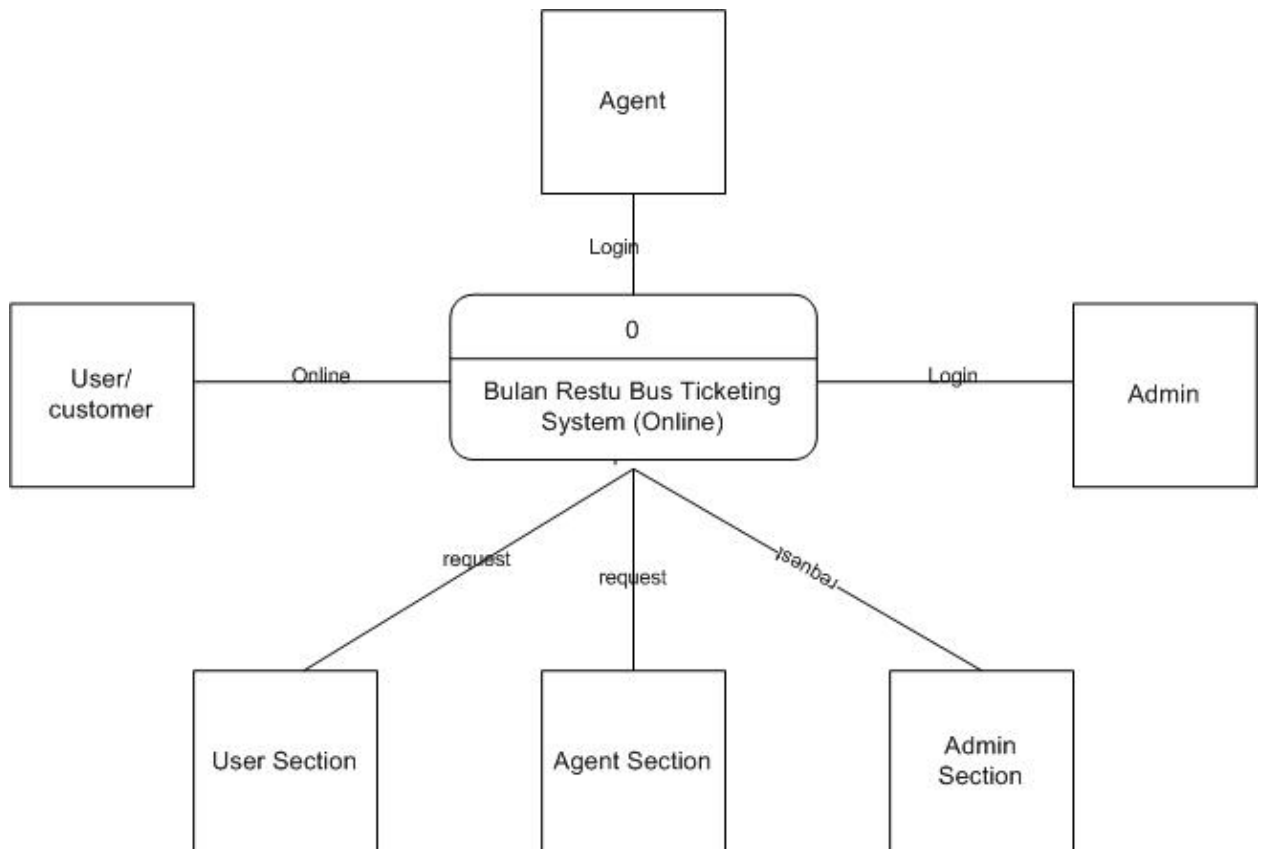


Figure 3.2 Context diagram for Bulan Restu Bus Ticketing System (Online)

3.4.1.2 Data Flow Diagram

A data flow diagram (DFD) is a graphical representation of the "flow" of data through an information system. DFDs can also be used for the visualization of data processing (structured design).

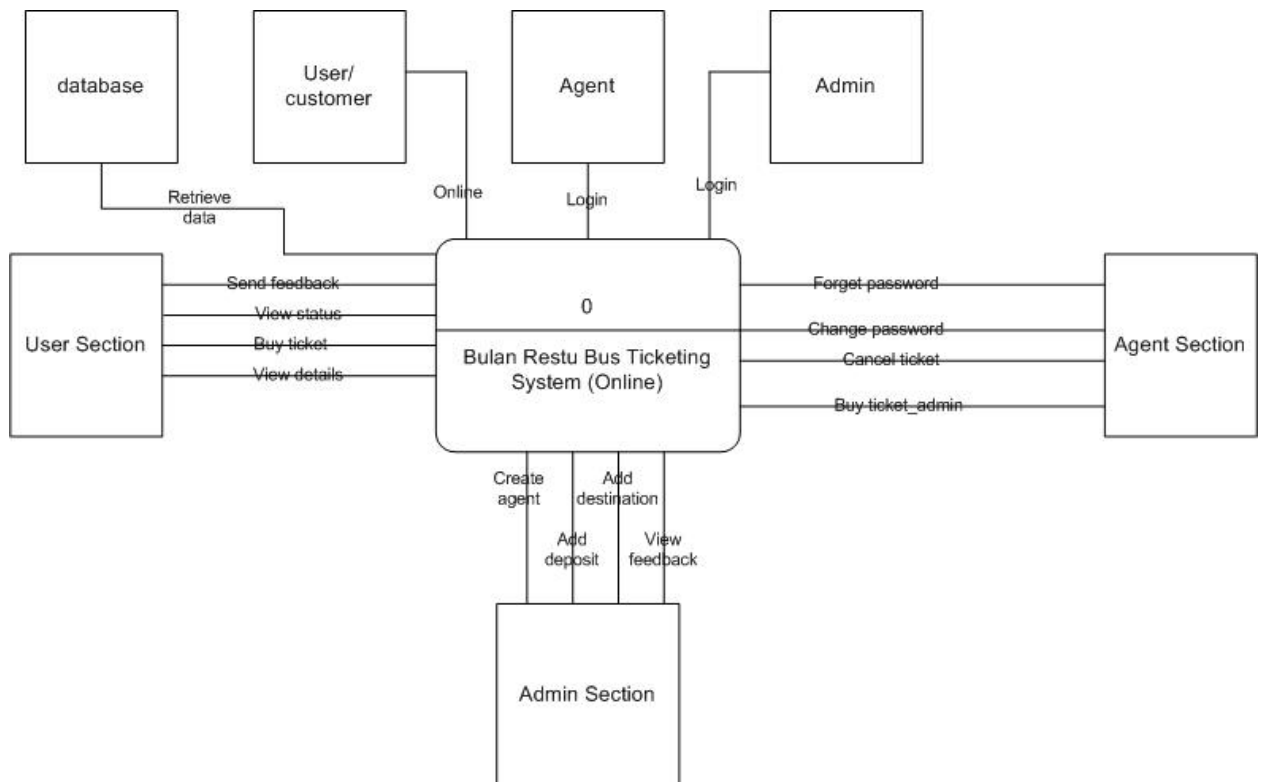


Figure 3.3 Data Flow Diagram Level 0 for Bulan Restu Bus Ticketing System (online)

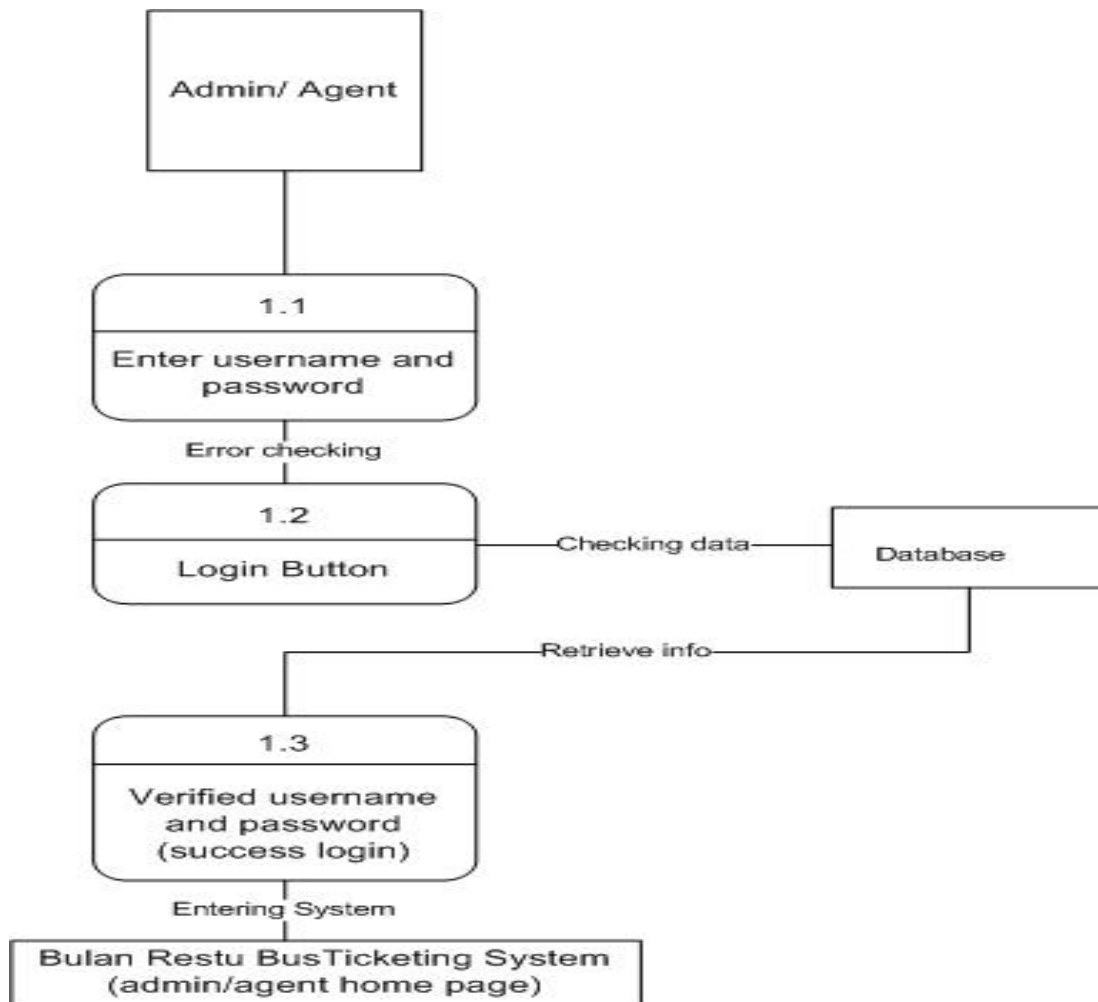


Figure 3.4 Data Flow Diagram Level 1 for Login

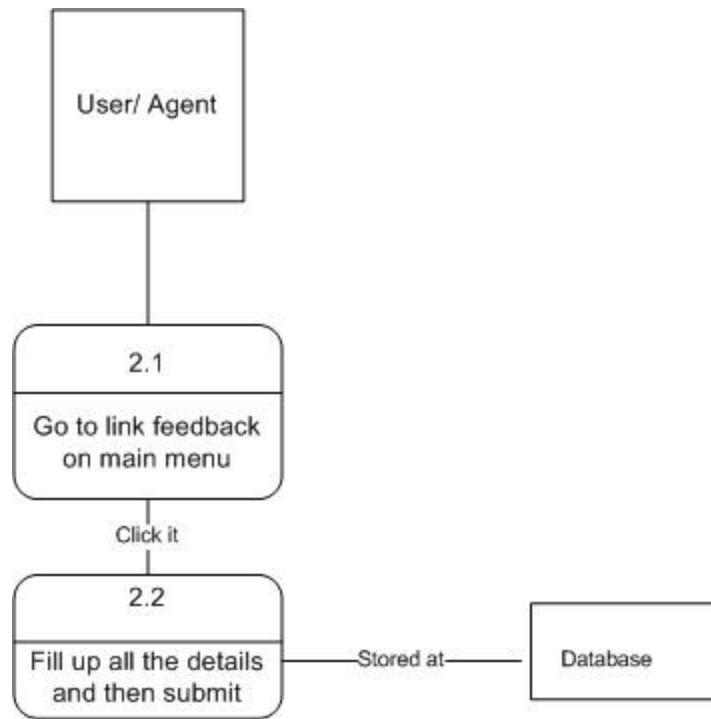


Figure 3.5 Data Flow Diagram for Send Feedback

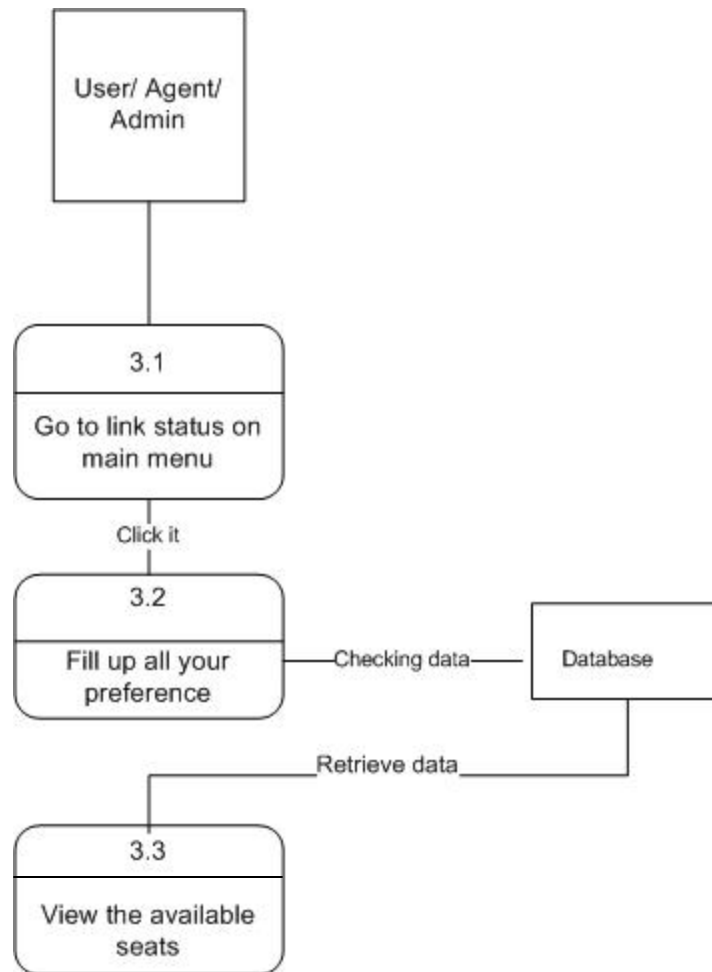


Figure 3.6 Data Flow Diagram for View Status

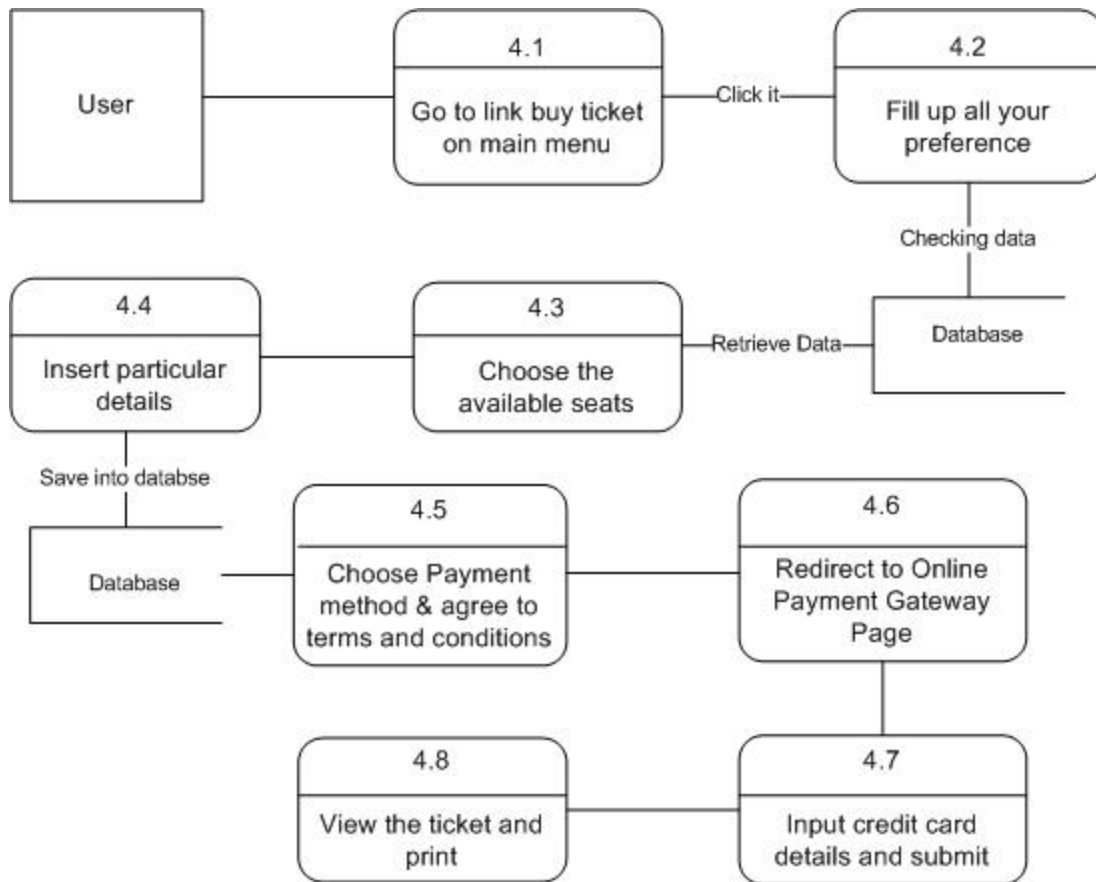


Figure 3.7 Data Flow Diagram for Buying bus Ticket user based

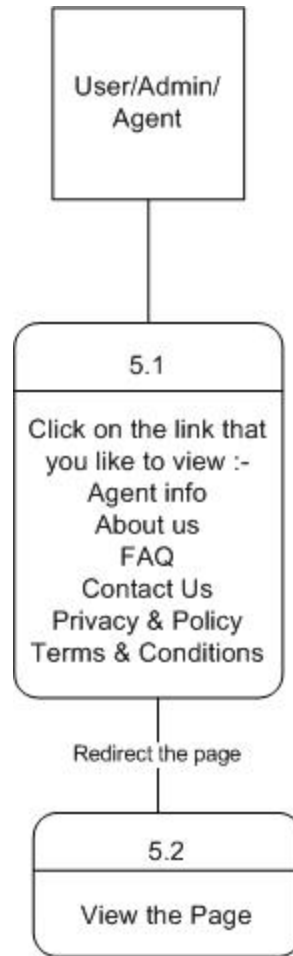


Figure 3.8 Data Flow Diagram for View Details

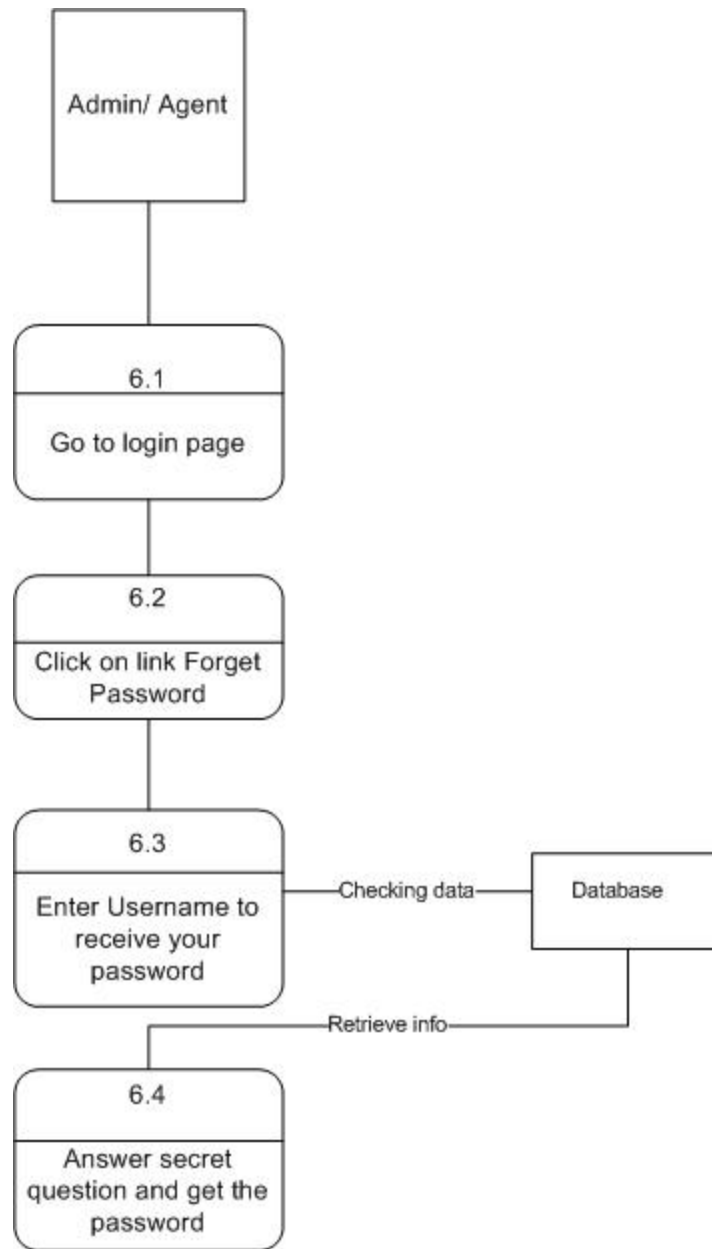


Figure 3.9 Data Flow Diagram for Forget Password

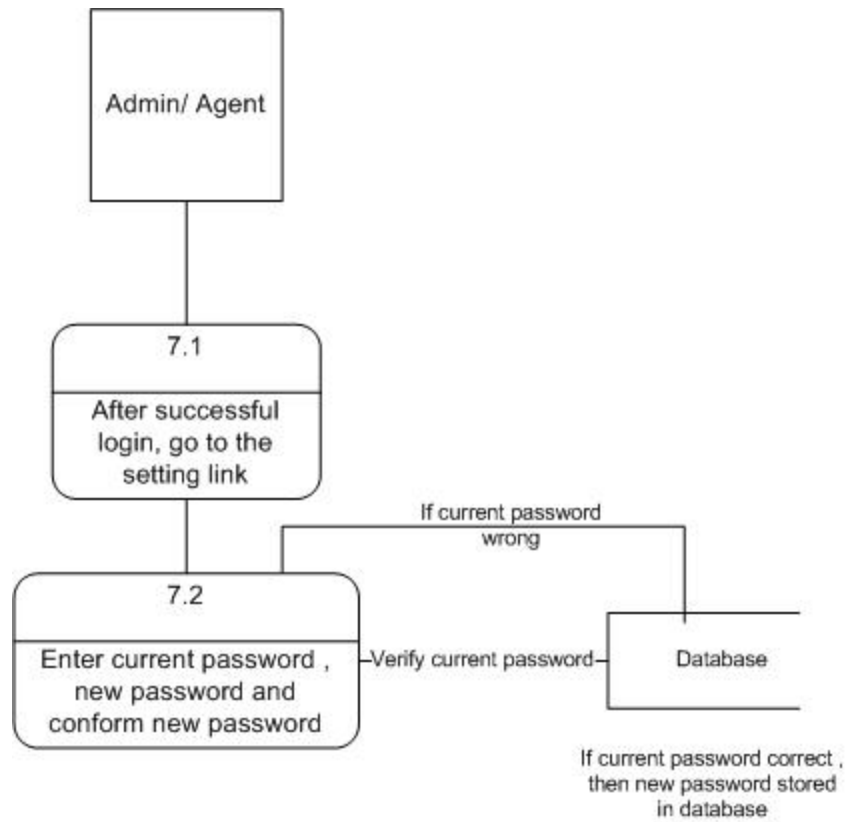


Figure 3.10 Data Flow Diagram for Change Password

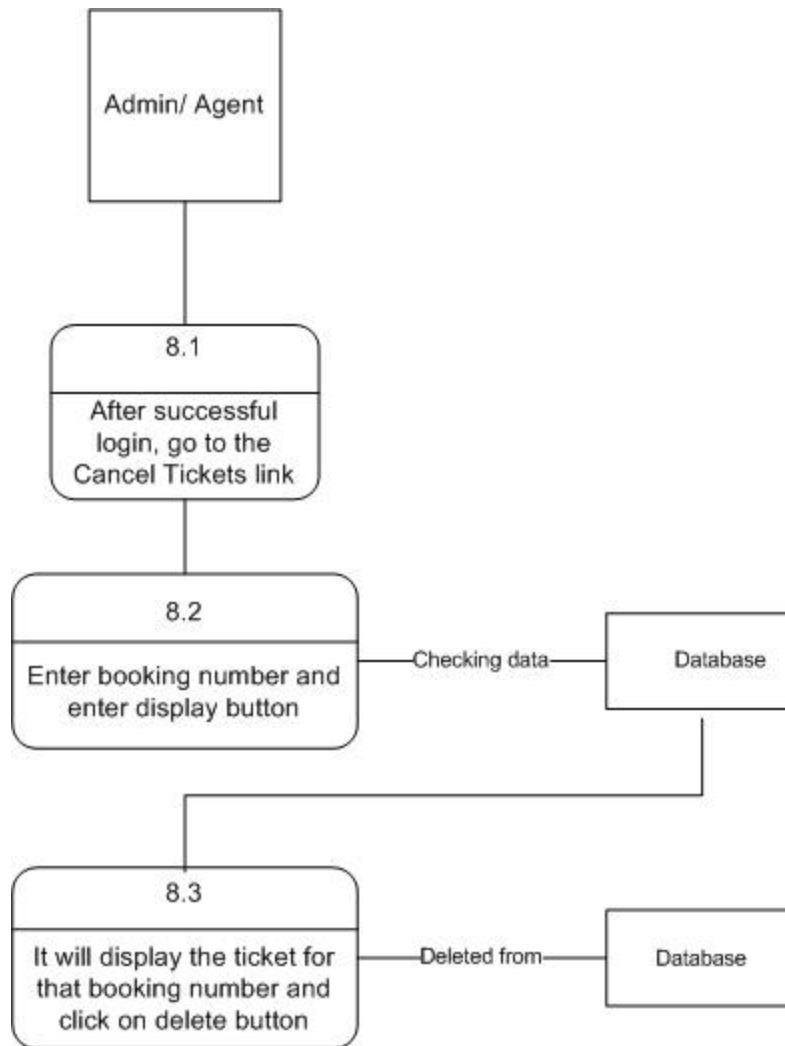


Figure 3.11 Data Flow Diagram for Canceling the Ticket

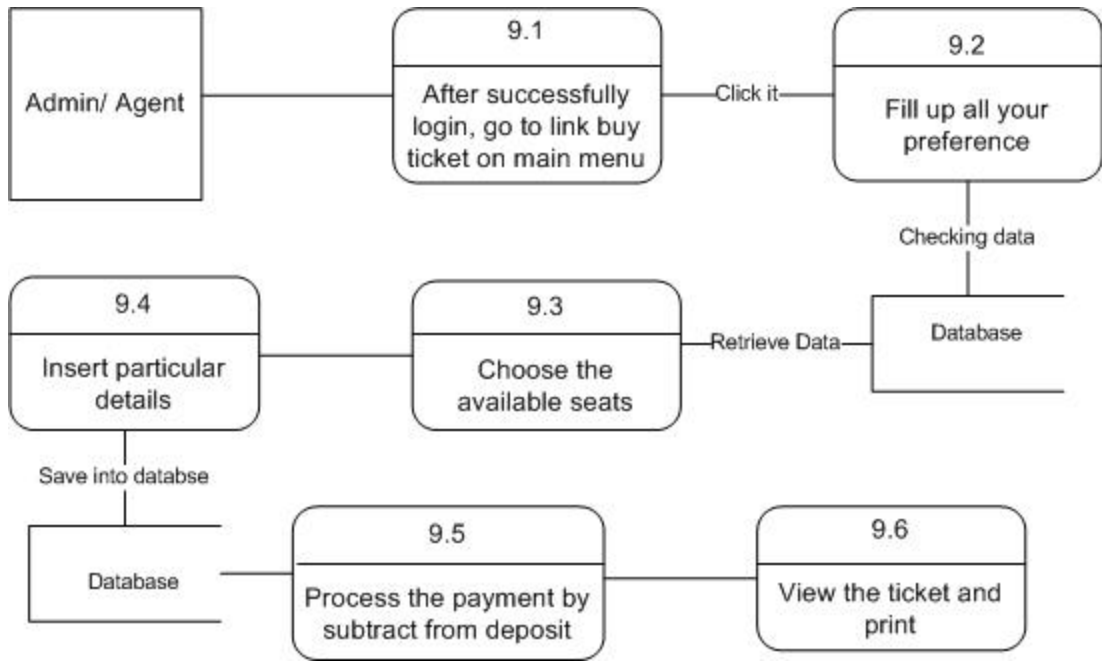


Figure 3.12 Data Flow Diagram for Buying bus Ticket from agent and admin side

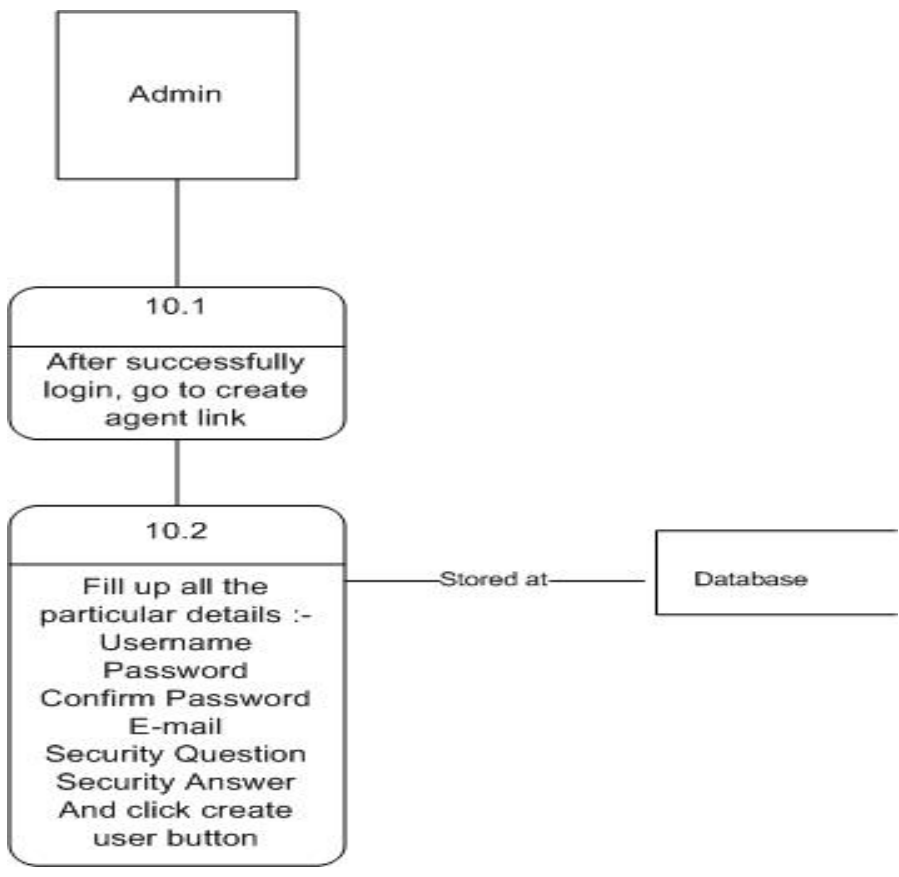


Figure 3.13 Data Flow Diagram for Create Agent

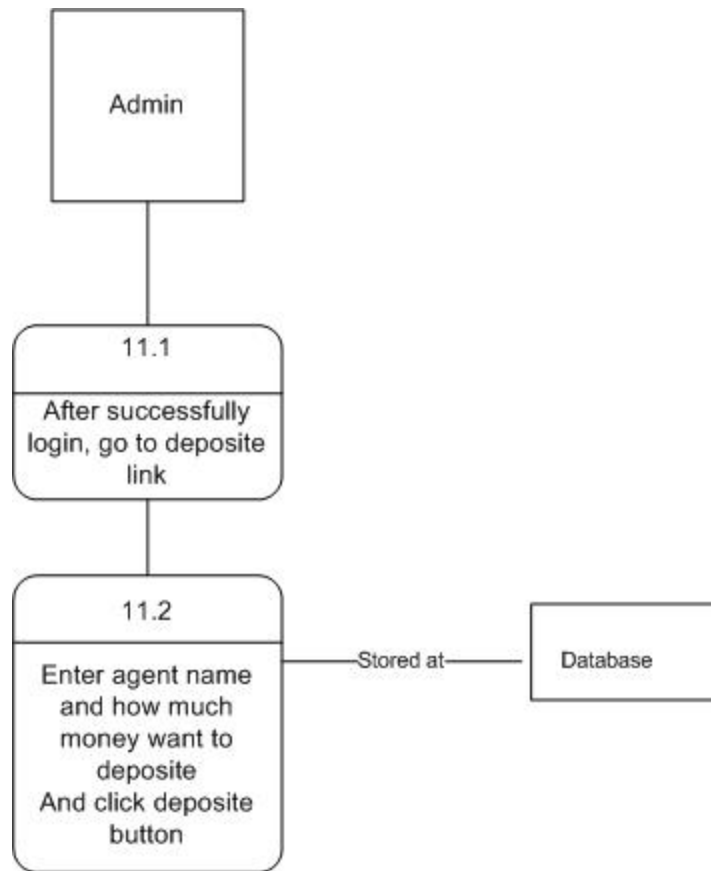


Figure 3.14 Data Flow Diagram for Add Deposit

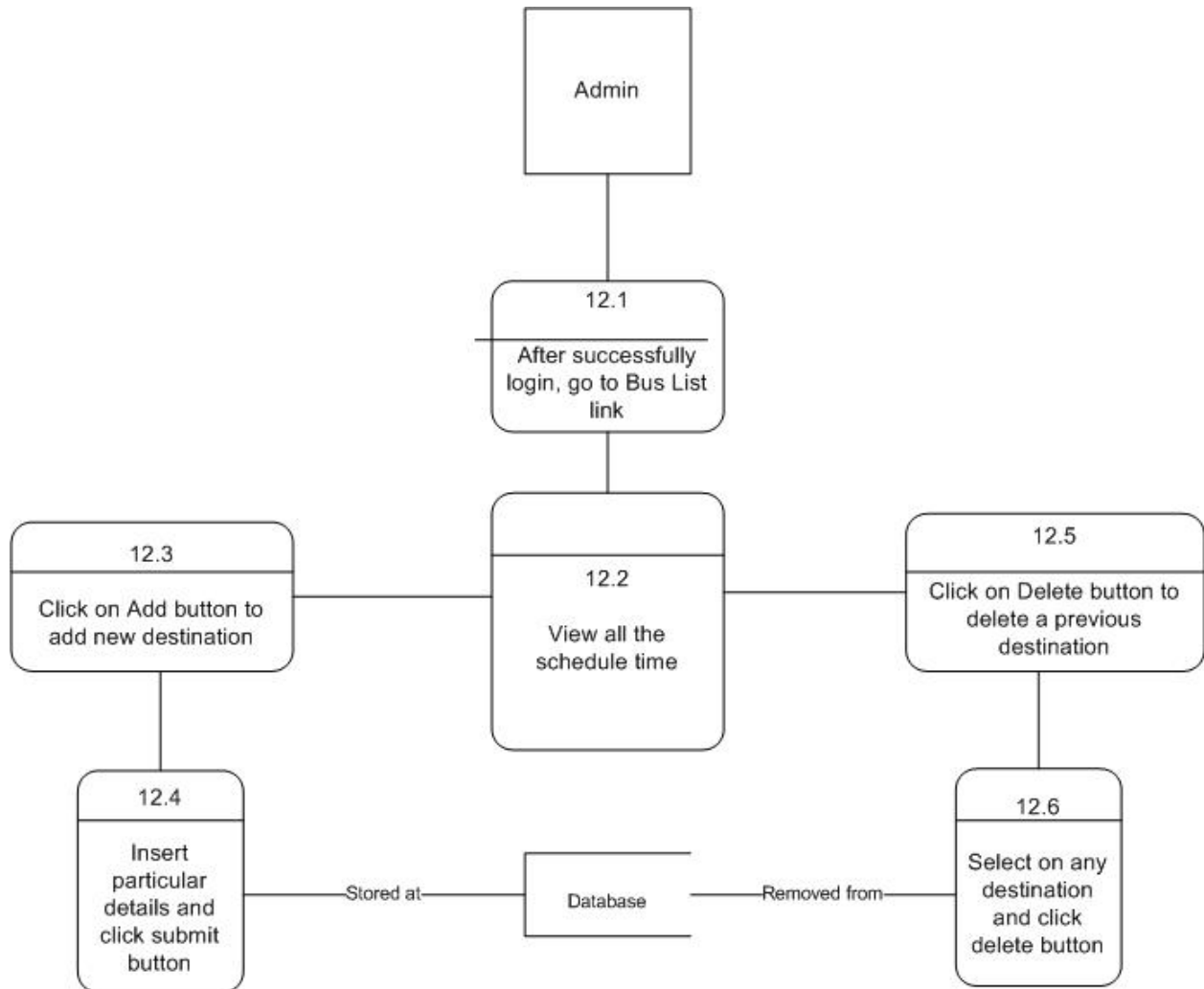


Figure 3.15 Data Flow Diagram for Bus List

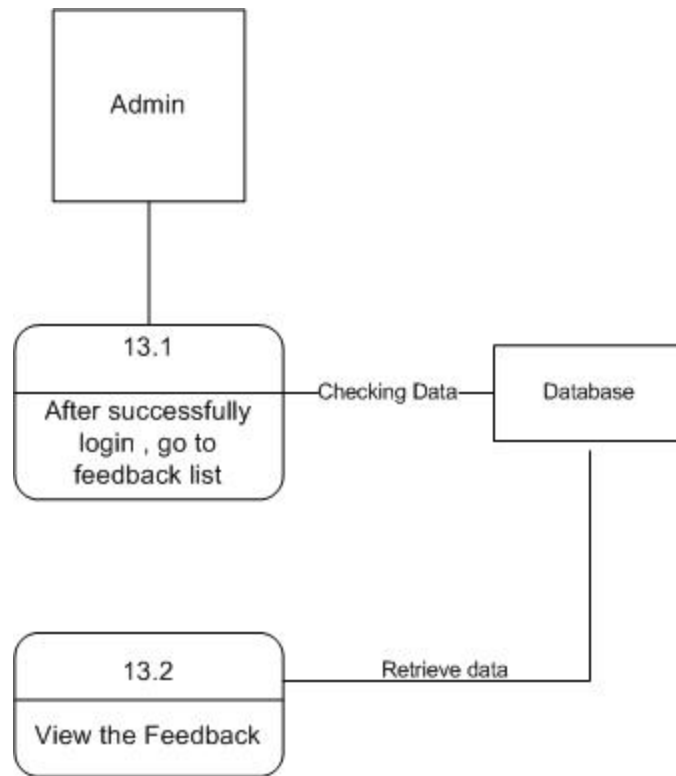


Figure 3.16 Data Flow Diagram for View Feedback

3.4.2 Database Design

Database design is the process of producing a detailed data model of a database. The logical data model contains all the needed logical and physical design choices. Physical storage parameters are needed to generate a design in a Data Definition Language, which can be used to create database.

They are six tables. There are AgentBasicInfo table, feedback table, passengerInfo table, States table, UserInfo table and Time_list table that exist in system. These tables hold data that is related each other.

Table 3.1: Data dictionary for *AgentBasicInfo* table

Field Name	Data Type	Description	Constraint
Agent_Id	Memo	Agent/admin Id	PK
Agent_name	Text	Agent/admin name	
Agent_fname	Text	Agent/admin first name	
Agent_shop_name	Text	Agent/admin shop name	
Agent_shop_add	Memo	Agent/admin shop address	
Agent_shop_city	Text	Agent/admin shop's city	
Agent_phone_number	Number	Agent/admin phone number	
Agent_mobile_number	Number	Agent/admin mobile number	
Agent_current_bal	Number	Agent's/admin's current balance after done with transaction	

Table 3.1 shows the data dictionary for *AgentBasicInfo* table. This table is used to gather all the information about the agent/admin in the system and this data only can edited by Admin.

Table 3.2: Data dictionary for *feedback* table

Field Name	Data Type	Description	Constraint
Name	Text	Name of the agent/ customer	PK
Email	Text	Email address of the agent /customer	
Phone	Number	Phone number of the agent/customer	
Subject	Text	Bus services/ website/schedule/other: choose which category to give feedback	
Comment	Memo	Write feedback	
User type	Text	Choose customer or agent	

Table 3.2 shows the data dictionary for *feedback* table. The table is designed to store the feedback from agent and customer.

Table 3.3: Data dictionary for *passengerinfo* table

Field Name	Data Type	Description	Constraint
PNR	Text	Booking / purchase id	PK
C_name	Text	Customer name	
C_icNumber	number	Customer Mykad number	
C_phone	Number	Customer phone number	
C_to	Text	Customer's destination	
C_from	Text	Customer departure from	
C_date	Text	When is the bus will be departure(date)	
C_time	Text	What time the bus will departure	
Totalseat	Text	Total seats in the bus	
Seatnumber	Text	Seat number that choose by customer	
Amount	Text	Total price	
Status	Text	Purchased or canceled	

Table 3.3 shows the data dictionary for *passengerinfo* table. This table is created for show the details of the customer and the trip .

Table 3.4: Data dictionary for *States* table

Field Name	Data type	Description	Constraint
Date	Text	Date of the departure	PK
Time	Text	Time of the departure	
Station	Memo	From which station	
S1	Text	Seat number 1	
S2	Text	Seat number 2	
S3	Text	Seat number 3	
S4	Text	Seat number 4	
S5	Text	Seat number 5	
S6	Text	Seat number 6	
S7	Text	Seat number 7	
S8	Text	Seat number 8	
S9	Text	Seat number 9	
S10	Text	Seat number 10	
S11	Text	Seat number 11	
S12	Text	Seat number 12	
S13	Text	Seat number 13	
S14	Text	Seat number 14	
S15	Text	Seat number 15	
S16	Text	Seat number 16	
S17	Text	Seat number 17	
S18	Text	Seat number 18	
S19	Text	Seat number 19	
S20	Text	Seat number 20	
S21	Text	Seat number 21	
S22	Text	Seat number 22	
S23	Text	Seat number 23	
S24	Text	Seat number 24	
S25	Text	Seat number 25	

S26	Text	Seat number 26	
S27	Text	Seat number 27	
S28	Text	Seat number 28	
S29	Text	Seat number 29	
S30	Text	Seat number 30	
S31	Text	Seat number 31	

Table 3.4 shows the data dictionary for *States* table. The table is designed so customer can choose they own seat

Table 3.5: Data dictionary for *Time-list* table

Field Name	Data Type	Description	Constraint
Station_name	Text	Departure station name	PK
Rate_per_seat	Number	Price per seat	
Time	Memo	Departure time	
Reach_time	Memo	Estimated reach time	
Bus_number	Memo	Bus number	

Table 3.5 shows the data dictionary for *Time_list* table. The table is designed to list out all the trip that been conduct.

Table 3.6: Data dictionary for *UserInfo* table

Field Name	Data Type	Description	Constraint
ID	AutoNumber	Auto generate ID for agent	PK
UserName	Text	Name of the agent	
Password	Text	Password for the agent	
SecQues	Text	Secret question	
SecAns	Text	Secret Answer	
Email	Text	Agent email address	

Table 3.6 shows the data dictionary for *UserInfo* table. The table is designed to create new agent.

3.5 Construction Phase

Construction phase is known as development phase. In this phase, the system development process involves three important processes that are design interface, create database and implement coding process. For develop the system, database MS SQL is used. While, Microsoft Visual Web Developer 2010 express is used for interface design. The further description on this phase is discussed in chapter 4.

Each interface created need to consider to the user requirement. During the coded the programming is write to make up the system while during testing the system, it also find the error of the system. If have any error the system can be correct. Another activity is the installation which the application of the software is installed after checking and corrects the error. After the system has been developed, the system must be tested. In this phase, every module must be tested.

3.6 Cutover Phase

Cutover phase also known as implement phase. After the system has been developed, the system must be tested. In this phase every module should be tested. Although testing process can begin in parallel as coding has begun but at this phase, the entire project need be tested. If the errors occur, then the developer needs to debug the error. For the stage, this phase not been done, the system is still prototype. During the testing, the codes and the interfaces are tested to make sure that the outputs results are fulfill the system requirements. Any error and interoperability problem which were not discovered in earlier phase of life cycle can be corrected at this phase and also modification is done to fulfill the system requirement. The result of the testing phase for this system will be discussed in Chapter 5, Result and Discussion.

3.7 System Requirement

In order for Bulan Restu Bus Ticketing System (Online) work accordingly, there are a few specific hardware and software tools requirement that have to be met for development and running the program. There are few specific hardware and software requirement that have used during develop Bulan Restu Bus Ticketing System (Online)

3.7.1 Hardware Requirement

Hardware is the most common set of requirement that defined by any operating system or software application as the physical computer resources. The hardware specification that used in the BulanRestu Bus Ticketing System (Online &Vendor Machine) development process is listed as shown in Table 3.7:

Table 3.7: The list of Hardware Requirement

Hardware	Specification	Unit	Description
Laptop	Intel Pentium processor T4200 2.0GHz Hard Disk 160GB RAM 1 GB DDR3	1	Laptop is main hardware that has been used to documentation, develop and run the system.
Thumb Drive	San Disk 4GB	1	Thumb drive is used to store the data temporary as a backup data and files for the system.
Printer	Brother DCP- 195C	1	Printer is used to printout the documentation of the system.

3.7.2 Software Requirement

Software requirement deal with defining software resources requirements and pre-requisites that need to be installed on a computer to provide optimal functioning of an application. The software specifications for the development this system have been identified as show in Table 3.8-

Table 3.8: The list of Software Requirement

Software	Specification	Description
Operating System	Window 7 Ultimate	To run all the software that related in this system development.
Interface Design	Microsoft Visual Web Developer 2010 express	To develop the system interface and coding it.
Database	MS SQL	To store the data or information.
Word Processor	Microsoft Office 2007	To make the documentation and slide presentation.
Antivirus	Avast! 5 Free Antivirus	To used as the antivirus to protect notebook from virus attack.
Schedule	Microsoft Office Project 2003	To make Gantt Chart for project schedule and planning.
Diagram	Microsoft Office Visio 2003	To create use case and sequences diagram of the EAM

CHAPTER IV

IMPLEMENTATION & TESTING

The purpose of this chapter is to discuss the development process of the system. All the main function's coding used in the system to achieve the system objective will be explained. There are 13 modules which are Login, Send Feedback, View Status, Buy Tickets, View Details, Forget Password, Change Password, Cancel Ticket, Buy Tickets_Admin, Create Agent, Add Deposit, Add destination and View Feedback. (*See Table 4.1*).

Table 4.1 Explanation of the System Interface

Modules	Details
Login	This Section for admin or agent to enter into the system. Username and password is required
Send Feedback	This section for user and agent to send their feedback about the system or services, complains, or suggestions.
View Status	This section for everyone function as only to view how many sits available for a trip
Buy Ticket	This section only for user. The user will choose their preference and insert credit card to pay the fare.
View Details	This section allows everyone to view the details about this company such as terms & conditions, about the bus company, contact number, and FAQ.
Forget Password	This Section is for agent and admin. If they forget their password, they can get it by answering secret question.
Change Password	This section is for agent and admin. They can change their password whenever they want.
Cancel Ticket	This section is for agent and admin. They can cancel the ticket by using booking number. Normal user can't do that.

Buy Ticket_Admin	This section is for agent and admin. They can buy ticket without using any kind of payment because the admin already the money into account when creating the profile.
Create Agent	This section only for admin. Admin can create how many agent he want.
Add Deposit	This section only for admin. Admin will add the deposit into agent account including him.
Add destination	This section only for admin. Admin can update their bus schedule time.
View Feedback	This section only for admin. Admin can view the feedback that received from user and agent.



Call for bus tickets and home delivery service

Bulan Restu (KL)	-	603 6250 1035
Bulan Restu (Kuantan)	-	604 1234 567

Bulan Restu Advantage

- Home delivery service of bus tickets @ RM2.50 in major cities
- Book bus tickets online with over 30 bus travel operators
- Book bus tickets online for over peninsula malaysia
- Return bus tickets reservation
- Cancel your bus tickets way Agent
- Return ticket Facility is available for major cities.
- Book for the same day.

Figure 4.1: Main interface for Bulan Restu Bus Ticketing System (online)

The Bulan Restu Bus Ticketing System (online) consist 3 main functions or module to execute the result or output of the system. The basic function of the management system which is Inserting, Delete and Update will be used in the Send Feedback, Change Password, Cancel Ticket, Create Agent, Add Deposit and Add destination.

4.1 DECLARATION OF VARIABLE IN SQL STATEMENT USING ASP.NET

MS SQL connection string.

```
using MsSql.Data.SqlClient;
public static string GetConnectionString()
{
    string connStr =
    String.Format("server={0};user id={1}; password={2};
    database=yourdb; pooling=false", "172.20.30.36",
    "cb09064", "314159265");

    return connStr;
}
```

create an instance from MsSql.Data.SqlClient.SqlConnection

```
open the MsSQL connection.
if(mycon .State != ConnectionState.Open)
try
{
    mycon .Open();
}
catch (MsSqlException ex)
{
    throw (ex);
}
```

4.1.1 INSERT SQL STATEMENT

```
Imports System.Data.SqlClient
Imports MySql.Data.MySqlClient

Partial Class _Default
Inherits System.Web.UI.Page

Protected Sub Button1_Click(ByVal sender As Object, ByVal e As System.EventArgs) Handles
Button1.Click
Dim MyConnection As String = "server=172.20.30.36;User
Id=cb09064;password=314159265;database=cb09064"

    Dim Connection As New MySqlConnection(MyConnection)

    Connection.Open()

    Dim Sql As String = "INSERT INTO [cb09064.tbimages] ( Title,Description) VALUES (parm2,parm3);"
    Dim cmd As New MySqlCommand(Sql, Connection)

    cmd.Parameters.Add(New MySqlParameter("parm2", "hajjaj"))
    cmd.Parameters.Add(New MySqlParameter("parm3", "hajjaj"))

    cmd.ExecuteNonQuery()
    cmd.Connection.Close()
End Sub
End Class
```

4.1.2 DELETE SQL STATEMENT

```
<asp:SqlDataSource ID="orderDetailsForProduct"
  DataSourceMode="DataReader"
  ConnectionString="<%$ ConnectionStrings:NWConnectionString %>"
  SelectCommand="SELECT [OrderID], [ProductID], [UnitPrice],
[Quantity] FROM [Order Details] WHERE ([ProductID] =
@ProductID2)"
  Runat="server" DeleteCommand="DELETE FROM [Order Details]
WHERE [OrderID] = @original_OrderID AND [ProductID] =
@original_ProductID">
```

4.1.3 UPDATE SQL STATEMENT

```
<asp:SqlDataSource ID="productDataSource" Runat="server"
  SelectCommand="SELECT [ProductName], [ProductID],
[UnitPrice], [UnitsInStock] FROM [Products]"
  UpdateCommand="UPDATE [Products] SET [ProductName] =
@ProductName, [UnitPrice] = @UnitPrice, [UnitsInStock]=
@UnitsInStock WHERE [ProductID] = @original_ProductID"
  ConnectionString="<%$ ConnectionStrings:NWConnectionString %>">
```

4.2 DATABASE DESIGN

Database design is the process of producing a detailed data model of a database. The logical data model contains all the needed logical and physical design choices. Physical storage parameters are needed to generate a design in a Data Definition Language, which can be used to create database.

They are six tables. There are AgentBasicInfo table, feedback table, passengerInfo table, States table, UserInfo table and Time_list table that exist in system. These tables hold data that is related each other.

Table 4.2: *AgentBasicInfo* table

Field Name	Data Type	Description	Constraint
Agent_Id	Memo	Agent/admin Id	PK
Agent_name	Text	Agent/admin name	
Agent_fname	Text	Agent/admin first name	
Agent_shop_name	Text	Agent/admin shop name	
Agent_shop_add	Memo	Agent/admin shop address	
Agent_shop_city	Text	Agent/admin shop's city	
Agent_phone_number	Number	Agent/admin phone number	
Agent_mobile_number	Number	Agent/admin mobile number	
Agent_current_bal	Number	Agent's/admin's current balance after done with transaction	

Table 4.2. shows the *AgentBasicInfo* table. This table is used to gather all the information about the agent/admin in the system and this data only can edited by Admin.

Table 4.3: *feedback* table

Field Name	Data Type	Description	Constraint
Name	Text	Name of the agent/ customer	PK
Email	Text	Email address of the agent /customer	
Phone	Number	Phone number of the agent/customer	
Subject	Text	Bus services/ website/schedule/other: choose which category to give feedback	
Comment	Memo	Write feedback	
User type	Text	Choose customer or agent	

Table 4.3 shows the *feedback* table. The table is designed to store the feedback from agent and customer.

Table 4.4: *passengerinfo* table

Field Name	Data Type	Description	Constraint
PNR	Text	Booking / purchase id	PK
C_name	Text	Customer name	
C_icNumber	Number	Customer Mykad number	
C_phone	Number	Customer phone number	
C_to	Text	Customer's destination	
C_from	Text	Customer departure from	

C_date	Text	When is the bus will be departure(date)	
C_time	Text	What time the bus will departure	
Totalseat	Text	Total seats in the bus	
Seatnumber	Text	Seat number that choose by customer	
Amount	Text	Total price	
Status	Text	Purchased or canceled	

Table 4.4 shows the *passengerinfo* table. This table is created for show the details of the customer and the trip.

Table 4.5: *States* table

Field Name	Data type	Description	Constraint
Date	Text	Date of the departure	PK
Time	Text	Time of the departure	
Station	Memo	From which station	
S1	Text	Seat number 1	
S2	Text	Seat number 2	
S3	Text	Seat number 3	
S4	Text	Seat number 4	
S5	Text	Seat number 5	
S6	Text	Seat number 6	
S7	Text	Seat number 7	
S8	Text	Seat number 8	
S9	Text	Seat number 9	

S10	Text	Seat number 10	
S11	Text	Seat number 11	
S12	Text	Seat number 12	
S13	Text	Seat number 13	
S14	Text	Seat number 14	
S15	Text	Seat number 15	
S16	Text	Seat number 16	
S17	Text	Seat number 17	
S18	Text	Seat number 18	
S19	Text	Seat number 19	
S20	Text	Seat number 20	
S21	Text	Seat number 21	
S22	Text	Seat number 22	
S23	Text	Seat number 23	
S24	Text	Seat number 24	
S25	Text	Seat number 25	
S26	Text	Seat number 26	
S27	Text	Seat number 27	
S28	Text	Seat number 28	
S29	Text	Seat number 29	
S30	Text	Seat number 30	
S31	Text	Seat number 31	

Table 4.5 shows the *States* table. The table is designed so customer can choose they own seat

Table 4.6: *Time-list* table

Field Name	Data Type	Description	Constraint
Station_name	Text	Departure station name	PK
Rate_per_seat	Number	Price per seat	
Time	Memo	Departure time	
Reach_time	Memo	Estimated reach time	
Bus_number	Memo	Bus number	

Table 4.6 shows the *Time_list* table. The table is designed to list out all the trip that been conduct.

Table 4.7: *UserInfo* table

Field Name	Data Type	Description	Constraint
ID	AutoNumber	Auto generate ID for agent	PK
UserName	Text	Name of the agent	
Password	Text	Password for the agent	
SecQues	Text	Secret question	
SecAns	Text	Secret Answer	
Email	Text	Agent email address	

Table 4.7 shows the *UserInfo* table. The table is designed to create new agent.

4.3 TESTING

Once source code has been generated, software must be tested to uncover (and correct) as many errors as possible before delivery to customer. Our goal is to design a series of test cases that have a high likelihood of finding errors. To uncover the errors software techniques are used. These techniques provide systematic guidance for designing test that

- (1) Exercise the internal logic of software components, and
- (2) Exercise the input and output domains of the program to uncover errors in program function, behavior and performance.

4.3.1 Steps. Software is tested from two different perspectives:

- (1) Internal program logic is exercised using “White box” test case design techniques.
- (2) Software requirements are exercised using “block box” test case design techniques.

In both cases, the intent is to find the maximum number of errors with the minimum amount of effort and time.

4.3.2 Strategies

A strategy for software testing must accommodate low-level tests that are necessary to verify that a small source code segment has been correctly implemented as well as high-level tests that validate major system functions against customer requirements. A strategy must provide guidance for the practitioner and a set of milestones for the manager. Because the steps of the test strategy occur at a time when deadline pressure begins to rise, progress must be measurable and problems must surface as early as possible.

Following testing techniques are well known and the same strategy is adopted during this project testing.

4.3.2.1 Unit testing: Unit testing focuses verification effort on the smallest unit of software design- the software component or module. The unit test is white-box oriented. The module interface is tested to ensure that information properly flows into and of the program unit under test the local data structure has been examined to ensure that data stored temporarily maintains its integrity during all steps in an algorithm's execution. Boundary conditions are tested to ensure that the module operated properly at boundaries established to limit or restrict processing. All independent paths through the control structure are exercised to ensure that all statements in a module haven executed at least once.

4.3.2.2 Integration testing: Integration testing is a systematic technique for constructing the program structure while at the same time conducting tests to uncover errors associated with interfacing. The objective of this test is to take unit tested components and build a program structure that has been dictated by design.

4.3.2.3 Validation testing: At the culmination of integration testing, software is completely assembled as a package, interfacing errors have been uncovered and corrected, and a final series of software tests—validation testing—may begin. Validation can be defined in many ways, but a simple definition is that validation succeeds when software functions in a manner that can be reasonably expected by the customer.

4.3.2.4 System testing: System testing is actually a series of different tests whose primary purpose is to fully exercise the computer-based system. Below we have described the two types of testing which have been taken for this project.

4.3.2.4.1 Security testing

Any computer-based system that manages sensitive information causes actions that can improperly harm (or benefit) individuals is a target for improper or illegal penetration. Penetration spans a broad range of activities: hackers who attempt to penetrate system for sport; disgruntled employees who attempt to penetrate for revenge; dishonest individuals who attempt to penetrate for illicit personal gain.

For security purposes, when anyone who is not authorized user cannot penetrate this system. When programs first load it check for correct username and password. If any fails to act according will be simply ignored by the system.

4.3.2.4.2 Performance Testing

Performance testing is designed to test the run-time performance of software within the context of an integrated system. Performance testing occurs throughout all steps in the testing process. Even at the unit level, the performance of an individual module may be assessed as white-box tests are conducted.

4.3.2.5 Criteria for Completion of Testing

Every time the customer/user executes a compute program, the program is being tested. This sobering fact underlines the importance of other software quality assurance activities.

As much time we run our project that is still sort of testing as Musa and Ackerman said. They have suggested a response that is based on statistical criteria: “No, we cannot be absolutely certain that the software will never fail, but relative to a theoretically sound and experimentally validated statistical model, we have done sufficient testing to say with 95 percent confidence that the probability of 1000 CPU hours of failure free operation in a probabilistically defined environment is at least 0.995.”

4.3.2.6 Validation Checks

Software testing is one element of broader topic that is often referred to as verification and validation. Verification refers to the set of activities that ensure that software correctly implements a specific function. Validation refers to a different set of activities that ensure that the software that has been built is traceable to customer requirements. Boehm state this another way:

Verification: “Are we building the product right?”

Validation: “Are we building the right product?”

Validation checks are useful when we specify the nature of data input. Let us elaborate what I mean. In this project while entering the data to many text box you will find the use of validation checks. When you try to input wrong data. Your entry will be automatically abandoned.

In the very beginning of the project when user wishes to enter into the project, he has to supply the password. This password is validated to certain string, till user won't supply correct word of string for password he cannot succeed. When you try to edit the record for the trainee in Operation division you will find the validation checks. If you supply the number (digits) for name text box, you won't get the entry; similarly if you data for trainee code in text (string) format it will be simply abandoned.

A validation check facilitates us to work in a greater way. It become necessary for certain Applications like this.

CHAPTER V

RESULT, DISCUSSION AND CONCLUSION

5.1 Introduction

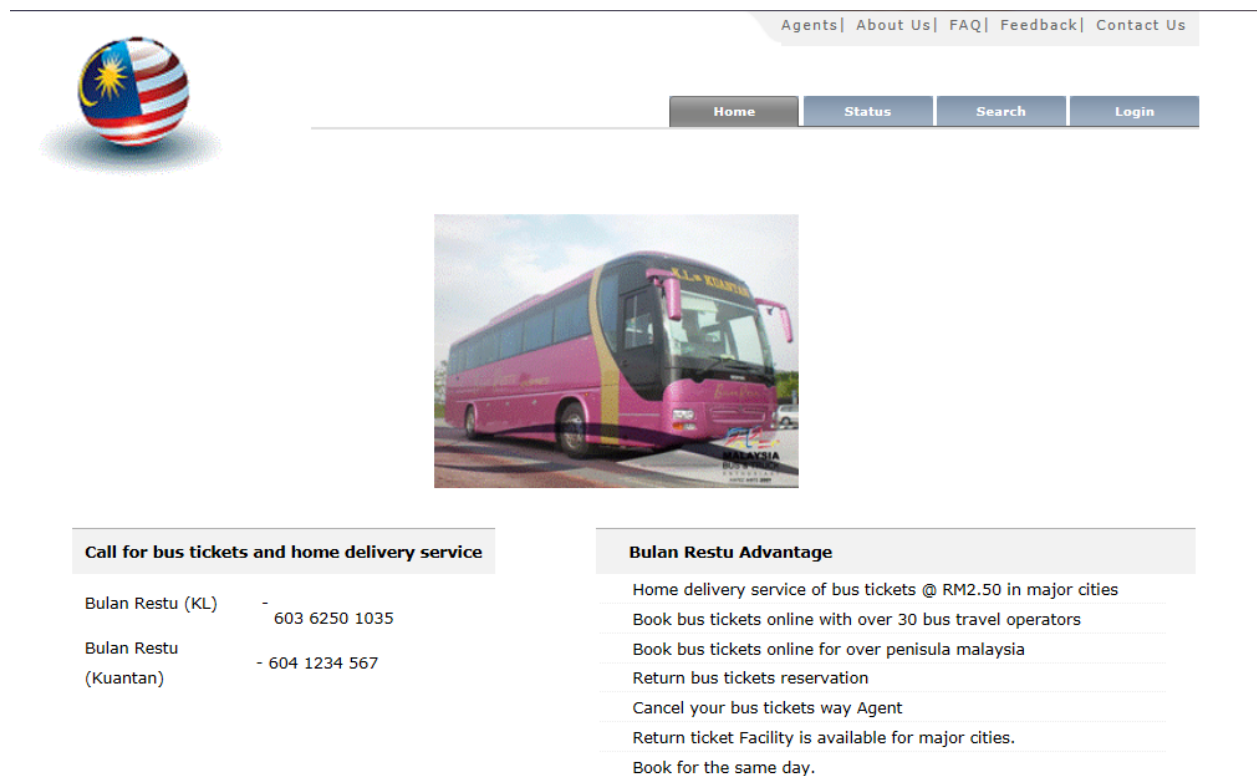
Bulan Restu Bus Ticketing System (BRBTS) is developed using software Microsoft Visual Web Developer 2010 express and MS SQL as its database. The system was fully implemented in *asp.net scripting* with *SQL* codes to manipulate the database. BRBTS has been successfully developed and tested in the single client server environment. The system is capable of:

- a) Login
- b) Buy Tickets
- c) View the Status
- d) Cancel the Ticket
- e) View Details
- f) Retrieve Forget Password
- g) Send or View Feedback
- h) Change the Current Password
- i) Create New Agent
- j) Add Deposit to Agent/Admin
- k) Add New Destination

5.2 Output of Bulan Restu Bus Ticketing System (BRBTS)

BRBTS have a simple interface to make sure it is easy to use. Different level of user (User, Agent and Administrator) have different interface. The interface must look tidy and clean and easy to use. Figure 5.1 show the Main Page of the BRBTS system.

Figure 5.1 Main Pages BRBTS



Agents | About Us | FAQ | Feedback | Contact Us


Home Status Search Login

Call for bus tickets and home delivery service

Bulan Restu (KL)	- 603 6250 1035
Bulan Restu (Kuantan)	- 604 1234 567

Bulan Restu Advantage

- Home delivery service of bus tickets @ RM2.50 in major cities
- Book bus tickets online with over 30 bus travel operators
- Book bus tickets online for over peninsula malaysia
- Return bus tickets reservation
- Cancel your bus tickets way Agent
- Return ticket Facility is available for major cities.
- Book for the same day.

Figure 5.2 Login Menu

Agents | About Us | FAQ | Feedback | Contact Us

Home Status Search Login


Log In

User Name:

Password:

[Forget Password](#)

Figure 5.3 Main Menu for Admin



[Agents](#) | [About Us](#) | [FAQ](#) | [Feedback](#) | [Contact Us](#)

Home

Search

Book Ticket

Cancel Ticket


Settings

Logout

[Basic Info](#) | [Create Agent](#) | [Agent List](#) | [Deposit](#) | [Search Agent](#) | [Bus List](#) | [FeedBack List](#)

Welcome admin, RM96152

Sunday, June 10, 2012



Call for bus tickets and home delivery service


Bulan Restu (KL) - 603 6250 1035

Bulan Restu (Kuantan) - 604 1234 567

Bulan Restu Advantage

- Home delivery service of bus tickets @ RM2.50 in major cities
- Book bus tickets online with over 30 bus travel operators
- Book bus tickets online for over peninsula malaysia
- Return bus tickets reservation
- Cancel your bus tickets way Agent
- Return ticket Facility is available for major cities.
- Book for the same day.

Figure 5.4 Buy Tickets Section (Select Seat)



Agents | About Us | FAQ | Feedback | Contact Us

Home Search **Book Ticket** Cancel Ticket Settings Logout

[Basic Info](#) [Create Agent](#) [Agent List](#) [Deposit](#) [Search Agent](#) [Bus List](#) [FeedBack List](#)

Welcome admin, RM96152 Sunday, June 10, 2012

Book Tickets Now!

From:

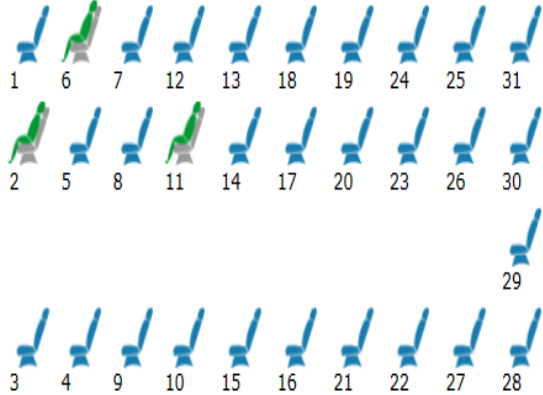
To:

Depart on :

Time:

Seat Number:

Rent: 40



1 6 7 12 13 18 19 24 25 31

2 5 8 11 14 17 20 23 26 30


3 4 9 10 15 16 21 22 27 28

29

[Go >](#)

Figure 5.5 Buy Tickets Section (Print Ticket)

[Agents](#) | [About Us](#) | [FAQ](#) | [Feedback](#) | [Contact Us](#)



Home

Search

Book Ticket

Cancel Ticket


Settings

Logout

[Basic Info](#)
[Create Agent](#)
[Agent List](#)
[Deposit](#)
[Search Agent](#)
[Bus List](#)
[FeedBack List](#)


Welcome admin, RM96032
Sunday, June 10, 2012

Print Ticket Now!



H.O :-Bulan Restu
Ph :- 016-9453160
B.O :-Kuantan Teruntum
Ph :-603-1234 567


Ticket Number	: 14115154923	Agent Name	: admin
Name	: sara	Phone Number	: 123456
Source	: Online - Kuantan	Destination	: Terengganu
Journey Date	: 11-Jun-12	Journey Time	: 10:30:00Pm
Seat Numbers	: s2,s6,s11	No.of Passengers	: 3
Boarding Point	: Kuantan	Bus Number	: RJ-07/P-9909
Booking Date	: Sunday, June 10, 2012	Total Rent	: 120



H.O :- Bulan Restu
Ph :- 016-9453160
B.O :- Kuantan Teruntum
Ph :- 603-1234 567

Ticket Number	: 14115154923	Agent Name	: admin
Name	: sara	Phone Number	: 123456
Source	: Online - Kuantan	Destination	: Terengganu
Journey Date	: 11-Jun-12	Journey Time	: 10:30:00Pm
Seat Numbers	: s2,s6,s11	No.of Passengers	: 3
Total Rent	: 120		

Figure 5.6 View Status Page



Agents | About Us | FAQ | Feedback | Contact Us

Home Status Search Login

Check Status Now!

From:
To:
Depart on :
Time:

1	6	7	12	13	18	19	24	25	31
2	5	8	11	14	17	20	23	26	30
								29	
3	4	9	10	15	16	21	22	27	28




 Book Seat  Available Seat

Figure 5.7 Cancel Ticket Section



Agents | About Us | FAQ | Feedback | Contact Us

[Home](#) | [Search](#) | [Book Ticket](#) | **[Cancel Ticket](#)** | [Settings](#) | [Logout](#)

[Basic Info](#) | [Create Agent](#) | [Agent List](#) | [Deposit](#) | [Search Agent](#) | [Bus List](#) | [FeedBack List](#)


Welcome admin, RM96152 Sunday, June 10, 2012

Cancel Tickets

Booking Number : 27640303371	Agent Name : admin
Name : sara	Phone Number : 19
From : Kuantan	To : Selangor
Date : 31-May-12	Time : 9:30:00Pm
Seat Number : s1,s2	Total Seat : 2
Status : Cancel	
Total Rent : Rs. 48	

Enter The Booking number:

Figure 5.8 View Details Section (Example FAQ)



Agents | About Us | **FAQ** | Feedback | Contact Us

Home Status Search Login

FAQ

Frequently asked questions

[Do I have to pay extra when compared to buying the tickets in the traditional way?](#)

[I've lost my ticket what do I do now?](#)

[Can I cancel the ticket?](#)

[I don't have a credit can I still buy tickets at Bulan Restu?](#)

[I missed the bus. Do I get refund?](#)

[What credit/debit cards do you accept?](#)


[What payment options do i have?](#)

[Is there any other option to book tickets from Starbus?](#)

Do I have to pay extra when compared to buying the tickets in the traditional way?
Bulan Restu does not charge anything extra when compared to the traditional way. The tickets are absolutely at the same cost.

I've lost my ticket what do I do now?
We required PIN of your ticket. on that basis we will provide you a new ticket. In near future this problem will be solved by taking your name and destination and on that, we will provide you a fresh ticket to the particular destination.

Can I cancel the ticket?

Figure 5.9 Forget Password

Agents | About Us | FAQ | Feedback | Contact Us

Home Status Search Login

Forgot Your Password?

Enter your User Name to receive your password.

Next

Copyright © 2011, All rights reserved | Privacy policy | Terms and conditions | Created By Sarawanakumar

Figure 5.10 Send Feedback

[Agents](#) | [About Us](#) | [FAQ](#) | [Feedback](#) | [Contact Us](#)

[Home](#) | [Status](#) | [Search](#) | [Login](#)

Feedback

Name:

Email:

Phone:

Subject:

Comment:
(Max 1000 char)

Copyright © 2011, All rights reserved | [Privacy policy](#) | [Terms and conditions](#) | Created By Sarawanakumar

Figure 5.11 View Feedback



Agents | About Us | FAQ | Feedback | Contact Us

[Home](#) | [Search](#) | [Book Ticket](#) | [Cancel Ticket](#) | [Settings](#) | [Logout](#)

[Basic Info](#) | [Create Agent](#) | [Agent List](#) | [Deposit](#) | [Search Agent](#) | [Bus List](#) | [FeedBack List](#)

Welcome admin, RM96152 Sunday, June 10, 2012

Feedback List

Name	Email	Phone	Subject	Comment	User Type
vijay	vijay@gmail.com	9258569524	Bus service	Nice Service	other
admin	admin@gmail	38473	schedules	Best Schedules	agent
vijay	vijay6512@yahoo.co.in	9887301585	Bus service	Best Service	other
Nehpal	nehpal@yahoo.com	9214961605	website	Nice Designing	other
Ankur	ankur@yahoo.com	9415856525	website	Easy to Process	other
admin	vijay@gmail.com	254775	schedules	nice	agent
vijay	vijay@gmail.com	2544757	website	hello	agent
lacky	lacky@gmail.com	25447	schedules	Thanks \$ u	other
Shri Mohan	shri@gmail.com	1512521030	Bus service	this is really good	other
test	test@gmail.com	123456798	Bus service	this is for testing	other

Copyright © 2011, All rights reserved | Privacy policy | Terms and conditions | Created By Sarawanakumar

Figure 5.12 Change Password

Agents | About Us | FAQ | Feedback | Contact Us



[Home](#) | [Search](#) | [Book Ticket](#) | [Cancel Ticket](#) | [Settings](#) | [Logout](#)

[Basic Info](#) | [Create Agent](#) | [Agent List](#) | [Deposit](#) | [Search Agent](#) | [Bus List](#) | [FeedBack List](#)

Welcome admin, RM96152

Sunday, June 10, 2012

Change Password


Current Password:

New Password:

Confirm New Password:

Copyright © 2011, All rights reserved | Privacy policy | Terms and conditions | Created By Sarawanakumar

Figure 5.13 Create New Agent



Agents | About Us | FAQ | Feedback | Contact Us

Home Search Book Ticket Cancel Ticket Settings Logout

[Basic Info](#) [Create Agent](#) [Agent List](#) [Deposite](#) [Search Agent](#) [Bus List](#) [FeedBack List](#)

Welcome admin, RM96152 Sunday, June 10, 2012

Create Agent

Sign Up for New Account

User Name:

Password:

Confirm Password:

E-mail:


Security Question:

Security Answer:

Copyright © 2011, All rights reserved | Privacy policy | Terms and conditions | Created By Sarawanakumar

Figure 5.14 Add Deposit

[Agents](#) | [About Us](#) | [FAQ](#) | [Feedback](#) | [Contact Us](#)



Home	Search	Book Ticket	Cancel Ticket	Settings	Logout
------	--------	-------------	---------------	----------	--------

Basic Info	Create Agent	Agent List	Deposit	Search Agent	Bus List	FeedBack List
----------------------------	------------------------------	----------------------------	-------------------------	------------------------------	--------------------------	-------------------------------

Welcome admin, RM96152

Sunday, June 10, 2012

Deposit Amount

Agent Name :

Deposit Amount :

Copyright © 2011, All rights reserved | [Privacy policy](#) | [Terms and conditions](#) | Created By Sarawanakumar

5.3 Constraints

There are a few constraints faced during the development of the system:

- I. Need to choose appropriate server and database version for support ASP.net.
- II. Try to simplify the management , not to make them burden

5.4 Further research

There are few recommendations for further research in order to make the Bulan Restu Bus Ticketing System(BRBTS) more practical to be implemented. For the current prototype system its applicable to online only, but in the future a vendor machine could provided so customer can buy from nearest place and there's no need of credit cash usage to buy ticket.

5.5 Conclusion

Bulan Restu bus ticketing system (online) is company online system, which enable customer to check availability bus ticket, buy bus ticket, and pay bus ticket online. It makes the customer easy to get bus ticket online instead of queue up to buy the bus ticket. The online system is new for this Bulan Restu Bus Company. Other's company can use this idea to develop another system to easy their customer to buy bus ticket. Since Malaysia is a developing country, concept electronic ticket or e-ticket should be widely applied in all the sector industries. After literature review, research and case study on the proposed system, I found that Bulan Restu bus ticketing system (online) is a potential system in Malaysia. It is very useful and helpful in transportation Malaysia since this kind of buy bus ticket system never exists in -Malaysia. It helps customer for bus company easy in booking bus ticket and payment. E-ticket is a popular issue especially in developed country. So, Malaysia as a developing country should apply concept E-Ticket in all types of industry since Malaysia hopes to realize vision 2020.

References

- [1]. Public Transport. Retrieved 2011, from main page
http://www.linkedin.com/skills/skill/Public_Transport
- [1]. Terminal Bersepadu Selatan. Retrieved 2011, from main page
<http://www.tbsbts.com.my/>
- [2]. *transnasional.com*. Retrieved 2009, from know us
<http://www.transnasional.com.my/knowus.html>
- [3]. Jazayeri, M. (2007). Some Trends in Web Application Development. *Future of Software Engineering, 2007. FOSE '07*, (pp. 199 - 213).
- [4]. Dahlan, A. A., & Nishimura, T. (2008). Implementation of asynchronous predictive fetch to improve the performance of Ajax-enabled web applications. *the 10th International Conference on Information Integration and Web-based Applications & Services*, (pp. 345-350).
- [5]. *SearchCIO-Midmarket.com*. (n.d.). Retrieved October 6, 2011, from Operating system(OS) : <http://searchciomidmarket.techtarget.com/definition/operatingsystem>
- [6]. Reynolds, F. (2002). Evolving an operating system for the Web. *Internet Kiosk* , 90-92.
- [7]. *liutilities.com*. (n.d.). Retrieved October 6, 2011, from Windows, Mac , Linux and Comparison: <http://www.liutilities.com/articles/mac/>
- [8]. *liutilities.com*. (n.d.). Retrieved October 6, 2011, from Windows, Mac , Linux and Comparison: <http://www.liutilities.com/articles/windows/>
- [9]. Kong, M., Li, J., & Wang, F. (2010). Study on educational mode of Linux majors in colleges. *Artificial Intelligence and Education (ICAIE), 2010 International Conference*, (pp. 623 - 626).
- [10]. *liutilities.com*. (n.d.). Retrieved October 6, 2011, from Windows, Mac , Linux and Comparison: <http://www.liutilities.com/articles/linux/>
- [11]. *TuxRadar*. (2009). Retrieved October 6, 2011, from Linux vs Windows 7: <http://tuxradar.com/content/linux-vs-windows-7>
- [12]. Gube, J. (n.d.). *Adobe*. Retrieved October 10, 2011, from Performance Comparison of Web Browsers: <http://sixrevisions.com/infographs/browser-performance/>
- [13]. Kiatruangkrai, P., Phusayangkul, P., Viniyakul, S., Prompoon, N., & Kanongchaiyos, P. (2010). Design and Development of Real-Time Communication Content Management

- System for E-Commerce. *Data, Privacy and E-Commerce (ISDPE), 2010 Second International Symposium*, (pp. 111 - 116).
- [14]. http://www.pcmag.com/encyclopedia_term/ Retrieved 09 October, 2011
- [15]. *W3Schools.com*. (n.d.). Retrieved October 5, 2011, from PHP Tutorial:
<http://www.w3schools.com/php/default.asp>
- [16]. Yu, X., & Yi, C. (2010). Design and Implementation of the Website Based on PHP& MYSQL. *E-Product E-Service and E-Entertainment (ICEEE), 2010 International Conference*, (pp. 1 - 4).
- [17]. *Wikipedia*. (n.d.). Retrieved October 5, 2011, from ASP.NET:
<http://en.wikipedia.org/wiki/ASP.NET>
- [18]. *Oracle*. (n.d.). Retrieved October 5, 2011, from JavaServer Pages Technology:
<http://www.oracle.com/technetwork/java/javaee/jsp/index.html>
- [19]. Yu, X., & Yi, C. (2010). Design and Implementation of the Website Based on PHP& MYSQL. *E-Product E-Service and E-Entertainment (ICEEE), 2010 International Conference*, (pp. 50 - 55).
- [20]. Naim, N., Yassin, A., Zamri, W., & Sarnin, S. (2011). MySQL Database for Storage of Fingerprint Data. *Computer Modelling and Simulation (UKSim), 2011 UkSim 13th International Conference*, (pp. 293 - 298).
- [21]. Trujillo, G. (2008, May 28). *MySQL versus Oracle Features/Functionality*. Retrieved October 2011, 2011, from http://blogs.oracle.com/GeorgeTrujillo/entry/mysql_functionality
- [22]. Trujillo, G. (2008, May 28). *MySQL versus Oracle Features/Functionality*. Retrieved October 2011, 2011, from http://blogs.oracle.com/GeorgeTrujillo/entry/oracle_functionality
- [23]. Li, Q., Honglin, X., & Yan, G. (2009). Research on Performance Optimization and Implementation of Oracle Database. *Intelligent Information Technology Application, 2009. IITA 2009. Third International Symposium*, (pp. Volume : 3,520 - 523).
- [24]. Trujillo, G. (2008, May 28). *MySQL versus Oracle Features/Functionality*. Retrieved October 2011, 2011, from http://blogs.oracle.com/GeorgeTrujillo/entry/mysql_versus_oracle_features_functionality
- [25]. [James S. McKeown](#), [Jim McKeown](#), Programming in Visual Basic 2010: The Very Beginner's Guide, 2010

APPENDIX A

GANTT CHART

