E-REAL ESTATE MANAGEMENT SYSTEM

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ABSTRACT

Real estate property is a growing market which has a lot of future and hope in Malaysia. Whether real estate property is for investment of for personal use, its strong command in the market is undeniable. It is soon becoming a very attractive business to people who have interest in it. With the astonishing growth of the Internet, real estate companies are beginning to find new ways to expand their businesses as Internet and E-commerce has given businesses the ability to interact closely with end consumers. They want to add value to their services and thus an online system would help them achieve that target. Online real estate is expected to meet the ever increasing demands for the new properties.

E - Real Estate Management System is a an automated system for property-related service on the Internet. This project is aimed at developing a web based online real estate application. With this system, real estate agents, potential buyers, sellers, landlords, and other parties in real estate dealings can easily collaborate in a secure Web environment. This automation uses the internet to increase buyers' utility through information accessibility and efficiency in real estate dealings compared to the traditional business approach. The main features of this website would be to post and view property listings; search for commercial, industrial, and residential property; calculate loan amount; to gain total information on real estate and get professional help and advice on it; financing solutions; and feng shui advice on property.

Features mentioned above are expected to speed up the buying and selling process; provide an easier, convenient and faster mode for finding relevant details about commercial, industrial, and residential properties for rent or for sale; promote online

property advertising and listings; and provide the user with unsurpassed service and content when it comes to shopping for property online. Gone are those days of waiting and doing things manually. This project aims to make the best use of online technology to help the buying and selling processes. Automated features provided will further enhance the systems functionality and thus giving users a much wanted all round system for real estate property buying and selling.

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Contents

List Of Figures

APPENDIX FIGURES

List of Tables

Chapter 1

Introduction

1.1 Background To Project

Real estate, which is also called "real property", is defined as any land and anything permanently affixed to the land, such as building, fences and those things attached to the buildings, such as light fixtures, plumbing and heating fixtures, or other such items that would be personal property if not attached. In Malaysia, there are many new housing developments which are increasing by the day. Developers are responsible to develop, and then sell their developed property. The old way or the normal way developers use is to firstly advertise their developed real estate property trough the print media, or even sign boards. This manual process from the date of viewing till the key presentation takes a long time and is the process is slow. This can be improved and done faster with more efficiency and effectiveness with the internet by having an online real estate system. The internet will make it better by reaching people or buyers fast. It also offers a big audience compared to sign boards. Buyers will get fast retrieval of information in the comfort of their own house. It is also 24 hours 'ON' compared to manual systems of marketing, buying and selling real estate. This is because an online system is always there and will not be effected by rain unlike manual methods like sign boards or posters. It also can not be switched 'OFF' like other methods of advertising or marketing. E-Real Estate Management System is a system developed to improve the features in the currently available system on the Internet. This system will cater to the real estates users and developers needs and requirements so that the process of marketing, selling and buying real estate becomes simpler and more precise. The current systems available are still incomplete and lack some innovative features that can make it better. Besides that, E-Real Estate Management System also aims to provide service to both

real estate owners and real estate seekers in an easy-to-manage environment to Real Estate Company.

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1.2 Purpose of project

E-Real Estate Management System is developed for the usage of an individual based real estate company. The system provides services to various kinds of users which can generally be categorised into two types which are the users from the real estate company (company agents and the administrator of system) and also the users from outside the company which is referred to as the external users. Real estate company users will involve people from the management, the system administration who maintain the system and perform tasks such as add agents and create archives of purchases. The agents on the other hand will be the people that will authenticate the sellers property information and post them online besides making the property more interesting by adding pictures of the property and posting it on the system. E-Real Estate Management System will provide features that will be able to satisfy the needs of the above-mentioned users.

All the real estate sites currently available on the Internet only offer the basic and essential features for its users such as the property postings, news corner, loan calculator, property search engine, real estate activities' guidelines, online inquiry form and some others. Some of the more established systems have more features to enhance the function of the site while some others lack important features that should be added in. A major disadvantage of web-based real estate system offered nowadays is lack of new features that can provide a friendlier environment to its

users or even user friendly interface so that user effort is made minimum. The current system problems that were identified had to do with meeting the users needs. The current system fails to solve problems faced by developers, buyers and sellers of real estate. The purpose of this project can be listed simply below :

- To enable the control and management of real estate to be done easily via web technology that is easier, more effective and efficient and reaches a larger audience.
- Create databases that can store various type of related information of the real estate property and user account for security purposes. It should be secure enough so that contents in the database are not alterable in the non-permitted ways. The system personal user information needs to meet the requirements of confidentiality, integrity and availability.
- To enable authorized user or personnel to access, view and update their information anytime and easier by storing all records in centralized database, it will save the user's time and reduce the processing time.
- To provide accurate, persistent and relevant property information.
- To create a paperless environment through the system and avoid redundant paper works, it will contribute to the cost saving aspect in terms of paper cost and paper storing facilities.
- Allow authorized user to maintain the database. Database records that can be maintained by a particular user depend on the level of restriction.
- To provide a user-friendly environment so that novice users and expert users can understand. It will provide an interesting interface to attract attention.

1.3 Objectives Of Project

The objectives of the system is vital for capturing the concepts of developing a particular system, therefore, it is important to outline the system objectives before any further development or planning is carried out. A number of objectives have been outlined for this system, which include:

- ***To help seller market their property or real estate.***

This is done by allowing a person who wants to sell their real estate property to post detailed information about their property, including pictures and any other method that they feel will help market their property online.

- ***To help user of system search and decide on the real estate property they wish to buy.***

This is done by searching trough the properties posted on our system by State, Area, Township, Price Range, Type of property, rent or for sales, and land area as well as build up area. This will make the process of finding the ideal property much more efficient and effective. It will provide enough information for decision making by the buyer.

- ***To make process of buying and selling real estate property simpler so that it will make it more efficient and effective.***

This is done by reducing the paperwork, time for visiting each and every property, beating traffic jams, having the convenience of your own home and most of all is the

ability of the system to be so simple yet comprehensive and precise to help buyers and sellers get the most out of their transaction.

- ***To reduce the need for real estate agents and thus cutting down on cost.***

This is done by automating each and every sellers property posted to be redirected to an agent who is in charge of property in that area. Because the system has all the information a person needs to make a decision to buy or not to buy, agents role decreases and thus their need is lessened. This is a plus point as it cuts down the cost of hiring many agents just to show the buyers around the house. Using the internet, all the information and specifications of the property can be posted online and the user will not need a single agent for them privately.

- ***To provide the latest and up-to-date information regarding properties, land owners and clients (public).***

This is done by having the latest properties posted on the main page so that users of the system will get to spot the latest properties available immediately. It is displayed according to date on the latest properties main page. The property specifications also provide up to date and precise information that is needed by a buyer.

- ***To provide opportunity to any users to sell and rent their properties***

This is done by not asking a user to log on or sign in before they can even view what the system has in store for them. Any users of the system who want to buy or sell their house will be required to fill in their particulars and automatically they will be notified of their status.

- ***To improve and enhance the quality and accuracy of data keeping.***

This is done by having a database of all the property that is posted by agents to the system. The agents get this information from the sellers. This way information can be managed more efficiently. Data that goes on the system has to be verified by system – such as information about property has to be verified by agents before it can be posted by the agent to the system.

- ***To allow authorized user to maintain the whole system.***

This is done by having agents login and admin login to maintain the system and respond to the system. The admin in this case will archive previous property sales and add in more agents when needed.

1.4 Scope Of Project

- E-Real Estate Management System focuses to manage all the real estate property in **Kuala Lumpur**.
- The proposed system is a web-based system that is designed for the use of normal users, agents and maybe directly by any company.
- This system will be divided into two main modules, which is
  i. Public Module
  ii. System Administration Module
  iii. Agents Module

Public Module

- General users of the system who are not employed by the real estate company
- Divided as property owners and property seekers
- Uses the system to obtain information of properties and post information about property that wants to be sold
- Able to check status of their property
- Get advice on loans, insurance, real estate, feng shui

System Administration Module

- Selected staff who are responsible to maintain the system and database
- Back-up data in the database

Two groups involved, that is managerial level (possesses decision making power in the company) and normal staff level (clerks and executives)

Agents Module

- Responsible to receive property information and then post it on the system.
- When property buyer found, arrange meeting with buyer and finalize deal and update status of property.

CHAPTER 2

LITERATURE REVIEW

2.0 Role of literature review

In the previous chapter, introduction to the system was done. In this chapter, the comparisons between the currently available systems on the Internet and E-Real Estate System are made. A detailed study is done on reviewing the different real estate management system, system architecture, system platform, database system, development tools, and others. At the end of this chapter, a synthesis is provided to summarise the information collected through literature review. Before any further detailed information is being elaborated, the motivation on how the ideas of the system are generated is being discussed.

2.1 Definition of Real Estate

Real estate, which is also called "real property", is defined as any land and anything permanently affixed to the land, such as building, fences and those things attached to the buildings, such as light fixtures, plumbing and heating fixtures, or other such items that would be personal property if not attached. By law, real estate is defined as: 'Real Estate is land and everything made permanently a part thereof, and the nature and extent of one's interest in it.'

2.2 Definition of E-Commerce

Electronic commerce (e-commerce) is the buying or selling of goods or services on the Internet, especially the World Wide Web. Sometimes, it is referred to as e-business and e-retailing. According to EC Innovation Centre, e-commerce means "the enablement of a business vision supported by advanced information technology to improve efficiency and effectiveness within the trading process".

"A modern methodology that addresses the needs of organisations, merchants and customers while improving the quality of goods and services and also increase the speed of service or service delivery. It involves the application of multimedia technologies in the automation, designing transactions, workflows to aim at the current business competition." – this is also another definition provided by various groups in the industry about electronic commerce. Definition of e-commerce can be so different but it concentrates on one thing which is the usage of information technology to speed up the business process.

There are a few technologies introduced to improve the effectiveness of trading relationships. The application level's typical technologies includes *fax*, *Electronic data interchange (EDI)*, *Electronic mail (e-mail)*, *voice messaging*, *electronic catalogues*, *electronic funds transfer*, *technical data interchange*, *electronic forms* and *workflow*.

2.1 Approach to literature review

This approach is being done so that this project will be studied well before implementing it. To come up with a lot of idea how to develop a better system than the existing ones, there a few different kind of approach that has been done as listed below :

Referring to :

- Existing Web Page – Researching the current existing web pages features and modules. Will be discussed deeply below.

- Books – Several books were used as a guide to understanding the real estate property sales process.
- Parents – Parents gave an insight of the things one had to go trough to buy a house especially in the financial and insurance side.
- Friends – Some friends gave an insight on how current systems failed to meet user requirements.
- Real Estate Agents – They provided the most comprehensive source of information. Agents provided feedback on current systems as well as their requirements for an online system.

2.2 Previous Systems Research

Research has been conducted on both the local and foreign countries' real estate agent web sites to get a better view and understanding of how a real estate agent web site is currently implemented. Besides that, the advantages and disadvantages of these web sites are compared as well.

2.2.1 Local Web Sites

i) Malaysian Institute of Estate Agents (MIEA) – www.miea.com.my

This web site provides features like property searching, guidelines on real estate, loan calculator, latest real estate news and information of financial institutions where loans can be applied. As the recognised body representing all Registered Estate Agents in the country, this site projects a more formal representation on its site where lots of information on the procedures and activities of real estate market can

be found. The Malaysian Institute of Estate Agents (MIEA), formerly known as the Malaysian Association of Real Estate Agents (MAREA) is. It was formed in 1974, but officially registered on April 14th 1977, with the Registrar of Societies, Malaysia.

Besides that, there is a full list of real estate agents (who are also the members of MIEA) where users can choose. All these information are well organised into four categories, which are the property centre, finance centre, news centre and agent centre. There are some animations designed in this web site that are able attract users' attention to certain information like upcoming events, latest added properties and others. One good point about the design of this site is that the interface is made simple by adding just a few nice images and pictures, which are of ideal sizes and this makes the download speed of its web pages become faster. Although being simple, the design of the web pages looks nice and appealing.

The property search in this site can be performed in two methods which are the normal search mode and the advanced search mode. In the advanced search mode, users can either select to view all the records found from normal search or continue on to narrow down the search results by entering advanced search criteria.

ii) Metrohomes – www.metrohomes.com

Basically, this site has the basic features like properties search, listing of new projects, latest real estate news and loan calculator. The outstanding features of the site is on its loan calculator where it can perform many different types of

calculations like various fees plus duties imposed on different property transactions, monthly payment for a loan and total loan based on property price.

The currency converter tool is another selling point of this site, which is helpful in knowing the value of a currency equivalent to another different currency. Besides that, it also contains sections for users to submit their inquiries, suggestions and comments by filling an online form, and also a career section where job opportunities in the company are being advertised here.

The property search section is divided into two pages, which consist of two steps of entering criteria with one step on each page. This can limit too many search criteria to contain in one page. The search results screen displays only 20 records per page to enhance the loading time. Selecting the property code for a particular record in the search results screen can link to the property's detail screen that shows most of the information needed by property seekers. Along in this detail screen, a link is provided for sending property inquiry email to Metro Homes.

This site has an attractive main page with a good combination of background colours. Instead of using pictures and images to design its web page interface, attractive text styles, logos and combinations of colours are also being used to make the web pages attractive. This site does not use any animation at all.

iii) Malaysiarealty.com

This web site is a real estate portal that offers features such as property searching and properties advertisement where users can put up their property in the search directory for this website where fees will be charged for listing a property together with picture and free of charge for listing property without a picture. Apart from that, it also provides many guidelines about real estate such as legal advise for property buyers, home financing and insurance guide, interior design and many others. Besides that, there is also a search engine called 'Meta Crawler' that is incorporated into this web site for the convenience of users to search for other information in the Internet.

The screen appearance of this website is enhanced with the usage of some animations. However, there are some drawbacks in its design which is there are too many unrelated links to other web sites like providing shopping for cars, books and etc. Although this may look convenient to users, but too many unrelated links can result in losing focus of its main purpose, which is to relate to real estate.

The property search offered in this web site only has two criteria for searching that are located in the main page such as property type and developer's project. In the actual search screen, there are too little guidelines for users to perform property search and contains only one criteria, which is property type. Below this search screen are a few search engines such as Hot Bot, InfoSeek and Lycos. There is also an added feature where users are able to look for some particular real estate agents according to the specified location.

iv) Oasis Properties

The main business of Oasis Properties is to locate ideal homes and office spaces for expatriates taking up residence in Malaysia and includes Individuals, Large Corporations and Diplomatic Missions. This web site concentrates on sales and rental of top quality properties and real estate within Kuala Lumpur, Malaysia. It offers some of the basic features that a real estate web site would have like online inquiry form and guidelines on real estate activities for buying and selling of properties. Information provided by this web site is very little and limited.

The interface of this web site is quite poor and is not very user friendly. The horizontal size of each web page is too big that it cannot be fit in the screen properly and users have to drag the scrollbar left and right to view the web page. Besides that, all property search results are being displayed in a bordered table form, which does not look attractive. If there is too many search results, the size of the table will increase and all the data will be crumbled up. This will make it look confusing and users might feel that they will have a hard time viewing the information provided.

This web site lacks of the most important feature provided by any real estate web sites which is this website does not has is the property search feature. It only has a property listing function that gave users no choice for searching.

2.2.2 Foreign Web Sites

i) Bringyourbuyer.com – www.bringyourbuyer.com

This is the real estate web site which provides free and comprehensive information on the Atlanta / North Georgia Real Estate property market and is updated on daily basis to ensure accuracy. It provides functions like the property search, rules in real

estate, property guides, property news and headline, housing loan schemes, analysis report, loan calculator and many others. Property seekers can search for their dream property by filling up the online search form or by clicking on the location on the map provided. Its property search returns a complete list of properties that met the user's requirement and it is well organised in a table form. It is a place where sellers of Greater Atlanta real estate and North Georgia real estate advertise their properties to homebuyers. Atlanta and North Georgia homes for sale include: For Sale by Owner Homes, For Sale by Agent Homes and For Sale by Builder Homes.

ii) Propertybuyers.com – www. Propertybuyers.com

Propertybuyers.com is a Singapore-based real estate web site and is one of the good real estate web sites that should be visited. This site provides a very good interface design with colourful pictures and some animations. Image mapping is being used to increase the loading speed too. All information is well organised in several sections that simply clicking on the icons provided at the main page can access them. Selling, buying, leasing and renting property, latest launches, financial information, property trends and analysis for certain years, financial calculator and others essential features are provided in by this system. One of the attractive features in this site is its discussion forum for real estate issues that is open to anyone. The search function of this web site actually divided into four categories. Users can choose to buy, rent, sell or lease properties from the options provided. In each of these options selected, there is a criterion for choosing a property type. After selecting one type of property, the advanced search begins by providing more search criteria for users to enter and choose.

The search result returns a comprehensive list of properties, which is being displayed in a very organised way, in columns. Information on a particular property is provided in detail with a map showing the location of the property. If property seekers are interested in a property, they can sign up as a member by filling up their personal information posted to the management and arrangement for the property owner to contact them using that information will be provided.

iii) Gold Coast Property Inc. – www.goldcoastpropertyinc.com

This site has a very attractive and appealing interface design. It uses some animations and has a very good combination of background colours. The contents in this site are well organized into a few parts, which can be accessed by just clicking the icons on the main page. Comprehensive list of properties for any type of property being searched is displayed in an organised way. However, it has only one very simple search feature that contains one criteria and one listing feature that limit users' choices of searching.

Besides providing general information, this site also displays added information such as interior condition of a property, valuation price and others. There is also a link to contact the related agent, which can be selected from the drop down list or from the map shown. It also provides facilities for either property owners or real estate agents to put up their property to be rented or sold. Other information is such as open house listing, career opportunity, company offices and branches.

v) Realtor – www.realtor.com

Realtor.com provides a very complete and comprehensive real estate agent-based website. It is a highly successful web site with an average of over 1.3 million listings from all over the United States. Users can search the database for the sale of homes or detailed information on the available homes and their surrounding neighbourhoods as well as finding an agent to assist them in the buying or selling process.

Property search, selling and buying guides, financial calculator, online forum and others are provided by this web site. There are many discussion topics on the forum like home improvement, finance, homes, insurance, decorations, home safety and many others. Basically, the information posted on this web site is divided into two categories, which are for consumers and realtors.

This site offers two types of property search; one by using map and the other one is by filling up and selecting some listed selection provided. This is to provide a flexible searching method for users. In addition to that, this web site provides users real estate Q&A (Questions and Answers), real estate news, financial centre, furniture and appliances, home improvement, insurance and many others.

Information in this site is displayed in an organised way and it has a friendly user interface. From the main page, users can access all types of real estate related information by just a click away.

Chapter 3

Methodology

3.1 Development Methodology

Waterfall Model With Prototyping

Waterfall Model with prototyping has been chosen as the system process model. The figure below shows the waterfall model with prototyping. This system process model contains seven phases, which are described as below:

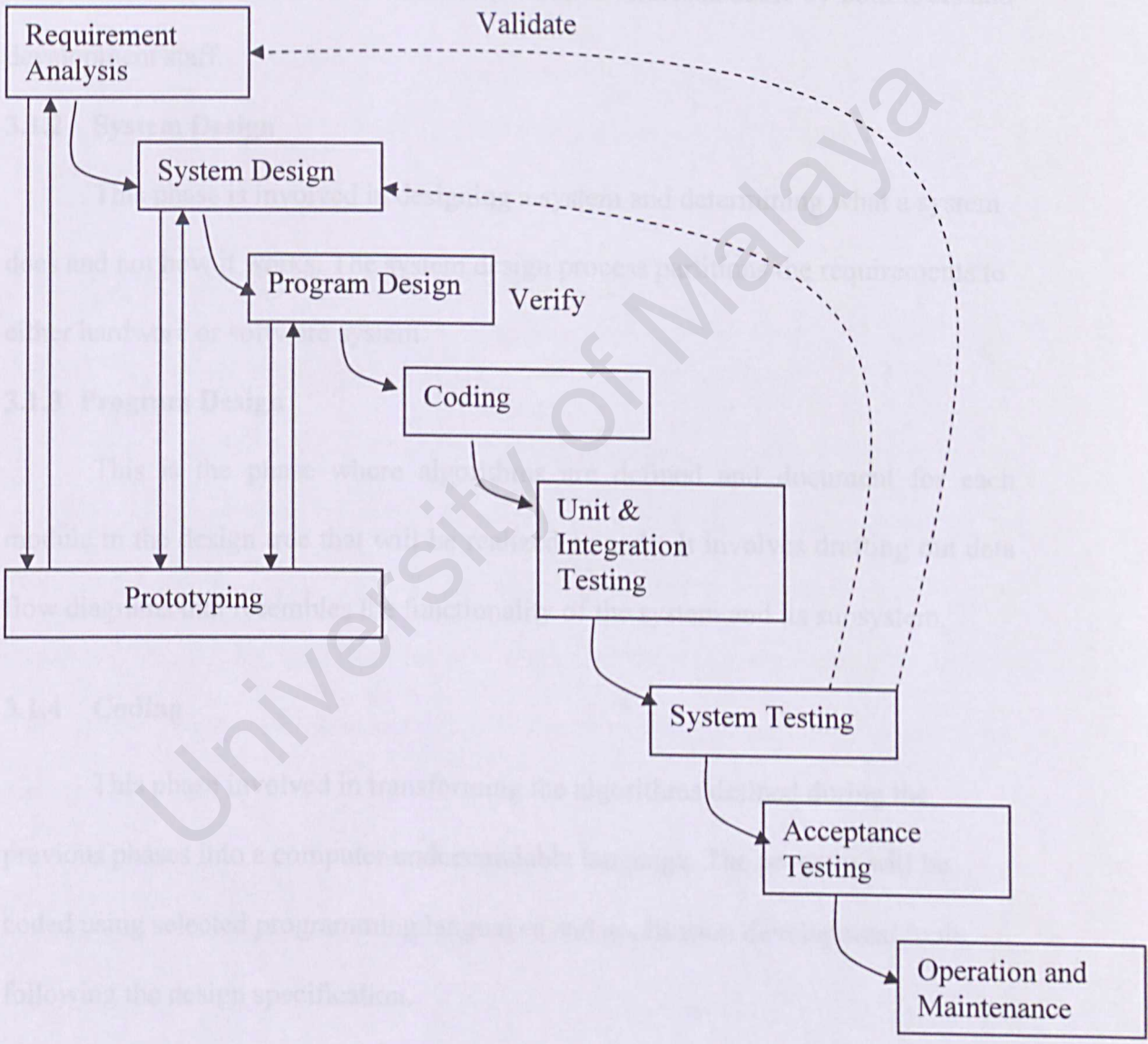


Figure 3.1: Waterfall Model With Prototyping

3.1.1 Requirement Analysis

This phase requires information gathering. It may be in technical aspect or non-technical aspect. Information will be gathered through the Internet, conduct interview and reading materials. The materials may include journals, magazines, books and newspaper. This is the phase where research and survey are done. The system's services, constrains and goals are established by consultation with system users. They are then defined in a manner, which is understandable by both users and development staff.

3.1.2 System Design

This phase is involved in designing a system and determining what a system does and not how it works. The system design process partitions the requirements to either hardware or software system.

3.1.3 Program Design

This is the phase where algorithms are defined and document for each module in the design tree that will be realized as code. It involves drafting out data flow diagrams that resembles the functionality of the system and its subsystem.

3.1.4 Coding

This phase involved in transforming the algorithms defined during the previous phases into a computer understandable language. The program will be coded using selected programming languages and application development tools following the design specification.

3.1.5 Unit Testing

The purpose of unit testing is to ensure that each module behave accordingly to its specification defined during program design phase. It checks each coded module for the presence of bug.

3.1.6 System Testing

This phase checks the entire system to ensure that the system behaves according to the software requirement specification.

3.1.7 Operational Maintenance

This phase continues defection and repair of bugs are carrying out.

3.2 Rationale for Proposed Methodology

3.2.1 Why Waterfall Model With Prototyping Better?

The Waterfall Model with Prototyping is chosen because Waterfall Model can suggest to the developer the sequence of events they should expected to encounter. It can be very useful in helping developers lay out what they need to do. Besides, developer also can estimate how close the project was to completion to give point of time. This model also enables developers to make necessary preparation for the coming phase.

Prototyping is used with waterfall model because it can help the developers to enhance their understanding about the system. In the prototyping section in waterfall model, the user requirement will be identified and documented. This information will be used to develop user interface and will be taken as prototype. Prototyping enable the users to interact with the system so that they have a better understanding what the new system will be. All the feedback from the users will be used to re-adapt the prototype in order to satisfy the users needs. The prototype is

then used again and re-adapt until satisfy by the developers and users. The prototyping is added to waterfall model because the users do not know exactly what they want until they actually have a chance to see and work with the system or part of the system. Then, the system developers build system-using feedback supplied by the users.

The reason why the prototype is important to be integrated with the waterfall model is shown as below:

- Requirements are often poorly understood.
- Requirements usually change during the development process.
- Current requirements remain only partially understood until after users have an actual opportunity to use a system.

3.2.2 Why Waterfall Model not used?

Many problems will arise if we only use waterfall model alone. The biggest problem with the waterfall model is that it does not reflect the way code is really developed. Except for very well understood problems, software is usually developed with a great deal of iteration. Often, software is used in a solution to a problem that has never before been solved or whose solution must be upgraded to reflect some change in business climate or operating environment. The actual software development process, if uncontrolled, developers may thrash from one activity to the next and then back again, as they strive to gather knowledge about the problem and how the proposed solution addresses it.

Waterfall model shows how each major phase of development terminates in the production of some artifact (such as requirements, design, or code). There is no

insight into how each activity transforms one artifact to another, such as requirements to design. Thus, the model provides no guidance to managers and developers on how to handle changes to products and activities that are likely to occur during development. For instance, when requirements change during coding activities, the waterfall model does not address the subsequent changes to design and code.

Waterfall model's major shortcoming is its failure to treat software as a problem-solving process. The waterfall model was derived from the hardware world, presenting a manufacturing view of software development. But manufacturing produces a particular item and reproduces it many times. Software is not developed like that; rather, it evolves as the problem becomes understood and the alternatives are evaluated. Thus, software is a creation process, not a manufacturing process. The waterfall model tells us nothing about the typical back-and forth activities that lead to creating a final product. In particular, creation usually involves trying a little of this or that, developing and evaluating prototypes, assessing the feasibility of requirements, contrasting several designs, learning from failure, and eventually settling on a satisfactory solution to the problem at hand.

3.2.3 Why Prototyping not used?

In the competitive world, every manufacturer wants to develop their products as fast as possible and want to promote that product before their competitors. Therefore, most of them use prototyping model. Prototyping is the technique of constructing a partial implementation of a system so that users or developers can learn more about a problem or solution to that problem. It causes the entire system to be constructed quickly

If a system is needed badly and welcomed readily, the prototype may be accepted in its unfinished state and pressed into service without the necessary refinements. While superficially, this may seem to be an appealing way to short cut the development effort, it works to the business' and team's disadvantage.

Besides, the manufacturer also does not considered the long-run maintenance. They always produce products that are difficult to maintain. However, they argue that when the problems arise in the future, the next release of the software that is more advanced had published to solve those problems. From this point of view, the manufacturer is blamed to be not responsible to the users.

Users will develop interaction patterns with the prototype system that are not compatible with what will actually occur with the complete system. Additionally, a prototype will not perform all necessary functions. Eventually, when users discover the deficiencies, user backlash may develop if the prototype has been mistakenly adopted and integrated into the business as if it were a complete system

All of the possible problems that project management is subject to are relevant here. It can be quite difficult to manage prototyping as a project within the larger systems effort. Although several iterations of the prototype may be necessary, extending the prototype indefinitely also creates problems. It is important that the system analysis team devises and then carries out a plan regarding how feedback on the prototype will be collected, analyzed and interpreted.

3.3 System Requirement

3.3.1 Hardware Requirement for System Development

3.3.1.1 Hardware Requirement for Server

Component	Description
Microprocessor	Pentium MMX 166 MHz
RAM	At Least 16 MB
Storage	At Least 2 GB Hard Disk
Input Device	Mouse, Keyboard, Printer, Scanner
Video Monitor	EGA, VGA or Compatible Display

Table 3.1: Hardware Requirement For Development PC

3.3.1.2 Hardware Requirement for Client

Component	Description
Microprocessor	Pentium II 200 MHz or Higher
RAM	At Least 128 MB
Storage	At Least 2 GB Hard Disk
Input Device	Mouse, Keyboard
Video Monitor	EGA, VGA or Compatible Display
Internet Connection	At Least ISDN Line

Table 3.2: Hardware Requirement For Client PC

3.3.2 Software Requirement for System Development

3.3.2.1 Operating System

Windows XP Professional

Due to several advantages that are distinct when compared to other operating systems, Windows XP Professional was selected as the operating system in the project. The main reason for choosing this Windows is that Windows currently enjoys a dominant position as the preferred operating system by most corporations.

UNIX is extremely difficult to administer, even with attempts to make it friendly. It is based on several text files, which are often maintained manually. The formatting is critical software from operating NT Server, on the other hand, uses a Registry database. The graphical front end for managing the database interacts

integrally with the operating system, making it easy to access and modify both user and system configurations.

UNIX has a native networking scheme called Network File System NFS, developed by Sun MicroSystem, allows the same sort of remote access to drives on servers on the PC redirector software. Although native to UNIX, NFS is quite foreign to the PC. NT Server does not suffer from this 'foreigner' status. NT Server is windows, from the interface to the networking and fits into a Windows network like a native. If no Windows access to NT Server is desirable, it can be accomplished through a third-party product.

UNIX systems are under constant attack by hackers. There is continuous Computer Emergency Team (CERT) alert warning of ways that various flavors of UNIX are open to comprise. Furthermore, UNIX does not use encrypted passwords at login. Thus, a packet snifter on the network can read passwords in clear text — a real danger. NT Server has been certified as C2-secure, so it does not have the potential security holes of UNIX. NT Server can be used for secure government installations and has been widely adopted by financial firms instead of UNIX for security reasons.

3.3.2.2 Markup language

Hyper Text Markup Language (HTML)

HTML is a way of adding various attributes to plain text that are published on the World Wide Web. An HTML document is an ordinary text file. One of the key strength of HTML is that a document conforming to the HTML standard can be understood no matter what sort of software or computer the reader has. For example,

someone using Netscape in Windows or someone using Lynx UNIX can interpret the same page.

HTML is the set of markup symbols or codes inserted in a file intended for display on a W.W.W. browser page. The markup tells the Web browser how to display a Web page's words and images for the user. Each individual markup code is referred to as an element (but many people refer it as a tag). Some elements come in pairs that indicate when some display effect is to begin and when it is to end.

HTML is a formal recommendation by the World Wide Web Consortium (W3C) and is generally adhered to by the major browsers, Microsoft's Internet Explorer and Netscape's Navigator, which also provides some additional non-standard codes. Both Internet Explorer and Netscape implement some features differently and provide non-standard extensions. Web developers using the more advanced features of HTML 4 may have to design pages for both browsers and send out the appropriate version to a user. Normally, HTML files are 'interpreted' on the client side (in a user's web browser).

3.3.2.3 Technologies

Active Server Page (ASP)

An Active Server Page (ASP) is an HTML page that includes one or more scripts (small-embedded programs) that are processed on a Microsoft web server before the page is sent to the user. The code inside ASP is mixed with standard HTML and will not be seen by the browser. ASP pages run in all browsers unless the person making the page uses HTML or browser commands outside of the ASP portions.

ASP is a server-generated page that can call other programs to access databases, serve different pages to different browsers. Typically, the script in the web page at

the server uses input received as the result of the user's request for the page to access data from a database and builds or customizes the page on the fly before sending it to the requestor. ASP is as efficient as writing code directly to server's application program interface.

ASP is an open, compile-free application environment in which HTML, scripts, and reusable ActiveX server components can be combined to create dynamic and powerful web-based business solutions. ASP has evolved into an 'open technology framework', means it is not necessary to use Microsoft products to create code in it. Nowadays, any language can be used to create ASP pages. ASP can also take advantage of COM and DCOM (Component Object Model and Distributed Component Object Model) objects with minimum effort.

Any text editor can be used to create Asp code. Microsoft Visual Interdev will give nice highlights, wizards and pop-up boxes. With ASP, the code can be simply written in the HTML page. The HTML tags and the code are side by side. There is no compiling and complex interfacing. ASP has made it much quicker and easier to create highly interactive web sites. It also enables the pages easier for maintenance and updating in the future.

The output of an ASP file is plain HTML, the content of which can be customized for the capabilities of the client. We can capture all sorts of information that is not known at the time the instruction was written, for example, a user's input and profile, the time and location the user accesses the page, the type of browser and/or operating system that is running on the user's computer or the information contained in database, text files, etc. This HTML-generation instructions can be written in such a way that they use newly captured information to create up-to-minute, personalized, interactive web pages that serves fresh information every time they are requested.

ASP allows you to define application and session variables that can be carried across multiple pages in a Web site.

ASP allows persistent connections between the client and server, the development of client server sessions, and the access and management of databases from the client side. They are not static pages, but rather they are dynamically produced from information stored in a database. Each time the database is updated, your Web site is updated. When you make a change or modification to the ASP file on the server, you need to only save the changes to the file. The next time the Web page is loaded, the script will automatically be compiled.

ASP.NET

Active Server Pages (ASP) has long been the foundation for creating rich and dynamic Web sites using server-side scripting. With the Beta release of the .NET Framework, ASP has evolved into ASP.NET, and it now embodies many of the important key concepts behind the .NET Framework. In addition to being able to access any of the programmatic interfaces exposed by the .NET Framework, you can now construct server-side code using any of the languages that are compatible with the .NET Framework.

ASP.NET is a set of technologies in the Microsoft .NET Framework for building Web applications and XML Web Services. ASP.NET pages execute on the server and generate mark up such as HTML, WML or XML that is sent to a desktop or mobile browser. ASP.NET pages use a compiled, event-driven programming model that improves performance and enables the separation of application logic and user interface. ASP.NET pages and ASP.NET XML Web Services files contain server-

side logic (as opposed to client side logic) written in Visual Basic .NET, C# .NET, or any .NET compatible language. Web applications and XML Web Services take advantage of the features of the common language runtime, such as type safety, inheritance, language interoperability, versioning, and integrated security.

3.3.2.4 Scripting Languages

JavaScript

JavaScript is an interpreted programming or script language from Netscape. In general, script languages are easier and faster to code in than the more structured and compiled languages such as C and C++. Script languages generally take longer to process than compiled languages, but are very useful for shorter programs. JavaScript is used in web site development to do such things as:

- Automatically change a formatted date on a web page
- Cause a linked-to page to appear in a popup window
- Cause text or graphic to change during a mouse rollover

JavaScript uses some of the same ideas in Java, the compiled object-oriented language derived from C++. JavaScript code can be imbedded in HTML pages and interpreted by web browser (or client). JavaScript can also be run at the server as in Microsoft's Active Server Page (ASP) before the page is sent to requestor. Both Microsoft and Netscape browsers support JavaScript, but sometimes in slightly different ways.

JavaScript gives developers the ability to do things such as check from contents, communicate with the user based on their actions, and modify the web page

natively executed on the Internet Explorer browser and can be executed in the browser through plug-in technologies. VBScript lets the user to interact with a web page rather than simply viewing it. VBScript can take input from the user and check the data to make sure it is valid or meets certain criteria. Then, it can put an Internet server to work either by actually storing the data or causing some action to take place on the server based on the information given. VBScript validates data, pricing, provides impressive multimedia feedback, and initiating data storage. The user can use VBScript to sequence the questions based on responses.

3.3.2.5 Web Application Development Tools

Macromedia Dream weaver

Macromedia Dream weaver is a designing tool used for creating a good web page with its special functions. There are three main categories to look at in this software that is design, code and develop.

In the design category, the latest version of it that is the macromedia Dream weaver MX, there are certain new features such as improve workspace layout, predefined sample page layouts and code, improved cascading style sheets (CSS) support and enhanced dream weaver templates.

The code category includes of a lot of new features such as coder-oriented workspace layout, code hints, snippets panel and tag editors. Where else the develop category comprises of ColdFusion MX support, ASP.Net support, PHP support and web services introspection.

3.3.2.6 Database

My SQL

My SQL is a database management system, which can run under the Windows 95/98/2000/NT operating system. My SQL offers an easy-to-use database for managing and sharing data. It also adds increased integration with the Web for easier sharing of data across a variety of platforms and user levels. It enables sharing of database among the co-workers over the Internet, searching and retrieving the information quickly, and taking advantage of automated, pre-packaged solutions to quickly create databases.

Benefits of My SQL:

- An easy-to-use tool for easily finding information that provides consistency and integration with the other applications.
- My SQL allows easily sharing information via the corporate Intranet and the ability to easily host a database within the browser. User may create solutions that combine the easy-to-use of the My SQL interface (client) with the scalability and reliability of SQL server.

3.5.2.7 Web Browser

Web Browser is a client program (application) that is used to search through the information provided by a specific type of server. A browser helps you to view and navigate the information on the Internet. The creation of the browser made the Internet easier because the web-browser provides graphical, text-based terminal

interface to the web-server. The web-browser translates client-requesting information sent by the web-server into a graphical user interface within the browser. It is also responsible in sending the request of the client in HTML form to the web-server.

Microsoft Internet Explorer 5.0 / 6.0

Currently, almost all the Internet users use either Netscape's browser or Microsoft's Internet Explorer browser or both. Although Netscape was initially the predominant product in terms of usability and number of users, Microsoft's browser is now considered superior by many users (although many other users see them as roughly equivalent) and has taken a slight lead in usage. Microsoft Internet Explorer (MSIE) is the graphical World Wide Web browser that is provided with the Microsoft Windows operating system. The MSIE browser competes closely with an earlier browser, Netscape Navigator. (As of December 2001, Internet Explorer was the dominant browser in terms of numbers of users and has apparently dominated the browser market.)

3.5.2.8 Web Server

Internet Information Server (IIS)

Internet Information Server (IIS) is a group of Internet servers (including a Web or Hypertext Transfer Protocol server and File Transfer Protocol server) with additional capabilities for Microsoft's Windows NT and Windows 2000 Server operating systems. IIS is Microsoft's entry to compete in the Internet server market that is also addressed by Apache, Sun Microsystems, O'Reilly, and others. With IIS, Microsoft includes a set of programs for building and administering Web sites, a

dynamically without the web page being re-loaded and without the use of Java, plug-ins or ActiveX controls. JavaScript also supports functions, again without any special declarative requirements. Functions can be properties of objects, executing as loosely typed methods.

VBScript

VBScript allows truly interactive Internet application to be constructed. HTML forms the basic design of a homepage, whereas VBScript adds interactively and performs validations on inputs keyed in by the user. The advantages of VBScript are:

- It can be written as a HTML file
- VBScript can be used to check variables in the input boxes. It verifies that all of the input boxes on a given form are filled and contain valid data ranges
- VBScript can also capture incoming e-mail addressed from the web site visitors.

The limitations of VBScript are:

- VBScript cannot write a file to web server's hard disk but uses another scripting language (ASP) to create interactive forms that append data to a file.
- No any compliant database. Data are stored in arrays to replace database files.

Visual Basic Scripting is a lightweight scripting language that provides programming functionality based on the Visual Basic programming language. It is

search engine, and support for writing Web-based applications that access databases. Microsoft points out that IIS is tightly integrated with the Windows NT and 2000 server in a number of ways, resulting in a faster Web page serving.

A typical company that buys IIS can create pages for Web sites using Microsoft's FrontPage product (with its WYSIWYG user interface). Web developers can use Microsoft's Active Server Page (ASP) technology, which means that applications – including ActiveX controls – can be imbedded in Web pages that modify the content sent back to users. Developers can also write programs that filter requests and get the correct Web pages for different users by using Microsoft's Internet Server Application Program Interface (ISAPI). ASP and ISAPI programs run more efficiently than common gateway interface (CGI) and server-side include (SSI) programs, two of the current technologies.

Microsoft includes special capabilities for server administrators designed to appeal to Internet service provides (ISPs). It includes a single window (or 'console') from which all services and users can be administered. It's designed to be easy to add components as snap-ins that you didn't initially install. Individual customers can customize the administrative windows for access. IIS includes security features and promises that it is easy to install. It works closely with the Microsoft Transaction Server to access databases and provide control at the transaction level. It also works with Microsoft's Netshow in the delivery of streaming audio and video, delayed or live.

CHAPTER 4

SYSTEM ANALYSIS

4.1 System Analysis

System Analysis is a most important phase in a software development life cycle. It is the process of gathering and interpreting facts, diagnosing problems and using the information to recommend improvements to the system. The information gathered during this phase has provided alternative strategies to develop this system. This alternative strategy is in terms of what methodology and development tools are most suitable to develop this system, and there are several methodologies and development that being considered. From the information in Literature Review in Chapter 2 justify among the methodologies and development tools and give reasons why a certain methodology or development tool is used to develop this system but not others.

The purposes of this analysis phase are:

- Justify which methodology is the most suitable methodology to be used to develop my proposed system.
- Justify which kind of hardware and software which will be used to develop the system, this includes operating system, web application language, web technology, scripting language, web application development tools, web browser and web server.
- Analysis what are the smart features from the existing system can be incorporated in my system.
- Introduce new and smart features in my proposed system's modules.
- Justify what are the limitations of my proposed system.
- Justify what are the non-functional requirements that should be considered.

4.2 Requirements Analysis

4.2.1 Functional Requirements -

Functional requirements specify what actions a system design must provide in order to benefit the users of the system. The functional requirements for this System are: -

- The system must be able to validate the users login and password. Users should only able to view selected web pages, which they are authorized to view accordingly to categories the users are in.
- Members may join the mailing list. Any new information about the properties available or new project launches will be sent to all members available in the mailing list.
- Public users (whether they are members or not) can obtain information about properties by querying the database with the parameters such as property type, location, budget and so on.
- Create online database with information on properties, new housing projects, public auction tender, customer particulars, forms and legal documents, sales archive, tenancy information are available for viewing, searching and modification according to access granted. Reports can be automatically generate using preformatted templates for reference as well as statistical purpose.
- Database should allow updates, modification and deletions of selected tasks and web pages. The ability to perform these updates, modifications and deletions should be specific to category of users allowed to do so. The system should not allow unauthorized users to perform these tasks.

- Each forms provided by the system must be validated before they are submitted to the database. Fields that are left out should be checked and if not filled the system should prompted to fill the left out fields. Restriction that has been imposed onto certain fields should also be checked. These restriction may be the numbers of characters accepted and types of characters accepted. This is important for fields such as the user ID, Password, Name, Telephone number, E-mail address and etc.

- Each users sessions should be abandoned when the users logs out of the system or closes the web browser. This is to prevent another user from accessing the system using the previous users access account.

4.2.2 Non Functional Requirements -

The non-functional requirements specify certain criteria, which the system must satisfy in order for the system to be more usable. These actions are not actual actions taken by the system but they are further restrictions on what the system must be able to handle.

The following are the non-functional requirements that are embedded into the proposed system: -

Integrity :

To provide a system that manipulates the data in a correct way as expected

Efficiency :

To provide user speed in page as well as information processing, to remove a screen from the memory once it is closed, abandon a user session once the user logs out of

the information. This may cause an inconvenience to the users or even financial lost to company. Therefore all possible error or failure must be taken into considerations and thorough test should be conducted to ensure that the system is reliable.

4.3 Feasibility Studies

Feasibility study is important before the requirements of a system can be gathered in order to make sure that the system being develop, meets the users requirements. This study is also to determine whether the system is feasible to be implemented and whether it can be implemented with the time and cost given. Several methods have been carried out to determine whether the E-Real estate system is feasible to be implemented or not, for example checking out the other similar existing applications.

Basically, all the features in this application already exist in other similar application. Also, interviews with few friends of my father who're related in this field and knowledgeable about real estate and were carried out to get some feedback on how the system should look like and its functions, and whether this system can be completed in the cost and time given. The conclusion made from this study was this site is feasible enough to be implemented.

4.4 Problems of current manual systems

Below are the identified problems that were found in the current manual real estate systems.

1. Manual systems take a long time and this causes more mistakes in application and administration as it requires one to have good knowledge on real estate.
2. Storage of records trough diskettes or compact disks not appropriate. There is always a risk of virus attack on diskettes and scratches on compact disks.
3. Redundancy of data and data entry mistakes by workers – such as handwriting not readable, or can not be understood by officer.
4. Advertisements of housing or real estate property sale through sign boards and posters, is less effective compared to online systems. This is because these techniques are old fashioned and it does not meet a great number of audiences compared to an online system.
5. Users find it hard to actually find what they are looking for in manual systems. They have no time to go trough pages of newspaper or travel from one place to another to find what they are looking for. The current manual systems are not systematic and thus it is not convenient for the user.

4.5 Synthesis

E-Real Estate Management System aims to retain the advantages and good points of the current systems mentioned above in its development while avoiding its disadvantages at the same time. Realising the disadvantages of the foresaid system, E-Real Estate Management System incorporates additional features to overcome the disadvantages of the foresaid system.

To serve the different types of users of the system, the concept of the system is designed specifically to meet the user's needs. Priority of design is given to external users where they are actually the client or maybe a potential client of a real estate company. The system intends to make user effort minimum so that even a normal person who knows the basic handling of the computer will be able to use this system properly. Basically this system understands that its users may not be professional or expert users of IT, thus it intends to create a simple interface that suits a balance between the novice users as well as the expert users.

Self-complement is a characteristic of this system, which is to provide anything and everything that anybody needs in his or her process of buying, selling or renting a real estate item. Besides offering the basic features that are currently available in real estate system on the Internet, E-Real Estate Management System does incorporate a few new features that will better serve its users and increase the efficiency of the business process through the offerings of *Financial Advice Centre* and *favourites* in a real estate system.

Financial advice centre is an alternative searching method in addition to the conventional searching method for the property hunters to find a dream real estate item. It will cater to those who might feel indecisive or are new at real estate or those who don't know what to look for in property search. The system will analyse their financial status and suggest a real estate item for them to look out for that suits them best.

E-Real Estate Management System provides additional ways for real estate seekers to communicate with property owners or the management. This is done by allowing sending a note to the property owners or the management via the system. It also allows the real estate seeker to get the contact numbers or e-mail address of the owner displayed at the search page.

Online systems are becoming more popular amongst Malaysian people. The very fact that the internet usage of the countries population has gone up from 24% in the year 2002 compared to 28.41% in 2003 is a clear indication that online systems are gaining more audience. This survey was taken from MIMOS research report which was done in Malaysia. As online bidding is gaining its popularity in the Internet with more and more established auction house, E-Real Estate Management System also incorporates an auction house in the system where real estate item is put up for auction. This is to serve those who prefer to look for more valued item. Any user registered with system will be eligible for the auction once they submit additional information vital for the auction process.

There are many people who are interested in the real estate market, but not many of them know about the correct procedure in buying a property. Realising this, the system provides a step-by-step guide for them in realising their dream of owning a property. Guides on performing a property transaction, fees involved, documents and other things that are involved in the process of buying or selling a real estate item are provided. Others features that are commonly found in other real estate system throughout the Internet like providing the housing loan scheme will also be incorporated in the system.

E-Real Estate Management System is a system which aims to provide all necessary facilities to both its users at the side of buying or selling a property item would make sure that everything which is needed will be served. Property seekers will be provided with any necessary information on their way to buy a real estate item while for real estate owners; they can have the benefits of real estate system's help them to deal the property for them.

4.6 Summary

After making reviews on the different websites, it is found that those websites, either local or foreign countries' only provide basic yet essential features. The common features available in these websites are:

- Search Engine
- Loan Calculator
- News Corner
- Online Inquiries Form

E-Real Estate Management System, on the other hand has a few advantages over the currently available real estate management system on Internet of which E-Real Estate Management System provides the following features:

- Info centre-one stop
- Help Centre
- Financial Advice Centre
- More detailed loan calculator
- Real Estate Activities' Guidelines

The first four features in E-Real Estate Management System are identical to the one available in most real estate web sites where search engine, loan calculator, Info centre and Help Centre can perform the same functionalities of those features in other web sites. In addition to that, E-Real Estate Management System provides additional features that will help in making E-Real Estate Management System a system with higher efficiency and capabilities. The additional features in E-Real Estate Management System are Financial Consultant and Auction House.

The inclusion of Financial Advice as a module of the system is to generate users from the group who is not knowledgeable on what kind of property item to look for. With financial consultant, users only need to enter their financial and personal information and the system will help to generate the list of property item, which are suitable for them.

Besides that, auction house is provided as a place where users can put up their property in this auction house to be auctioned. Users can also participate in the bidding to get any property they wanted, as online bidding or auction is becoming more and more popular. The auction house will certainly provide benefits to both the company and also the property seekers.

Apart from the features that are lacking in the web sites being reviewed, lots of other information and knowledge can be gained from this research like the presentation of the web sites, the organization of it and others. All the advantages and good points of these websites will be incorporated into the development of E-Real Estate Management System if possible and on the other hand, the disadvantages will be avoided as much as possible too.

CHAPTER 5

SYSTEM DESIGN

5.1 Data Flow Design

A data Flow Diagram is a graphic illustration that shows the data flow and logic within a system. In order to simplify and clarify what the data flow diagram is portraying, there are supplemental conventions as shown in the table below.

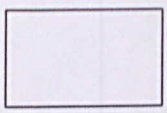
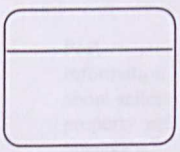
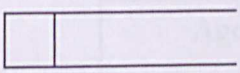
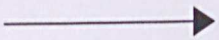
Symbol	Name	Description
	Source or destination of data	External sources or destinations of data. It interacts with system but is outside its boundary.
	Process	It represents the transformation or processing of information within a system
	Data Store	It is used for showing the data storage or referred by a process
	Data Flow	It is used to show the movement of data from an origin to a destination with the head of arrow pointing towards the destination.

Table 5.1: Symbols using Gane and Sardon Method

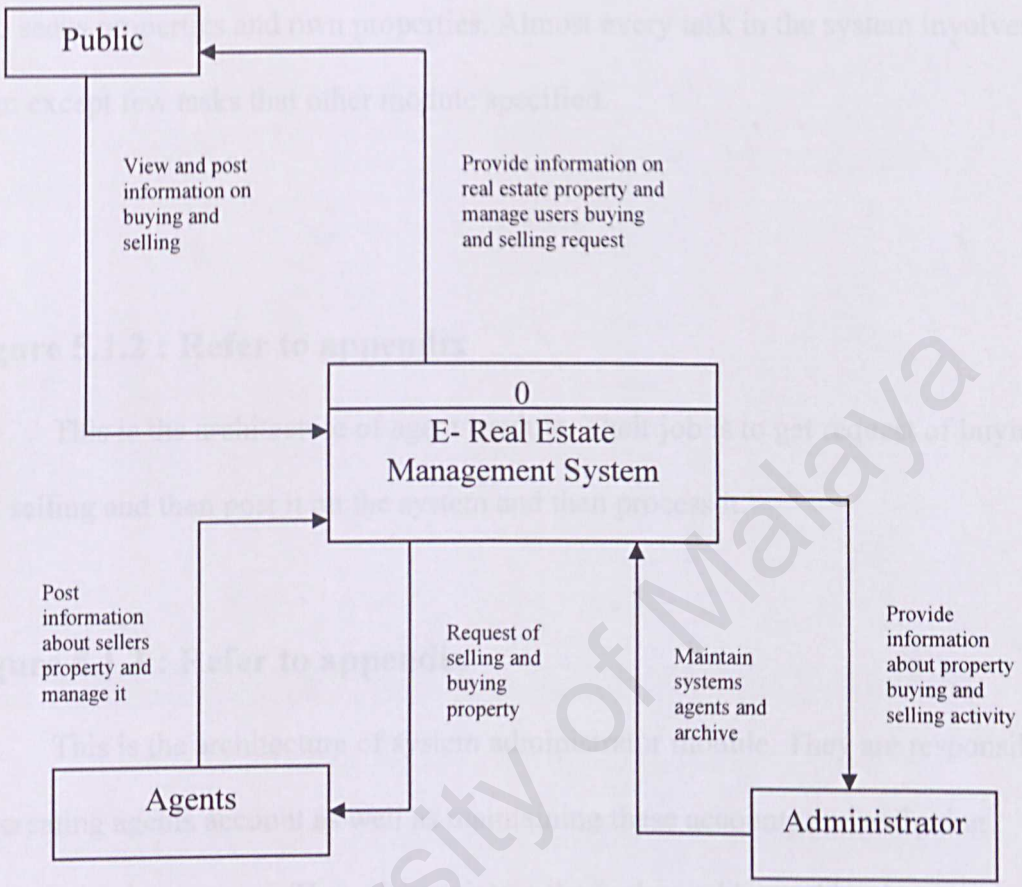


Figure 5.1: Context Diagram

Figure 5.1.1 : Refer to appendix

This is the architecture of public module. It shows the main functionalities provided by this particular module. This is the main module because they are the one who seeks properties and own properties. Almost every task in the system involves them except few tasks that other module specified.

Figure 5.1.2 : Refer to appendix

This is the architecture of agent module. Their job is to get request of buying and selling and then post it on the system and then process it.

Figure 5.1.3 : Refer to appendix

This is the architecture of system administrator module. They are responsible for creating agents account as well as maintaining these accounts and assigning agents to in charge areas. They also maintain the lookup table used by the system.

5.2 System Interface

Below is the initial design for the interface :

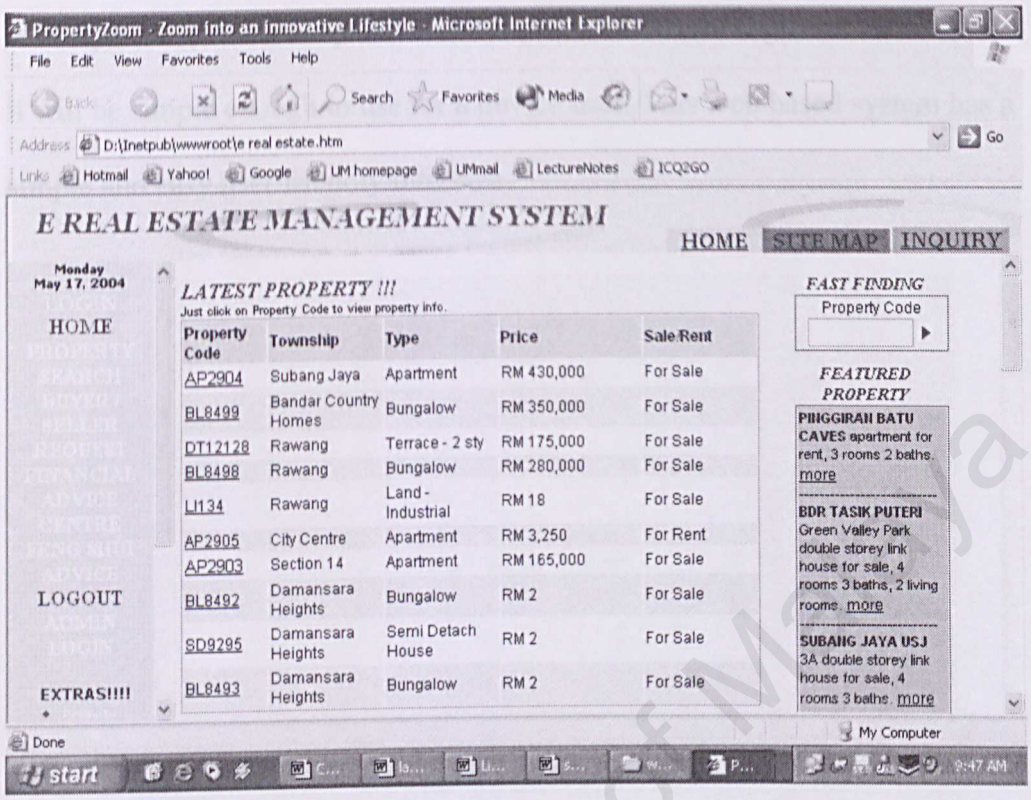


Figure 3.7: The initial interface design for main page

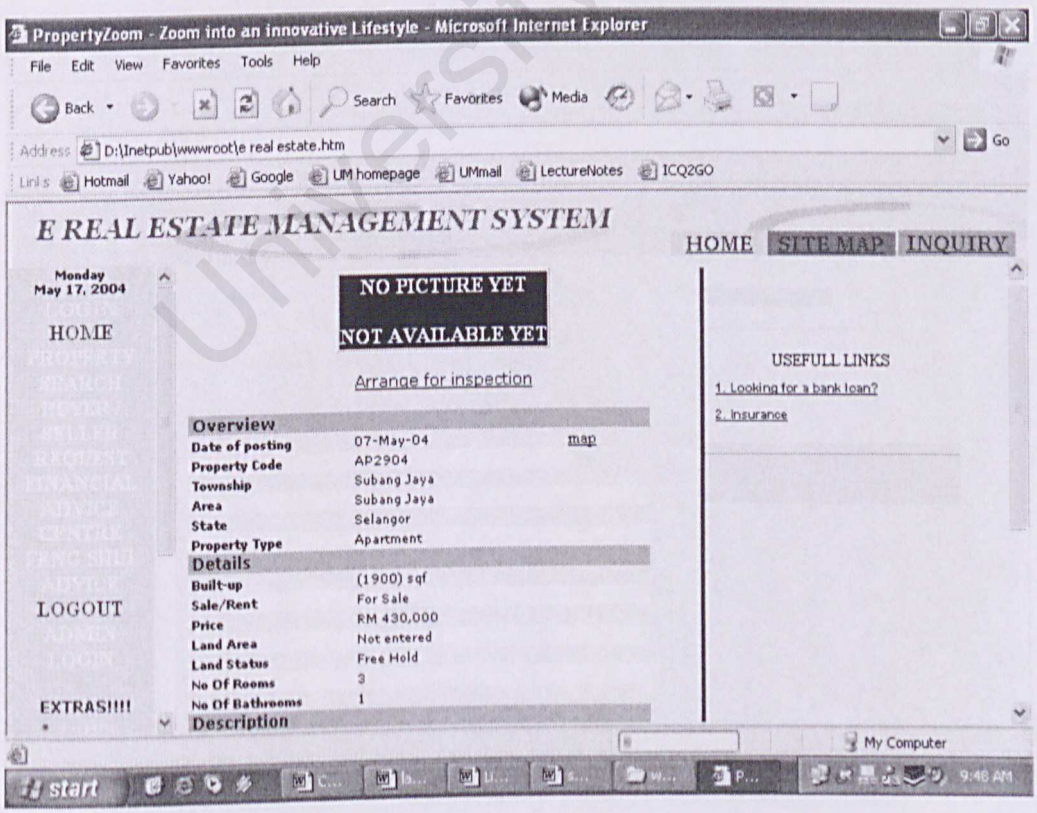


Figure 3.8: The initial interface design for property specifications

5.3 Expected Outcome

Upon completion to this project, it will give real estate buyers, sellers, and developers a systematic system that will be useful to its targeted users. Besides that, it will be simple enough to use for a novice user. This web based system has a simple and easy user friendly interface.

CHAPTER 6

SYSTEM IMPLEMENTATION

6.0 System Implementation

6.1 Introduction

System implementation in software development is a process to convert system requirements into program codes. This phase always involves some modifications to the previous design due to the limitations of the programming language used. The initial stage of system implementation involves setting up the development environment. This includes setting up development tools to facilitate the system implementation.

6.2 Development Environment

Development environment has certain impact on the development of a system. Using the suitable hardware and software will speed up the system development and it performance.

6.2.1 Hardware resource

From previous system proposal, system will be running in the networking environment, which is web based system. So, to achieve this objective, a proper hardware component should be chosen because this will determines the degree of successfulness of an implementation computerized system. The computer equipment will become the property of the users. This method is usually the most popular and advisable when the equipment is to be kept 5 years.

6.2.2 Software Resources

A computerized system will not be operated if there is not any software being installed and run in the computer system. There are basically three types of software for a computer system. They are system software (operating system), utility software and programming languages and application software.

Software	Purpose	Description
Microsoft Windows XP	System requirement	Operating System
Internet Information Server	System Requirement	Web Server Host
MySQL	Database	Build the data to store and manipulate the data
Macromedia Dreamweaver MX Educational Version	User Interface Design	Design the web pages.
ASP	System Development	Coding the web pages
HTML	System Development	Coding the web pages
Internet Explorer	System Development	Viewing the web pages
Adobe Photoshop	User Interface Design	Image design and creation

Table 6.1: Summary of software/tools used for E Real Estate Management System

6.3 Program Development

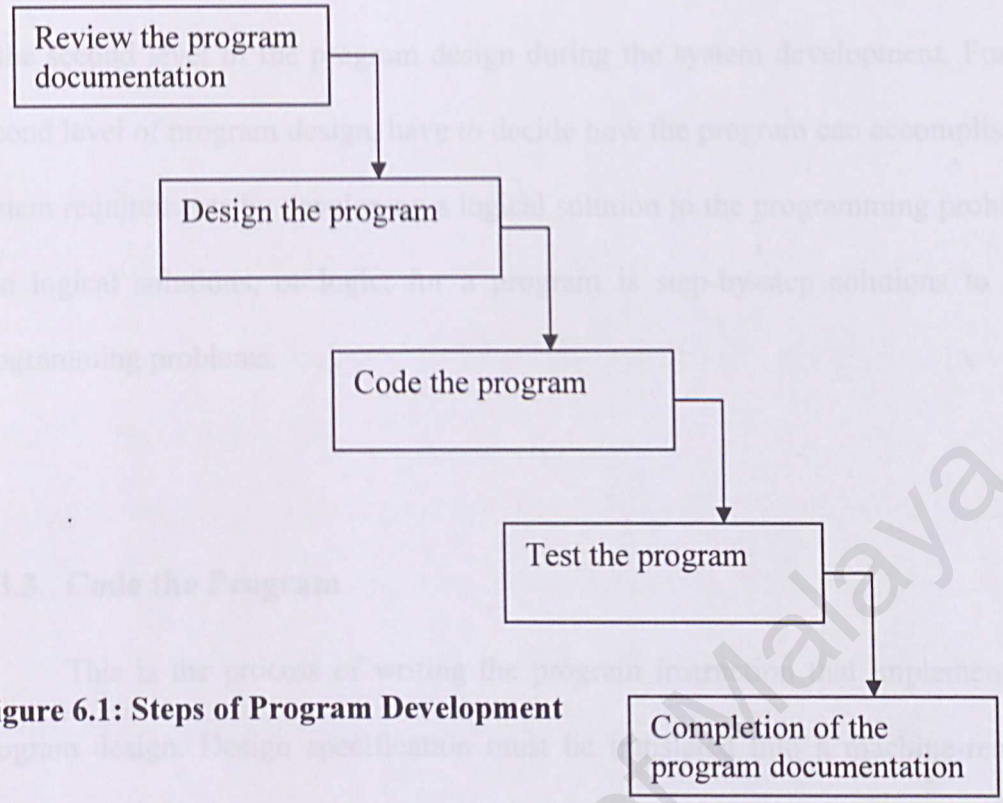


Figure 6.1: Steps of Program Development

Program development is the process of creating the programs needed to satisfy the system process requirements. It consists of 5 steps, which are reviewing the program documents, design of the program, code the program, completion of the program documentation. Figure 6.1 shows the steps of the program development

6.3.1 Review the Program Documentation

The first step of the program development is to review the previous program documentation. The program documentation of the E Real Estate Management System consists of simple system description, system requirements and database design. This documentation helps to understand better the task that has to be covered during this coding phase.

6.3.2 Design the Program

After the program documentation review, need to design the program, which is the second level of the program design during the system development. For this second level of program design, have to decide how the program can accomplish the system requirements by developing a logical solution to the programming problems. The logical solutions, or logic, for a program is step-by-step solutions to most programming problems.

6.3.3 Code the Program

This is the process of writing the program instruction that implements the program design. Design specification must be translated into a machine-readable format. If design is performed in a detailed manner, coding can be accomplished mechanically.

6.3.4 Test the Program

This process is to ensure the system function by testing the program thoroughly. Testing is a must before the program processes actual data and produces information on which people will rely. There will be several types of test on an individual program, which will be discussed further in the following chapter.

6.4 Program Coding

6.4.1 Coding Principles

Throughout the coding phase for the system, several principles are followed in order to ensure the quality and the structure of the generated code. They are as follows:

1. **Readability**

   Easy to read codes are essential for the future system enhancement by another developer. To cater for this, meaningful variables and label names have been used. Comments are written in most of the coding pages to explain their every functionality. Proper indentations are followed to enhance readability.

2. **Maintainability**

   Codes should be easily read, corrected and revised. To achieve this, codes should be readable (as explained above), highly cohesive and loosely coupled. A code that performs functions for one module should be grouped together and tries our best as much as possible to achieve high cohesive and loose coupling.

3. **Robustness**

   Codes should be robust in terms of handling errors and responding by displaying appropriate error messages and try to avoid system failure.

6.4.2 Coding Methodology

In the coding phase, two approaches have been used, which are the top-down and the bottom-up approach. Both of the approaches are used to obtain the benefits from them.

1. **Top-Down Approach**

This approach starts by looking at the large picture of the system and then exploding to smaller parts or subsystem. Top-Down approach allows the higher-level modules to be coded first before the lower level modules.

This method ensures that the important or core modules of the system to be developed and tested first. Deploying the methods gives a preliminary version of the system sooner. The advantages of using this approach are as follows:

- Prevents the developer from getting so mixed in the detail that they loose track of what the system is suppose to do.
- Avoiding the chaos of attempting to code a system all at once
- This method is compatible with the general system thinking of normal human nature.

2. **Bottom-Up Approach**

In contrast with the top-down approach, the bottom-up approach starts coding at the lower level modules before the higher-level modules. The higher-level module acts as an empty shell that calls these lower level modules. The completed lower level module will then be integrated with the newly completed higher-level module.

6.4.3 Database Implementation

For E Real Estate Management System, the database is stored in a PC in which MySQL is installed. Any data creation, updates or data retrieval will be connected directly to the database server through ADODB connection. The database

includes tables to keep agents details, buyers details, contact details, login details, and property details.

After the E Real Estate Management System is completed and tested successfully, all the data were flush from the database. All the unnecessary tables were eliminated from E Real Estate Management System database to avoid data overlapping and to reduce workload of the entire system when deployment. This will make the system work better and more efficiently because it wont lag.

6.5 ASP Coding

In the next few pages, some of the ASP codings that were used are explained. Not all the codings will be shown. Only the important ASP codings will be revealed and explained briefly. This coding was done using Macromedia Dreamveawer and hard coding the traditional way. Again, only some of the special features are explained here. There are too many ASP pages and not all can be explained here in this report. The first ASP coding shown is the home.asp page which is the index page.

Figure 6.2: Main page ASP coding

```
<!--#include file="driver.asp"-->
<%
Set data = server.CreateObject("ADODB.Connection")
data.Open database
Set record = server.CreateObject("ADODB.Recordset")
Set viewrecord = server.CreateObject("ADODB.Recordset")
record.Open "SELECT * FROM property WHERE status='onweb' ORDER BY
onwebdate desc", data
viewrecord.Open "SELECT * FROM property WHERE status='onweb' and
purpose='Sale' order by price", data

rec=0
do while not viewrecord.EOF
        rec=rec+1
        viewrecord.MoveNext
loop
if rec>2 then rec=2
if Session("j")="" then Session("j")=10
%>

<%j=0
            Do while not record.EOF
                                    j=j+1
                                    if int(Session("j"))>=j then%>
            <TR bgColor=#FFFFFF
onMouseOver="style.backgroundColor='#CCCCCC'; style.cursor='default'"
onMouseOut="style.backgroundColor='#FFFFFF'">
              <TD class=Normal><div align="center"><FONT face="Tahoma"
size=2>
                <A
href="viewproperty.asp?data=<%=record("p_id")%>"><U><%=record("p_id")
%></U></A></FONT></div></TD>
              <TD class=Normal><FONT face="Tahoma"
size=2><%=record("p_town")%> </FONT></TD>
              <TD class=Normal><FONT face="Tahoma"
size=2><%=record("type")%></FONT></TD>
              <TD class=Normal><FONT face="Tahoma" size=2><%="RM
"&formatnumber(record("price"),0)%></FONT></TD>
              <TD class=Normal><div align="center"><FONT face="Tahoma"
size=2><%=record("purpose")%></FONT></div></TD>
            </TR>
            <%end if
                                record.MoveNext
                                    Loop%>
```

```
<form name="form1" method="post" action="home2.asp">
            <FONT face="Arial, Helvetica, sans-serif" size=2>Show me latest
</FONT>
            <FONT face="Arial, Helvetica, sans-serif" size=2>
            <SELECT onchange='submit()' name=topno>
              <option value="10" <%if Session("j")=10 then Response.Write
"Selected"%>>10</option>
              <option value="15" <%if Session("j")=15 then Response.Write
"Selected"%>>15</option>
            </SELECT>
            properties<B></B> </FONT>
           </form>

<FORM action="fastfind.asp" method=post>
                <TBODY>
                 <TR vAlign=top borderColor=#ffffff>
                  <TD> <DIV align=center><FONT face="Arial, Helvetica,
sans-serif" color=#000000 size=2> Property Code</FONT>  <BR>
                    <input name="idcode" type="text" id="idcode"
size="10">
                    <INPUT type=image height=15 width=13
src="main2_files/button.gif" border=0 name=image2>

      <%=Session("notice")%>

<%
                                                    if rec<>0 then
                                                    viewrecord.MoveFirst
                                                        for i=0 to rec
                                                            if
viewrecord("bedroom")<>"" then bed=", "&viewrecord("bedroom")&" rooms "
                                                            if
viewrecord("bathroom")<>"" then bath=", "&viewrecord("bathroom")&" rooms
"

      Response.Write "<strong>"&ucase(viewrecord("p_town"))&"</strong>
"&viewrecord("type")&" for sale "&bed&bath&" <a
href=viewproperty.asp?data="&viewrecord("p_id")&">more</a><br>"

      Response.Write "------------------"

      viewrecord.MoveNext
                                                        next
                                                        end if
                                                        if rec=0 then
Response.Write "No cheapest Sale property"
                                                        %>
<%Session("notice")=""%>
```

The previous page showed the home.asp coding. It features modules such as defining and listing the best buy property, fast find search (which is connected to another asp page called fastfind.asp), listing the latest properties posted, and showing the latest 10/15 property.

```
<!--#include file="driver.asp"-->
<%
prop_add = Request.Form("p_add")
p_area = Request.Form("area")
town = Request.Form("township")
purpose = Request.Form("purpose")
p_type = Request.Form("p_type")
builtup = Request.Form("builtup")
area = Request.Form("L_Area")
bed = Request.Form("bedroom")
bath = Request.Form("bathroom")
price = Request.Form("price")
ava = Request.Form("available")
info = Request.Form("addinfo")
name = Request.Form("name")
contact = Request.Form("contact")
email = Request.Form("email")

Select Case p_type
        Case "Apartment" : id_type = "AP"
        Case "Bungalow" : id_type = "BG"
        Case "Condominium" : id_type = "CD"
        Case "Double Storey Link" : id_type = "DS"
        Case "Factory" : id_type = "FC"
        Case "Land" : id_type = "LN"
        Case "Office Space" : id_type = "OS"
        Case "Retail Space" : id_type = "RS"
        Case "Semi Detach" : id_type = "SD"
        Case "Shop" : id_type = "SH"
        Case "Single Storey Link" : id_type = "SL"
        Case "Townhouse" : id_type = "TH"
        Case "Warehouse" : id_type = "WH"
End Select

Set data=server.CreateObject("ADODB.Connection")
data.Open database
Set record=server.CreateObject("ADODB.Recordset")
```

```
data.Execute "INSERT INTO contact(name,contactno,email)
values('"&name&"','"&contact&"','"&email&"')"
record.Open "SELECT * FROM contact order by id desc", data
idx = record("id")

if builtup="" then builtup=0
if price="" then price=0
if ava="" then ava=date

data.Execute "INSERT INTO
property(submit,p_address,p_area,p_town,purpose,type,builtup,land_area,bedroo
m,bathroom,price,available,p_info,contactid,status)" &_
                                                    "values('"&year(date)&"-
"&month(date)&"-
"&day(date)&"','"&prop_add&"','"&p_area&"','"&town&"','"&purpose&"','"&p_
type&"','"&builtup&"','"&area&"','"&bed&"','"&bath&"',"&price&",'"&year(ava)
&"-"&month(ava)&"-"&day(ava)&"','"&info&"',"&record("id")&",'New')"

record.Close
record.Open "SELECT * FROM property ORDER BY id desc", data

if len(day(date))=1 then
        days="0"&day(date)
else
        days=day(date)
end if

if len(record("id"))=1 then id_rec="00"&record("id")
if len(record("id"))=2 then id_rec="0"&record("id")
if len(record("id"))>=3 then id_rec=record("id")

prop_id = id_type & days & id_rec

data.Execute "UPDATE property set p_id='"&prop_id&"' WHERE
id="&record("id")


%>
```

Figure 6.3: Defining property code

CHAPTER 7

SYSTEM TESTING

7.0 System Testing

7.1 Introduction

The main function of testing is to establish the presence of defect in a program. Meanwhile, testing is used to judge whether or not the program is usable in practice. Nevertheless, testing can only demonstrate the presence of error. It cannot show that there is no error in the program. Therefore, suitable approach must be chosen to reduce the possibility or error in a program. Several rules serve well as program testing objectives.

a) Testing is a process of program execution with explicit intents to find errors and run-time program bugs.

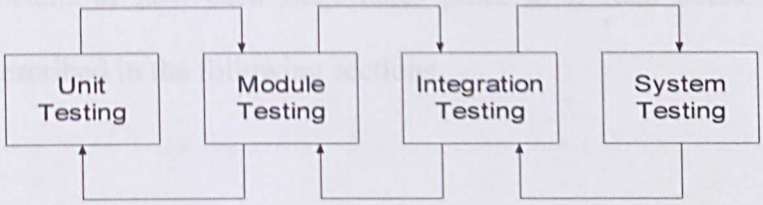
b) An effective test case is one that contains unexpected testing record sets with high probability of detecting undiscovered errors during the program design and development phase.

c) A successful test is also not one that uncovers only few expected error, but it is which constantly provides new challenges to its programmers over time.

The different between testing modules during the development phase and testing them during software integration is that error can be fixed as they are found the integration phase must be recorded and the bugged module must be returned to its development team or programmers for further correction based on its errors logs. E Real Estate Management System has gone through three stages of testing before it is completed. These three stages are the component testing, integration testing and acceptance testing.

7.2 Testing Process

In general, the testing process of the system can be shown in the following figure.



Testing Process

The testing procedure will be started from component testing to ensure the codes implemented in the system will properly fit the system requirements. This is follow by the integration testing, which is tested for the overall functionality and performance of a few modules that are integrated together. Lastly, the testing procedure, user is required to test the system carefully to ensure that the implemented system will function according to their requirements. If any mistake or defects are discovered at any stage, the previous stages might need to be repeated for correction and modification.

7.3 Testing Approach

The testing approach adopted in this system is the bottom-up approach. Using this approach, each module at the lowest level of the system hierarchy is tested individually. Then, the next module to be tested is that module that calls the

previously tested module. This approach is followed repeatedly until all modules have been tested.

7.4 Component Testing

The details of how each stage takes place in E Real Estate Management System are described in the following sections.

7.4.1 Unit Testing

Unit testing is where testing is done on individual components of the system to ensure that they operate correctly. Each component of the system is tested independently, without other system components. Unit test is very time-consuming and labor intensive stage of any software development. Several techniques have been used in the unit testing for the E Real Estate Management System: -

7.4.1.1 Code Review

Before the function is run in the browser, codes are reviewed line by line to discover any syntax error as well as semantic error. If errors are discovered, they are corrected immediately.

7.4.1.2 Code Differ In Colour

By using the Macromedia Dreamweaver MX, the code will be in different color. For instance, JavaScript codes will be in red color and ASP codes will be in grey. If the code contains errors, it will appear in bright yellow.

7.5 Module Testing

Module testing is implemented after the unit testing stage to uncover error in each unit. A module is a collection of dependent components. During this stage, all the related units or functions will be integrated and tested in the module level. In performing module test, different test cases are applied to the module and the test results are recorded. If errors occur in this level, each unit will be retested till there is a solution to the problem. This is done because although each sub module performs its task correctly, the end result produced may be incorrect when all the sub modules work together.

7.6 Integration Testing

7.6.1 Sub-System Testing

The sub-system testing is done after the module testing whereby the entire module would be integrated and tested further. The sub-system testing is done to check the functionality of the integrated modules. The most common problems that arise when modules are integrated together are module interface mismatch. Therefore, the main concern in integration test is to exercise the interface repeated to defect any interface mismatch problem. Several important aspects are checked to reduce the possibility of interface problem as listed below:

- The necessity to perform a checking that redirects the user to the correct module
- Whether the type of parameter tallies with the type of parameter received
- Whether information passed is sufficient for the receiving module to perform its task

- The necessity of the type conversion.

7.7 System Testing

The system testing process is concerned with finding errors, which result from anticipated interactions between sub-systems and system components. It is also concerned with validating that the system fulfills the functional and non-functional requirements. System testing can be categorized into a few types: -

7.7.1 Stress Testing

This is to determine that the program fulfills the requirements defined for it. It is equally important to ensure that the program works, as it should under extreme conditions. In order to perform stress testing, execute the system in a manner that demands resources in abnormal quantity, frequency, or volume.

7.7.2 Performance Testing

For real-time and embedded systems, software that provides required function but does not conform to performance requirements is unacceptable. 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.

7.8 User Testing

User testing or acceptance testing is the final testing procedure in the E Real Estate Management System whereby users will be actively involved in testing system to ensure that the system meets their requirements. The main purpose of this testing is to verify whether the system has fulfilled the user's requirements. Besides

that, the functionality of the system is demonstrated to the end users and the users are given the chance to experience and explore the system themselves.

Some of the comments that are given by user are as below:

- The system is easy to understand and have a short learning curve.
- The user interface is nice but can do some enhancement to it to give a more user friendly look.
- More faster auction function should be better
- More types of Services can be prepared in this system.

7.9 Analysis of test Results

From the all testing process that has been carry out, the test results can be summarized as follow:

- Achieving the main objectives of the project.

  Generally the main objectives of the project as described in Chapter 1 have been achieved. The system can maintain all the inventory transactions. This is an important and major activity in an organization.

- Enhancement on the user interfaces

  The user interface for the system should be more attractive and user-friendly in order to attract the user to use the system. So using more graphics and attractive icon to represent the buttons may help t improve.

7.10 Conclusion

At the end of the testing phase, the system should be able to perform the task required and free of most errors. The user should use the system. However, there are still some critical problems and errors, which would occur only after using the system for some time. Therefore, work of testing should not just end in this phase but have to done every now and then to make sure the system functions well.

CHAPTER 8

SYSTEM

EVALUATION

8.0 System Evaluation

8.1 Introduction

Evaluation is the ultimate phase of developing a system and an important phase before delivery the system to the end users. Evaluation was related to user environment, attitudes, information priorities and several other concerns that are to be considered carefully before effectiveness can be concluded. At all phases of the system approaches, evaluation is a process that occurs continuously, drawing on a variety of sources and information.

8.2 Problems Encountered and its Solutions

8.2.1 Problems In Tools and language Selection

Since developing an E Real Estate Management System is a new technology to me, it is difficult in selecting the most appropriate tools and software for the development of E Real Estate Management System in the beginning stage. It is because the process of choosing the suitable technology and tools for project development is a very critical process as different tools has its strength and weaknesses.

Hence, to learn more information in web-based application in the system, in depth studies and research on the programming language and tools using were conducted in the earlier stage of the development. The studies and research activities including Internet surfing, reference books, review the current systems in the market and others.

8.2.2 Difficulties In Determining System Scope

Without experience in web-based development, it is difficult to define the scope of the system in the early stage. Due to the insufficient knowledge and time constraint, it is impossible to built a full-scale complete system within the given time frame.

To solve this problem, reference and analysis on current web sites has been conducted in order to understand the system design of each web site and try to adopt some of the ideas into the system design of E Real Estate Management System.

8.2.3 Lack of Knowledge In the Language and Tools Chosen

Due to the time constraint, it is very difficult in learning the chosen language and tools. Without a strong base of the language, I need more time in looking for solution to solve technical and non-technical problems that were encountered during the development of E Real Estate Management System. It consumes a lot of time in the beginning stage of development to learn the new programming language. All these need some research on the component before knowing how to use the component and how to apply it in the modules. To solve these problems, Internet was the most vital source. There are lots of source codes and free tutorials in the World Wide Web.

8.2.4 Slow System Response Time

There are some modules in this system especially those are connected to database need to be able to response in the minimum amount of time.

8.3 Evaluation By The End User

As E Real Estate Management System is proposed to produce a more efficient and effective property management, the final stage of system development which is the system testing becomes critical and it needs feedbacks from all respective users in judging the correctness of these functionalities, precise data flow as well as enhance interface of the system.

Anyway, as the scope of E Real Estate Management System is large, development was conducted with the objective to cover the scope briefly, which means that the whole system was developed quickly to have the overall structure and potential of the system but the system was not refined to show its full efficiency.

The overall feedback from the end users is good and E Real Estate Management System is expected to serve the targeted group well after refining.

8.4 System Strengths

8.4.1 Simplicity of User Interface

By employing the graphical user interface, E Real Estate Management System can be evaluated as an easy-to-use system. Unlike those command-based environments, E Real Estate Management System is more user friendly to interact with sufficient instruction and guidelines are provided to assist users. Users are required only minimum typing and inputs when they interact with the system.

8.4.2 Efficiency of the System

The system administrator module developed is a user-friendly and efficient program. The administrator can easily add new records, update and delete existing records in their respective fields.

8.4.3 Error Messaging

In this system, the error message will display immediately when an error occurs. This allows users to identify their errors effectively. For examples; when a required field is not entered during and updating session to the records, the system will notify the particular user about this.

8.4.4 Consistency

All the pages are designed in a way that all the links are arranged in the same position although the user switches from one page to the other. This allows the user to perform better while using the system.

8.4.5 System Transparency

System transparency refers to the condition where the user does not need to know where the database resides, how is the system structure or anything related to how the system was built. This is important because without transparency, confused user might lead to the destruction of the system.

8.4.6 Maintainability

The system is saved in files, thus making it relatively easy to maintain. All the classes and objects are coded in a standardized form to ensure the readability, which eventually will increase maintainability.

8.5 System Weakness

8.5.1 Lack of Security Features

Encryption and the security of the login module are still considered as a hazard for the system to be implemented. Better encryption techniques and security policy should be implemented in the future for the system and its databases.

8.5.2 Platform and Browser Limitations During The Implementation Phase

The E Real Estate Management System implementation depends heavily on the use of Microsoft Technology. The current implementation of the E Real Estate Management System is limited to the Windows 2000 and XP Operating System and Internet Explorer 5.0 as client browser. Due to constrain of time and technical knowledge, they system cannot perform properly under other operating system, such as Linux.

8.5.3 Very Limited Reporting Function

The available reporting module that is very limited in function. It has to load all the record in to the data grid in the browser first before users can print them. If too many records are to be shown, then the downloading time will extend and memory from the client side will be exhausted. Third party software should be sought to ensure a more efficient reporting module to handle large amount of data.

8.5.4 Lack of Functional Modules

The available functional module in the system is very limited. This is because of the lack of knowledge and experience in the handling of a web-based E Real Estate Management System.

8.5.5 Agents Cannot and Retrieve Password Through The Internet

This limitation is actually trade off for the security of the system. This is caused by the central maintenance of the login module by the administrator to control the agents.

8.6 Future Enhancements

System development is a very dynamic process that requires the developer to consistently checking on the system to ensure that it is running smoothly. The system was developed under three months that does not allow the developer to implements all the new ideas that come about during the implementation stage. Below are some of the enhancements that the developers wish to implement in the future;

- Implement password encryption to increase the security of the session
- Enhance the reporting module to be able to have more function
- Administrator should be able to backup the database through the system
- Automatically notify users who are just added to the system through mail

8.7 Conclusion

The lure of greater efficiency, lowered costs and higher quality drive must of an organization to gain competitive edge in business from the knowledge of Information Technology. E Real Estate Management System is a start to computerize the operations/ transactions in the business organizations towards the effort of paperless concept.

A lot of knowledge was gained throughout the literature review, requirements analysis and the initial system development of the project. Information gathered through various sources is extra knowledge for me that cannot be obtained from the courses taught in faculty. Adherence to a development schedule is very important in order to get a job done on time. This experience will definitely prove useful in future system development.

Overall, the E Real Estate Management System has achieved and fulfilled the objectives and requirements of a web based real estate system as stated in the project proposal. The use of web based approach brings along many benefits including the ability to access information anywhere and at anytime of the day. Administrator can perform administering tasks online anywhere at anytime. This will ease the administrator to expand the business throughout the whole Malaysia. This also meets the university's objective in bringing education to the public throughput the nation and also expanding its facility.

Finally, there are still many rooms for the improvement in the E Real Estate Management System, in terms of implementing a comprehensive and complete inventory system. With the initial step taken, enhancements could be made by inserting more features when implementing the system in the time to come. It is hoped that this system will be a success and provides a foundation upon which more innovative and comprehensive system may be built to perform multiple tasks and fulfill various user requirements.

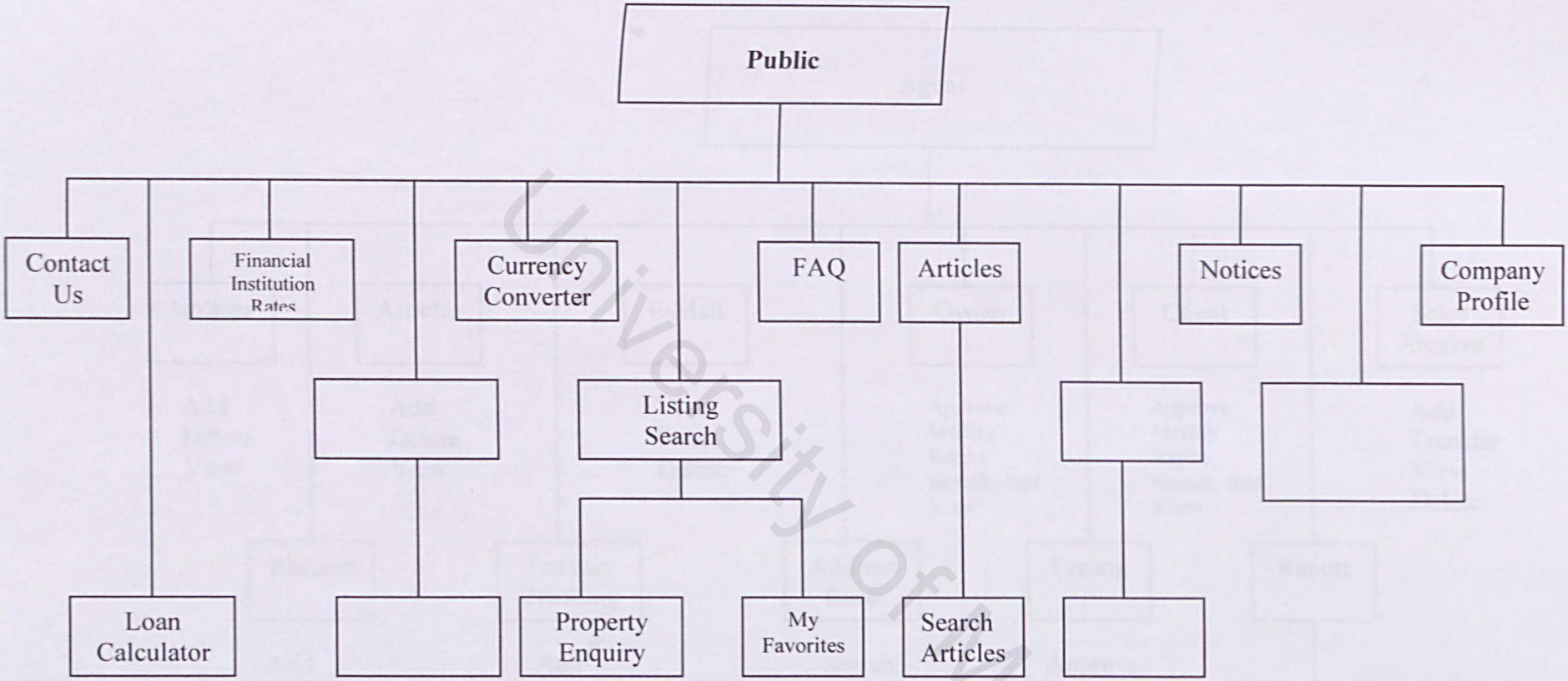


Figure 5.1.1 : System Architecture of Public Module

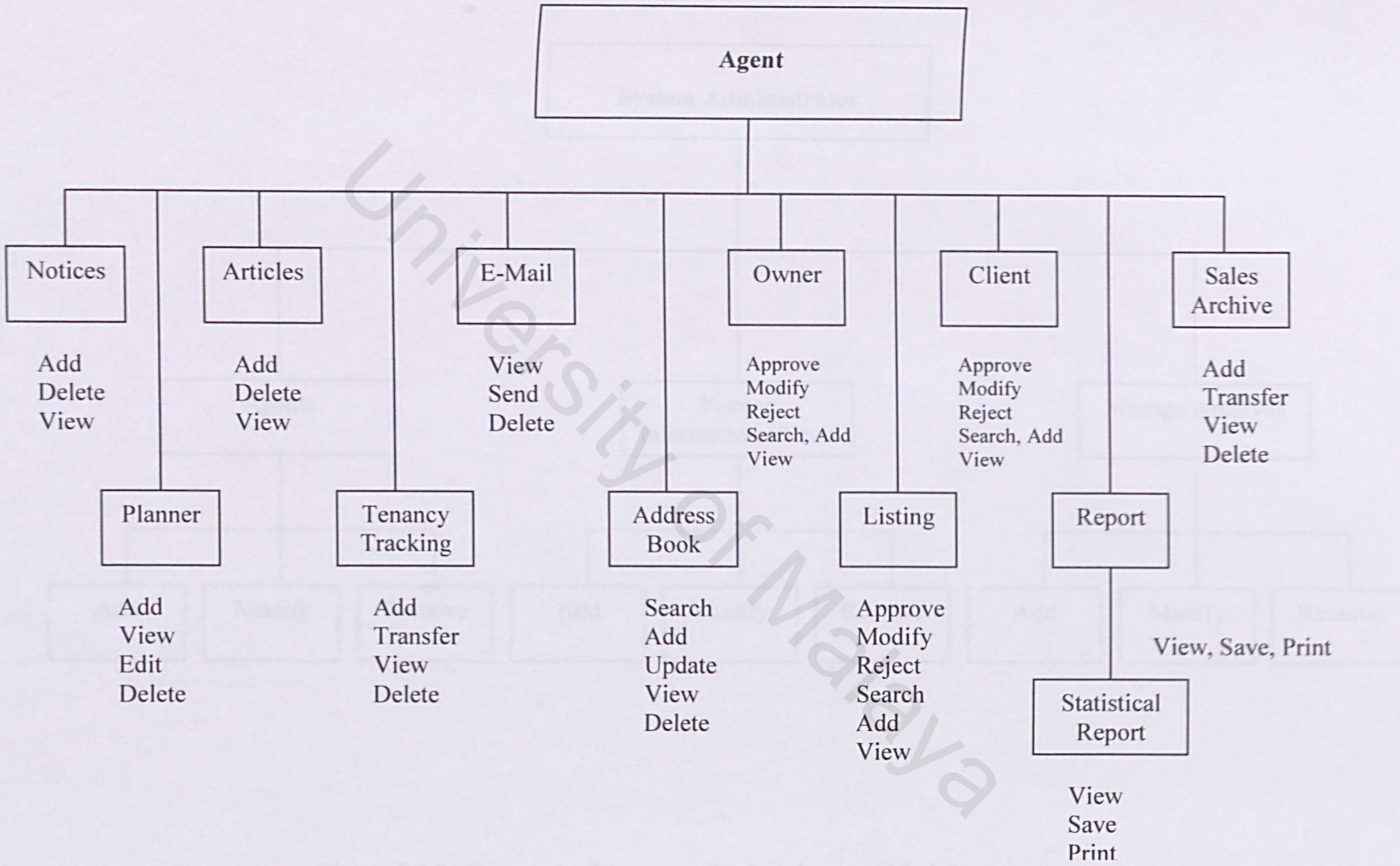


Figure 5.1.2 : System Architecture of Agent Module

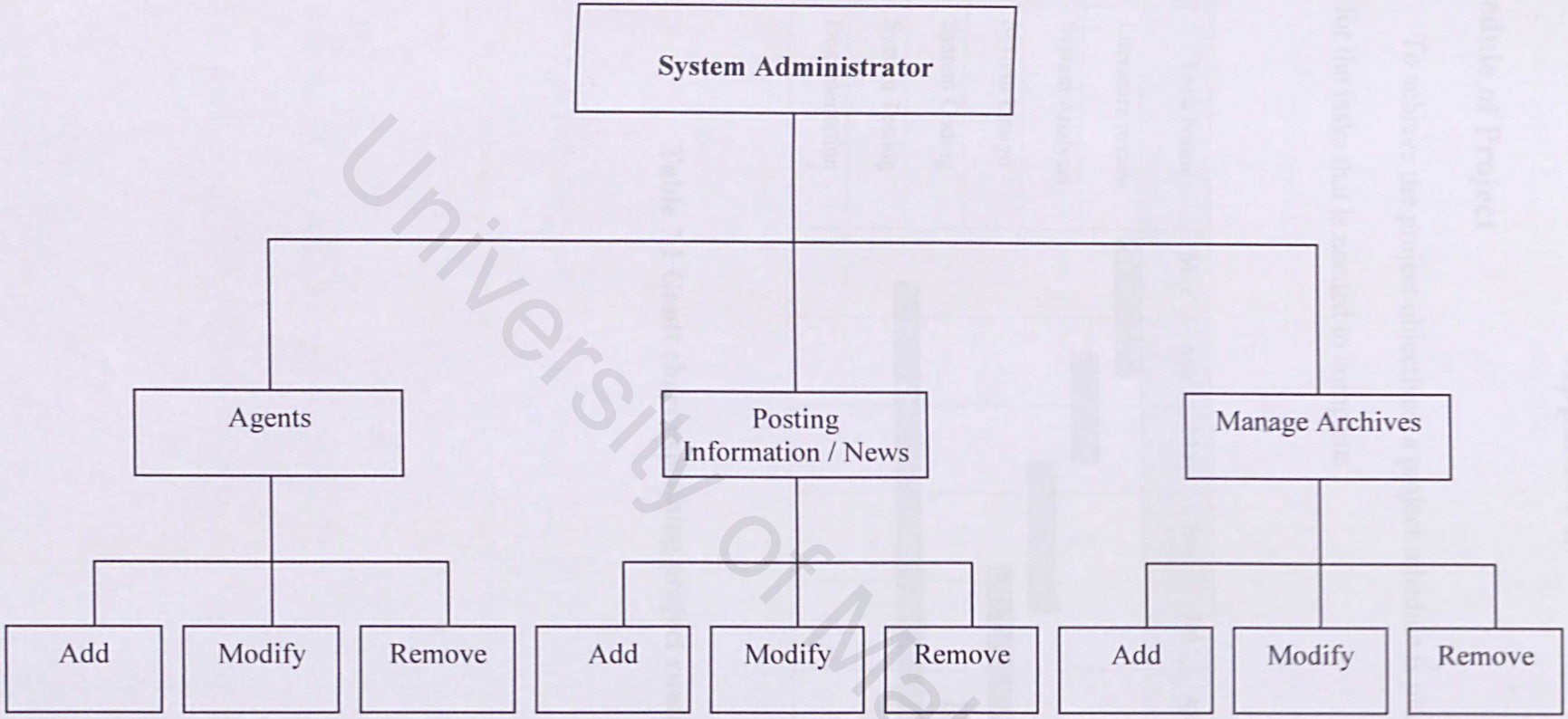


Figure 5.1.3 : System Architecture of Administrator Module

Appendix D

Schedule of Project

To achieve the project objectives, a project schedule is planned to manage the time for the tasks that is needed to complete.

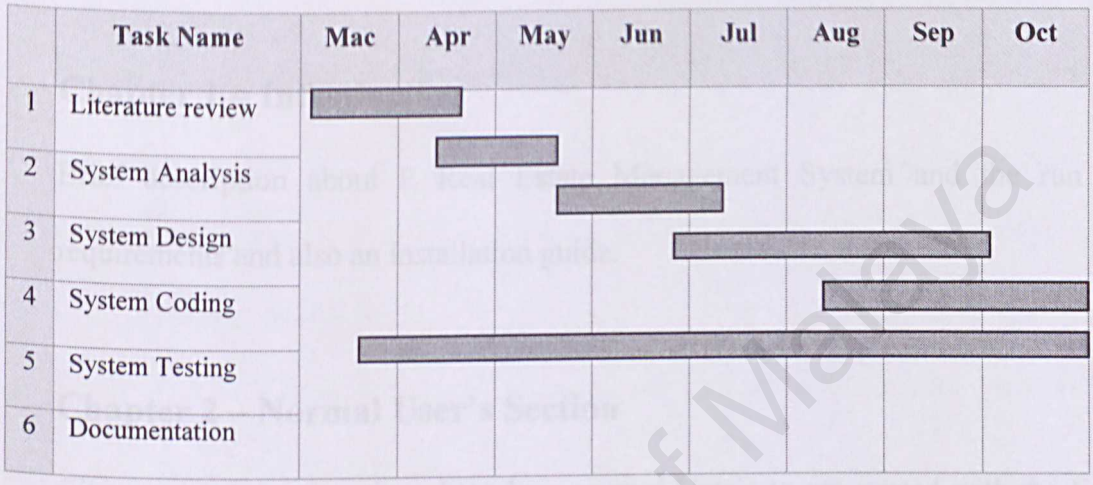


Table 7.1 Gantt chart explaining project runtime

Apendix E : User Manual

User Manual Overview

Chapter 1 – Introduction

Brief description about E Real Estate Management System and the run time requirements and also an installation guide.

Chapter 2 – Normal User's Section

Gives a simple explanation about how normal User's to get started with the E Real Estate Management System.

Chapter 3 – Agent Section

Explains modules in the agent section of the E Real Estate Management System.

Chapter 4 – Administrator Section

Explains modules in the administrator section of the E Real Estate Management System.

Chapter 1: Introduction

E Real Estate Management System is a web based online system that allows users to view information about property, buy property and sell property all using agents, and administrators can keep record of the sales. An administrator can add, delete, update and view property items.

1.1 Run Time Requirements

Hardware requirements to run the E Real Estate Management System are as follows:

1. A computer with at least Pentium 166MHz MMX processor.
2. At least 64MB RAM.
3. Network Interface Card (NIC) and network connection with recommended bandwidth at 10Mbps.
4. Standard computer peripherals.

Software requirements to run the E Real Estate Management System are as follows:-

1. Windows 95 and above.
2. Internet Explorer 5.5 and above

1.2 Installation Guide

These are step-by-step installation guides.

First insert the CD into the CD-Rom. Then open CD-Rom drive in your pc and right-click on <sansite2> and click <copy>.

Then paste sansite2 to your c:\inetpub\wwwroot.

Make sure all the files in sansite2 are writeable. To do that, right click sansite2 and click properties. Then uncheck attributes read only. Also make sure the databases are writeable to. Paste the database sansite from the CD-Rom into the folder C:\mysql\data.

Chapter 2: Normal User's Section

How To Use E-Real Estate System

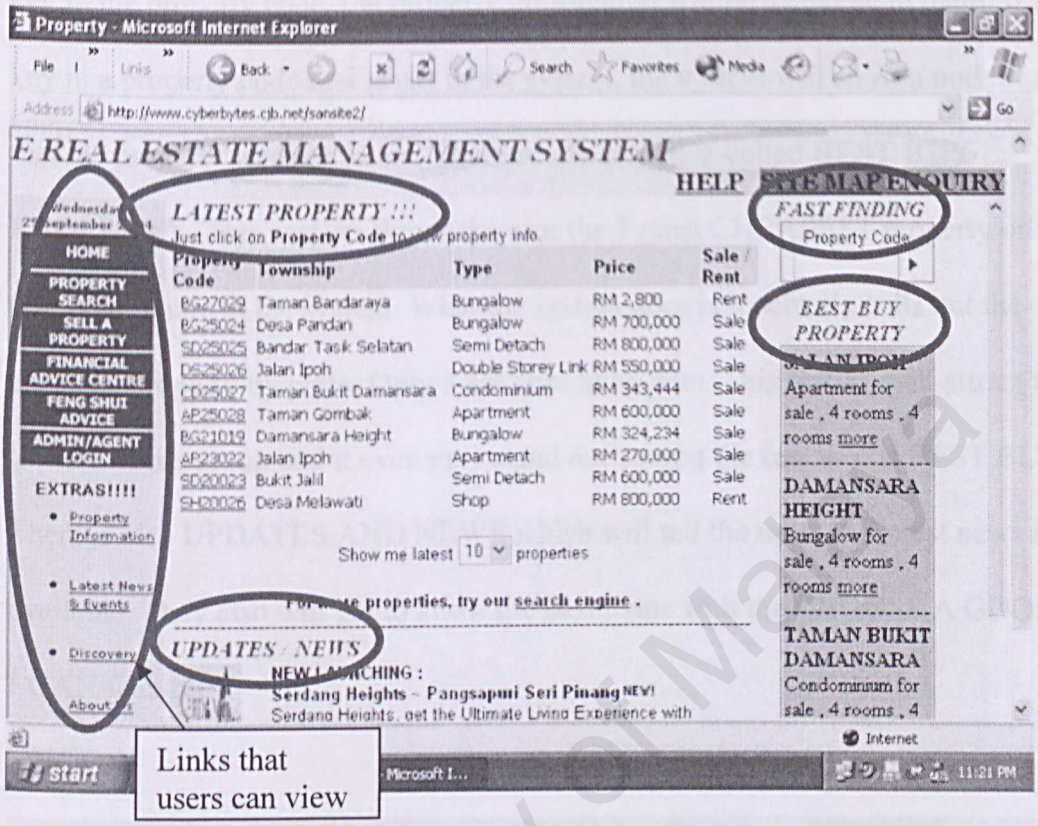


Figure 2.1: Main Page for E Real Estate Management System

The figure above shows the main page of the E Real Estate Management System. You need to type in: http://localhost/sansite2 to view the page. From here, you can view the main page of the system. User do not have to login and are free to view the property that is available to them in the system. They can see the **LATEST PROPERTY** posted on the system. What the system does is it actually calls out the **10 / 15** (determined by user by selecting choice button below) latest property (by date), that is posted to the system. The user simply has to click on the property code to view the property information. They can then also arrange for inspection. This part will be explained later. On this main page, they will also get to search properties using the **FAST FINDING** search. This search is useful to users who are coming

back to the system after viewing it beforehand. They will not have the hassle of finding the property as they would have remembered the property code. Once they key in the property code, the property information will be available to them. If they key in a property code that is not in the system, the system will show a notice saying that the property was not found. There is also a section called **BEST BUY PROPERTY.** This section shows the user the 3 most CHEAPEST property on sale that is available in the system. What the system does is it actually calls out the cheapest property by price. Only 3 are chosen by date. This feature will attract the lower income group and it even may stand out among the rest as it is BEST BUY. There is also UPDATES AND NEWS which will tell the users the latest news that is available. They also will get to know the best loans with the CHOOSE A GOOD LOAN feature.

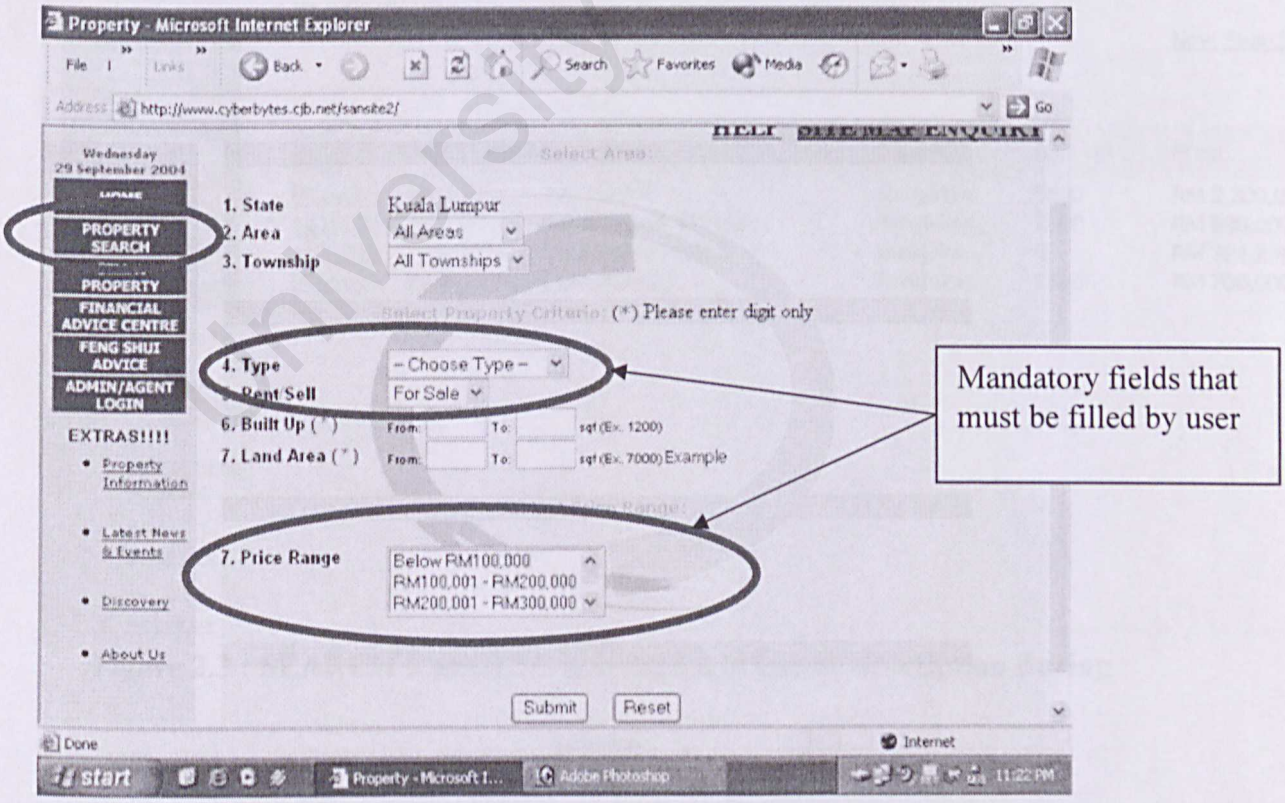


Figure 2.2 : PROPERTY SEARCH page for user

This figure above show the **PROPERTY SEARCH** module of the system. It allows users to search property according to their preference. The system will check the database and produce the results page (refer to figure 2.3 below). There the user can view the property information by clicking the property code like usual (refer to figure 2.4 below). This search only needs the user to insert type of property (apartment / bungalow / condominium / etc), and the price range. The others are not mandatory fields. This is to allow more flexibility to the user to find and browse trough more property without limiting them to being too specific.

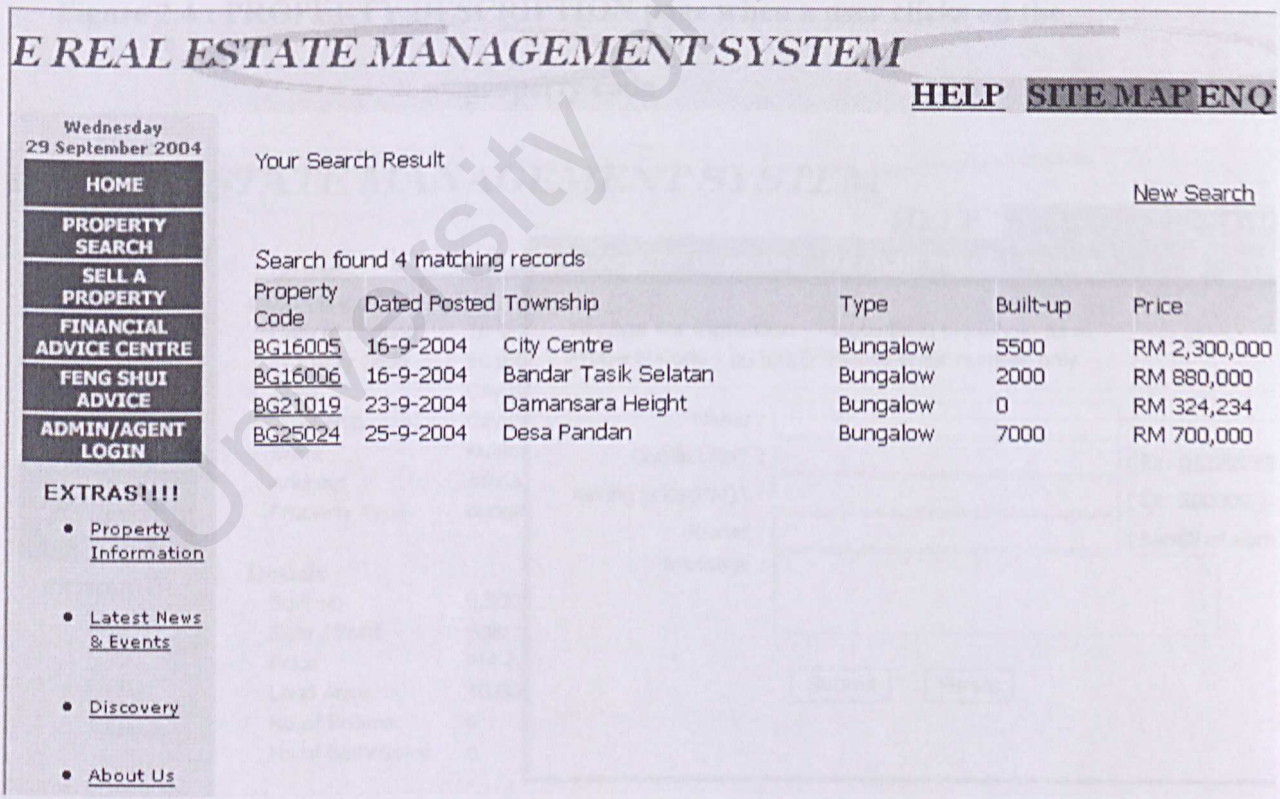


Figure 2.3 : SEARCH RESULTS that match property description during search

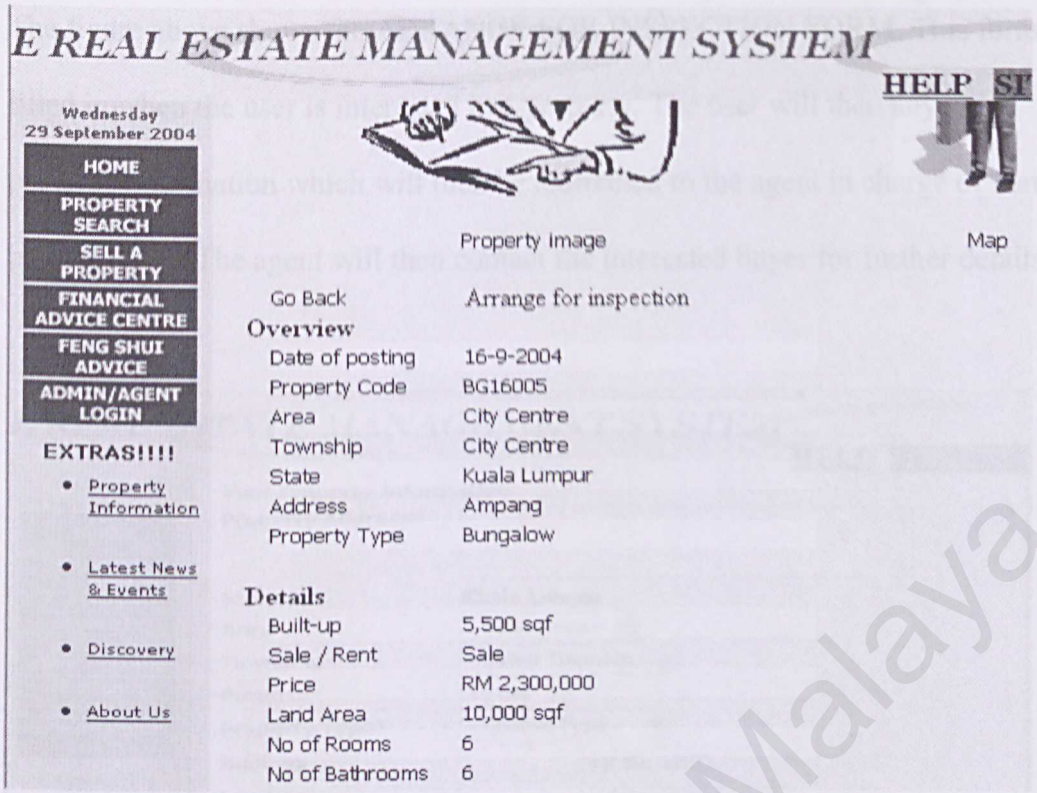


Figure 2.4 : PROPERTY DESCRIPTION page when a user clicks on the property code

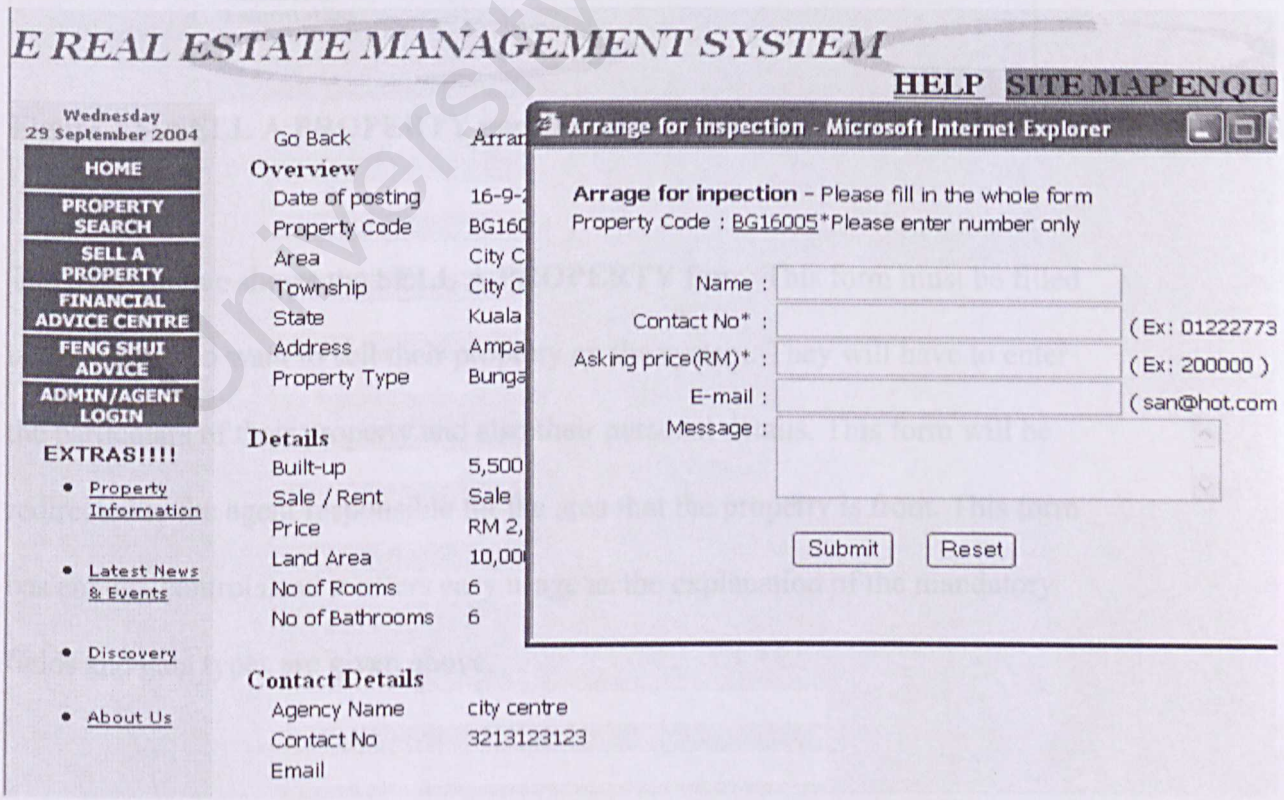


Figure 2.5 : ARRANGE FOR INSPECTION FORM

The figure above shows the ARRANGE FOR INSPECTION FORM. This form is filled in when the user is interested in a property. The user will then key in his personal information which will then be redirected to the agent in charge of that property area. The agent will then contact the interested buyer for further details.

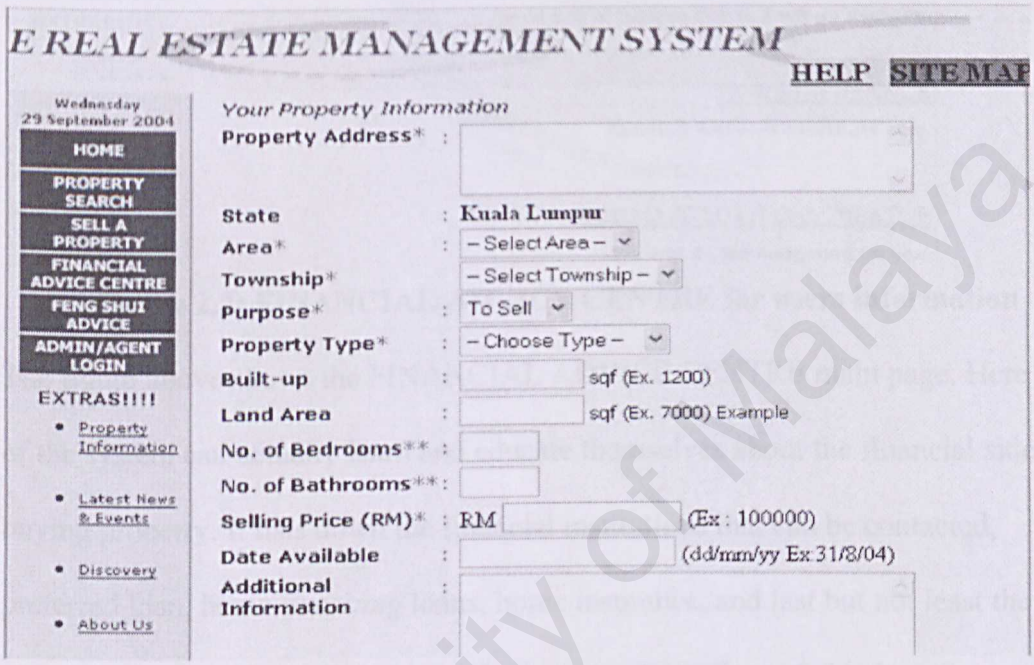


Figure 2.6: SELL A PROPERTY page for users who want to sell their property

The figure above shows the **SELL A PROPERTY** form. This form must be filled up by users who want to sell their property on the system. They will have to enter the particulars of their property and also their personal details. This form will be redirected to the agent responsible for the area that the property is from. This form has enough controls and it offers easy usage as the explanation of the mandatory fields and data types are given above.

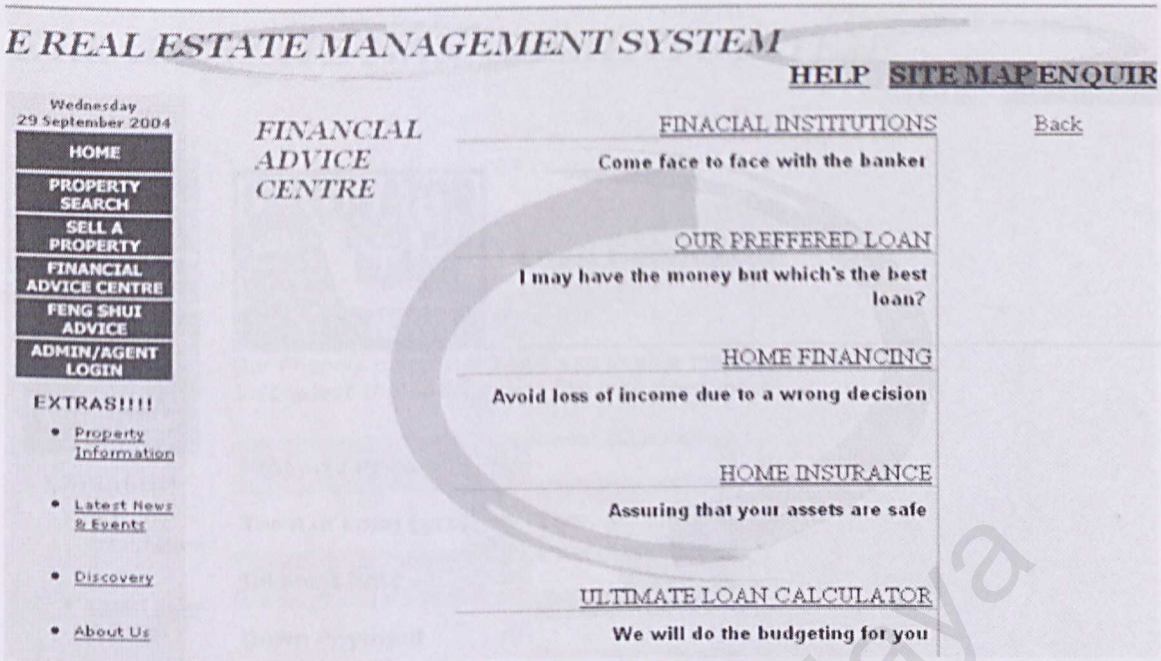


Figure 2.7: FINANCIAL ADVICE CENTRE for users information

The figure above shows the FINANCIAL ADVICE CENTRE main page. Here users of the system can actually learn and educate themselves about the financial side of buying property. It lists down the financial institutions that can be contacted, preferred loan, home financing loans, home insurance, and last but not least the ultimate loan calculator. This loan calculator (refer to figure 2.8 below) can count the amount you have to pay in a month after the user enters their details such as house price, interest rate, term of loan and down payment. Other then that, E Real Estate also keeps you informed about your FENG SHUI (refer to figure 2.9 below). There is also a page for property information (refer to figure 2.10 below). This information is very useful when a user wants to buy a house. It is the A-Z information about property.

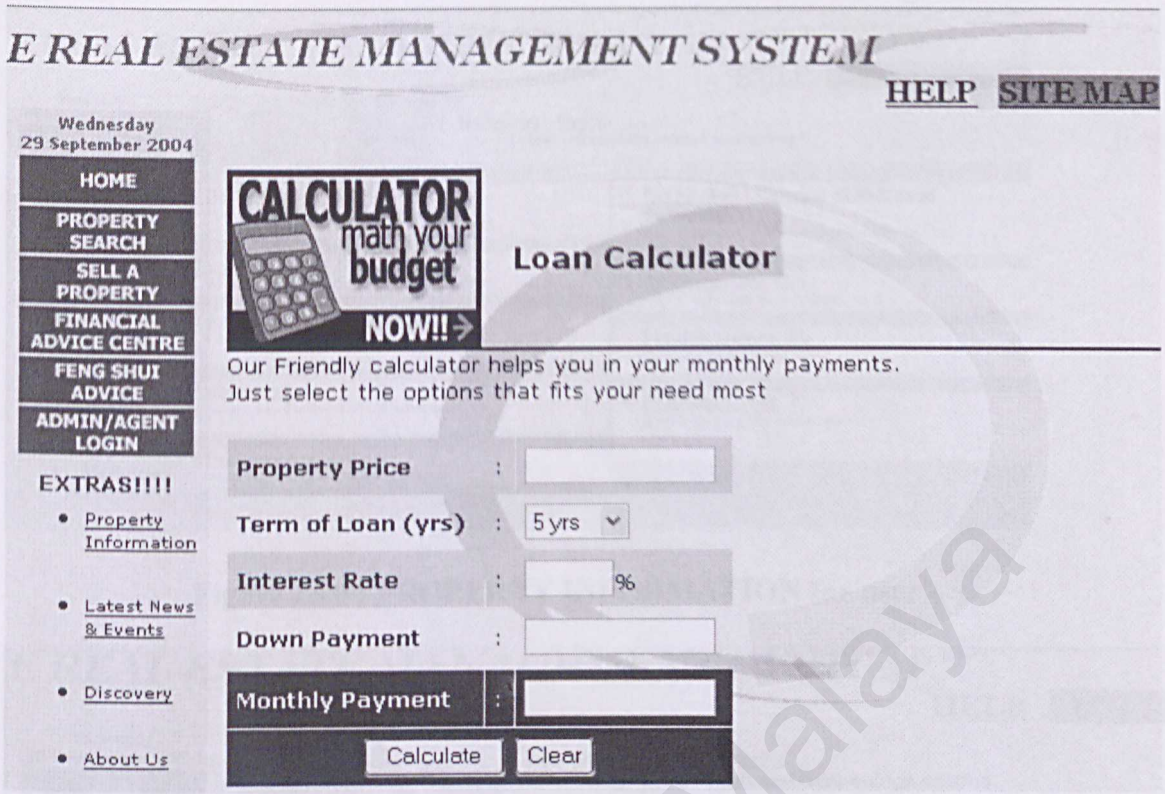


Figure 2.8 : ULTIMATE LOAN CALCULATOR

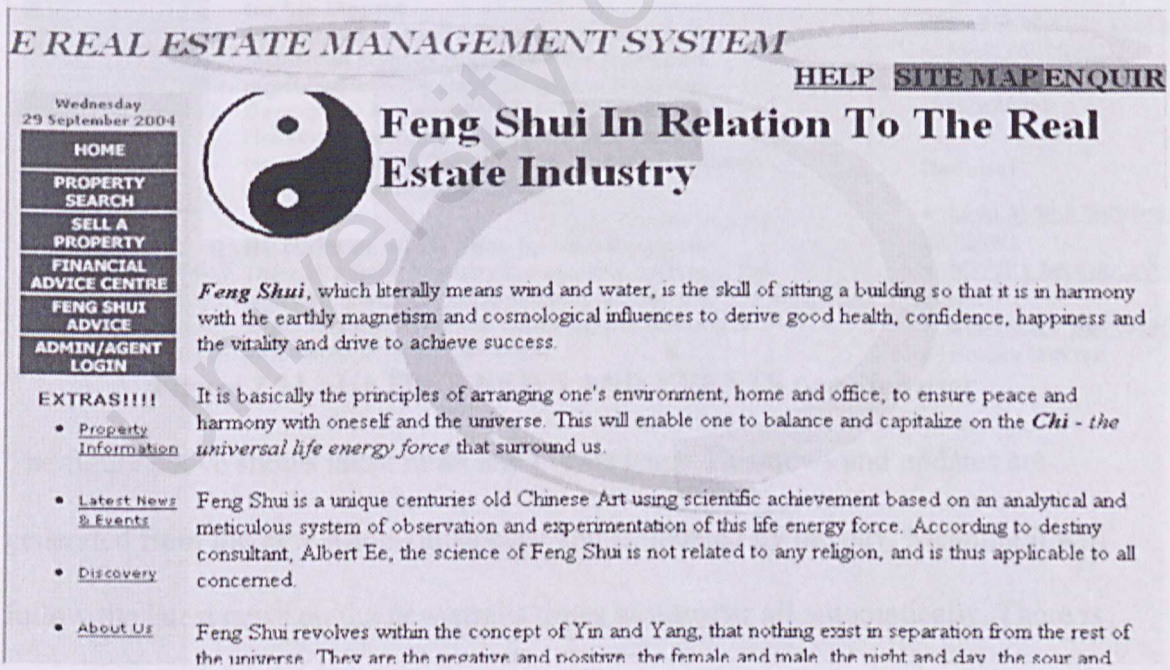


Figure 2.9: FENG SHUI ADVICE for users who believe in feng shui

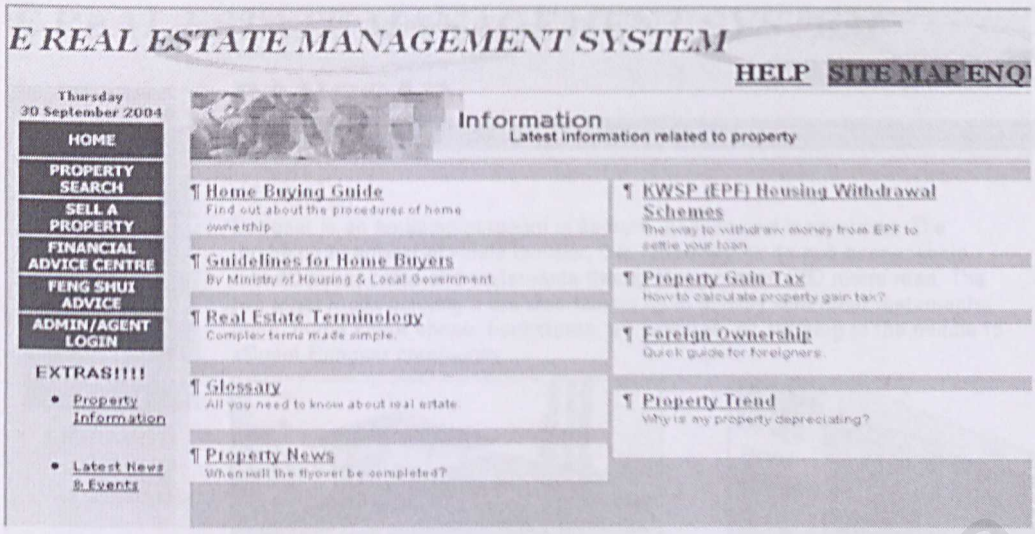


Figure 2.10 : PROPERTY INFORMATION for user

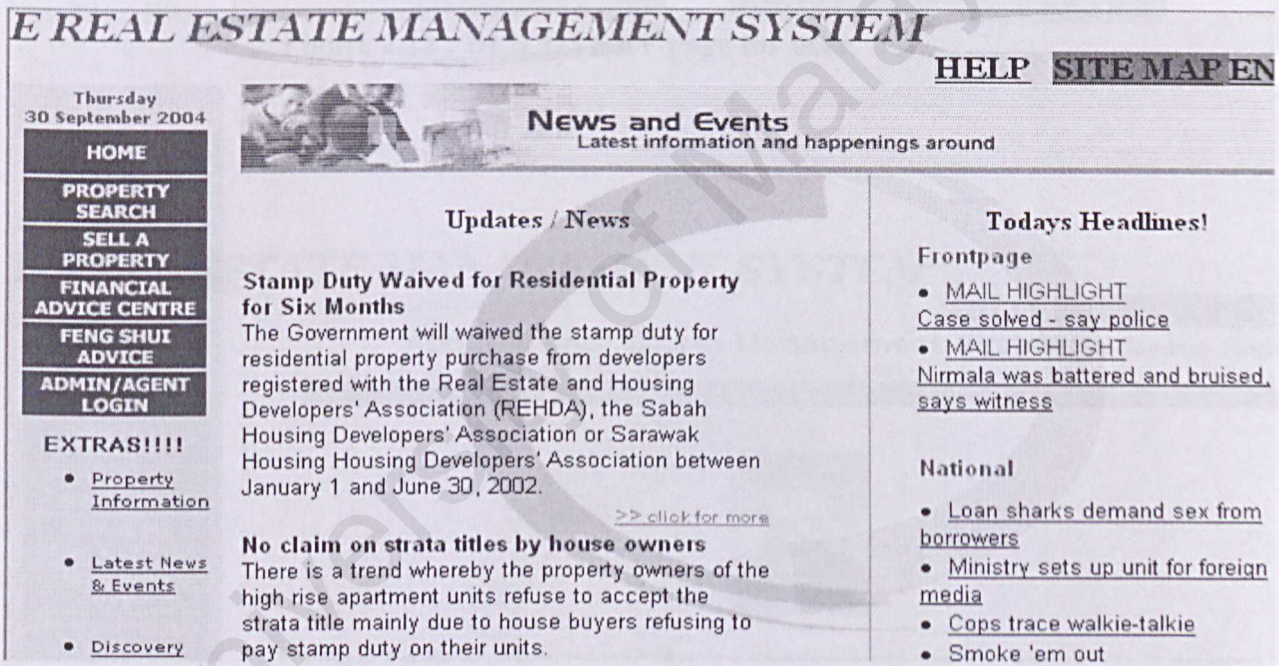


Figure 2.11 : LATEST NEWS AND EVENTS page for user

The figure above shows latest news and events page. This news and updates are generated from the new straits times page and is updated by the day. Meaning it will follow the latest news on the new straits times newspaper all automatically. There is also a discovery page where users will get to know more about a certain area and they can view its maps, and photos of the area (refer to figure 2.12 below). Lastly there is a page that explains what E Real Estate is actually about (refer to figure 2.13 below).

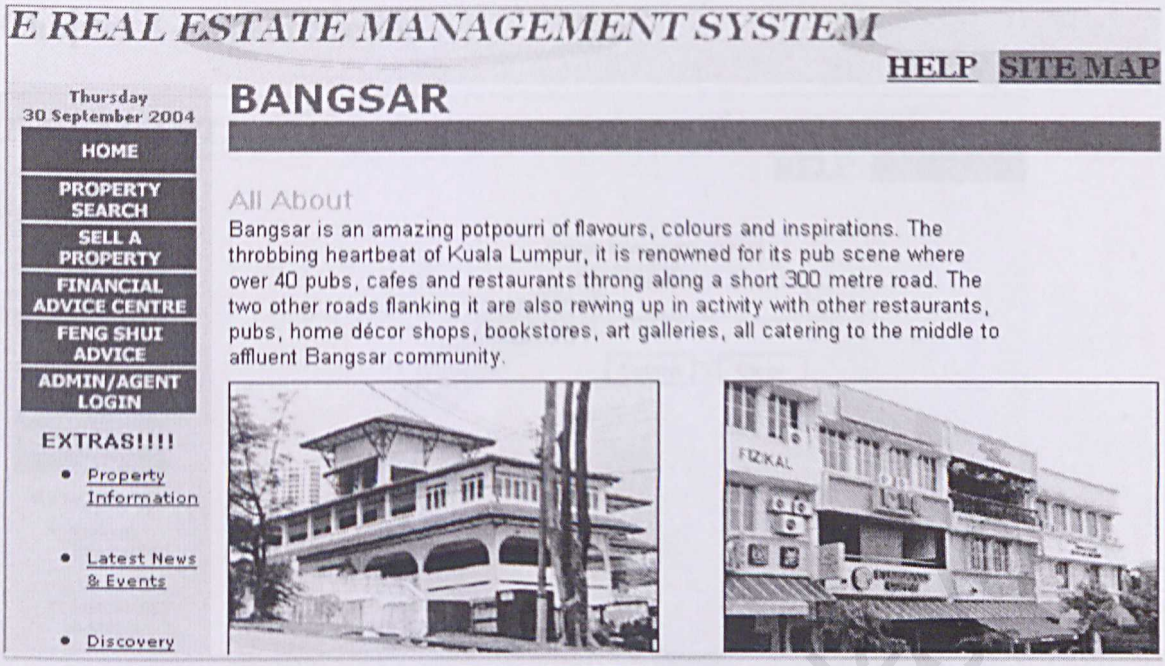


Figure 2.12 : DISCOVERY page for user

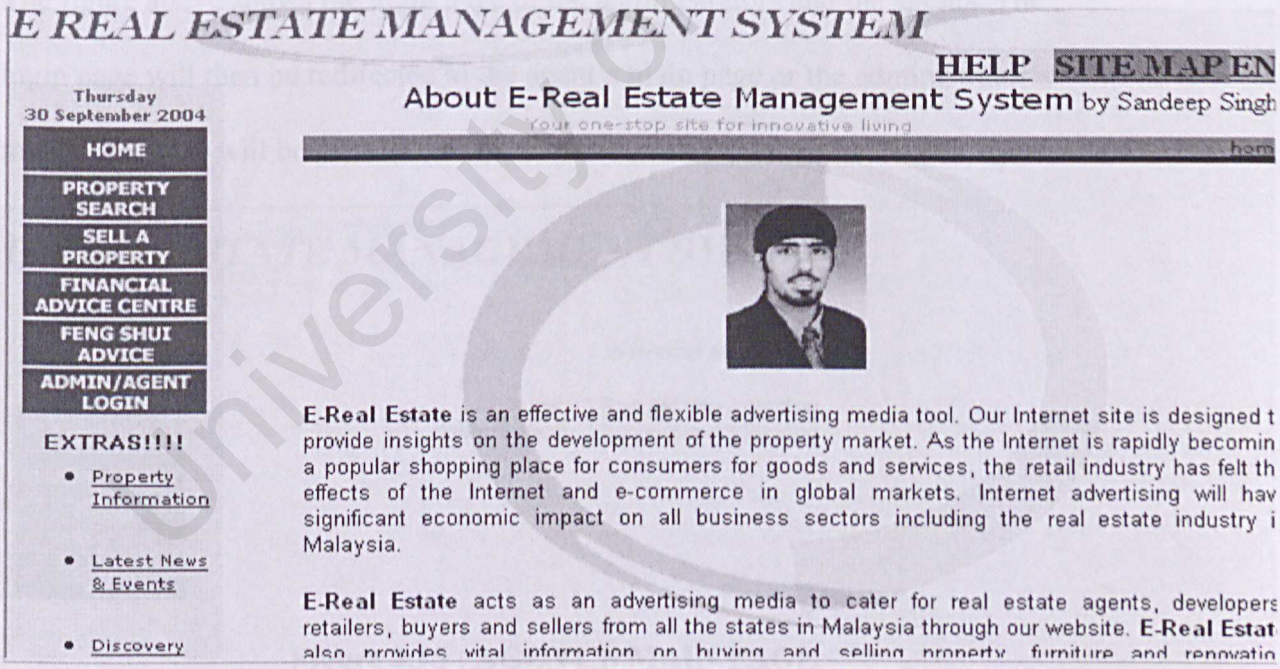


Figure 2.13 : ABOUT E-REAL ESTATE MANAGEMENT SYSTEM

Chapter 3 – Agent Section

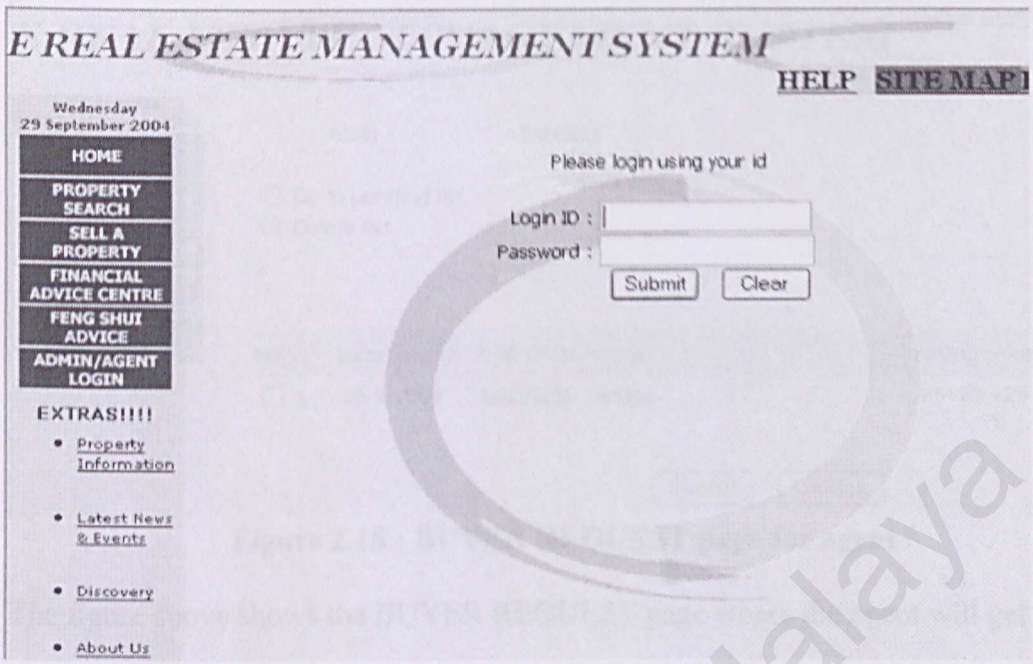


Figure 2.14: LOGIN PAGE for ADMIN and AGENTS

The figure above shows the login page of the administrators and the agents. The login page will then be redirected to the agent's main page or the administrator's main page. This will be differentiated.

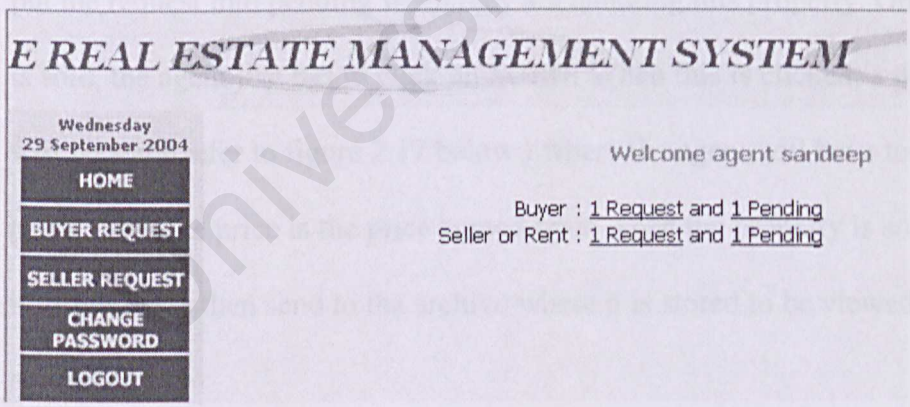


Figure 2.15 : AGENT'S MAIN PAGE

The figure above shows the main page when the agent logs in. The agent will then see a summary of their job to be done. The new requests are put first followed by pending requests. Pending requests are requests that have already been looked into and being processed. The agent can change this status following their needs.

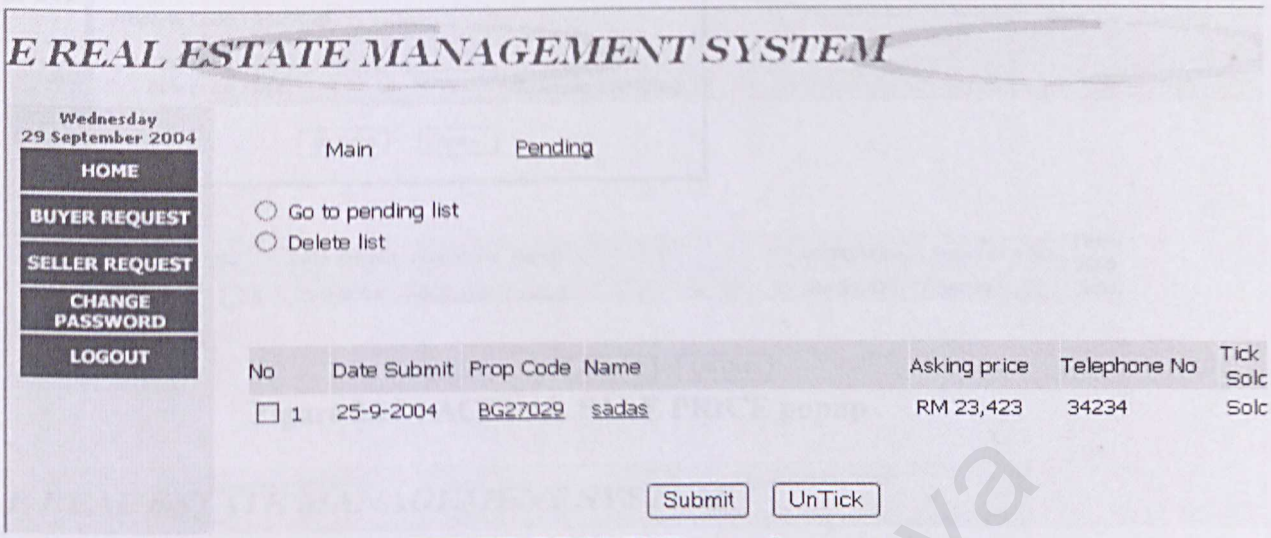


Figure 2.16 : BUYER REQUEST page for agent

The figure above shows the BUYER REQUEST page where the agent will get to view all the buyers interested in buying/renting property under the agents in charge area. This buyers/renters are the people who have arranged for inspection. Their personal information and property information will be sent here to this page. The agent can view all the details of both the buyer/renters and the property. Agents can put the request into pending when they are handling this property. Once the property is sold, the agent just has to click on SOLD. When this is clicked, a popup window will appear (refer to figure 2.17 below) where the agent will have to enter the sale price. This sale price is the price agreed upon when the property is sold/rented. This information is then send to the archive where it is stored to be viewed by administrator.

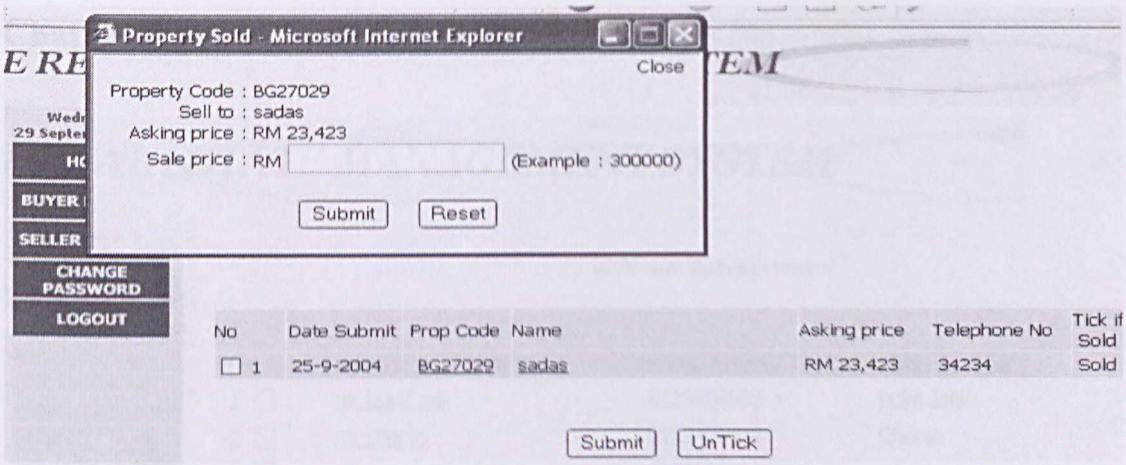


Figure 2.17 : ACTUAL SALE PRICE popup

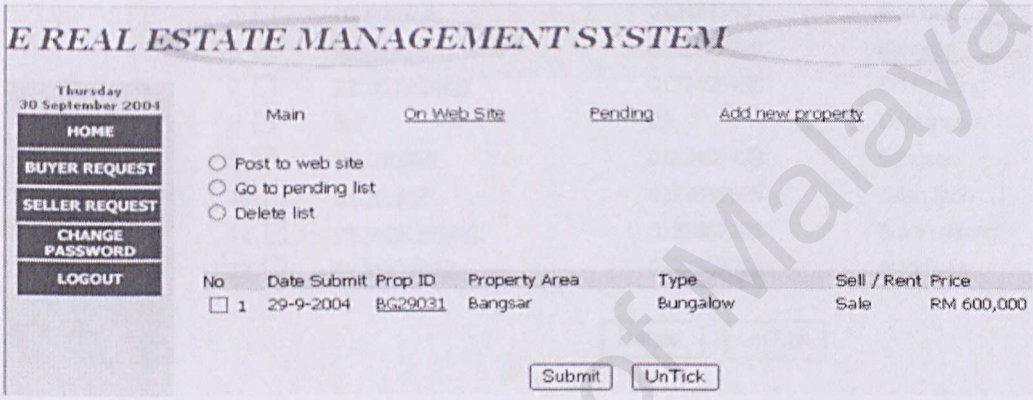


Figure 2.18 : SELLER REQUEST page for agent

The figure above shows the SELLER REQUEST page where the agents will get to view all the properties that want to be sold/rented out by users. This information is from the SELL A PROPERTY form that the user filled in to sell/rent out their property. The agent will be in charge of a certain area. All property that users want to sell will be redirected to the in charge agent. The agent can then view the property, put it to pending list and then meet up with that person to authenticate them. Once agreed and authenticated, the agent will come back to system and open their pending list. There the agent will have the choice to edit the information and add a property photo and map. The agent then posts this property on to the web where it can be viewed by users of the system. If the property is not accepted by the agent, then the agent will have the ability to delete the property.

Chapter 4 – Administrator Section

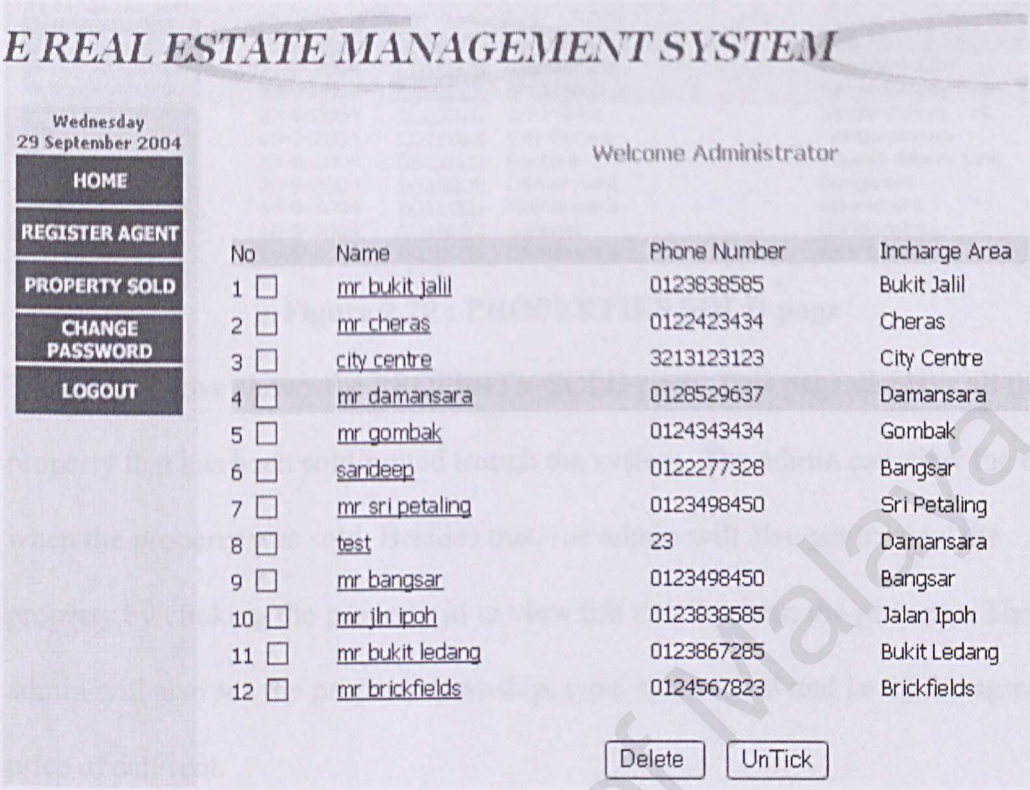


Figure 2.19 : MAIN PAGE for ADMIN

The figure above shows the MAIN page of the system administrator. The administrator will get to view all the agents on the system in this page. The administrator also has the ability to delete any agent who have resigned or stopped or are no longer working for E Real Estate. The administrator will get to view the agent's details in more detail by clicking on their name. An administrator also can also edit the agent's details or information. On the main page, the administrator will get to view the agents names, phone number and in charge area. An administrator also can add agents by clicking the register agent button on the main menu on the admin main page. The admin will then enter the agent details and the agent would be created.

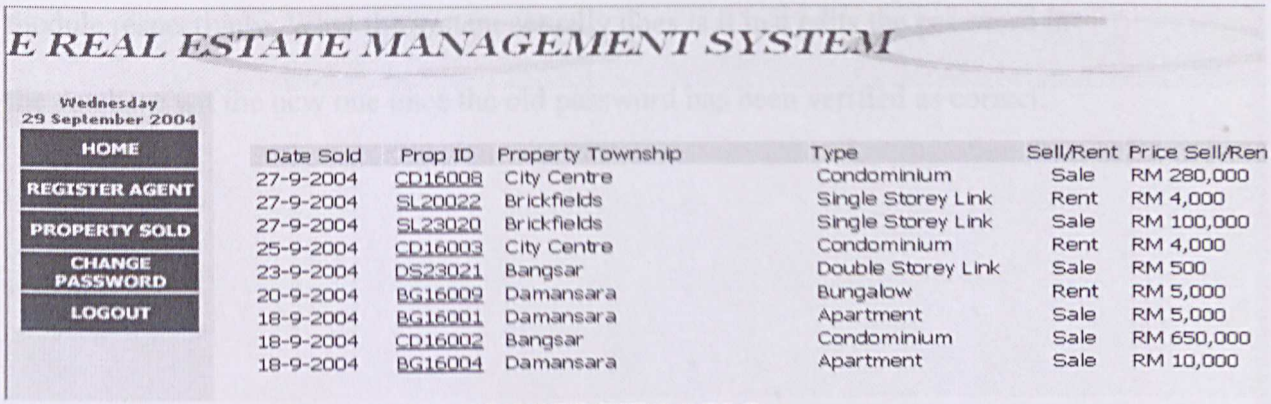


Figure 2.20 : PROPERTIES SOLD page

The figure above shows the PROPERTY SOLD page. This page displays all the property that has been sold/rented trough the system. The admin can view the date when the property was sold. Besides that, the admin will also get to view the property by clicking the property id to view full details about the property. The admin will also see the property township, type, sale or rent and lastly the agreed price of sell/rent.

Figure 2.21 : CHANGE PASSWORD page

The figure above shows the CHANGE password page. This page is available in both the admin and agents modules. For instance, the admin can change his/her password and so can the agents. They will just have to enter the old password and choose a new password. This new password will then be used to access the admin or agents

module respectively. What the system actually does is it just edits the password in the database wit the new one once the old password has been verified as correct.

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