AJAX Based Online Shopping Application

by

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CERTIFICATION OF APPROVAL

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A Project Dissertation Submitted to the
Information Technology Programme
Universiti Teknologi PETRONAS
in partial fulfilment of the requirement for the
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Approved by,

_____
(Mr. Mohammad Noor Ibrahim)

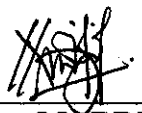
UNIVERSITI TEKNOLOGI PETRONAS

TRONOH, PERAK

January 2008

CERTIFICATION OF ORIGINALITY

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgements, and that the original work contained herein have not been undertaken or done by unspecified sources or persons.



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ABSTRACT

This document briefly explains the building of an e-commerce web application that implemented AJAX as defined for the latest available Web 2.0 technologies. It is a major intent of the project to introduce selected company and consumers an e-commerce web application that features increases in its interactivity, speed, functionality and usability. The web application is meant for the chosen SME Company to promote and make sales of their products through the internet more efficiently and effectively. Previously, customers for the company were people local to the company location. Deals were often handled face to face. Fortunately, this can be very much more improved by implementations taken by the project. Instead of only relying on sales made at their sales office, the products will be put onto display as for purchase on the new web application. Another important task of this project is also to improve the communications between seller and buyer. The seller or company contact details are provided at the web application. The project also worked on improving the methods of holding related business deals and transactions to be more efficiently done and secure. This is as well to expand their business into a much larger market hence increasing the opportunities of producing more profits and company size. This project is also motivated to change the users experience in browsing web applications. In the past few years and as it still is now, much of the internet applications rely on the server-client model. Other than the quality of existing web applications designs, the physical attributes of the networking local to each user distinguish one experience from another. The implementations made in this project overcome problems that may arise from that aspect. For example, people that had previously been unnecessarily put to wait just for their page reloads to appear can now have faster response from the web application. One of the major causes to this is the ability of AJAX to make asynchronous calls to the web application server.

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INTRODUCTION

1.1 PROJECT OVERVIEW

In online shopping, users as consumers can do the shopping right from their home or just by sitting in front of their PCs with internet connection to be exact. It has become a common phenomenon for users or customers to shop through internet without going out. At present, the interest of users helps the designers to understand and improve in developing a website that increases the usability, speed, functionality and interactivity to compete with the others. Nowadays, not only small business that offers a website that specially designed for a user to help consumers more efficiently shop for products but bigger organization like shopping mall also have offered the same facility. This is due to have a better competition between each of company that can attract more consumers to buy their product. Basically, online shopping does not only give the facility to the consumers but also give the benefits to the organization to expand their business.

The project is concentrating on developing an interactive online shopping web application with own shopping cart whereby to allow people to shop while visiting the web site. The main product for this online shopping application is homemade jewellery made from crystal. The user may browse their needs; select the jewellery and adding it to their own shopping cart. On the other hand, the user as well is allowed to customize the colors of the crystal for the design chosen. The user is needed to register to have their own account if they want to shop and have their own shopping cart. This website also provides the accessibility to user to cancel their order before any payment or submission. The web application will be developed using Web 2.0 technology which is Ajax and OpenLaszlo.

1.2 PROBLEM STATEMENT

Online shopping applications nowadays are too typical and can be found anywhere but depending on the quality of the website itself. Unfortunately, most of the current web shopping applications have problems that give bad impression to the customers. There are many problems may arise and challenges that the author need to face in order to develop the web application successfully. The problems that will be discussed are actually the current problems of e-commerce website. Hereby are some problems in developing the web application to be reviewed.

1.2.1 Site Performance Delays

In e-commerce site, performance is one of a very important factor to be considered in developing the website or otherwise it could cost loss to the company or irritation to the customers. Basically, there are two types of ecommerce site which are good ecommerce site and bad ecommerce site. Many of the current ecommerce site can de detected either it have been cheaply built or poorly run that may deter the customers from purchasing the product or from coming back to the site again. Slow performance also might cause frustration among the online shoppers.

As we are concerned, nowadays, nearly three-quarters of consumers now use the Internet to shop or to influence what they are buying. Amazingly, some of the consumers are willing to spend up until four figure sums to shop through internet. Unfortunately, more than 50 per cent of online shoppers complained that dissatisfaction with website performance has led them to turn off their computer while some of the online shoppers refuse to give even their favorite ecommerce website more than a second chance, before trying out the competition or ended turning back to the high street. Therefore, it can be seen that performance of the website can affect either the company or the consumers. This is the main current problem occurred in the e-commerce site.

1.2.2 Page Refreshing

Current ecommerce site contains this problem which is page refreshing. It can be happened especially when dealing with a form. For instance, a customer is required to fill in a form inside the web page. The form contains all the necessary information for the consumer including their account number if they wished to do a payment. If the user would like to select the country, these are pulled from the database through a drop down list. Next to that drop down, currently the consumer have the 'add a country' link that takes them to the page that adds the country to the drop down list if its not there. But the problem is the page refreshes their current page so it will load the new drop down which will make the user lose their information that they have entered before and they are required to fill in all the information again since the form is back to the earlier state.

1.3 POSSIBLE SOLUTIONS

Based from the discussion in the previous section about the current problems in ecommerce site, there are some possible solutions and suggestions that can be put into consideration in developing the application which is by using AJAX. Though AJAX is still new in the web development, but this new technique tool can be used to support the web application to improve the problems stated before.

AJAX has the main benefit compared to the other technique or style which is faster page load times. For example, when comes to develop an AJAX web application, the programmer can either choose either to have multiple pages or single page. Obviously, multi page is much easier to be developed than single page due to some reasons. However, if the programmer is interested in creating the best possible user experience, there are a number of advantages of a single-page design and one of them is faster rendering. This could be done with the help of AJAX as the single page approach can get pages in front of user faster and at the same time, it allows the programmer to add neat effects like using Script.aculo.us effects to fade page section in and out. This technique somehow show that users perceive the wait time as the time when nothing is

happening on the screen, some simple animation can make the web application feel faster even when it's not.

Moreover, developers now can limit the initial amount of data transferred to the client, prefetch data and images by applying AJAX to create a more responsive user experience. The data are loaded silently during the session that is unique to user's interaction. For that reason, AJAX based application are component centric which allow browser based clients to perform like fat client counterparts which is much different from page centric attributes. This presents an interactive experience that doesn't require a constant fresh. In return, smaller total of page refreshes is produced. However, it requires a greater amount of application logic on the client to manage additional connections to the server since the component centric concept is used.

This technology is still a drawback in some ways like in handling the page Refresh and Back button. In AJAX, users will have a static page that is partially updated by the AJAX request instead of the standard postback. When a web page is dismissed, the browser cached it to allow the Back and Refresh button to work. However, the browser cannot track back the partial updates on any applied AJAX framework.

There are several examples which show that AJAX can be used to solve the page refreshing problem. For instance, in a one ecommerce site, the users can have their own account in order to identify them. This example will show the process for a user who already owns an account. When the user decided to purchase the product, the first stage would be that the user chose the product and add the product into their shopping cart. The system would take a second to check the shipping costs to their ZIP code and then finally proceed to the one-page checkout. Once the user signed in the billing and filled the shipping addresses and the shipping options will be loaded to the user. At this point, AJAX will ensure that the shipping options loaded without refreshing the page. So, the customer can enter their credit card information, reviews back the information that has been filled before and finally proceed to the order submission.

Previous example shows about the old customer with a registered account and steps in purchasing the product. This example now will show the process for a first-time customer that wish to register to the ecommerce site. The process is almost the same because the user is still needed to fill in the form and the only difference is that the user will enter the addresses manually. While the customer entered their name in the billing address, the name for the credit card is automatically filled at the same time. Once the shipping address is filled the shipping options are loaded, once again using AJAX to keep the page from refreshing.

The current technical term that seemingly connected to web developers is AJAX. This term had been in a dispute from many perspectives, but it still got caught up as a mere term since it is yet to be wholely introduced to user groups. A very new feature that is available through this new subject is the "in-page replacement". It is a feature that enables a web page to transform with help of data from the web server without exactly reform the web page. This feature had been made available in Mozilla Firefox and Internet Explorer for some time and recently Safari and Konqueror have applied this feature to serve their users. It is this ability to have web pages that change dynamically that is changing the way users interact with the web. Below is table 1 that shows the difference between Old Style and AJAX Style in different area. For example:

	Old Style	**AJAX Style**
Scrolling in a mapping website	Click on right arrow to refresh whole page	Drag map area to the right - and watch the map scroll. (see Mapping in resources)
Lookup a word in a dictionary	Enter the word, and click submit to see a definition for that word	Begin typing the word, see possible matches as you type and the definitions as soon as you finish typing. (see Dictionary in resources)
Interact in on-line forum	Type message, click submit, regularly click "check new messages".	Type messages, and wait as new replies appear automatically without needing your interaction. (we will create a site like this)

Fill out form with a number of fields	Visit a number of pages of a "wizard", getting error messages about invalid fields.	Fill out a form which reports on errors as you type, and which can dynamically add data (like filling in full address details from a zip code) without needing a slow page refresh.

Source: http://getahead.org/dwr/overview/ajax

Table 1: The difference between Old Style and AJAX Style

1.4 THE MOTIVATION

The motivation behind this project is to fulfill my current interest in helping the small business to advertise their product through World Wide Web and to be familiar with the new web development tool which is called Ajax. This project is hopefully will ease the consumer who loves to shop online. With web-based shopping, it will in addition allow the company to focus on their marketing strategy on how to serve their customer better especially for those who have interest in buying their product. This is the motive lies behind the project.

1.5 OBJECTIVE OF STUDY

The objectives of the project are as follow:

- To develop the ecommerce application for the company and consumers that will increase the interactivity, speed, functionality and usability of the web application by applying AJAX.
- Develop the system accordingly to the business needs of the company by analyzing the current business process and gathering necessary data and information to be applied in the web application.
- Customize the interface of the new web application and create functions to enhance the existing relevant business procedures of the company.

1.6 THE BENEFITS AND BENEFICIARIES

The result of this web application gives benefits to the beneficiaries as stated below. They are the company and the consumers who will be the one using the web application most of the time.

1.6.1 The Company

Usage of the ecommerce web application will help the company to advertise their product in the World Wide Web and improve their current business. Besides, it helps the company to learn using the web application and fully maximize the opportunity given.

1.6.2 The Consumers

Consumers can purchase their needs and use the web application in a faster responding time, so they can shop at the ecommerce site in a pleasant way without feeling any dissatisfaction.

1.7 SCOPE OF WORK

1.7.1 Business Processes

In the project as proposed, the author will be focusing on the business process relevant to the subjected company. The author will need to identify and understand the how company business flow and intended area of business. The foundations of the e-commerce web will be coming from these details as many other webs do. They are also the main information that will need to appear in the web as the customers may request from them. All of this information is vital to the author project in developing e-commerce web for the company as a major component.

1.7.2 Requirement of the Web Application

Another component that will be focused on is the web application requirement. This component explains the details that the client wanted to integrate with the web application or how they will be applied to the web application. This component is very much like the common user requirement which the developer need to know and understand in order to be able to build the system correctly as requested by the client or user. This component lists down all features and functions as well as the design of the application as favoured by the client of this project.

1.7.3 Web Application Interface

The author has decided to choose the web interface where the main focus will be on. Web interface does help a lot and could be the main factor in any successful web application development. The client functionality depends very much on this component. With help from technologies available to web interfacing, all requirements made by the client for the web application development will be possible to be fulfilled. This component also plays the most important part in realizing one of the purposes of this project which is to create a more interactive experience.

1.8 TOOLS USED

Tools are considered as one of important factor in developing any applications depending on the needs. In this project, the tools that will be using to create this online shopping application are AJAX and MySQL. Below is the description for each of the tools that will be needed.

1.8.1 AJAX

AJAX is a web-development technique categorized under one of the web 2.0 technologies that are very useful to the web developer. It is one of the tools that can create powerful web applications with more sophisticated functionality using easier to implement web standards.

1.8.2 MySQL

MySQL is popular for web applications and acts as the database component. The trend in using it with web application is very much related to the fashion of PHP that has frequently been mixed with MySQL. PHP and MySQL is important module for executing popular content management systems.

CHAPTER 2

LITERATURE REVIEW

Online shopping is becoming more popular and integral to our daily life. It is not a new trend for users or customers to shop through internet without going out. Hence the interest of users helps the designers to understand and improve in developing a website that increases the usability, speed, functionality and interactivity to compete with the others. The importance factor in developing the online shopping application is to fulfill the user satisfaction.

According to Kyootai Lee and Kailash Joshi (April 2006) in their article called Development of an Integrated Model of Customer Satisfaction with Online Shopping, Consumer satisfaction is critically important for the success of a Web based online store. The concept of satisfaction in online shopping can benefit by examining satisfaction literature from different disciplines, for example user satisfaction from information systems, job satisfaction from organizational behavior, and consumer satisfaction from marketing.

There are several technologies that can be used in order to develop an interactive web page for users. For example is Web 2.0 Technologies which enable the developer to create a web application with better-than-browser user experiences. In the present paper, the importance and the usage of Web 2.0, e-commerce, and the human computer interaction aspect will be studied.

2.1 WEB 2.0 TECHNOLOGIES

The term "Web 2.0" was coined by O'Reilly Media at a conference in 2004 (Gibson, B 2007) and it has become the mechanism to refer to the next generation Web. Rather than

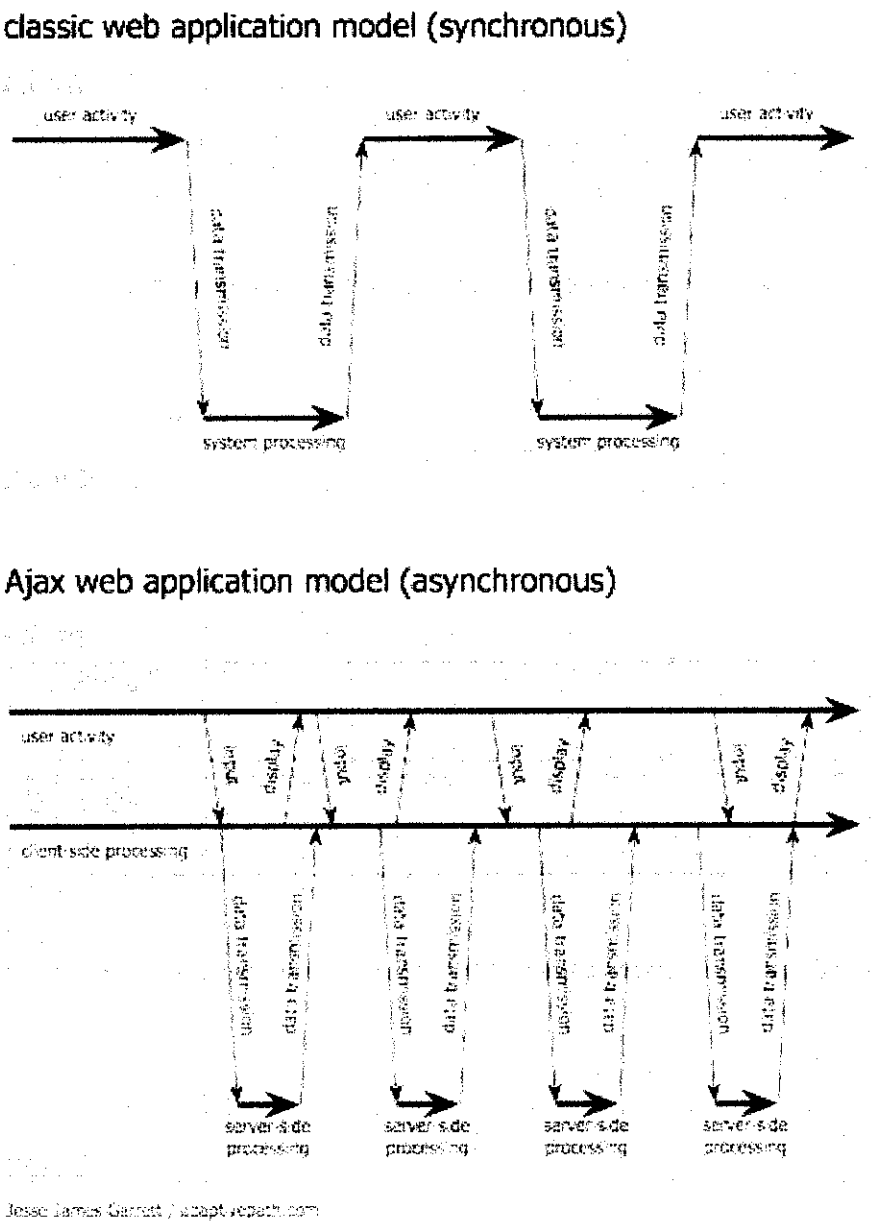
just a static repository for data, the Web has become a platform for applications and the enabler for on-line participation, collaboration, harnessing collective intelligence stated Gibson, B in his article called "*Enabling an Accessible Web 2.0*" and more. The key concepts are participation and dynamic interaction. Web 2.0 is a perceived revolution from the current server-client concept triggered by demands from businesses that desire higher productivity user experiences but then stuck at the persistence of some it groups who could not bother more than staying by the current WWW technologies or concepts inspired by Tim Berner Lee, therefore came the idea that allows the adaptation of these two environment.

In addition, the Web 2.0 purposes wanted the users' experiences on WWW to become more like client resident applications. This is to ensure that the applications can maximize the user productivity. The web technologies offered by Web 2.0 are HTML, Ajax, Flex, OpenLaszlo and more.

Web 2.0 uses scripting and other advanced technologies to create visually appealing, highly interactive rich internet applications. Most of these applications are very visual and rely on mouse interactions to operate. Each Web 2.0 application wants to distinguish itself from others based on a compelling visual design, rich user interface and dynamic interaction (Gibson, B, 2007).

2.1.1 AJAX

According to Jesse James Garrett, February 18, 2005, Ajax (Asynchronous JavaScript and XML) is a web-development technique that incorporates standards-based presentation using XHTML and CSS, dynamic display and interaction using the Document Object Model, data interchange and manipulation using XML and XSLT, asynchronous data retrieval using XMLHttpRequest and finally JavaScript that bind everything together. Ajax helps the web developers to develop a website that is full with interaction on user experience. Figure 1 below shows how exactly Ajax work and the differences of Ajax web application that users cannot find in the classic web application.



Source: Jeese James Garrett/adaptivepath.com

Figure 1: The interaction pattern between Ajax and classic web application model

Based from the figure 1 above, an Ajax application provides an Ajax engine that will be the middleware between the user and the server. The engine basically responsible to provide the interface for the user to view and at the same time, communicate with the server on behalf of the user. The asynchronous communication pattern in Ajax allows the

interaction participants to response at their own convenience without having to have acknowledgement from the server strictly at the same time. The users will no longer have to wait and stare at the blank window just to wait for the server to communicate with them.

2.1.1.1 Advantages of Ajax

Ajax is a new web-development approach that have the benefits of screen and paged-based approaches. Ajax can help create powerful web applications with more sophisticated functionality using easier to implement web standards. There are many reasons why Ajax should be chosen rather than other techniques.

2.1.1.1.1 Easy to Implement

Next, it is easy to implement since Ajax applications are built using nothing more than current web standards, they are comparatively easy to create. Therefore, for those web designers that wish to migrate their applications or interface to Ajax are more quickly without even having to write the code from scratch.

2.1.1.1.2 Reduce Waiting Time

Ajax also can make the web applications more usable that will eliminate the most end users' problem which are page refresh problem and slow receptions. With Ajax, the page can load more quickly, and things can be done faster. For example, if the users do submit a form, they do not have to wait for the entire page to rebuild by the server, instead, they can still do other work while the form is being transmitted.

2.1.1.1.3 Portability

Web application that has been developed by using Ajax is more portable than others. For example, 'meebo' is one of the web applications that used Ajax. With 'meebo', users are

able to connect to multiple instant messaging networks through a webpage rather than have to install each instant messenger into users desktop.

2.1.1.2 Disadvantages of Ajax

Though it has many advantages, there are still some drawbacks that need to be considered. AJAX is not well integrated with any browsers; so again, users may experience unexplained effects, such as failure of the back button, incapacity to bookmark pages. Search engines may not see the content, which can have severe effects on a company's page ranking [2]. The drawbacks are important issues for the web developers to either reconsider on using or migrating to Ajax or trying to search for solution in order to improve their web pages because the reason is to let the users feel more enjoyable experience when browsing the web rather than feel annoyed.

2.1.1.2.1 Integration of Browsers

'Back' button is quite important for an end user to go back to their previous page if they are incidentally clicked the link in the web page. Nevertheless, in Ajax web application, users may experience failure of the 'back' button since it will not typically return to the desired previous page that the users want to go. Besides, when the web application is develop by using Ajax, it might give the user a hard time to bookmark the particular desired state of the web application.

2.1.1.2.2 Accessibility

This is one of the main concerns of Ajax application. Since Ajax relies on JavaScript and the XMLHttpRequest object, therefore, some of the browsers might not have the complete support for it especially the older ones. On the other hand, in order to ensure for the compatibility issues, the web developers are needed to test out the sites in different browsers such as in Internet Explorer, Mozilla Firefox, and more.

2.1.1.2.3 Response Time Issues

In order to develop a good web application, the web developer should heavily consider the network latency which is the time interval between the user and the server response because if the feedback to the user is not clears, they might see the delay within the interface.

2.1.2 FLEX VS. OPEN LASZLO

According to Thomson, S, Flex and OpenLaszlo are similar declarative approaches to creating better-than-browser interfaces for Java EE applications and both technologies that let you build Flash applications using a combination of XML and code (javascript or actionscript) stated Manley, D (2006). Flex technology own by Adobe while OpenLaszlo is open source software.

1.1.1.1 Flex

Flex have extra features in compiling to Flash 9 runtime which Open Laszlo still doesn't support. As we all know, Flash is very popular especially when designing a very good interface and flash is known as one of the Adobe's technology. Therefore, flex have the main benefit as it employ Flash and this can be a platform for a web developer step up higher than others. Besides, Flex also is less quirky and buggy (Manley, D, 2006). While the web developer enjoying the benefits of Flex, there are still some drawbacks which need to be considered. Firstly, in order to program Flex, the developer is yet to require learning new programming language since the programming of Flex is in Action Script 3. As mentioned before, Flex has features in compiling to Flash 9 but it is only can compile to this Flash 9 runtime. Therefore, it will give a hard time for a web developer who using operating system other than Windows and Linux. Finally, the key disadvantage to Flex is the cost itself. Since Flex is own under Adobe/Macromedia, therefore, the license costs some serious dollars and this may be an issue for some companies or web developer.

1.1.1.2 Open Laszlo

Open Laszlo is currently known as open-source technology and have been licensed under the Common Public License (V1.0) stated Thomson, S, (2007). With Open Laszlo, the web developer does not need to think about any cost since it is free. Though OpenLaszlo does not yet support Flash V9, however, it still can compile with multiple runtime platforms such as Flash V6, 7, 8, DHTML/AJAX and others. Open Laszlo can be done with JavaScript and easier to learn since most of web developers already familiar with this language. On the other hand, Open Laszlo also provides good documentation rather than Flex. OpenLaszlo also have several disadvantages like quirky and buggy in places (Manley, D, 2006).

CHAPTER 3

METHODOLOGY

3.1 PROTOTYPING-BASED METHODOLOGY

The methodology that will be used in order to develop this project is prototyping. A prototyping based methodology involves analysis, design and implementation concurrently, and all these three phases are performed repeatedly in a cycle until the system is completed as shown in Figure 1 below. Prototyping can give the author the clearer picture and assist in identifying any problems with the efficacy of earlier design, requirements analysis and coding activities. Besides, it may extract better ideas for the improvement of the system. On the other hand, prototyping-based methodology also is able to do backtracking in the cycle of the system development and the fact that this model combines both linear and iterative approach which is implemented in the Waterfall model and Prototyping model respectively.

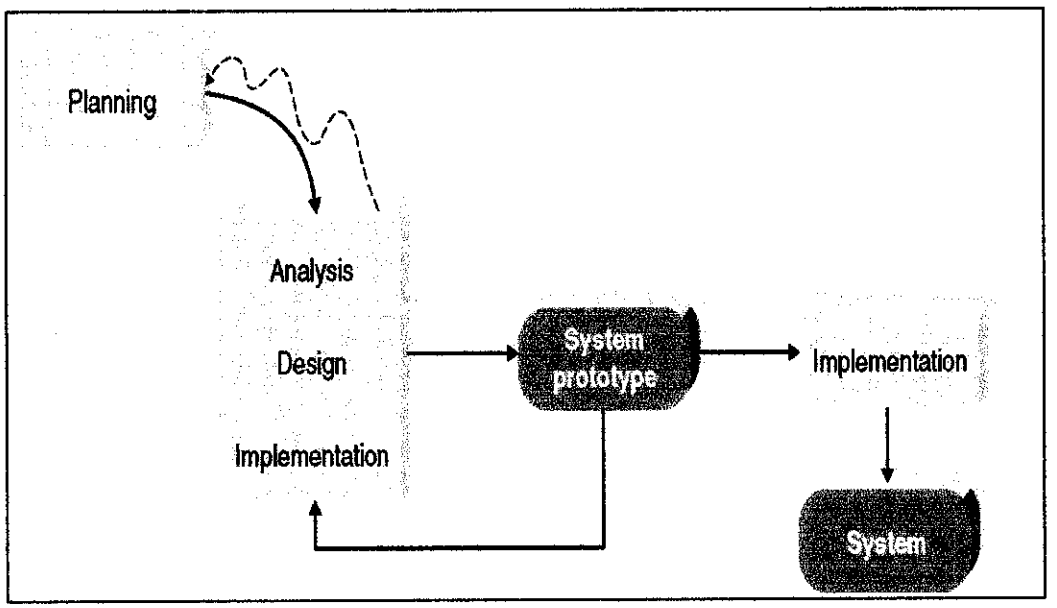


Figure 2: Prototyping-based methodology model

The application of these methodologies allows the analysis and design to be performed at basic levels and immediately initiate workings on a system prototype that impose a minimal amount of features. The first prototype is normally the early part of the system that will be encountered by the user. This will later be presented to the users and project sponsors who will give comments that will be used to re-analyze, re-design and re-implement the second prototype that possess more of the remaining features. This procedure continues in a cycle until the analysts, users, and sponsor agree that the prototype encompass enough functionality to be applied in the organization. After the prototype which is now acknowledged as the system has been installed, improvements take place until it is fully accepted as the new system.

One of the advantages in applying prototyping is it allows faster development. It will make the system easier for end users to learn or use. With prototyping, fewer changes are needed after implementation. End users will also be brought into involvement. Users will know what to expect during the implementation of the system. Prototyping also provides an enhanced communication with the user or analyst. Prototyping makes it easier to determine user requirements. Prototyping also may reduce the development costs.

3.2 PROCESS FLOW

Below is the overall process flow in order for the online shopping application.

1. Customers intend to visit the website.
2. Customers need to register a new account in order to start the purchasing process from the website by filling the required information such as name, complete and valid address, phone number and email address to be added in the database.
3. Customers log in to go to their own particular account by entering their user name and password based from their previous registration.
4. The system will verify whether the username existing in the database and the username is match with the password entered by the customers.

5. Customers choose the types of jewellery available in the website like necklaces, earrings, bracelets, anklets, or complete selection.
6. Customers choose different design from their preferred type of jewellery.
7. Customers select the jewellery and it will be placed in their shopping cart with the total amount of money that the customers need to pay.
8. If the customers confirm to buy the product,
    a. They will submit the order and make a payment
9. Else,
    a. They will keep the product in their cart
10. Customers log out from the website after they finish their transactions.

The graphical representation of process flow can be depicted in the Figure 3 below.

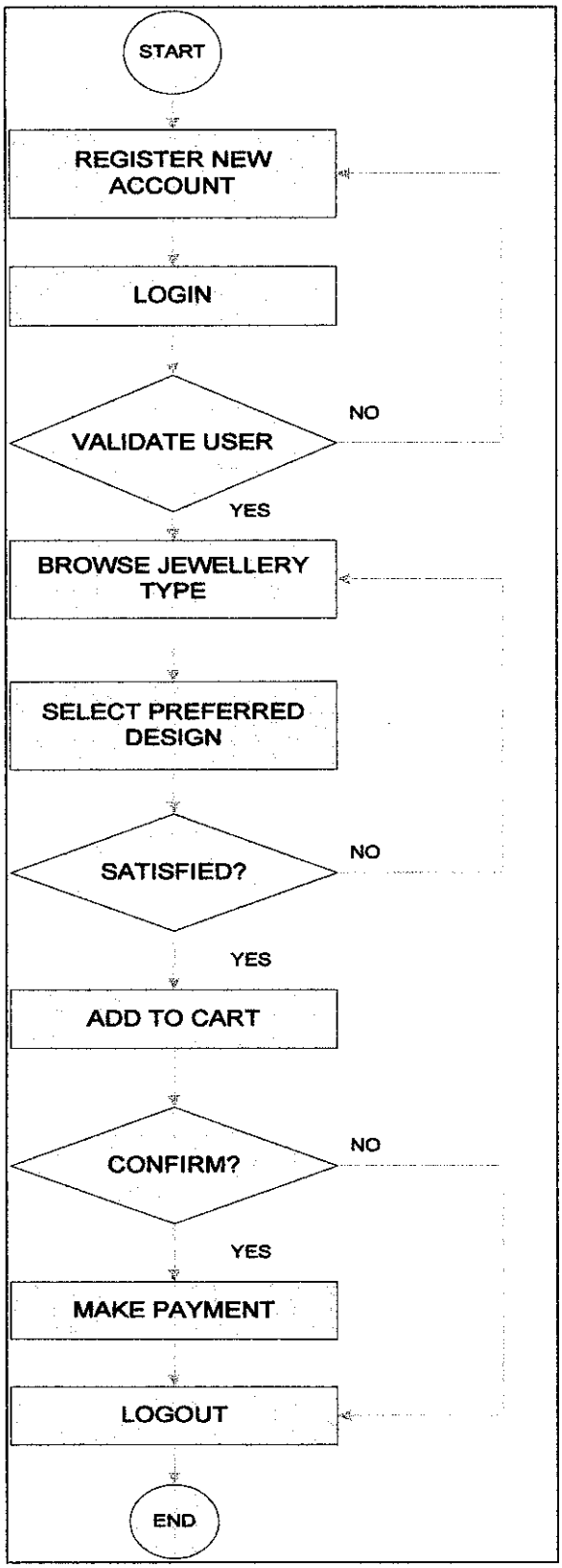


Figure 3: Flow Chart of the Online Shopping Application

3.3 DATA MODELS

3.3.1 Use Case Diagram

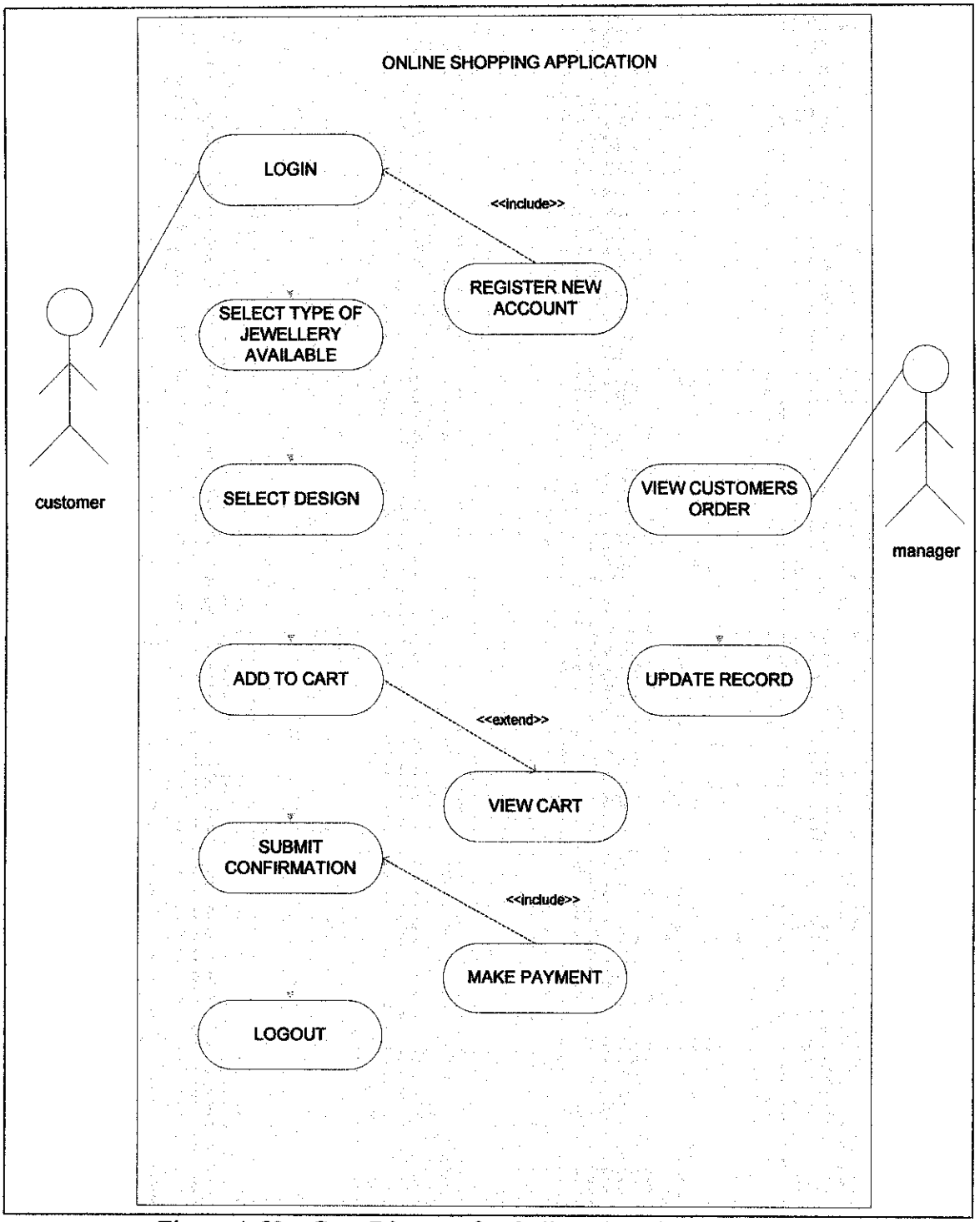


Figure 4: Use Case Diagram for Online Shopping Application

Based from the use case diagram as depicted in Figure 4, two main actors involved in the online shopping application are customer and manager. The use case shows the major process that the system will perform that benefits the involved actors. There are times when a use case includes or extends on the diagram. The include relationship tell the actor that it is a must to do that before proceed to the next process while the extend relationship tell the actor that the process can be done later.

3.3.2 Data Flow Diagram

A data flow diagram is a visualization of the "flow" of data through an information system. A data flow diagram can also be used to graphically represent the data processing or organization design. It is a well known practice that designers start with drawing context level DFD which indicates the interaction between system and external entities. The context level DFD is then exhaustively expanded to inform in a more specific manner of the system being modeled. For this project, there are several data flow diagrams as shown in figure 5, 6 and 7 below to represent the data flow for each respective process involved in the application.

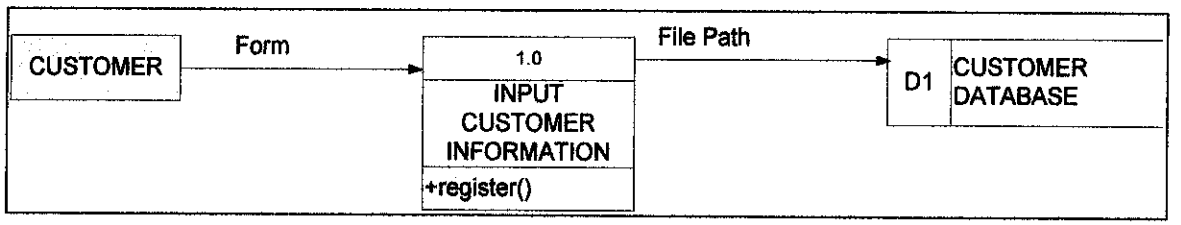


Figure 5: Data flow for process customer registration

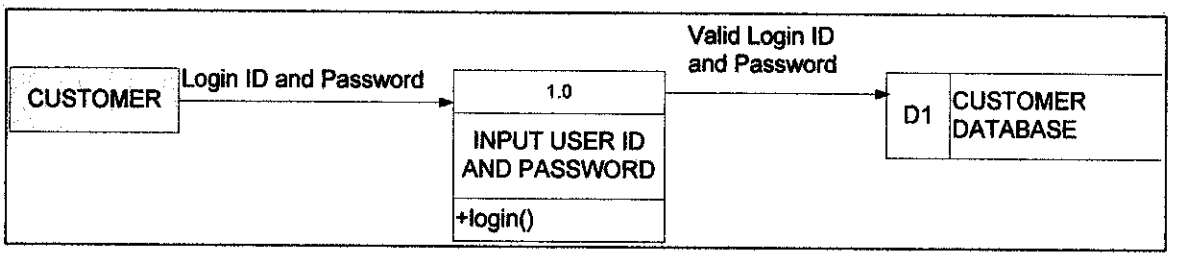


Figure 6: Data flow for process customer login to the website

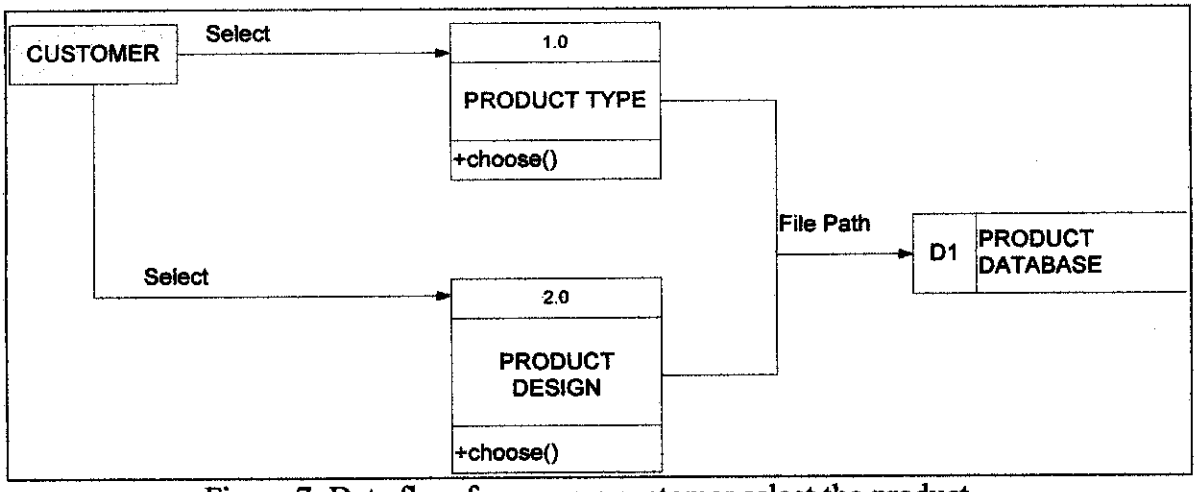


Figure 7: Data flow for process customer select the product

3.3.3 System Framework

The online shopping applications that will be developed consist of 2 entities, 1 subsystem and 1 database. The two entities are the customer; who are the main actor in the website that will do the purchasing and the other one is the manager; who will keep on managing the orders from customers and updating the record. The subsystem in this application is web interface and the database functioned as data storage for the customers' information.

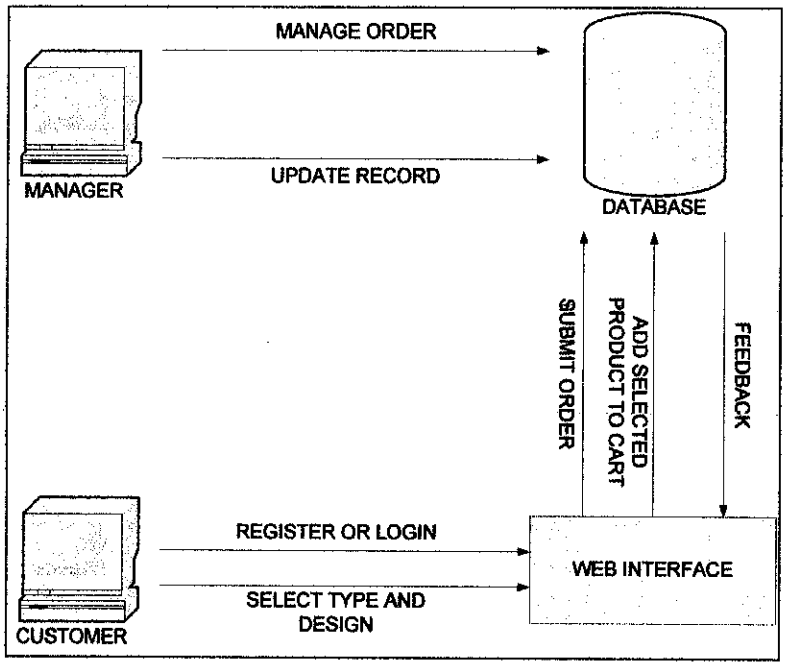


Figure 8: The online shopping application framework

3.4 USER INTERFACE DESIGN

Currently, there are about 3 main pages which are homepage, login to customer own account and registration. The layout for each pages shown in figure 8, 9 and 10 with their description.

3.4.1 Index/Home page for the application

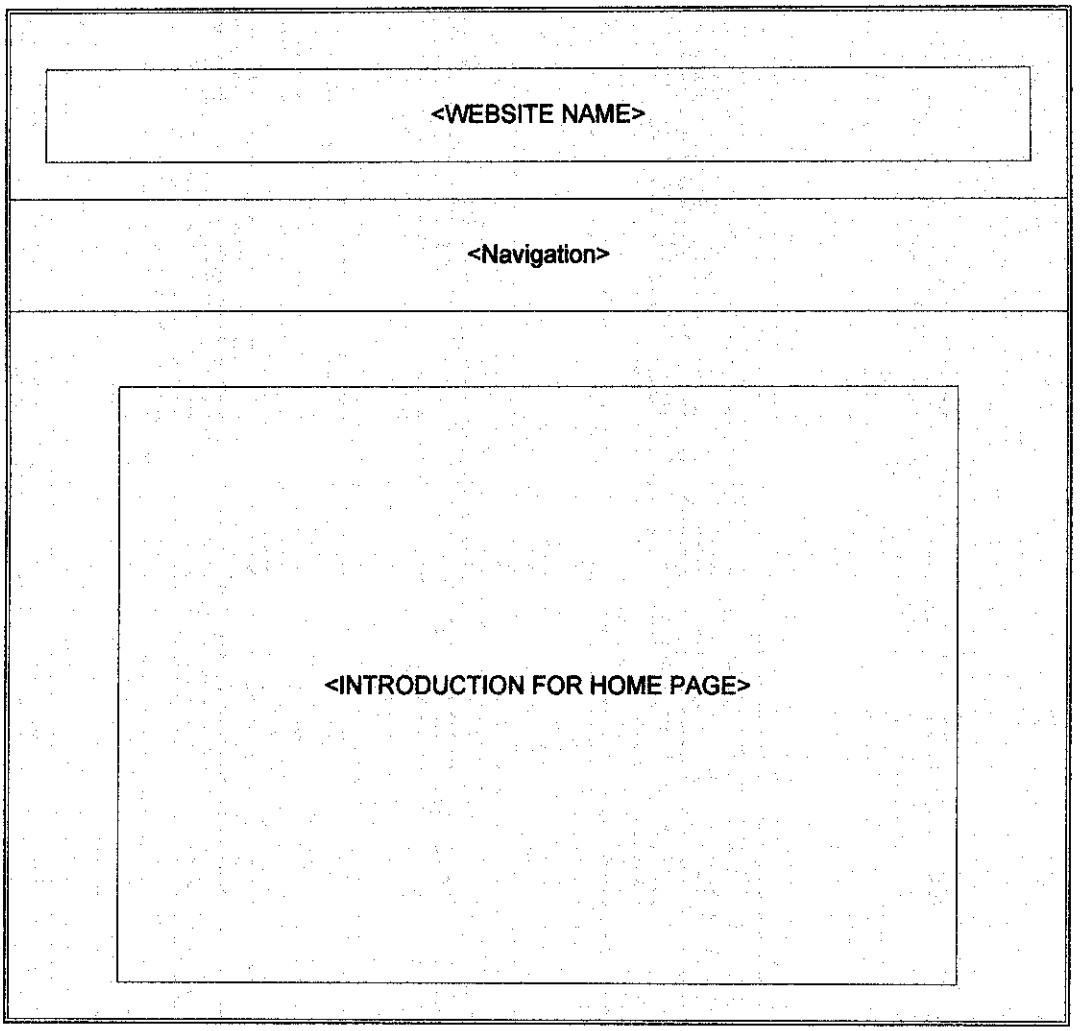


Figure 9: Home Page

This page basically tells the customer the introduction of the website and a bit description on the product sold in the website. The homepage is important to impress the customers

as they visit the website especially for the first time. The homepage will contain the website name, navigations to the other page and the introduction.

3.4.2 Login to Account page

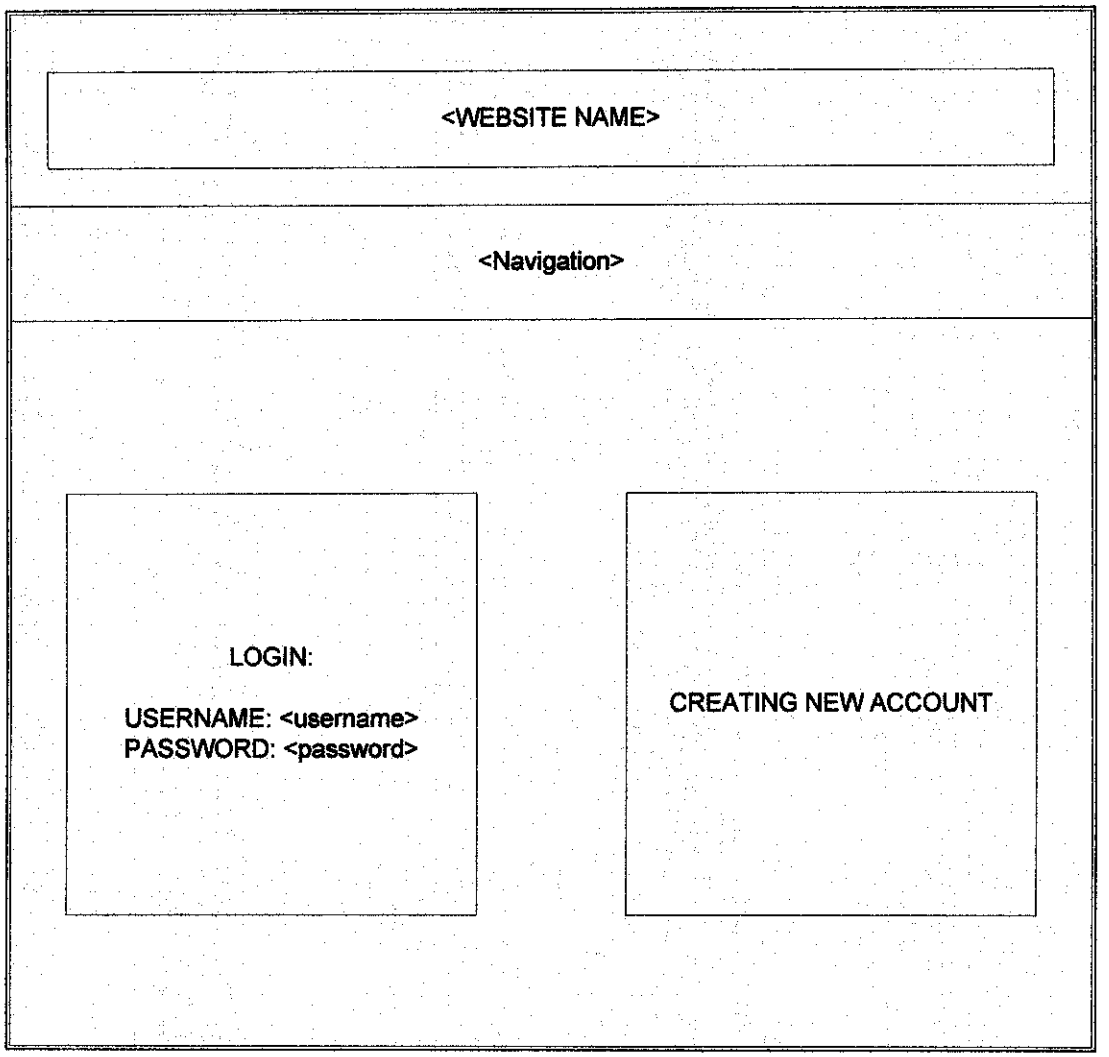


Figure 10: Login Page

This is the login page for the old customers for this online shopping application. To proceed with the application, the customer is needed to log in by specifying their username and password and hit the log in button. If the username and password is match according from the database, then, the customer will enter their own account. For the first time user, they can click the link available in the creating new account area.

3.4.3 New Account Registration page

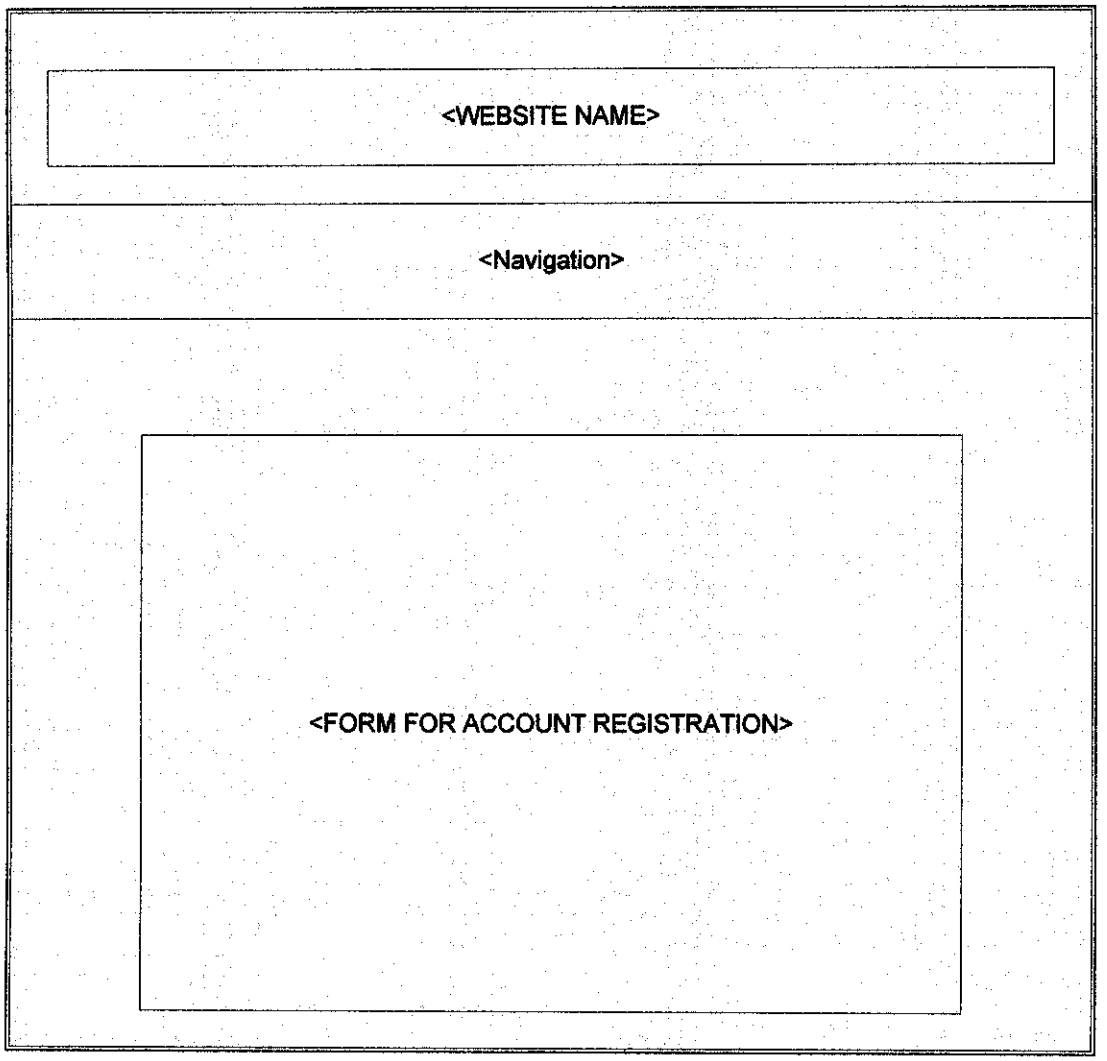


Figure 11: Registration Page

This page will be prompted to the customers if they click the link in the creating new account at the login page. This is a page where the customer will create new login credentials and also fill the required information needed by the application and finally click at register button to proceed.

CHAPTER 4

SYSTEM DEVELOPMENT

The findings from the project methodology were applied to form a complete new system. The activities during system development translate the system design in methodology into a working information system capable of addressing the new system requirements. In this part of the project, the system is built and functional testing is conducted.

The system is divided into three sub modules. The login is meant for users to create sessions when browsing through the web application. Username and password as input text fields are the main components of this sub module and used to create sessions. The shopping cart acts as a tool for users to tag the items that they may want to purchase or order. Users can mouse drag the chosen items into an area as their purchase selection and proceed to next procedures. For the payment module, the necessary information on the seller bank account is displayed. Users who have put their orders and wish to proceed to shipment will be prompted to enter the receipt number or transaction reference number as to verify that they have done the payment through the account details provided. Actual test on data input was performed to as end of development for each module.

4.1 USER LOGIN

In any online shopping application, user login and privilege play an important part as to identify each user who exist in the database. Basically, each user who intends to shop online will need to register an account and provide the correct and legal information for transaction security and shipping purposes. Once the registration application has been approved, the user can login into the system using the username and password that have been registered earlier.

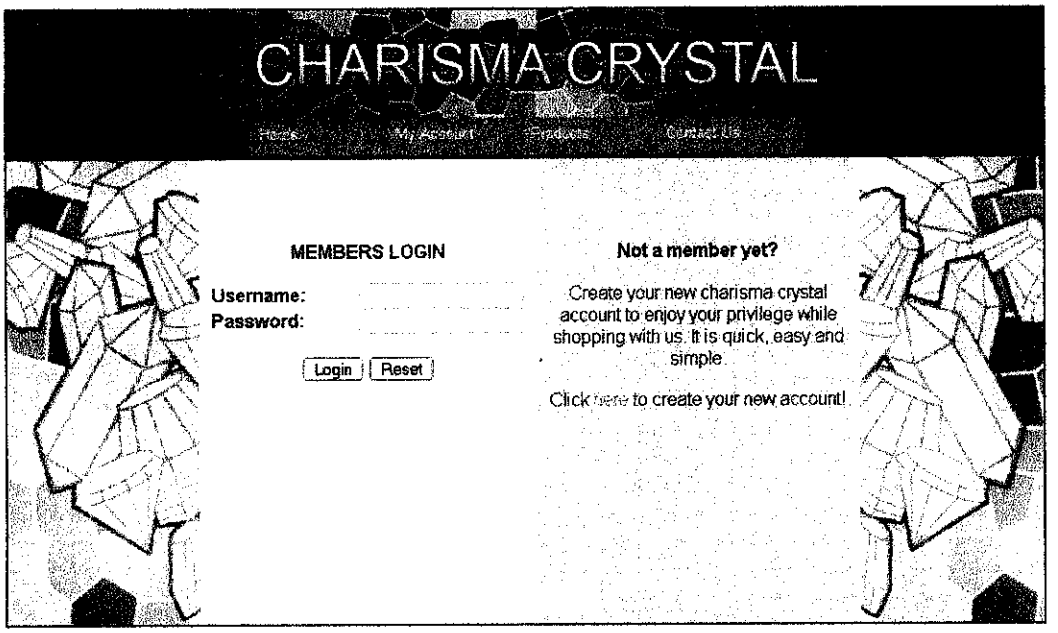


Figure 12: Login page for registered user

Most of the requirements gathered are typical to the current trends that exist in other online shopping applications that had been released into the internet. Security and user friendly are among the purpose for creating the login as to fill those requirements.

To implement the user login and registration, the author has used MySQL to store all the information entered by users. The author had applied MySQL and PHP which are open source software for the login. This has in return minimized the development cost for the entire project and ensured that the system is legal. The author identifies each user by their username. Therefore, users are not allowed to use the same username that already exist in the database. This will avoid duplicate or multiple accounts per user issues. Figure 11 below shows the code fragment on how the author identify if the username exists in the database.

```
$query = "SELECT username FROM user info " . "WHERE username =
'" . $_POST ['username']. "';";

$result = mysql_query ($query) or die (mysql_error());
if (mysql_num_rows($result) != 0)
{
?>
<p>The Username, <?php echo $_POST['username']; ?>, is already
in use. please choose another!</p>
```

Figure 13: Code fragment to check whether the username exists in the database

If the user insists on using the same username, error will be prompted asking the user to choose other username. Figure 11 shows how the system prompted the error if the users insist on using the same username.

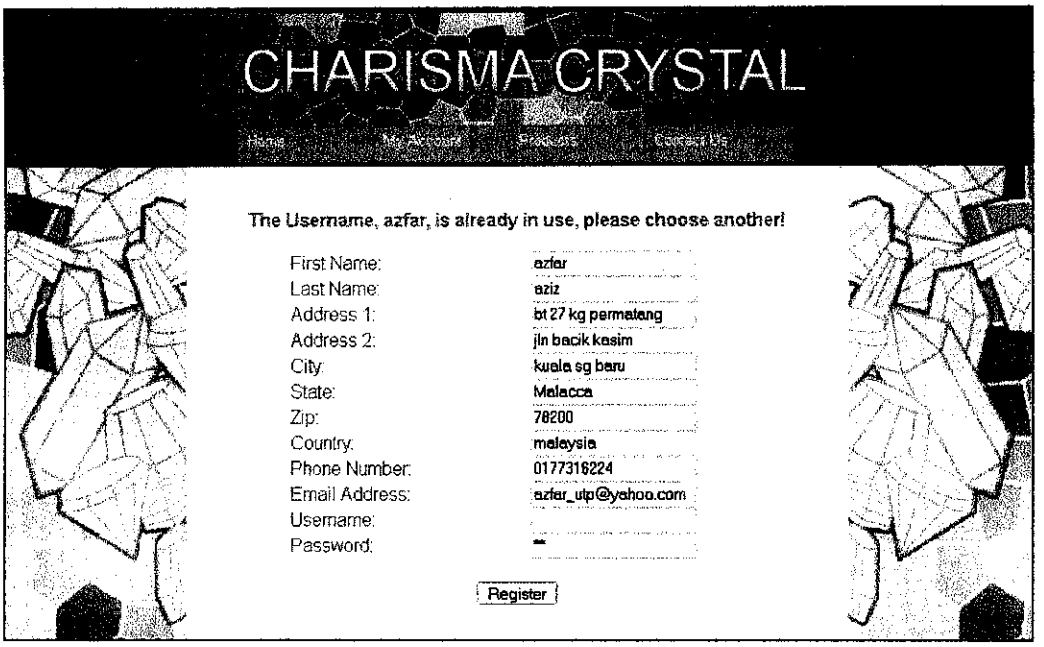


Figure 14: Error prompted by the system

After the user finish the registration part, he or she will be allowed to login into the system. During this phase, the user needs to enter their respected username and password. Users can only enter to their page if the username match with the password entered. Figure 13 below shows the code fragment on how the author check in the database whether the username entered by the users match with the password in the

database and figure 14 and figure 15 are the examples of successful login and unsuccessful login.

```
$query = "SELECT username, password FROM user_info " . "WHERE
username = '" . $_POST['username'] . "' " . "AND password =
(PASSWORD('" . $_POST['password'] . "'))";

$result = mysql_query($query) or die(mysql_error());

if (mysql_num_rows($result) == 1)
{
      $_SESSION['user_logged'] = $_POST['username'];
      $_SESSION['user_password'] = $_POST['password'];

      include "menu.php";
}
```

Figure 15: Code fragment to check the username and password in the database

The figure below shows how the login responds upon an invalid login. The user will be prompted to re enter the correct username and password or register an account if he or she is yet to have one. The reset button is meant for clearing entries on both fields.

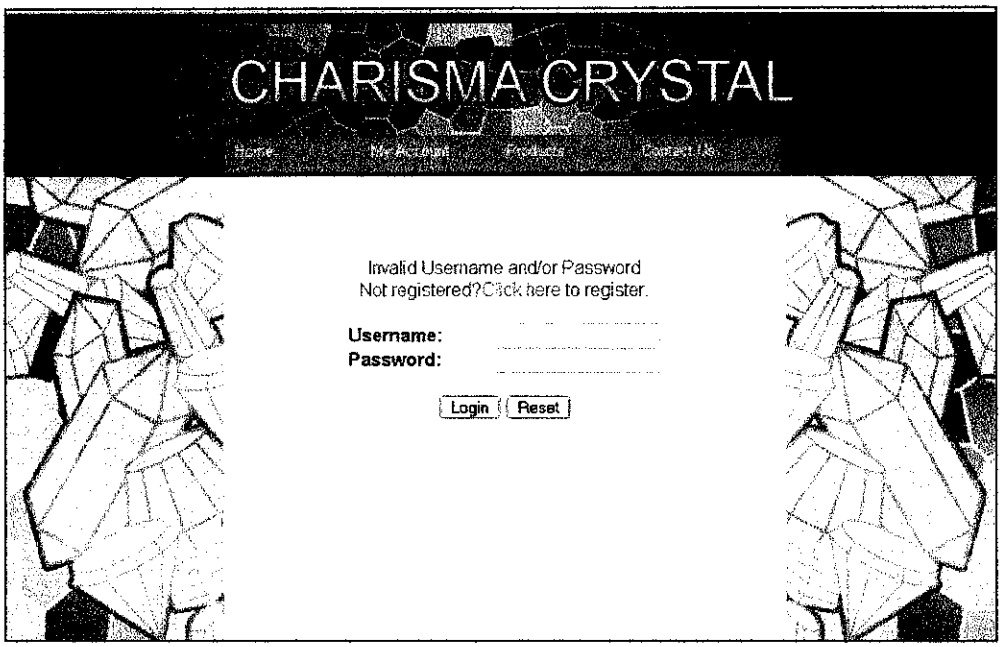


Figure 16: Unsuccessful Login

In case of a successful login, the user web browser will be transferred to a welcome page. The welcome page recognizes and greets the user by the name as registered. This page is divided into two adjacent parts. The one on the left greets the user upon successful login and the other shows the latest items as updated by the administrator.

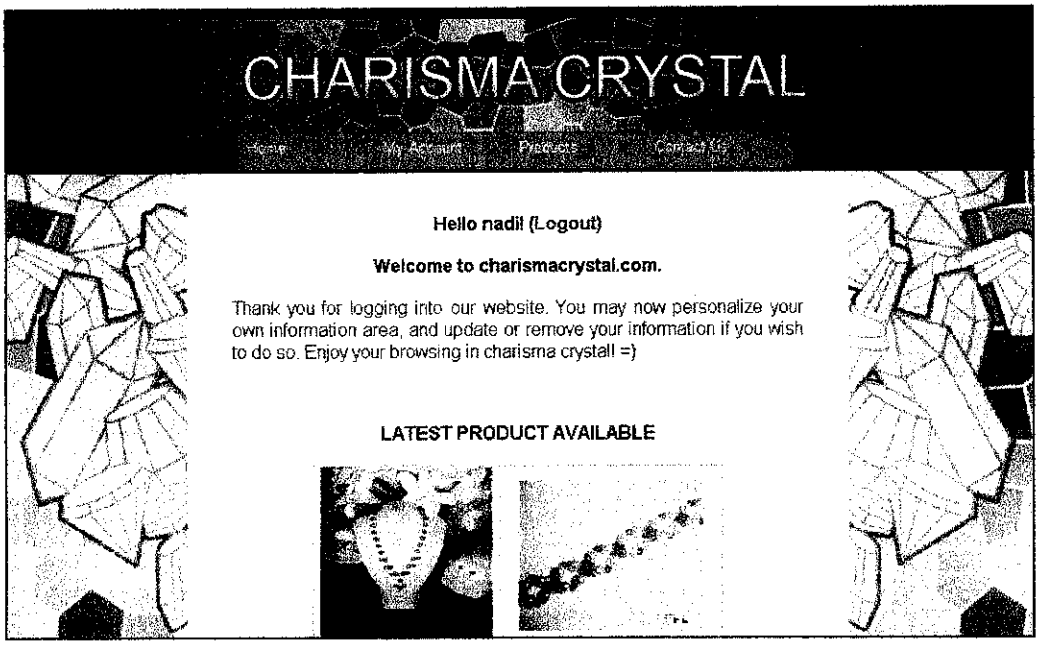


Figure 17: Successful Login

4.2 SHOPPING CART

In an online shopping application, shopping cart is a must for users need in order to purchase the products available in the website. There are several important elements in a shopping cart. In this application, the shopping cart implemented will have identification for each user, add item to the cart, remove item from the cart and also display the total amount of money the user need to pay for their items. Figure 16 below is the fragment of code on how the cart identifies the users.

```
$Cart = new Cart($_SESSION['user_logged']);
```

Figure 18: Code fragment to identify the user's cart

This is a code fragment from the shopping cart sub module. This fragment represents the function that will provide every user his or her cart. This is necessary to avoid different users getting their items mixed or misplaced into one or another. Every user that has logged into the web application will be recognized as an individual user with a cart. The shopping cart displays items that have been picked by the user and list those items information like product names, quantities and prices.

In this application, the author use AJAX to drag and drop the product to the shopping cart. To enable drag and drop in this application, the author used a Web 2.0 Java Script library called script.aculo.us where it provides dynamic visual effects and other functional. This library helps the author to easily add visual and AJAX effects to projects such as fade, appear and many more. To include the script.aculo.us library into a website, the author must copy all the needed files into one folder and include those files in the head of HTML/PHP document where the documents are needed as shown in figure 17 below.

```
<script src="javascripts/prototype.js"
type="text/javascript"></script>

<script src="javascripts/scriptaculous.js"
type="text/javascript"></script>
```

Figure 19: Code Fragment to request the script.aculo.us functions

The first feature made available for this shopping cart module is the drag and drop. This is implemented using JavaScript. In this process, all product items are made drag able and droppable to allow them be moved from the available products list into the cart. When a product item is dropped into the cart, that particular item will be passed to the 'addtocart' function.

```
var draggables = $$("div.productImg");

draggables.each(function(currentDraggable)
{
      new Draggable(currentDraggable, {
            revert: true, ghosting: true });
});
```

Figure 20: Code fragment to make the product image draggable.

As for the major component for the shopping cart module, AJAX is implemented. The shopping cart has three functions which are add item, remove item and empty cart as shown in figure 19 below. For this purpose, Ajax.request is created as a general purpose AJAX requester using 'new' operator. The requester initiates and processes AJAX request. This object is implemented to all three functions within shopping cart. This object is important as it adds another unique feature to this module which is that the object does not cause page reloads to the web browser. This will improve user experience about interactivity. The three functions only need successful responses thus onSuccess callback is used to detect the 'successes'.

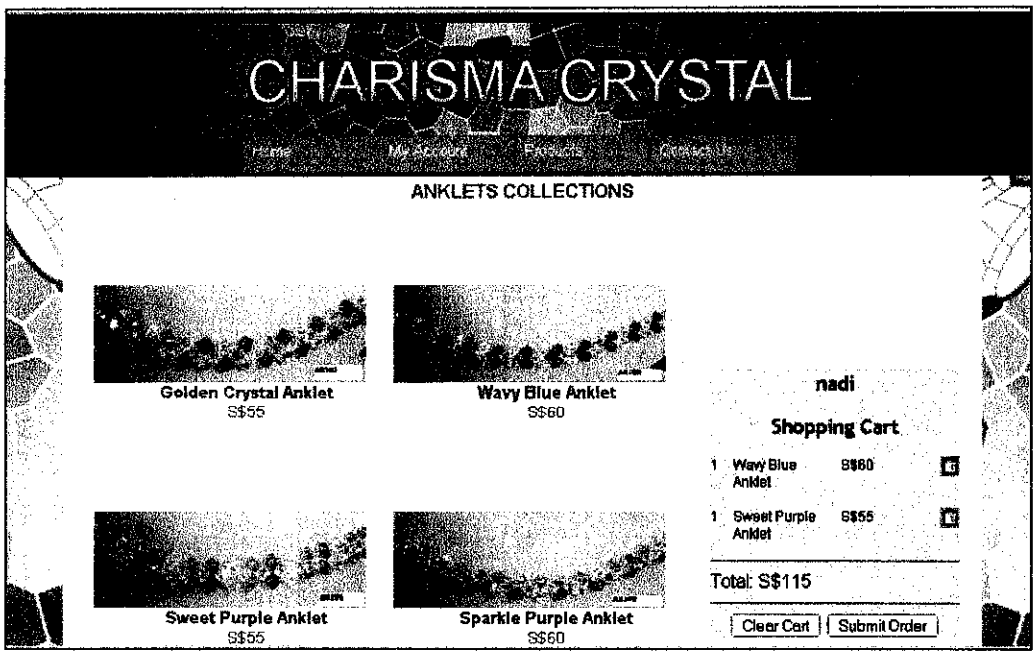


Figure 21: Shopping cart

For the addtocart sub module or function, every item passed to it will be checked if the item is new to the cart or have not for at least once been added into the cart. If the item is new to the cart, it will be added to the cart list of selected product items or else only the quantity and subtotal will be updated. An empty cart will be marked as empty. Upon the first drop of product item into the cart, this mark will be hidden and the first item dropped will be displayed. Each item added into the cart will have four cells in a row representing quantity, title, price and remove from cart clickable icon. The following items that may be added to the added will be put at the bottom of the list. Each item added to the cart will cause the total amount be incremented. Other than that, in each function, the author have used certain effects available from the Script.aculo.us library which are update, appear and hide.

The 'remove from cart' sub module updates the cart's total amount and contents. The sub module will first check if the total value is 0. In this case, the cart will be marked as empty and the displayed total set to 0. Otherwise, the displayed total will be updated. The last function within shopping cart is 'empty cart' which is allow users to clear their to be purchase items from the selection list or the shopping cart. The shopping cart will then be reset as empty.

4.3 PAYMENT

The payment sub module will be accessed by the user from the shopping cart sub module. At the shopping cart, users will be given two options in form of input buttons namely clear cart and submit order. Any attempt to click on the submit order button will require the user to be already logged in and have at least one item in his or her shopping cart which he or she had intended to purchase or make order. User will be redirected to the login page if he or she is yet to do so.

CHAPTER 5

RESULTS AND DISCUSSIONS

Throughout the process on developing this web application, the author has done the prototype for this web application with several functionalities. Below is the figure of the flow to show on how the customer can browse into the application.

When the user browsed into this web application URL, user will be redirecting into a home page of the system as shown in figure 20. From this page, user will know what is this application is all about and if the user is already a member for this website, user can login to their respective account. If the user does not own any account yet, user can click onto the 'Register Now' link and user will be redirecting to a new page called Charisma Crystal Account.

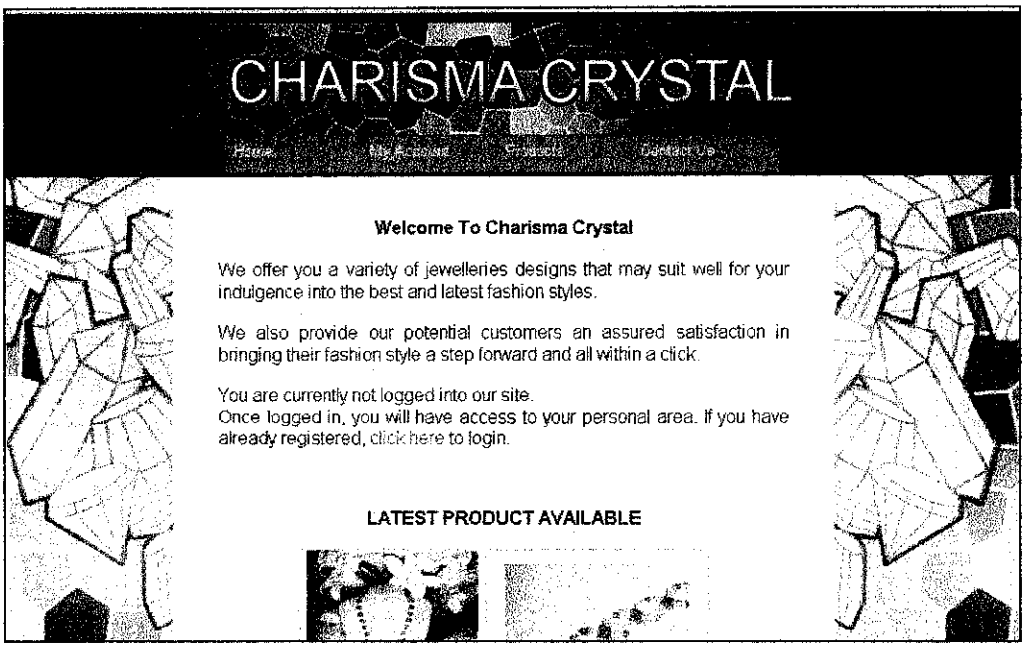


Figure 22: Home page

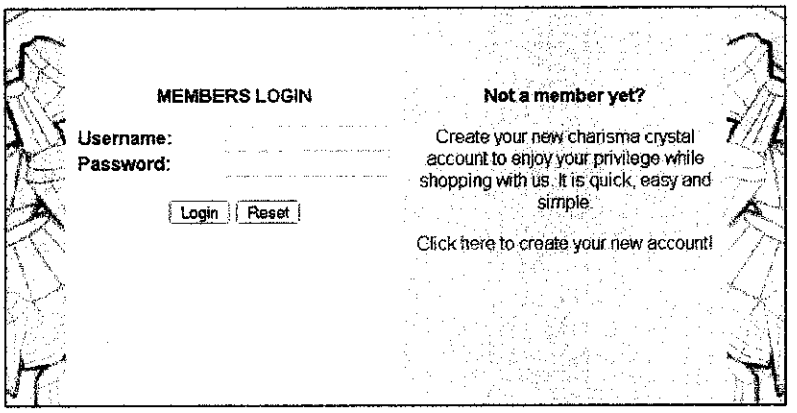


Figure 23: Login page for existing customers

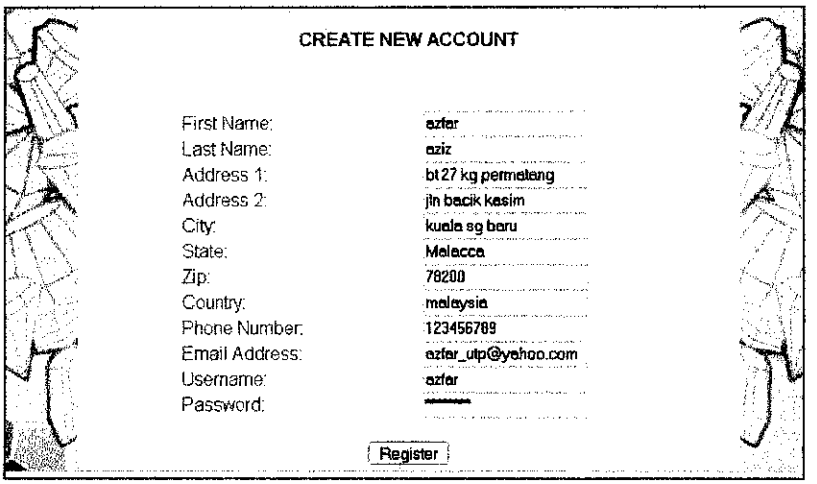


Figure 24: Registration page for a new member

This page will be prompted once the user has clicked the 'here' link from the previous login page. It means that the user intends to create a new account for this web application to allow the user do other transaction. In order to complete the registration, users are required to fill in the form completely to avoid any error (Figure 23: Error prompted for not completing the necessary information), only then the user can continue the registration by clicking on the 'Register' button to execute this process.

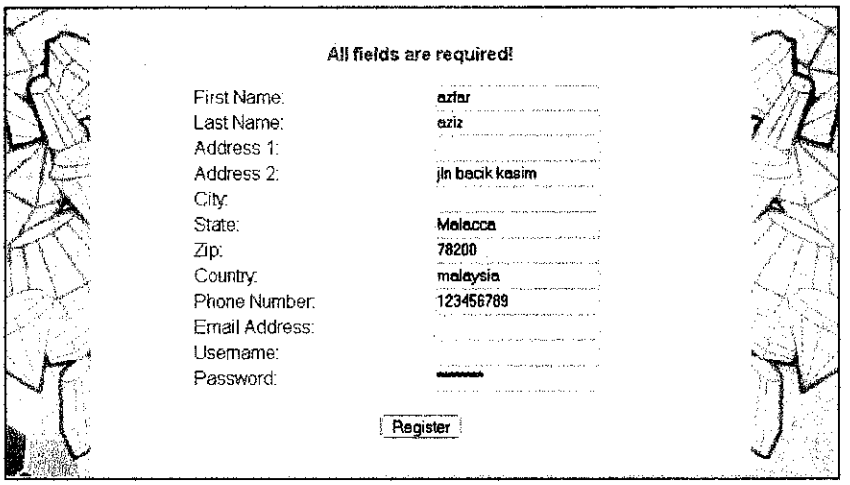


Figure 25: Error message

After the user has successfully registered to the application, then user is allowed to shop online. For this operation, user is only need to click the preferred product, hold the mouse while dragging the product and finally place it into the shopping cart. After that, the shopping cart will be updated. Figure 24 below show the updated shopping cart after the user drag the product.

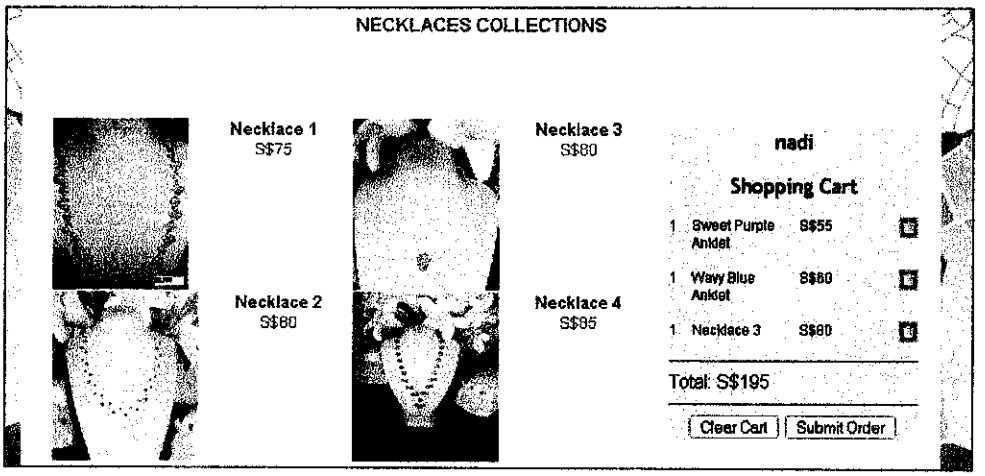


Figure 26: Updated shopping cart

Other than that, user also can change the color of the products by clicking on the customize button next to the preferred product. User will be redirected to the page where user can choose the combination of colors available for that product. If the user intends to choose the new combination colors, user will need to click on the Add to Cart button and

automatically the shopping cart will be updated for the new product. Figure 25 and 26 shows how the process works.

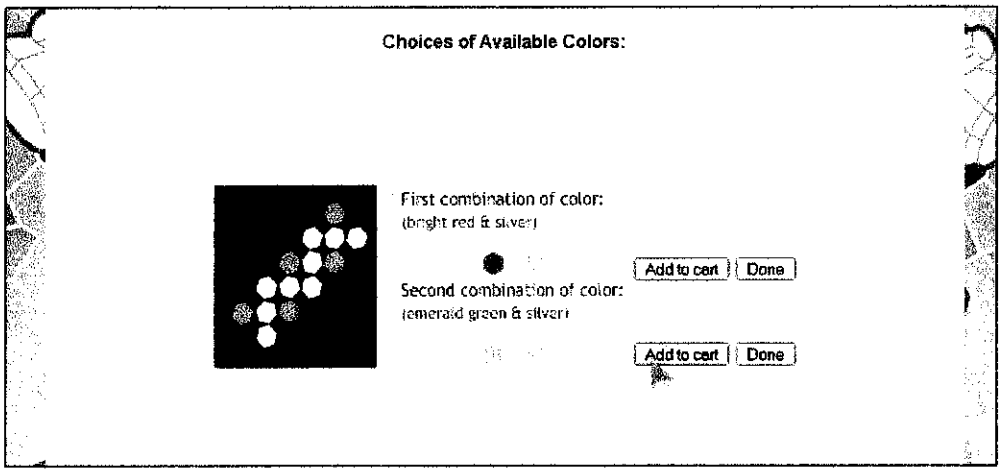


Figure 27: Choices of available colors

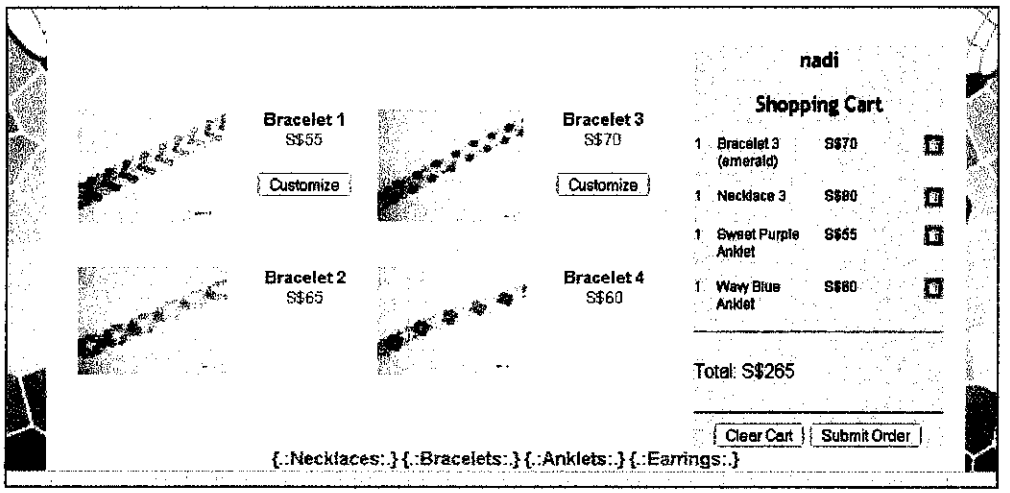


Figure 28: Updated shopping cart

Finally, when the user intends to submit the order, user will be required to click the submit order button. Upon a click on the submit order option, the user will be shown the list of products selected together with the total price that accumulates from the product list. There, the seller bank account details will be displayed as shown in figure 27 below.

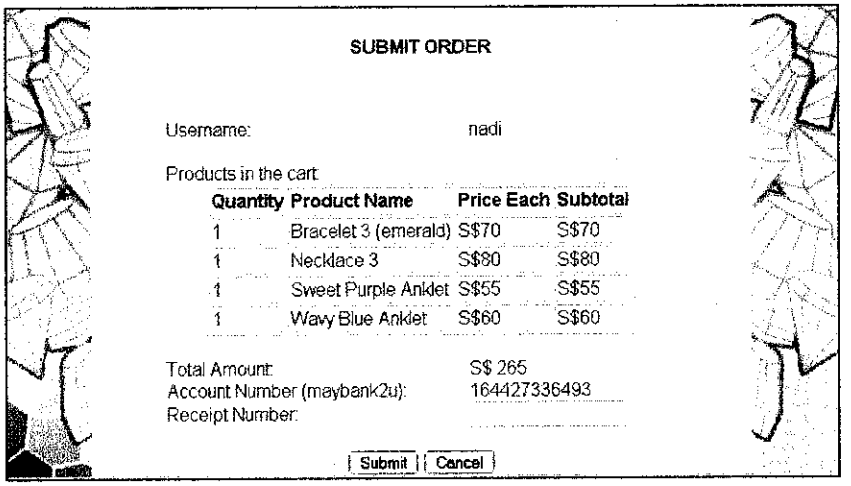


Figure 29: Order submission page

Users who wish to proceed with the product items shipment will need to do the payment as computed by the payment module into the bank account. Next, the user will need to go through the payment verification. At this point, any user who has done payment for their order will need to take note of the receipt number or transaction reference number for the payment made. Finally, the seller will ship the products based on the order submitted by the users.

CHAPTER 6

CONCLUSION AND RECOMMENDATIONS

6.1 CONCLUSION

The definition for related fundamental aspects in embarking on this project has provided the necessary boundaries of expectations. This was done by implementing studies about the available internet technologies that made the currently available e-commerce web applications. Objective values such as the interactivity, speed, functionality and usability of existing web applications were defined as a foundation point to be expanded to reach the primary goals of this project which is to improve those values. It is important for this project to make sure that the new web application can be delivered and accepted to the targeted end users. The functional structure and design requirements had been gathered from them. Their own definitions for the objective values were also taken into consideration to develop the new web application as expected for the project. The implementation of AJAX in the development of the new web application has enabled the author to add into features the increased and improved interactivity, speed, functionality and usability of the web.

6.2 RECOMMENDATIONS

It is a good practice in keeping the interface design simple but still many improvements on that aspect can be placed by having after deployment revisions of the web application such as specialized personalization on the web pages design theme. For example, the variety of contents in the home page can be improved giving users better perspective of the company business. For the login page, a link to web administrator email just below the login fields and buttons in case of users having login problems is another option in improving this web application. Most of existing web applications on the internet

nowadays that provide login function does practice this. This will add another web administrator role which is maintaining the integrity and validity of registered user accounts entries in the database. The application can be further enhanced by adding data checking function at user registration page. For instance, input for ZIP code and phone number fields can be checked whether they are valid ones. The registration page can also be further improved by changing the country and state text input fields into selection menus which the application will need to have list of common states and countries worldwide as selection input options. Security aspect may also be improved some more by adding a function that will do evaluation on the strength of password chosen by users during their account registrations. This function will be providing tips to users on choosing good ones. For custom design products page, the application may add more options to provide users comprising customers more detailed product customization.

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