

Md Nuruzzaman Faruk

DEVELOPMENT OF A COMMERCIAL WEBSITE

Thesis

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ABSTRACT

Centria University of Applied Sciences	Date June 2016	Author Md Nuruzzaman Faruk
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Name of thesis DEVELOPMENT OF A COMMERCIAL WEBSITE		
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<p>The goal of this thesis was to create an electronic online store website. Before building this website, the thesis explains about the ecommerce website because there is considerable amount classification of ecommerce. Moreover, the overall web page design and constructing process of an online store is shown on the constructed website. Header, body, footer, content menu and navigation system are represented through the website.</p> <p>Every successful project needs a proper plan. This project goes through the phases of accurate planning. One part of thesis explains about the modern web technologies how to use the web elements with web programming language. Another part describes the implementation process of web development with practical knowledge. Using of HTML, CSS, JavaScript and bootstrap are discussed in front end development and Python, Java, PHP and MySQL are represented in back end development. Usages of all these tools assist to construct a desired website. The whole project will finish through the website testing. If the website run properly in browser, the project will finish successfully.</p> <p>As a result of the thesis, the whole website is a good example of a commercial website. It could be a guidance book of constructing a commercial website step by step.</p>		

<p>Key words OSS, HTML, CSS3, Python, MySQL, XAMPP, Content Management System</p>
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ABBREVIATIONS

OSS	Open Source Software
FOSS	Free And Open Source Software
HTML	Hyper Text Markup Language
CSS	Cascading Style Sheets
AJAX	Asynchronous JavaScript and XML
PHP	Personal Home Page
CMS	Content Management System

1 INTRODUCTION

Centria UAS is a renowned multi-disciplinary and dynamic institute in Central Ostrobothnia region of Finland and three campuses are situated in Kokkola, Ylivieska and Pietarsaari. Some major courses are conducted in English, such as Degree program in International Business, Degree program in Chemistry and Technology and Degree program in Information Technology at the campus in Kokkola. All degree programs offer advanced courses so that students who are graduates from Centria UAS can show their skills in their own job fields.

Media and communication technology and Software engineering are offered in the Information Technology Degree program. Students can learn Algorithms and Data structure, Object-Oriented programming and modelling, Software Coding, Design and Business. From this particular field of Software engineering, the author has chosen this thesis on this section.

At present, e-business is spreading in all over the country. The popularity of e-business is increasing among the people. It has also changed many aspects of commercial business system, particularly shopping activities system, dealing with customers and choosing products within a very short time. For this reason, people are interested to make their career in e-business or e-commerce system.

To start a new company or enterprise, the owner of a company needs to spread company's profile by presenting company's own product and to increase profit from the business. Without extension of the company's profile, the company cannot grow their business in higher level and face less profit. Moreover, making a website is the face of a company or an enterprise. It shows company's profile to the customers. Furthermore, customers can browse company's website at any time and people are able to know about product, service and order system.

Electronic products are such kind of products that needed every day in life. People need electronic products till they are alive, so selling electronic products is much more profitable than other business. If people can run their business through internet services, it is really convenient and less spending for them.

This thesis is about to build an electronic online store website. This thesis is in two parts, first part explains about web technology and second part is implementation of constructing website. E-business model and concept, benefits of created website, website development tools, open source software and content management system will be described briefly in this thesis. Second part is the practical work. Main concept, online store structure and website design will be explained in the second part of thesis.

2 CAREER AS A WEB DEVELOPER

Web developer works in behind the making of a dynamic website. They also design, code and create a website. Moreover, they are performing their main activities in online world. Many companies and organizations hire them to create a dynamic website. There are three types of specialized web developers: Front-end developer, Back-end developer and Full stack developer. (Wales 2014.)

Front end developer makes the layout, design, integrate graphics and other contents, full website design depends on front end developer. HTML, CSS, jQuery, and JavaScript language should know to become a front end developer, to make dashing and dynamic website. They also use Bootstrap, Ajax, foundation and backbone. (Wales 2014.)

To make a back end of a website, back end developer works with three different things, for example database, server and application. They need to know server side languages, such as Python, Rubi and PHP. In addition, MySQL, SQL and Oracle such kind of tools are used to build an application and it also helps to save data in server. (Wales 2014.)

Full stack developers who have skill and ability to understand the application, code and design. They usually work on the server side like back end developer, they also know the front end languages. That is why they are called “jacks all of trades”. In a one word, they have cross functional skills of back end parts and front end parts. (Wales 2014.)

To develop and improve a website, a webmaster is needed who maintain the server, hardware as well as software part also. Information update in website is very important, such as uploading photo, adding contents and deleting links. Server becomes down sometimes that time webmaster repair the whole system. Actually, webmaster ensures that website work correctly. (Wales 2014.)

3 THEORETICAL FRAMEWORK

A clear theoretical background is a key of a project to finish it with well output. In this section, it will be described about the elements of building a website. Why and what kind of web page needed for different companies or enterprises. Different kinds of front end and back end development tools are used to construct this commercial web page.

3.1 Importance of having a website

In this modern age, people are so advance and they always looking for good things or products. Everyone wants to get the best things than others. Whenever people go to the restaurant for having food, they always select to eat that kind of food which is alluring to the eye. So, good looking food is first choice and people want to taste this first than any other food. Exactly the same thing happens in having a dynamic website. Most of the people go for shopping in these places, such as Amazon, e-bay, Apple, LinkedIn and YouTube. Actually, having a website of a small or large company means that it has its' own identification to introduce others about their company and company's product.

By having an own website, people can browse the company's website and they can know about the company's profile, service and products and customers can also establish their credibility to buy aproduct from them. Vendees can easily access any company's website because a dynamic website is so user friendly and exoteric. Moreover, communication between the customers and dealers, is the main key to reach higher position in Business and it increases also the sales. A good website is the best communication media between customers and dealers. (Jack 2015.)

Whenever people build a new company, they need to advertise their company and company's activities. A website works as an advertisement to increase fame of a company to the vendee. Purchasers can access

and make an order through the website 24 hours a day and 365 days a year. Moreover, vendors can save their valuable time because they can run or operate also their business from any place which is convenient for them. If they need sick leave or holiday, it is also get-at-able for them. (Jack 2015.)

3.2 Open source software (OSS)

Open source software is a free source code software with license key where a programmer or user can change, modify or make new source code of existing software. A certified license from Open Source Initiative (OSI) needed to release OSS. If any software meet 10 criteria of OSI, then that software get license and is approved as an OSS. Moreover, OSS is a free software and source code is also available but in free software of Free Software Foundation the source code is unavailable. So, free software and OSS are not same. On the other hand, OSS is also called FOSS (Free and Open Source Software). (Watch 2015.)

Web developers like to use open source software. It has huge advantages and it is also important software for the developers. In addition, the concept of open source has been developed in last 10 years and OSS has also gained popularity and availability for the user. Apache server, MySQL, PHP and Python are examples of OSS. Due to these software, programmer's life have been easier to create new web tools. OSS will be explained later in back end development tools section. Open source software is important for web programmer and web designer is getting some advantages by using OSS. First of all, OSS is free to use, source code can be modified and changed by the user. Source code is accessible to all. So, it is more secured than other software. Anybody can fix the bug for availability of source code. OSS is always analysed by a large non-profit community, nobody need to wait for new release. OSS is independent, if any company fails to update it, then it is always developed by the user. (Tweaks 2012.)

3.3 Frontend and Backend Web Development Technology

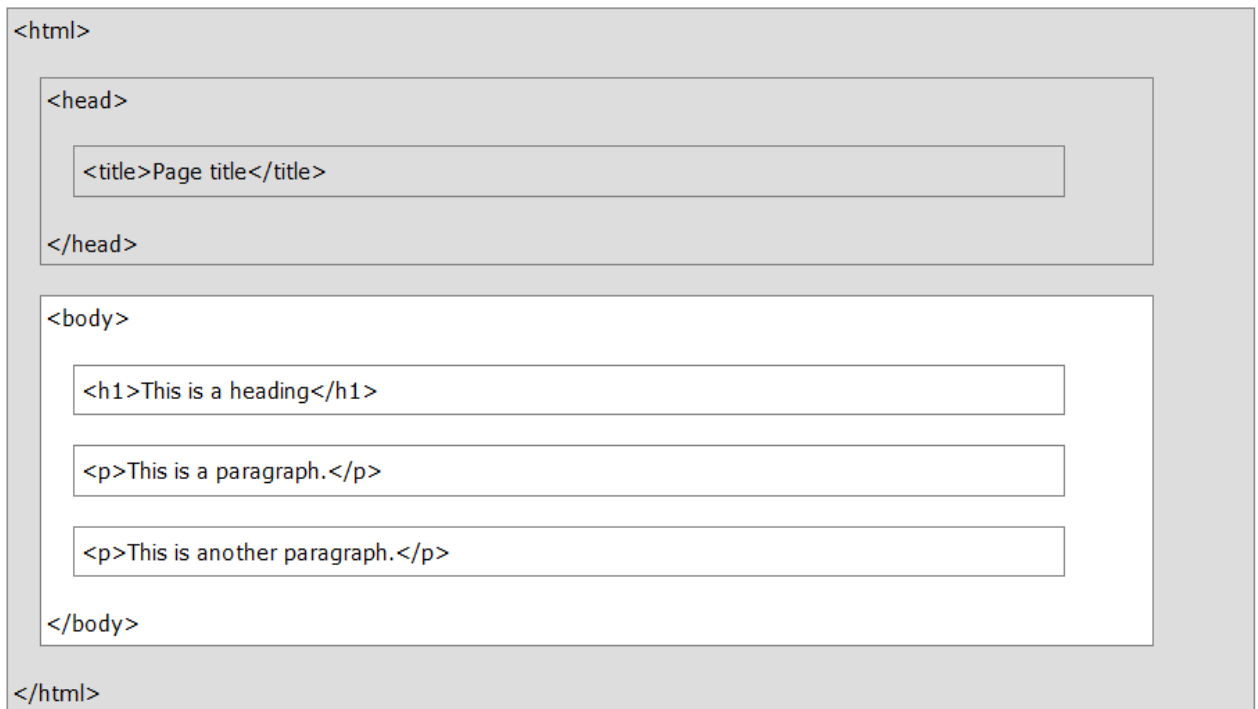
At present, human beings are more habituated to use modern technology. People are facing unbearable daily problem without using a technology and programmers are helping to remove this problem by inventing new technology. Moreover, they are creating and updating modern technology by the skills of information technology. By the help of IT skills, web developers are also building dynamic websites which is helping to the people and making their everyday life easier. However, to start a new project, everybody need to prepare some technique and necessary tools. Front end development tools is such kind of tools which is needed to construct a web design. On the other hand, back end is like a hardware system of a computer and front end is like software system where one cannot run without another one. Back end generally works on server side application with particularly Java, Ruby, Python, and PHP which provide information in database (SQL) of a web page or website.

3.3.1 HTML/HTML5

HTML means **Hyper Text Markup Language** and this language are used to describe content and data on the World Wide Web. Most of the people get confused between HTML and HTML5 but both of these languages are the same and HTML5 is the latest version of HTML language. In addition, new features, improvements to existing features and scripting-based APIs are included in HTML5 markup language. New version has been released of that markup language and HTML5 is the latest iteration. Furthermore, all valid elements of HTML4 and XHTML 1.0. are included in HTML5 and it is also compatible with older browsers. (Goldstein, Lazaris & Weyl 2011.)

HTML5 has been developed by two different organizations (WHATWG and W3C). The original HTML and CSS specification are maintained by the W3C (World Wide Web Consortium). On the other hand, the WHATWG (aka the web Hypertext Application Technology) organization has been formed by

Apple, Mozilla and Opera and HTML5 specification was developed by the WHATWG. (Goldstein, Lazaris & Weyl 2011.)



Graph 1. HTML Page Structure Example (w3school 2014).

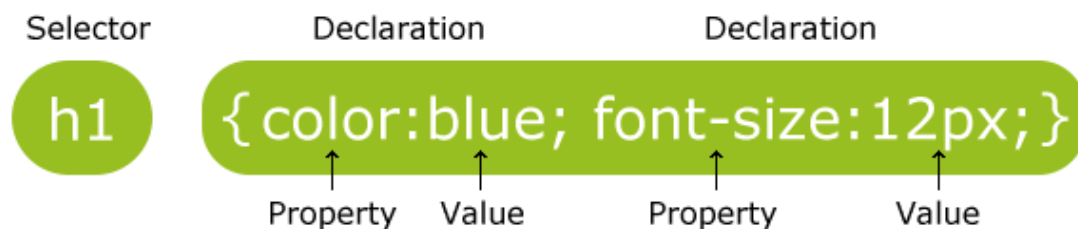
Graph 2 illustrates the structure of a HTML page. This structure is followed by the developer to make a HTML page. HTML tags are keywords surrounded by angle brackets, such as **<tagname>content</tagname>**. First tag and second tag with slash are called start tag and end tag respectfully. (w3school 2014.)

3.3.2 CSS3

Cascading Style Sheets (CSS) is a part of creating web pages. To present a stylish web page, CSS is used in HTML markup language. Actually, it describes regarding the layout and how elements are shown in the screen. Besides, CSS3 is the third level of the CSS specification and it is also the updated new version. All features of CSS2.1 version are included in CSS3. Drop shadows, animation, multiple

backgrounds, transparency and rounded corner are all new features supported in CSS3. (Goldstein, Lazaris & Weyl 2011.)

CSS code structures are made by a selector and a declaration block. The selector points indicate the HTML element to modify the style. One or more declarations are separated by semicolons in the declaration block and a CSS property and a value are separated by a colon in each declaration. Whole declaration blocks are surrounded by a curly braces and declaration always ends with a semicolon. (w3school 2014.)



Graph 2. CSS Syntax and Selector example (w3school 2014).

3.3.3 JavaScript

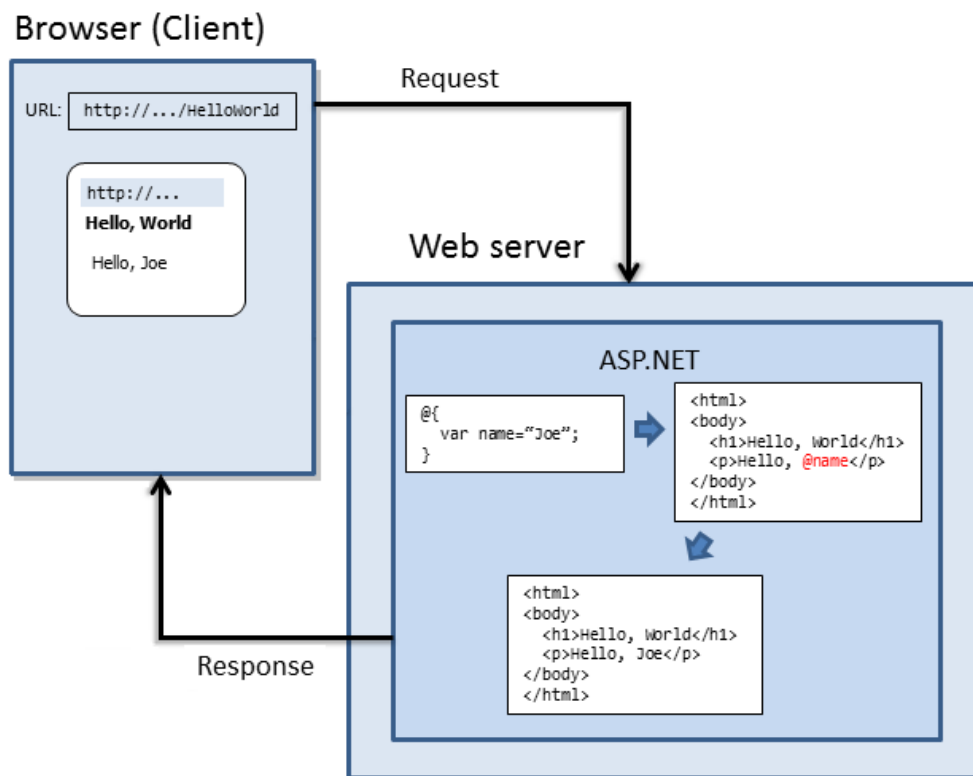
JavaScript is the most popular language among all programming languages and it is designed by Brendan Eich at Netscape as well. The short form of JavaScript is JS. It is the most well-known and powerful scripting language to the programmer due to the easiness and understanding. Moreover, JS is multi-paradigm scripting which is object oriented, dynamic and interpreted with first class function and it also helps to control web page behaviour. (Jsx 2015.)

Using JS in inside of HTML5 has been extended. Open a new window through clicking a button and control its appearance, for example print page window, resizing and scrolling window and blur and focus a new window. Screen, location and history object has been modified and updated JS, such as visitor's

screen, width, height and colour depth and location objects are used to get the current address of URL and history object helps to contain history in browser. Different kind popup boxes of browser, timing of current location and cookies all are created by JavaScript. (w3school 2014.)

3.3.4 ASP.Net

ASP.NET is also known as Classic ASP. It stands for Active Server Pages and was first used in 1998 to build Microsoft's first server side scripting engine. ASP is used in web technology to make web pages. It helps to enable scripts in web pages to be executed by an Internet server. ASP is a member of the .NET framework which is very valuable web tool for the web developers to construct rich and dynamic web pages. ASP.NET supports three different development models, such as Web Pages, MVC (Model View Controller) and Web Forms. ASP.NET pages have the extension .aspx, and are normally written in VB (Visual Basic) or C# (C sharp). (w3school 2014.)



Graph 3. How ASP.NET webpage works in browser (Adapted from FitzMacken 2014).

3.3.5 JQuery

In 2006, John Resig created and designed JQuery to use in JavaScript. It is not a language and it is fast, easy and concise JavaScript Library. The objective of JQuery is to write code shortly in JavaScript language for making a website. However, HTML, CSS and JavaScript language should know first before studying JQuery. HTML/DOM manipulation, CSS manipulation, HTML event methods, Effects and Animations, AJAX, Utilities features are contained in JQuery library. First of all, to install JQuery, JavaScript library needs to download from their official website. JQuery comes with a single JavaScript file and it is written between the HTML <script> tag. (w3school 2014).

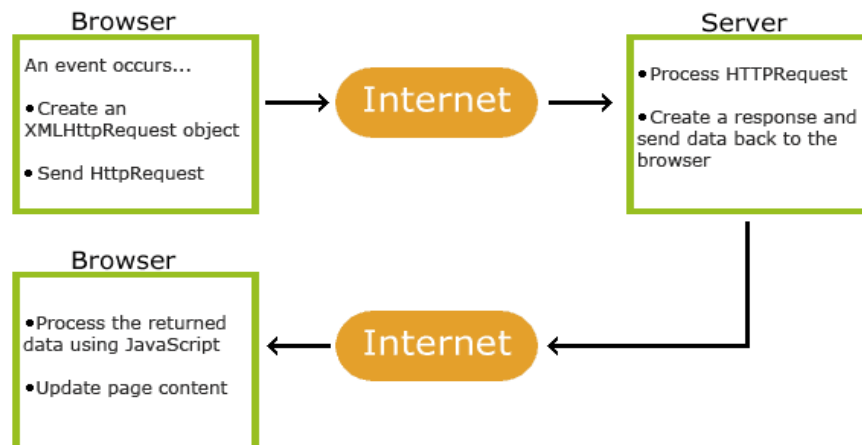
```
<head>  
<script src="jquery-1.12.0.min.js"></script>  
</head>
```

Graph 4. Source code of JQuery (w3school 2014).

3.3.6 AJAX

Ajax means Asynchronous JavaScript and XML and it is designed by Jesse James Garrett. It is not a programming language. AJAX is a concept of web development. Ajax is about exchanging and updating data in the server of a web page without refreshing the entire page. HTML and JavaScript languages are needed to learn first to acquire good knowledge of Ajax. At present, Ajax is getting popularity. It is used to make fast and dynamic web pages and some popular websites are using Ajax to make applications, such as Gmail, Google Maps, You Tube and Facebook. (w3school 2014.)

How AJAX Works



Graph 5. Ajax working process on Internet (w3school 2014).

3.3.7 Bootstrap

Bootstrap was created and developed by Mark Otto and Jacob Thornton, and it was released in August 2011. Bootstrap is the most popular framework of HTML, CSS and JavaScript language because it helps to build fast, dynamic and responsive websites. Bootstrap is used in HTML and CSS based design templates for forms, tables, buttons, navigations and optional JavaScript plugins. (w3school 2014.)



Graph 6. Website design using Bootstrap (Adapted from Admin 2013).

3.3.8 Python

At present, Python is the most popular programming language for the web. It was designed by Guido van Rossum. It is object-oriented, interpreted, functional and reflective programming language compare to java and .NET based languages. Design and syntax rules of this programming language are readable, portable and interactive language, which is easier to learn for the programmer. It is also regarded as a strong server side scripting language. (Smith 2013.)

There are following advantages of python. Python programming language is simple and quick to learn because its source code resembles the pseudo code. The code of python is well organized and the syntax is readable and clear for beginners and experts, they can bring more productivity very soon in Python. The community of Python always support the Python's users by giving free products. Python is not just for one operating system. Python program can be written in different operating system, such as Windows, MAC and Linux. It is based on object oriented language normally and scripting languages have different object-orientation support in the programming language. (Smith 2013.)

3.3.9 Java

Java is object-oriented based computer programming language. It is regarded as a "high-level" programming language because programmers can easily read and write the code of a java language. In addition, Java was created by a team which was led by James Gosling for sun microsystems. It was designed generally for using a cell phone. However, when it was released first to the public in 1996, its main focus was using on the internet. (Leahy 2014.)

Java language has several significant utilities which is so appreciated by the programmer. C++ is object oriented based and powerful language and the fundamentals of java came from this C++ programming

language. Java was mainly targeting application of mobile devices that would be exchanging data over networks. Moreover, Java is the most secure language because it was built to include a high level of security. Java is a portable language, it can be written by any operating system of the computer. (Leahy 2014)

3.3.10 PHP

PHP means Personal Home Page. It was created by Rasmus Lerdorf in 1994, it is a popular general purpose and server side programming language that is designed for web development. Furthermore, PHP is fast, flexible and pragmatic language. Most popular websites was created by PHP language, such as Facebook, Yahoo, Gmail and Wikipedia. (Goel 2014.)

There are significant advantages of PHP. PHP is totally open source, it is free to use and easy to get. People can easily use it without paying any license fees because it is freely distributed by Apache-style license. The community of PHP users and developers is very large and they are most fluent in PHP language. There has a website named php.net and it is very useful website. People can find their solution of different kinds of PHP related problems. PHP uses the syntax of C programming language who are good in C programming language, they can easily acquire the knowledge of PHP language. PHP can run in any other operating system, such as Windows, MAC and UNIX. It supports major web servers; for example Apache, Microsoft IIS and Netscape servers. PHP is flexible, powerful and user friendly, it is more comfortable to use than other language. (Goel 2014.)

3.3.11 MYSQL

MySQL was originally created by a Swedish company, MySQL AB. It was acquired by Oracle in 2008. MySQL is the most popular open source relational database management system based on Structured

Query Language which helps to modify, add or remove data in the database system. MySQL runs on all operating systems and it is mostly associated with web based applications. PHP web scripting language is used to change information of various data in MySQL database. (Rouse 2013.)

The benefits of using MySQL is a lot. It is easy to use, portable and fast and it can be run in multi-platform database. People do not need to spend money to buy this software or license key because it is free software. Multiple users can run MySQL database without facing any problems. It has a good security features and administrative tools. MySQL can be integrated with different kinds of existing programming languages. (dickyibrohim 2015.)

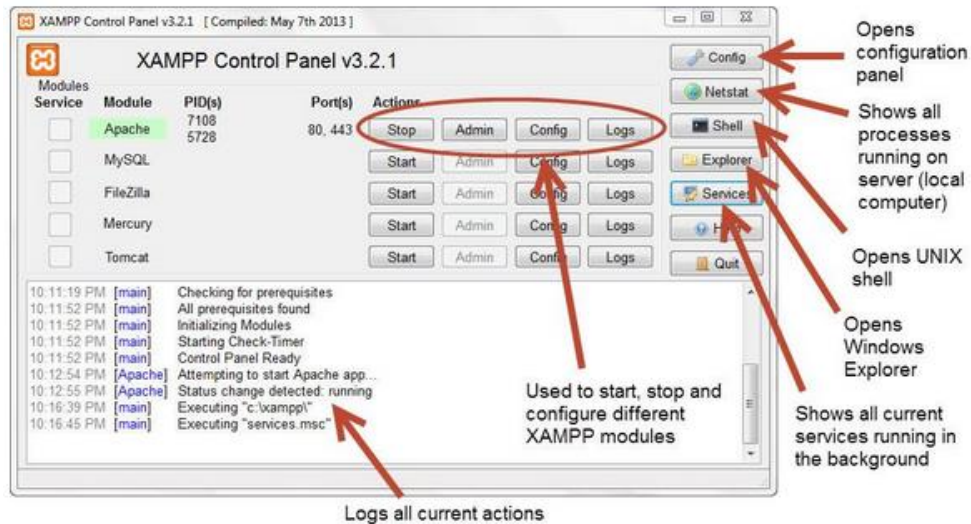
3.3.12 XAMPP

XAMPP was created by Apache friends. It stands for Cross-Platform (X), Apache (A), MySQL (M), PHP (P) and Perl (P). It helps to create a local web server for developers and they use it for their testing purposes. Apache, MySQL and PHP language are needed to make a web server but all those are included in a simple XAMPP file. XAMPP equally works on Windows, Mac and Linus because it is cross platform product. Users create a local test server through XAMPP for testing their website. (Mikoluk 2014.)

There are four important components in XAMPP. Firstly, Apache is the most used web server application and web contents are delivered and processed by this Apache to a computer. Almost 54% of websites are using Apache because it is one of the popular web server. Secondly, MySQL is a database and a database connection needed for collecting data to make a web application. It is easy to create a database by using MySQL. It helps to add, remove and modify data in a web server. Thirdly, PHP is web programming code. Apache should start from XAMPP control panel to run PHP code in web server.

At last, Perl is a dynamic programming language and it is used in network programming and system admin.

(Mikoluk 2014.)



Graph 7. XAMPP control panel (Adapted from Mikoluk 2014).

3.3.13 Web hosting

Web hosting is a service provider of posting web pages on the internet where all websites are stored in the computer. If web pages are hosted by any web hosting site, then anyone can access that website through internet. A web page is constructed by several bunch of files written in programming code. All of these files are saved in a web server and that can be accessed by someone's browser. When someone write a domain name of any website in the address bar, the browser pulls the stored files from the web server and translates the code into the web page. (Tussenbrook 2015.)

There are different kinds of web hosting services for a website. Free web hosting has its own limits. This is free because the host try to earn money in other way and the host always give some extra services and publish exterior advertisements for buyer so that they are pushed to buy some services. In addition, a

connection speed between the webpage and the server work slowly and most of the time website may be down. (Reeves 2012.)

Shared hosting means that one server is shared by two or three website owners. It is the most common and cost effective web host because it is affordable and easy to manage. Shared hosting cost less than other web host almost \$10 per moth and Clients get quick response of browsing the website. Many small e-commerce and blog websites use shared hosting. (Reeves 2012.)

Dedicated hosting is the most secure host because the entire web server is fully used by the owner of one website without any sharing of the server. For this reason, its performance is fast. Website owner needs a lot of system resources and standard server maintenance system to use dedicated web hosting. Large e-business sites, data streaming sites and high-volume informational sites need the dedicated hosting server for optimal performance. (Reeves 2012.)

Cloud hosting is another division of web hosting. It is same as dedicated web hosting because it has also its own server but the main difference is when this server goes down or does not work, cloud hosting takes help of the virtual server. Virtual server design meets the needs of a websites. The cost of cloud hosting is very low compared to its service and it is approximately \$50 per month. (Reeves 2012.)

3.4 Web content management system

A management system is used to keep update and maintain of a website and it is called content management system (CMS). It is a computer software used to change, create, modify and manage the content of a website. News articles, blogs and marketing brochures of a website are needed to change or update frequently. CMS helps to change or update the contents of a website. Website visitors always get

update information and it pushes them to repeat browsing of a website. Nowadays, Drupal, WordPress and Joomla are the most popular web content management systems. (Maran 2008.)

3.4.1 WordPress

WordPress is the most popular web content management system site where different kinds of tool help to create and manage a website. Without any coding and design skills of making a website, anybody can build a website by the site of WordPress. Nothing need to install in the computer to run a website of WordPress. Only internet connection is enough to update a website. It is an open source software and users can chose any design (known as “themes” in the WordPress), and chosen themes can be modified or changed because the source code is with the design. WordPress.org is the official website of WordPress. People can use free domain name from WordPress.com or they can use their own domain name by offering very low cost. WordPress is very convenient way to maintain a whole website system. That is why people are using willingly WordPress and the users are also increasing day by day. (Biglione 2016.)

3.4.2 Joomla

Joomla is the award winning site among other content management systems. It is a free open source to publish content for the WWW (World Wide Web). In addition, PHP language and Object oriented programing (OOP) style are used to create Joomla. It is free, flexible and easy to install. People can easily use Joomla tools. Using of Joomla are increasing nowadays among blogs, e-commerce sites, small and large companies and news stie also. (Themes 2011.)

3.4.3 Drupal

Drupal is another free open source content management system, it is one of the top three most familiar CMS. Personal website, blogs, social sites and e-commerce sites are built by Drupal. A large and dynamic community is working behind the Drupal system. They are always working to update the tools of Drupal. People easily get content related solution of a website from the specialists and the contributors of Drupal. (admin 2014.)

4 WEB APPLICATION DEVELOPMENT PROCESS

The construction or development of a website consists of various steps and phases of web based system development. All steps and phases should be defined so that developers can follow all steps. It is difficult, challenging and complex to construct a website without following any steps. In addition, some evolutionary steps are followed to make easier this process for web development. However, the purpose of this research is to construct an e-commerce website where it shows how this project follows all the development phases.(Suh 2005, 10-11.)

4.1 Conceptualize and Gathering Idea

Every website has its own concept and idea. The concept should be clear why or for what reason this website need to build. All in all, the purpose of a website should also be specific and it will help to reach the goal. Good strategy need to follow for increase the audience and to bring back visitors. Moreover, targeting a group of people or audience will help to increase visitors. Then, planning for the essential content will clear audience about information of ordering, a particular service or product. (Robbins 2007, 404-405.)

Electronic online store website will be created here. At present, users of electronic products is increasing. They always want to use all kinds of electronic products. This website is for the ones who are willing to introduce new electronic products in a very little price. People could sell second-hand or firsthand products through this website like eBay and Amazon. This website will provide information about the product, shipping method and cost. Different aged people will be able to use this website.

4.2 Development of E-Shop

Every project goes through the several phases and it finishes in time with great success. Electronic online store website will be developed here by following few important phases. This important steps will be explained and showed to build this E-Shop web page in the proper way. It will be easy to create desired web page of E-Shop by following this phase.

4.2.1 Planning and Requirement

After understanding the concept and generating idea of a website, the next phase is making a plan for building a website. In this planning section, few requirements need to establish for the clients, such as search capability, mobile site design, tabbed menu navigation, interaction with content management system and other necessary web tools that will help the desired outcome for the website. Another important requirement is to gather and to organize the appropriate functionality in the content of a website. Moreover, a website logo, title, text, pictures, video and audio are the examples of contents. Gathering this all kind of content is very important work before designing the website. (Shelly, Woods & Dorin 2009, 12-13.)

It is an online shop store website and this website is about the whole concept of constructing an ecommerce website. That is why all necessary contents are downloaded from the internet for the purpose of the site, such as a website logo, the image of electronic products and information. All contents are needed to organize after collecting the resources.

It is essential a text editor to write web code like HTML5, JavaScript and PHP. Recommended text editors for Windows are Dreamweaver, PSPad, TextPad and EditPlus but most of the developers use Notepad++ for their work easier. In addition, API of JavaScript and few HTML5 features are required

in the web server. APACHE or IIS is needed to install in computer for establishing a web server, but there are many open source software that helps to build a web server, for example XAMPP and WAMP. (Robson & Freeman 2011, 28-29.)

Appropriate and right tools are needed to use for organizing all contents. Professionals or developers use different kinds of web tools to construct the website. Notepad++ have been used here as a web editor and XAMPP software is installed to make the web server and run PHP file. The full project will be created on the computer and it will be transferred or uploaded lastly via FTP in the web server. In addition, there is another way to run the web file; for example, buying a domain name and disk storage space on the internet of a server with PHP service.

4.2.2 Designing

After determining the purpose and defining the content and functionality of the website, the third phase is website design. There are some keys which is defined how to form the content of web pages, selecting the right structure, using multimedia in web pages and making perfection for an international audience. Developers follow many ways to organize a web page. Some organizational standards are listed in table given below for creating a web page, this is easy to read and navigate. (Shelly, Woods & Dorin 2009, 14-15.)

Element	Organizational Standard	Reason
Titles	Use simple titles that clearly explain the purpose of the page	Titles help users understand the purpose of the page; a good title explains the page in the search engine results lists
Headings	Use headings to separate main topics	Headings make a Web page easier to read; simple headlines clearly explain the purpose of the page
Horizontal Rules	Insert horizontal rules to separate main topics	Horizontal rules provide graphical elements to break up Web page content
Paragraphs	Use paragraphs to help divide large amounts of text	Paragraphs provide shorter, more-readable sections of text
Lists	Utilize bulleted or numbered lists when appropriate	Lists provide organized, easy-to-read text that readers can scan
Page Length	Maintain suitable Web page lengths	Web users do not always scroll to view information on longer pages; appropriate page lengths increase the likelihood that users will view key information
Information	Emphasize the most important information by placing it at the top of a Web page	Web users are quick to peruse a page; placing critical information at the top of the page increases the likelihood that users will view key information
Other	Incorporate a contact e-mail address; include the date of the last modification	E-mail addresses and dates give users a way to contact a Web site developer with questions; the date last modified helps users determine the timeliness of the site information

Graph 8. Web Page Organizational standard (Adapted from Shelly, Woods & Dorin 2009, 14-15).

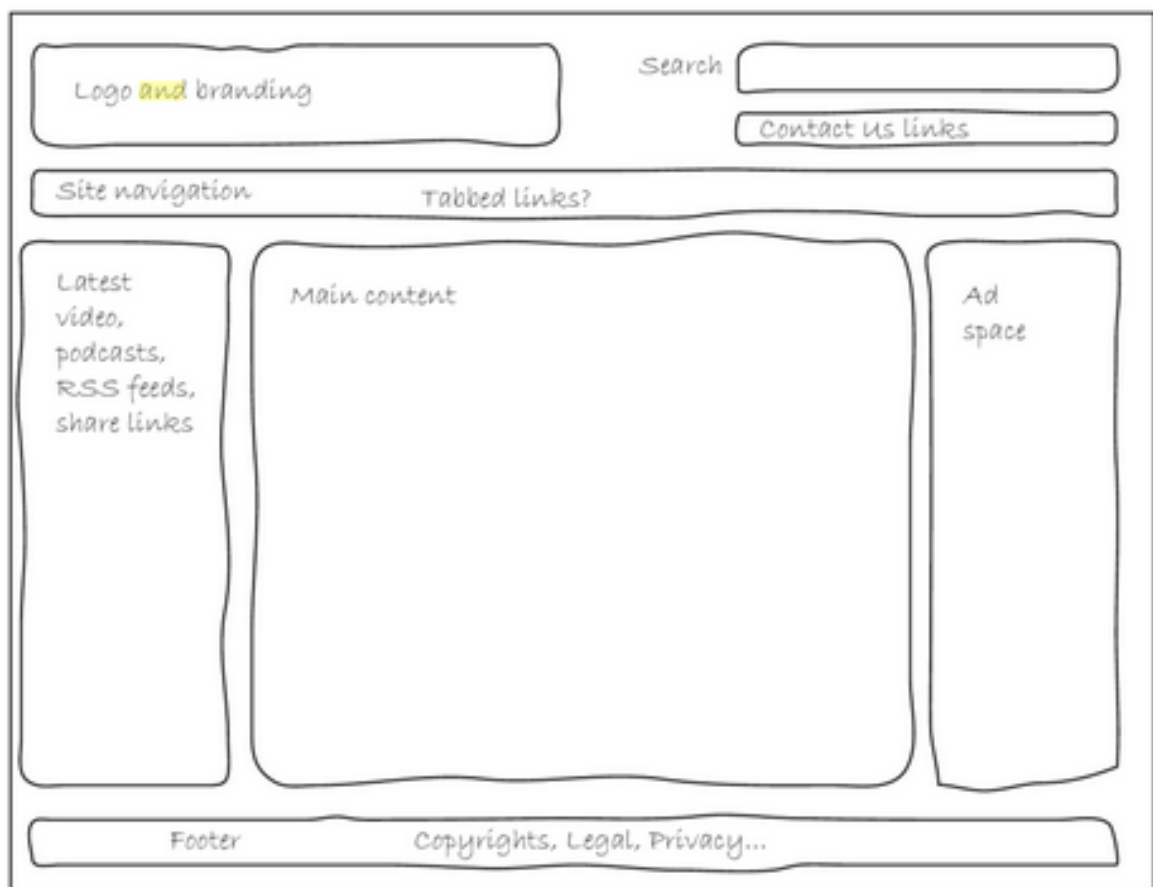
4.2.3 Information Design and Taxonomy Creation

In this phase, the designers are guided by user analysis and the site content of different organizations are prepared and tested by them. The main purpose of this stage is to organize an unstructured site content in a way which is more easier to navigate and meaningful for the user. Moreover, different kinds of site information which is known as a taxonomy are developed by the designers in this phase. Taxonomy mainly refers to the classification and content name in a hierarchical structure. Different aged people can navigate the taxonomy of site information in accordance with their interests and needs. They also get connected with each other through the taxonomy of the site information. A menu system, navigation and topic section names of the content site are reflected by the taxonomy creation. (Sklar 2011, 108-109.)

4.2.4 Graphic design and page template creation

During this phase, designers are designing the site information and at the same time, design sketches and page mockups are prepared to represent or organise page layout in simple way that will be used to

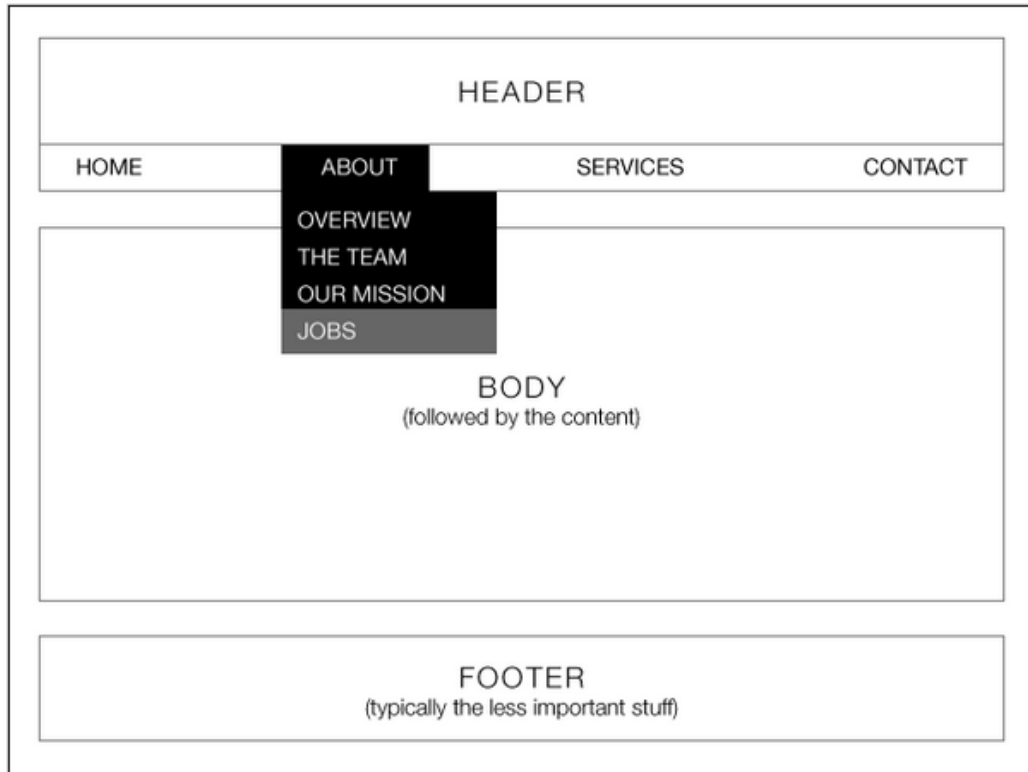
make site information. In addition, sketching of desired web design is called mockup that is usually used to start making the page layout. Designers show their page layout mockups to the web design stakeholders to discuss and deep analysis for making the real design. Creating a mockup for each page layout in the web design, helps to build a full website in a short time. One sketching of a web site home page shows in graph 9 below. (Sklar 2011, 108-110.)



Graph 9. Web Page Mockup (Adapted from Sklar 2011).

Designers can change or edit these mockups based on feedback from the design team. Using more graphical elements on mockup to make sharper structure and site content of web site is called wireframe. It is also known as a skeletal framework of a website. In addition, a wireframe is more complete version of a page layout. Searching options, advertising space, navigation function and other elements are included sometimes in wireframe. Wireframe gives a complete view of the web site to the stakeholders,

it shows them what the final web site will look like. Wireframe figure of a web site home page shows in graph 10 below. (Sklar 2011, 108-110.)



Graph 10. Wireframe of a web site (Adapted from Lim 2012).

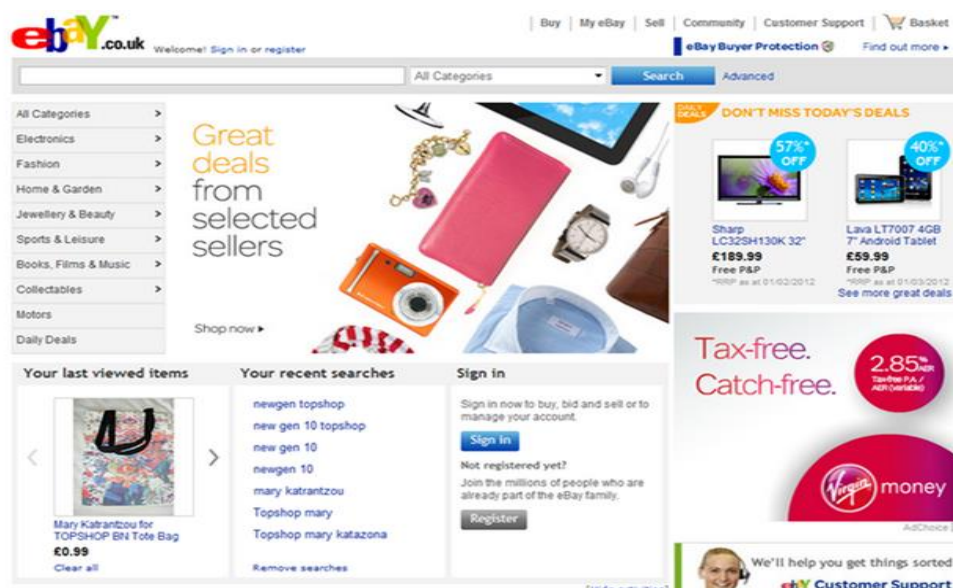
Graph 10 represents the wireframe of a web page. After creating mockup page, wireframe is drawn by in paints or AutoCad. Main page of a website depends on the design of a wireframe.

5 IMPLEMENTATION PROCESS OF E-SHOP

This is the most hard core stage to build a website. Web developers use their programming code to create successfully a web site. They will add code with web design elements. In addition, web programmer will execute the outcomes of all previous stages. In this phase, the programmers and designers need their own skills with extra creativity and they will show their whole activity by constructing a dynamic desired website. Besides, a developing team is needed to build a full website for a large company or enterprises. Furthermore, building a website for a small company do not require large number of developers. It can be developed by small number of developers or an individual.

5.1 Front end design

All web programming languages like HTML, JavaScript, CSS, JQuery are included in front end design. Web developers use all these languages to create different layouts and design websites. As it is an ecommerce website, all products of this website will be displayed in the home page. Different product images are used with CSS code to build this web page. Developers need to think about the easy navigation of website so that different users can easily navigate the website. So, it is essential to use CSS style with HTML elements. It helps clients to find their desired products.



Graph 11. eBay web site (Adapted from Missmeasured 2012).

Graph 11 illustrates a famous and renowned website home page named ebay.com. They use website logo, footer, header, side menu bar navigation and main body in their website. The navigation of eBay website is easy for customers and client can easily find their products. In addition, important links and ad banners have been added with other contents of the website.



Graph 12. Online shop website main page.

Graph 12 represents an online store website of electronic products. All products are displayed in the main body and product images are surrounded by square shaped lines. Product prices, details and add to cart has been added in below of picture and footer, header, menu bar, side bar, logo, background colour

and navigation of website all are created and designed by using HTML with CSS style. This website is user friendly, anybody can search or find their desired product.

```

<html>
<head>
<title>My Online Shop </title>

<link rel = "stylesheet" href="styles/style.css" media="all" />

</head>

<body>
  <div class = "main_wrapper">
    .....
    <div class ="header_wrapper">
    <a href="index.php"> <img id="logo" src ="images/4.jpg" /></a>
    <img id="banner" src ="images/2.jpg" />
    </div>
    <div class = "menubar">
    <ul id ="menu">
    <li><a href="index.php">Home</a></li>
    <li><a href="all_products.php">All Products</a></li>
    <li><a href="customer/my_account.php">My Account</a></li>
    <li><a href="registration.php">Sign up</a></li>
    <li><a href="cart.php">Shopping Cart</a></li>
    <li><a href="contact.php">Contact Us</a></li>
    </ul>
    <div id="form">
    <form method="get" action="results.php" enctype="multipart/form-data">
    <input type="text" name="user_query" placeholder="Search Product"/>
    <input type="submit" name="search" value="Search"/>
    </form>
    </div>
  </div>

```

Graph 13. Main page HTML code.

Graph 10 shows the HTML code of the main page. Title of website and external CSS style has been added to create this website design. All products, customer accounts, shopping cart and contact information of the company are added in the menu bar by using HTML code.

5.2 Developing CSS

CSS style is followed with HTML code beginning of the creating a website. Designers and developers start to design a page in the designing stage, they change or create a new design, if it is necessary to add more later, then they also can change for user friendly. Ultimately, developers want to execute efficient design by using CSS code. The following CSS web code has been used in making this online website. . CSS code of a web site home page shows in graph 14 below.

```
body {background: orange;}
.main_wrapper {
width:1000px;
height:auto;
margin:auto;
background:black
}
.header_wrapper{
width:1000px;
height:100px;
margin:auto;

}
#logo{float:left;
width: 200px;
height: 100px;
}
#banner{float:right;
width: 80%;
height: 100px;
}
.menubar{
width:1000px;
height:50px;
color:white;
background:gray;
}
#menu {
padding:0;
margin:0;
line-height:40px;
float:left;
}
```

Graph 14. Main page CSS code.

Graph 14 shows the CSS code of the main page. Above CSS code is the last edited CSS style of the website. Developers can change the design at any time according to their necessity. CSS style has been used little beginning of the project and CSS code was more developed with HTML elements during the creating this webpage.

5.3 Adding Links

Links and images are used to open different pages from main page and it is the most important points to create a website. In addition, anchor tag (<a>) is used to make the link in images or menu items. The following Graph 11 shows the HTML code of adding a link to create this web page.

```
<body>
  <div class = "main_wrapper">
    ...
  <div class ="header_wrapper">
    <a href="index.php"> <img id="logo" src ="images/4.jpg" /></a>
    <img id="banner" src ="images/2.jpg" />
  </div>
  <div class = "menubar">
    <ul id ="menu">
      <li><a href="index.php">Home</a></li>
      <li><a href="all_products.php">All Products</a></li>
      <li><a href="customer/my_account.php">My Account</a></li>
      <li><a href="registration.php">Sign up</a></li>
      <li><a href="cart.php">Shopping Cart</a></li>
      <li><a href="contact.php">Contact Us</a></li>
    </ul>
    <div id="form">
      <form method="get" action="results.php" enctype="multipart/form-data">
        <input type="text" name="user_query" placeholder="Search Product"/>
        <input type="submit" name="search" value="Search"/>
      </form>
      ...
    </div>
  </div>
</body>
```

Graph 15. Adding links.

5.4 Back end design

If front end design is hardware, then back end design can be compared with software. Both software and hardware are needed to run a computer. In addition, front and back end design are also needed to run the whole website without any problems. Furthermore, MySQL, Apache, Asp.net and PHP all are included in back end development. After finishing front end design, developers start working with database, server, PHP and other languages. There are three most popular web server, such as XAMPP, WAMP and LAMP. For convenience this project, XAMPP web server has been used in the whole project.

5.5 Establishing Database Connection

It is necessary to connect the database with PHP code to run PHP code,. The hostname, database username and password and database name are needed in the PHP script to connect with the data server. The following PHP script is for connecting with the data server.

```
<?PHP
$con = mysqli_connect("localhost","root","","onlineshop");

if(mysqli_connect_errno())
{
echo "Failed to connect to MySQL:" .mysqli_connect_error();
}
?>
```

Graph 16. Database connection.

5.6 Inserting product in Database server

All product items should be saved in the database and all these items will be displayed in the web page. One admin panel has been created so that all products can be inserted by this PHP script admin panel. The following PHP code has been used to create this inserting product webpage.

Insert New Post Here	
Product Title:	<input type="text"/>
Product Category:	Select a Category ▾
Product Brand:	Select a Brand ▾
Product Image:	Browse... No file selected.
Product Price:	<input type="text"/>
Product Description:	<div style="border: 1px solid #ccc; padding: 5px;"> <div style="border-bottom: 1px solid #ccc; padding-bottom: 5px;"> File ▾ Edit ▾ View ▾ Format ▾ </div> <div style="padding: 5px;"> ← → Formats ▾ B <i>I</i> ≡ ≡ ≡ ≡ ≡ ≡ ≡ ≡ ≡ ≡ </div> <div style="padding: 5px; min-height: 100px;"> <p>p</p> </div> </div>
Product Keywords:	<input type="text"/>
<input type="button" value="Insert Product Now"/>	

```

<?php
if(isset($_POST['insert_post'])){
$product_title = $_POST['product_title'];
$product_cat = $_POST['product_cat'];
$product_brand = $_POST['product_brand'];
$product_price = $_POST['product_price'];
$product_desc = $_POST['product_desc'];
$product_keywords = $_POST['product_keywords'];

$product_image = $_FILES['product_image']['name'];
$product_image_tmp = $_FILES['product_image']['tmp_name'];

move_uploaded_file($product_image_tmp,"product_images/$product_image");

$insert_product = "insert into products
(product_cat,product_brand,product_title,product_price,
product_desc,product_image,product_keywords) values
('$product_cat','$product_brand','$product_title',
'$product_price','$product_desc','$product_image','$product_keywords')";

$insert_pro = mysqli_query($con, $insert_product);
if($insert_pro){
echo "<script>alert('product has been inserted!')</script>";
echo "<script>window.open('insert_product.php','_self')</script>";
}
}
?>

```

Graph 17. Insert product in the database.

Graph 17 shows the PHP code with database connection and admin panel page. Admin can insert or delete products from this page.

5.7 User Registration and Log in

After adding product in the cart, a customer needs to register and log in for ordering their desired product. They fill up the sign in form and press sign up button. When the registration is complete, it will show “you are successfully registered”. That means users’ all information is successfully saved in onlineshop database table. If all information is stored in the users table, then the registration is successfully completed. The function of registration PHP code has shown in graph 18 below with webpage and phpMyAdmin.

```

<?php
mysql_connect("localhost","root","");
mysql_select_db("onlineshop");
if(isset($_POST['submit'])){
    $user_name = $_POST['name'];
    $user_pass = $_POST['pass'];
    $user_email = $_POST['email'];

    if($user_name==''){
        echo "<script>alert('Please Enter Your Name')</script>";
        exit();
    }
    if($user_pass==''){
        echo "<script>alert('Please Enter Your Password')</script>";
        exit();
    }
    if($user_email==''){
        echo "<script>alert('Please Enter Your Email')</script>";
        exit();
    }
    $check_email = "select * from users where user_email = '$user_email'";
    $run = mysql_query($check_email);
    if(mysql_num_rows($run)>0){
        echo "<script>alert('Email $user_email is already exist,
Please try another email')</script>";
        exit();
    }
    $query = "insert into users (user_name,user_pass,user_email) values
('$user_name','$user_pass','$user_email)";
    if(mysql_query($query)){
        echo "<script>window.open('index.php','_self') </script>";
    }
}
?>

```

Graph 18. PHP code of registration function.

Home All Products My Account Sign up Shopping Cart Contact Us

Categories Welcome and Thanks for choosing us

Laptops Shopping Cart Total Item:4

Cameras

Mobiles

Computers

Brands

HP

DELL

LG

Samsung

Registration Form

User Name:

User Password:

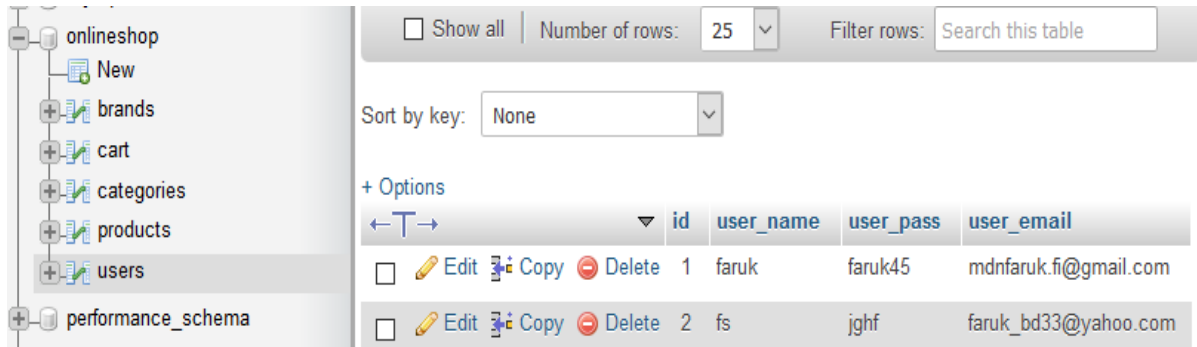
Email:

Successfully Registered

[Login](#)

Graph 19. User registration page.

Graph 19 shows the user registration form page. Customers can sign in or open an account from this page. They will write their name and password. After pressing sign up button, customer account will be created automatically.



	id	user_name	user_pass	user_email
<input type="checkbox"/> Edit Copy Delete	1	faruk	faruk45	mdnfaruk.fi@gmail.com
<input type="checkbox"/> Edit Copy Delete	2	fs	jghf	faruk_bd33@yahoo.com

Graph 20. User information in onlineshop database.

After completing the registration, the user can log in through email address. If user write correct email address and password, only then he/she can successfully log in. Otherwise, it shows “invalid information” and the user cannot be logged in. When user click log in, PHP code helps to connect with the database and it finds matching from users table of database. If matching is true, the log in is successful. Here, POST method means \$_POST associative array has been used in source code of login.php.

```

<?php
mysql_connect("localhost","root","");
mysql_select_db("onlineshop");

if(isset($_POST['login'])){

    $password = $_POST['pass'];
    $email = $_POST['email'];

    $check_user = "select * from users where user_pass = '$password ' AND user_email='$email'";
    $run = mysql_query($check_user);
    if(mysql_num_rows($run)>0){
        echo "<script>window.open('index.php','_self') </script>";
    }
    else {
        echo "<script>alert('Email or Password is not Correct')</script>";
    }
}
?>

```

Graph 21. Users' Login PHP source code.

5.8 Shopping basket

Shopping basket or cart is the main function of an e-commerce website. All kinds of online shopping webpages use this cart system of the product selling. In addition, consumers add product in the shopping basket before buying the product online. They can edit the shopping cart, for example increasing the quantity of products, remove products and add products. In addition, database connection is also needed to create the shopping cart because all information of products are stored in the cart table, for instance the product title, image, price and description.



Graph 22. Shopping cart page.

The navigation of shopping cart page makes easier to buy products from the online store. The following code is PHP cart function code. At first, shopping cart web page get connected with database through the PHP code and then consumers can update cart, continue shopping and checkout also by the PHP code of the cart function.

```

<?php
$total =0;

global $con;
$ip =getIp();
$sel_price = "select * from cart where ip_add='$ip'";
$run_price = mysqli_query($con, $sel_price);
while($p_price = mysqli_fetch_array($run_price)){
$pro_id = $p_price['p_id'];
$pro_price = "select * from products where product_id='$pro_id'";
$run_pro_price = mysqli_query($con,$pro_price);
while($pp_price = mysqli_fetch_array($run_pro_price)){
$product_price = array($pp_price['product_price']);
$product_title = $pp_price['product_title'];
$product_image = $pp_price['product_image'];
$single_price = $pp_price['product_price'];
$values =array_sum($product_price);
$total +=$values;

?>
<tr align="center">
<td> <input type ="checkbox" name="remove[]" value="<?php echo $pro_id;?>" /></td>
<td> <?php echo $product_title; ?> <br>

</td>
<td><input type ="text" size="4" name="qty" value="<?php echo $_SESSION['qty'];?>" />
</td>

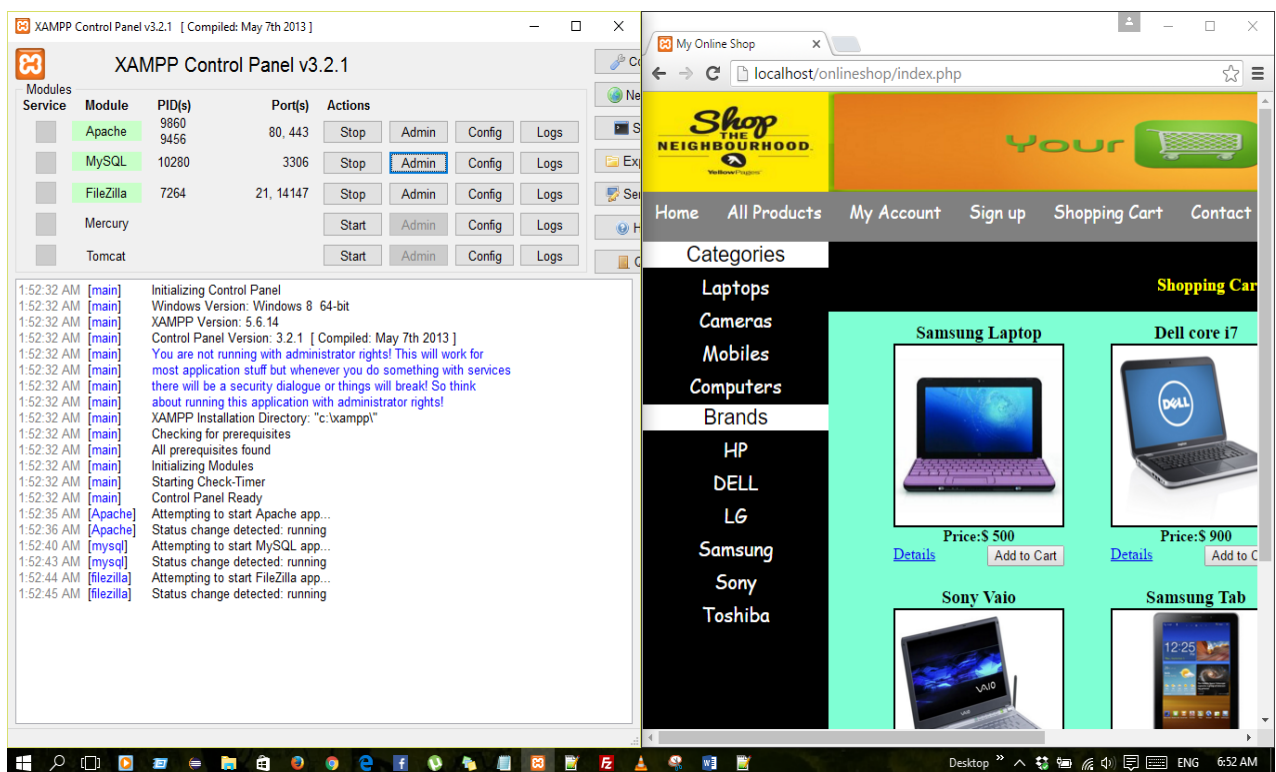
<?php
if(isset($_POST['update_cart'])){
$qty =$_POST['qty'];
$update_qty="update cart set qty ='$qty'";
$run_qty = mysqli_query($con, $update_qty);
$_SESSION['qty']=$qty;
$total = $total*$qty;
}
?>
<td> <?php echo "$" . $single_price;?></td>
</tr>
<?php } } ?>
<tr>
<td colspan = "4" align="right"><b>Sub Total:</b></td>
<td><?php echo "$" . $total;?></td>
</tr>
<tr align="center">
<td colspan = "2"><input type ="submit" name="update_cart" value = "Update cart" /></td>
<td><input type ="submit" name="continue" value = "Continue Shopping" /></td>
<td><button><a href = "checkout.php" style="text-decoration:none; color:black">
Checkout</a></button></td>
</tr>
</table>
</form>

```

Graph 23. PHP code of shopping cart.

5.9 Website Testing

After constructing the full website, it is important to test the website. Different kinds of problem can be arisen when a website is run in the browser without testing the website. Furthermore, it is necessary to test a website in various phase of the website development process. There are several following steps to test website. Firstly, a website needs to open in multiple browsers because it is essential to observe that the website is working same in all browser. Secondly, the load timing of a webpage is important. It should be quick loading, even in lower connection speeds. Different forms and other elements of page needed to test. Checking the page links, need to ensure that links are not broken and working properly. Graphics should be checked that it appears properly. Each page should run on web server. Database connection checking and different kind of functional test is also needed, such as shopping cart, registration and login. Proofreading of page titles and content to review for correct spelling and grammar. Usability testing should be by a software. (Shelly, Woods & Dorin 2009.)



Graph 24. XAMPP service running and main page testing.

Graph 24 illustrates that the main page is tested through XAMPP server and this main page has been opened in the browser without any complication. XAMPP server image shows that server is running and online main page is also running in browser.

6 CONCLUSION

It is really difficult to start a website project without accurate thinking and appropriate planning. It is needed to make proper planning before starting the project which will make easier to finish the project in short time. This web construction process is formed through several important stages. By following these phases, building a website is easy, effective and faster. In addition, the concept of the website should be clear and website related information need to be collected. After making the plan, developers give more focus on designing the website. Developers use different kind of web tools with web programming languages to create a desired design of website. In this stage, they need to spend more time than other stages and it is also challenging for them. When their design is complete, they start working on the implementation stage and they are able to get accurate results of building the website. It means website is ready for browse. Lastly, construction process is completed through the website testing. If everything is working well, then the website is ready to use.

The created website project is for learning a building ecommerce store in a simple way and it also introduces new web technology tools. The thesis project will be more modified or developed in the future. Upcoming and existed new web tools will be used in this website. Some extra features will also be added for user friendly to the customers.

In last few years, the technology of World Wide Web has been developed by the developers. For this reason, constructing a website has been easier for the developers. In addition, developers use many different web tools to build a website. Choosing a suitable method to build a website is challenging and harder decision for them. At present, developers are using new software and web tools to get perfection of a building website.

To conclude, the overall idea of an ecommerce website has been presented in this thesis. New features and web tools are used to construct this website to get good understanding with that tools. Acquiring knowledge of building a website will be an advantage so that the author can use this experience in different places to make more dynamic webpages in the future.

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