

A STUDY ON WEBSITE DESIGN AND PROGRAMMING

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PART A

TECHNOLOGY

1.1 PROGRAMMING

1.1.1 WHY PROGRAM A COMPUTER?

Computers are General Purpose Machines. Unlike Single Purpose Machines, this means that they are machines made for General Purpose Use. In this way, a computer should perform complex calculations (its initial purpose), play and make music, do drawings, etc.

Unless the manufacturers are God, it is impossible to determine what the user intends to use this general purpose machine for. However, a general purpose machine should be able to serve all purposes to earn the name, General Purpose Machine.

In order to achieve the aim of general purpose, users must then buy the computer and tell the computer what it should do for them. In order to achieve this, users, program the computer.

Now, programming a computer requires vast computer knowledge and skill so a profession is made for people willing to learn this skill to program computers on behalf of its users. In many cases as you know, programs are written by programmers to achieve a particular purpose amongst the many purposes and these programs can be acquired and installed in the computer.

1.1.2 PROGRAMMING LANGUAGES

Programming a computer is like giving the computer instructions to carry out. These instructions can be written the way a recipe or instruction manual is written; one statement at a time, telling the computer which actions to take in its right order so the intentions of the user can be achieved.

These instructions are usually referred to as software and like human instructions, a language is needed to communicate these instructions to the computer. These instructions are usually called ***Programming Languages***. Numerous programming languages have been formulated to aid software writing over the years and have had numerous names. Some of these programming languages were designed to address particular problems and/or tasks as they seem to be more suitable for instructing the computer in certain things. The most popular of these programming languages are B.A.S.I.C., C++, Java, Visual BASIC, Pearl, COBOL, SQL, Markup Languages (such as HTML, XML, WML, etc.), etc.

Hence, in order to instruct a computer in a particular programming language, a programmer must properly understand and know how to instruct the computer in that particular programming language.

1.1.2.1 PROGRAM LANGUAGE INTERPRETERS AND COMPILERS

Unlike human beings, computers are not able to directly understand instructions the way we do. This will someday be possible; perhaps in the next two generations or so, it is expected that Artificial Intelligence would have been developed and implemented properly.

In order to write a computer program, an interpreter or compiler program is required. What an interpreter or compiler program does is convert your instructions in the particular programming language and convert them to machine instructions which the computer will be able to execute. Each programming language has its own interpreter or compiler depending on the intentions of the programming language designers.

It is however important to note that each programming language always has either an interpreter or a compiler.

Interpreters and compilers work in different ways but do the same thing. A programming language interpreter reads the instructions one statement at a time and makes the computer execute each statement it reads, as it reads it. A compiler on the other hand, converts the entire instructions to machine readable instructions and stores them in a computer file. The user may however use this file directly and the computer will be able to execute all the instructions contained in it.

1.2 WEBSITE DESIGN

The **World Wide Web** (or simply the "**Web**") is a system of interlinked, hypertext documents that runs over the Internet. With a Web browser, a user views Web pages that may contain text, images, and other multimedia and navigates between them using hyperlinks (Wikipedia, 2008).

Website design however is the act of using Markup Languages, Images or newly, animations to construct a web page. The Markup Language describes the way things are displayed in the web page which includes text, images and/or animations.

Website design has become more and more popular as the demand for websites have grown immensely. Website design is an art, as well as a science. It basically involves using code and graphics to design web pages for the World Wide Web.

1.2.1 HOW WEBSITES WORK

First of all, you must understand that the World Wide Web is different from the internet. The World Wide Web is a collection of resources and web pages connected via the internet. In order to understand how websites work, you must already be a web user and this section assumes so. For the sake of this section, the *client computer* is the computer being used to surf the web and the *web server computer* is the computer having the website to be visited. Websites work in the following procedures;

- The user enters the URL (Uniform Resource Locator) / Domain Name / Website Address into the address bar of the browser and requests the web page at that address.
- The browser sends the requested web page to the user's ISP (Internet Service Provider). The ISP queries a DNS (Domain Name Server) for the IP (Internet Protocol) address corresponding to the Domain Name entered by the browser. When the appropriate IP Address is acquired, the ISP searches for a web server (via the internet) that has the IP address found.
- When the web server is found, a "*get request*" is sent, requesting for the web page that exists on the server with that address.
- If such a web page or resource is available with no further requirements like user authentication (providing username and password or so), the web server will send this web page or the resource with this address to the ISP and then the ISP sends this resource to your computer or device you are using to surf the web which sends the resource or web page to your browser.

1.2.2 MARKUP LANGUAGES

In order to create web pages, a website designer is usually required to know a Markup Language. In most cases, a website designer's first Markup Language is **HTML (Hyper Text Markup Language)**. Markup Languages are used to describe to the web browser, how it should construct the web page. Unlike word processors where a user simply needs to click a "**Bold**" button and the selected text is boldened, in web site design, Markup Languages are used instead to code in the bold effect.

Markup Languages are simple. They require the use of what is known as tags. Tags are named and wrapped with "<" and ">". Hence to bolden text as spoken of above, tag is used. You state the start and end of the tag by typing to start and (notice the

forward slash ("/") to end. Hence if you want to bolden, "This is my text". You simply type, `This is my text`.

With a good reference, you may find other Markup tags and their uses and may start to use them in building simple, yet efficient web pages.

It is important to note that if all you are doing is designing the layout of a web page, you don't need to know HTML. You can use a HTML editor which can be used design the web page in a friendly way (like a word processor without any typing of codes) and the HTML editor will automatically generate the HTML code for you. It is also important to note that this is not conservative and is not professional as the code generated are a lot larger than codes you could type by yourself. The code the HTML editor generates is awfully cumbersome and will take a longer time to download than codes you type yourself.

1.2.3 WEBSITE DESIGN TOOLS

There are numerous tools designed today that are used to design websites. It is important to note that a website is capable of serving numerous types of contents and resources (such as sound, pictures, text, data, video, etc.).

It is important to note now that data on the World Wide Web travels across huge distances. Hence, it is important to make the data as small as possible; either by compression or removing parts of the data that aren't required. This study will focus only on working with web pages. With a good understanding of how web pages are designed and work, other aspects of the web can easily be acquired.

On a normal case, to design a web page, you could use your system's text editor such as **Notepad** for Windows users. Notepad is used because it saves its data in raw ASCII format (i.e. it doesn't save any information with what you type into the file unlike word processors that save page size, text alignment, etc.).

A web page designer can use Notepad to type in all his Markup codes and save them to a file. It is important to note that when saving your file, you must save it with the appropriate file extension. So, save your file with any name you want but type the filename in a quote and add ".html" to the end of the filename before closing the quote. That is, if you want to save your file with the name, "myname", in the save dialog box, type "myname.html" (with the quotes) as shown in the figure below. If it is not done this way, your attempt to view the result of your markup instructions in a web browser, will fail.

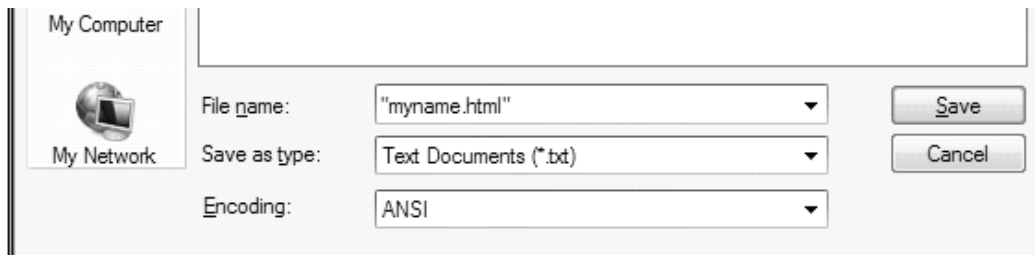


Figure: Showing How to Save A Web Page Using Notepad

When the web page has been saved on a data storage device on your computer, open the file as you would open any other file and your web browser will start and will display the result of the markup language you typed and saved in the file.

For a brief exercise, try to type the following markup language exactly as it appears in your notepad, save it as described above and open the saved file (either by double-clicking the file or right-click and click open).

```
<font face="arial" color="red">I LOVE </font><font size="8" color="blue"><b>HTML</b></font>
```

I believe you may learn a thing or two simply by comparing the results to the Markup you typed immediately above.

In the course of time, you will begin to realize that the Notepad program you are using is difficult and makes it writing codes very difficult. Imagine if there were programs that could make typing in Markup codes easier especially if it could predict your code and automatically type it in for you. Fortunately, HTML editors have been created to ease the stress of typing in Markup code. Examples of HTML editors are Microsoft Frontpage, Adobe Dreamweaver, HTML Notepad etc.

In this case, we will use the Adobe Dreamweaver as our HTML editor of choice, not necessarily because it's the best but it works well to provide the numerous advantages HTML editors provide. Adobe Dreamweaver not only is an editor for HTML but also an editor for other client and server side web technology languages (such as JavaScript, CSS, XML, PHP, ASP, JSP, SQL, etc.).

So, to build a website you need a HTML editor like Adobe Dreamweaver (or just a text editor such as Notepad) and a web browser (such as Internet Explorer) to test your web page.

Your web pages are more appealing with graphics. As it seems, almost every graphics utility program such as Corel Draw, Adobe's Photoshop or Fireworks, Microsoft's PowerPoint, etc. are able to create graphics for your web pages. You need to fully understand how to use these programs in order to create graphics suitable for your web page.

Also, graphical animations have appealing effects to your web pages. Initially, Java was used to create animations for web pages but now, a more user friendly format called **Shockwave**, creates better animations for web pages. The animations created in Shockwave format are clearer and download quicker hence are preferred. There are numerous applications that can be used to create Shockwave animations which include Adobe's Flash, Corel's Rave, Microsoft's PowerPoint, etc.

1.2.4 CASCADING STYLE SHEETS

Cascading Style Sheets (CSS) is a language that works with HTML documents to define the way content is presented. The presentation is specified with styles that are placed directly into HTML elements, the head of the HTML document, or separate style sheets.

Style sheets contain a number of CSS rules. Each rule selects elements in an HTML document. These rules then define how the elements will be styled.

Any number of HTML files can be linked to a single CSS file.

There are three types of style sheets that can influence the presentation of an HTML document in a browser. These are

- **Browser Style Sheets:** Browsers apply style sheets to all web documents. Although these style sheets vary from browser to browser, they all have common characteristics, including black text, blue links, and purple visited links. These are referred to as default browser style sheets.
- **User Style Sheets:** A user is anyone who looks at your website. Most modern browsers allow users to set their own style sheets within their browser. These style sheets will override the browser's default style sheets for that user only.
- **Author Style Sheets:** The author is the person who develops the website, you! As soon as you apply a basic style sheet to a page, you have added an author style sheet. Author styles generally override user styles, which override browser styles.

1.2.5 SCRIPTING LANGUAGES (CLIENT AND SERVER SIDE)

As a web page designer, there are numerous functions you may want to carry out with your web pages that conventional Markup Languages cannot instruct to do.

When the need arises to handle data or make your web site perform certain functions, there will be the need to program it. With the help of scripting languages (also programming languages), you can write programs your browser or the web server may execute as the need may arise.

Client side scripts are written in the HTML of the web page sent to the browser by the web server and the web browser then executes all the codes written in the script. Examples of client side scripting languages are JavaScript (most popular), VBScript (by Microsoft), LiveScript, etc. The advantages of using Client Side scripts are basically that programming tasks can be carried out in web pages which conventional Markup Languages cannot help the web page carry out. The disadvantage of client side scripts are that they are accessible by the visitor of the website and can either be modified or in some cases, copied and reused with no benefit to the original programmer.

Server side scripts are written to be executed by the web server hosting the website. When a request is made for a file containing server side scripts, the web server does not just send the file to the user's browser but the web server executes all the program scripts in that file and then sends the output of that program to the user's browser. The advantages of using server side scripting are basically that the codes are not accessible to the website's visitors thereby making them protected from manipulation and they can be copyrighted. Their basic disadvantage of using server side scripting are the fact that they require a connection to the web server before they can be executed which may have its financial and time costs for the users.

It is possible and is very common to combine client and server side programming in building certain websites.

1.2.6 HOSTING YOUR WEBSITE

Hosting a website is very easy. It is as easy as signing up for an email account. The only difference is in this case, it isn't free. Putting your designed web page on the website is also very easy. It is as easy as attaching a file to an email.

Hosting your website has two basic stages. The first is acquiring a hosting account and the second is uploading your web pages to this new website.

1.2.6.1 ACQUIRING A HOSTING ACCOUNT FOR A WEBSITE

The requirements for acquiring a hosting account are an email account, knowing your personal information and money. It's that easy. Everyone in the world that is interested can own a website just as everyone in the world can own an email account. Acquiring a host for your website can be done with the following steps.

- **Finding a Host:** The first step in acquiring a hosting account for your website is to find a website hosting company just as you must locate an email hosting company to host your

email. If you do not know any hosts, a search engine (such as Google) can help you find one. Find a host's website and move to the next point.

- **Choose the Right Type of Hosting:** After finding a host, visit the web host's website. You should basically find two types of hosting packages. ***Dedicated Hosting*** and ***Shared Hosting***. Shared Hosting is cheaper and recommended for people that do not know the technicalities of web and internet security thus, it is recommended for beginners. Dedicated Hosting however is more expensive, requires a lot of computer network experience and knowledge and is recommended only for network administrators. Please note that many dedicated hosting accounts are acquired to provide shared hosting. Hence, you are sharing someone's dedicated hosting account and the person (usually a company) helps you secure your website on his/her dedicated hosting account. Use a shared hosting account with a trusted company only. This is because shared hosting means your website is being hosted for you and your data and website is in the hands of the company/individual who's dedicated hosting account, you are sharing. With a reliable company, your data and website are safe and will certainly not be tampered with or used without your permission.

You will also note that the Host will also be offering two types of operating systems, basically, Windows and Linux systems. The type of system really doesn't matter if all your website does is serve web pages and there is no need for any server side programming. However, if you plan to make your website handle data and other functions which involve server side programming, be very careful with your choice of operating system. If you plan to use PHP to program the web server, you MUST choose to use Linux Hosting on Apache. If you plan to use ASP to program the web server, you MUST choose Windows Hosting on IIS (Internet Information Service).

- **Registering Your New Website:** All websites for hosting companies have a means for new websites to be registered and paid for. After deciding the type of hosting your want, click an Order button corresponding to the hosting type you've decided to use (this is usually organized in a tabular form and has the corresponding prices with it).

Because the methods of ordering for a new web hosting account are almost as numerous as the hosts, I will attempt to explain some basic steps.

First, you are usually required to check if the domain name / website name (e.g. www.mywebsite.com) is available. Enter the domain name without the "www" prefix (e.g. mywebsite.com) and try it. If the name you entered is already being used by someone else, you must try again with another name. To prevent this, you may go to the Who IS website (www.who.is) and check if the domain name you plan to use is already being

used before trying to register it. If the name you wish to use is available, you may proceed to do some minor configurations and enter your personal information that will be used to register the website.

Before we go any further, please note that we will be using mywebsite.com as an example. You are to place your website's name in the place of mywebsite in any future examples but every other part of the URL remains the same.

- **Pay for the Hosting:** In Nigeria, there aren't many reliable electronic banking systems in place so it is recommended that any payments you wish to make for your hosting account should be done by paying cash directly into the account of the hosting company. If the hosting company is foreign, you may be requested to provide credit card information. There is no need to patronize foreign hosts for your website hosting as there are shared hosting companies here in Nigeria that you can patronize and you will receive good value for your money.

After payment has been made for your website, the hosting company usually emails user authentication details for your website to the email address you provided while you were registering the product. Hence, you must ensure the email address you enter and all other information you provided is true and accurate or it may cost you a lot.

1.2.6.2 UPLOADING YOUR WEB PAGES TO YOUR WEBSITE

The files of your website can be uploaded to a web server either by using a File Transfer Protocol (FTP) program or by using a control panel web page, built by the host of the web server. Of the two methods, the control panel web page is the most commonly used because it doesn't require any programs other than a web browser which is always available (unless uninstalled) because it is installed automatically with your operating system.

With an FTP program, the files are uploaded as though they were being copied locally from one folder to another. This is considered more secure and fast method of uploading website files because the FTP program can provide special features such as encryption for data and is more capable of managing network resources.

With a control panel webpage, HTML forms are used to collect information about the location of the files and then the web browser than uploads each file at a time to the web server. This is not a preferred means of upload for people uploading huge number of files but is sometimes preferred because it doesn't require the use of an additional (FTP) program.

It is important to note however, that either of the above mentioned methods will only work properly if the homepage's filename isn't, "index.htm" or "index.html". If the name of the

homepage isn't any of the aforementioned names, the web server will not know which file to send to the user by default once the URL of the website is requested by a browser.

1.2.6.3 UPLOADING YOUR WEB PAGES USING AN FTP PROGRAM

FTP programs are numerous. There are no specific interfaces for FTP programs but they all work with the same principles. After making payment for your website hosting account, you will be emailed the details that you can use with an FTP program.

To use an FTP program to access a website's hosting account, you will be required to provide the FTP program with the following (which you will find in your email) information.

- Server Name (usually ftp.mywebsite.com)
- Username
- Password
- Port (By default, it is 21. Unless provided by your website's host, always use 21)
- Mode (Use "Automatic" and don't make a choice of ASCII or Binary)
- Default Directory (leave blank).

If you provide valid information in all these fields, your FTP program will display two file explorer parts in its window. The two file explorer parts are the Remote part (showing all the files and folders in your web hosting account) and the Local part (showing the files and folders in your computer).

Open the http_docs or www_root or http_www folder (it is usually any of these names) on the Remote file explorer part. Then from the Local file explorer part you can copy and paste your files and folders in the Remote file explorer part. Please note that if you do not place your files and folders in the http_docs (usual name) folder, the page will not be viewed sent to the visitor's browser. This is because your web server always checks this folder for your web pages. In most FTP programs, you can even drag a file or folder from the Local file explorer to the Remote file explorer.

1.2.6.4 UPLOADING YOUR WEB PAGES USING A CONTROL PANEL WEB PAGE

In the email sent with user authentication for your web site hosting account, you will also be provided with the URL to a control panel. In many cases, this URL is either <http://cpanel.mywebsite.com> or <http://www.mywebsite.com/cpanel>.

When you type this URL provided into a browser, a dialog box displays with a username and password fields. You are to enter the username and password emailed to you and the control panel for your website will be displayed as a web page in the web browser's window.

To upload your web files, look for a "File Manager" program. Click the file manager program and use the HTML hyperlinks and forms to navigate through your website's files and to upload your web page files. Please note that uploading files via this means is a little tedious. If your designed website has folders, you must create these folders in the web server as they are in your website design in your computer.

Remember that like the FTP program, you must navigate to the http_docs or www_root (depending on the one being used) and open it before uploading your files and creating your folders. Remember that you must open any folder created to upload its files to it.

1.2.7 WAP (WML)

With the creation of GPRS (General Packet Radio Service) it has become possible to surf the web using a mobile phone. When you build a website for a computer, you give consideration to reducing the data size of the website to enable it download easily via the internet.

For mobile phones, you have to give consideration not only to the download speed but the fact the mobile phones do not have as much hardware resources as computers. One obvious hardware limitation is the mobile phone's screen size. To meet with these new demands, a new web technology had to be born.

While web pages usually use the Hyper Text Transfer Protocol (HTTP) suitable for computers, mobile phones use Wireless Application Protocol (WAP) which is best suited for mobile phones. Unlike HTTP that uses HTML, WAP, uses WML (Wireless Markup Language). This markup helps create web pages that can be displayed by mobile phones without problems.

This WML uses tags just as HTML does. The tags being used are very similar to those used in HTML. The basic difference lies in the document type definition and tags without closing tags are covered with a forward slash first. Hence,
 is written as
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1.2.8 WEB PAGE TEMPLATES

Designing a very appealing and professional website can be difficult and very tedious. It requires a lot of artistic creativity and a great ability to use graphic design applications properly. Where such creativity and skill is absent, all hope is not lost.

Numerous websites on the internet provide free web page templates. That prevents the tediousness of creating a web page from scratch. It is however important to note that this does not eliminate the need to know how to design web pages.

Web page templates can be acquired for free from numerous websites which can be found with the aid of search engines.

1.2.9 WHAT A WEBSITE CAN DO FOR YOU

This is a very interesting question. There are numerous things a website can do. Websites designed and hosted can be accessed world wide. These websites can be found by search engines by users looking for the services you provide and can bring a lot of business one's way.

Besides, there are billionaires today that made all their wealth from properly managing a website. Such billionaires have been made from websites such as ebay.com, google.com, facebook.com, yahoo.com, twitter.com, etc.

In many cases, simple things like writing articles and putting them on your websites have been source of huge revenue. Sometimes, placing adverts from other companies have generated revenue. More benefits are explained in detail in Part C of this writing.

1.3 WEB APPLICATIONS

A web application is a type of application/program that is programmed to run using web technologies. These web technologies are not to be run by the client's computer. They are to be run by a web server. This web server can be within a local area network or in most cases is located somewhere on the internet. Web applications make it possible to write code that can send email, manage large data and databases, modify files, easily create network programs and tools, perform actions such as ZIP files, create PDF documents, etc.

Popular web applications include electronic mail clients (like Yahoo, Hotmail, GMail, etc.), social networks (Like Facebook, Hi5, Twitter, etc.), search engines (Google, Yahoo! Search, MSN Search, etc.), Web Encyclopedias (Such as Wikipedia), eBay, Amazon.com, the control panel used to upload and configure websites and many, many more examples.

Web applications usually consist of a:

- Web Server Program (such as Apache, IIS, Sun, etc.)
- Server Side Script Interpreter (such as PHP, ASP, JSP, Pearl, etc.)
- Database Server (such as MySQL, MSSQL, Oracle, etc.)

- Operating System (usually Windows Server, Unix or Linux)

For this study, we will be using an Apache Web Server Program, PHP Programming Language, MySQL Database Server and the Windows Operating System. Please note that on the Internet, Linux is usually the operating system of choice for this combination hence, understand that all the technologies stated above can inter-work (that is, there is no stated combination). What matters is the configuration and the fact that a web application must have a web server program, a server side script interpreter, a database server (which is however optional and is necessary only when the web application makes use of potentially large and difficult to manage data) and an operating system irrespective of the type.

We will consider how to implement the web technologies above, create, test and deploy a web application over a local area network on the internet.

1.3.1 IMPLEMENTING THE WEB TECHNOLOGIES

The web technologies chosen above exist in a bundle called the WAMP bundle. WAMP stands for Windows, Apache, MySQL and PHP. The version being used is the WAMP5 bundle which implements recent versions of the web technologies mentioned. There is however WAMPServer2.0 which implements the latest of the web technologies but WAMP 5.0 is chosen because not many web servers currently use the latest versions of these web technologies.

As a web application programmer, you can download and install WAMP5 free of charge from the WAMP5 homepage (<http://www.wampserver.com>). During the installation, it is important you note the Document Root. The Document Root is the folder where you must place all the files you want WAMP to run. For WAMP the default document root (unless you specify somewhere else during WAMP5 setup) is “C:\wamp\www”.

For IIS the default document root is “C:\inetpub\wwwroot”. In both cases, the files are accessed in the same way. To install IIS, the Windows operating system setup CD is required. To install a Database Server, its appropriate setup is required.

With the web technologies installed, it is necessary to ensure that they are currently running as they can be stopped. For WAMP5, to start the web server, simply click “Start WAMP Server” in the program’s menu, under WAMP Server. When all services are running, you find the icon below on the task bar, beside the system clock. If the icon doesn’t display as shown below, then the WAMP server isn’t currently running.



Figure: WAMP5 Icon Showing Servers are Currently Running

For IIS, you must go to Manage Computer and find Internet Information Service. Select it and click the Play button (▶) in the toolbar. You can access Manage Computer by right-clicking the My Computer Icon on the desktop or selecting Administrative Tools in the Control Panel.

To test the web server, simply start your web browser and type “http://localhost/” in the address bar and press enter. If a page loads, the web server is functioning properly. If a page cannot be found error displays then there are problems with your installation which can be troubleshot by reading installation documentation.

In a local area network, another computer can receive the same output from this computer by typing this computer’s IP address in the address bar and the contents of the “http://localhost/” page will be displayed in that computer. Truth be told. But it must be working in this computer first.

1.3.2 WRITING AND TESTING YOUR WEB APPLICATION

With the web technologies in place, all that is required is a web editor like Adobe Dreamweaver or even Notepad and your codes can be written. Remember however, that the file must be saved in the appropriate document root folder which may vary especially if it was changed during setup of the web technologies. Their default document root folders are stated in the previous section.

Also note that when saving the files, they must be in the appropriate extension. For PHP, the extension of the file must be “php” hence if your filename is myfile, you must save it with “myfile.php” as explained in earlier sections. If it is saved with the wrong extension, it will not work. Instead of running the program and displaying the output, it will attempt to download the program file which may be a very, very bad thing. For other server side scripting languages, its similar, for ASP, the extension is “ASP”. For JSP, the extension is “jsp”.

If your file name is myfile.php and you copied it into the document root, you can run the file by typing http://localhost/myfile.php into your address bar of the browser and loading it. If you create a folder in the document root named myfolder and you copy myfile.php file into it, you can run myfile.php by typing http://localhost/myfolder/myfile.php into the address bar of the browser and loading it.

Remember what I said about naming your file index.html? Well, if you named your file index.php and placed it in the document root, you can access the file by simply typing http://localhost/ without stating the filename. If you placed it in a folder named myfolder, you still don’t need to specify the file name. Just type http://localhost/myfolder/ and the file will be loaded. Note, this only applies the files that their name is “index” irrespective of their extension.

Database Server

For MySQL Database Server in the WAMP Module being used, there is PHPMyAdmin. This program is a web application that helps manage your MySQL database server. Without this program, you will only be able to create and manage your database using a command prompt which requires good knowledge of SQL or you may have to create a web application of your own that will manage the Database for you.

For MSSQL (Microsoft SQL) and Oracle and most other Database Servers, they usually come with a GUI application that makes it possible to setup, configure, backup or manage the databases on the database server.

PART B

SECURITY

This aspect is very technical and is recommended for advance web designers and programmers. As a website designer (that is, you only write Markup and Styles), you do not need to read through this section. However, as a professional, there are a number of things you may learn from reading the following sections.

2.1 DATA VALIDATION

When designing HTML forms, a lot of care should be taken. Users tend to mistakenly enter data that may cause problems for your program. Sometimes, these entries are deliberately entered to crash your program.

It is normal to do client side data validation with client side scripts such as JavaScript but in some cases, this isn't enough. Because this client side script is sent to the browser, it is subject to possible modification. Although the session that allows the user access a service is tied to the browser, some hackers have found ways to use the same session to submit any data they wish to the web server.

Hence, client side data validation is no long sufficient. In writing server side scripts to handle data, it is important to also perform data validation before your program attempts to do anything with the data.

In the case of making it possible for users to upload files, a lot of care should be taken in validating the file being uploaded. It is important to use built-in functions of the scripting language being used to validate the file. Built-in functions are able to check the kind of file, the file size and in some cases, whether the file is capable of being of any danger to the web server. Failure to implement such tests may be fatal. Read documentations about your server side scripting language for a list of such functions and how you can use them.

You should also avoid creating hyperlinks in your web application that make it possible to tell where these files are located such as a hyperlink that may make it possible for the user to view the file even if you are supposed to specify it in HTML such as its source (src) attribute. There are numerous techniques in doing so. This may include coding your server side script to redirect the browser to the file's location in a window that has had its title, menu, address and status bars removed but this doesn't serve all purposes. Hence, an appropriate strategy should be formulated when the need arises.

2.2 SQL INJECTION

One very funny security hole is called SQL injection. Because SQL is constructed during program execution to query data from the database with data from the user (such as, in user authentication), it is possible for the user to enter SQL which when added to the SQL being used to query the database, carries out malicious functions.

To prevent SQL injections, code your server side script to check the data entered by the user for special characters used in SQL such as "--" (two successive dashes), single quotes, +, -, /, *, etc. and remove them from the data entered before using them. It will be necessary to inform the user that such data are invalid with a client side script (such as JavaScript) but this usually isn't necessary because "normal" users do not use such characters in entering data such as user authentication data.

2.3 SECURE SOCKET LAYER (SSL)

Secure Socket Layer (SSL) is an encryption technology used to encrypt data sent by users to web servers. This is usually employed when the data being sent is important such as user authentication, PINs (Private Identification Numbers), credit card numbers, financial data, etc.

Configuring SSL technologies are easy. Web hosting accounts usually come with a free SSL implementation which can be used freely.

SSL works by downloading an encryption program with your web page for your form fields. All data entered in these fields are encrypted by this program before they are sent back to the web server so that if a hacker were to succeed in intercepting this data, it will be of no use to him/her since the key for decrypting this data lies in the web server and cannot be acquired even by the world's best.

2.4 DATA SENT TO BROWSER

When building your web applications, you must be careful about the data you send to the browsers and the URLs you construct with your server side code.

You should also ensure that the variables you use in GET variables (variables containing data that are part of the URL) are named in ways that make it impossible to liken the variable name to its true function to the web application unless you want to make it possible for a user to access such a page based on a bookmark.

As explained earlier on, try to avoid making locations that contain vital information obvious to your visitors such as a folder where you keep all your documents. If protecting such information is inevitable, try to put an index.html file in that folder so that your web server will load this web page when someone tries to type in the URL into a browser.

If there is no index.html file in that location, the web server will send a list of all the files in that folder to the browser thereby making it very easy copy all the contents of the folder. Also try to avoid naming your files in a serial order, else, it will be possible to predict the names of other files in that folder.

2.5 SESSION CONTROL

This isn't usually a problem but it is recommended that when using sessions for user authentication, you should provide a means for the users to manually destroy the sessions when they are no longer making use of the computer, especially if the computer they are using is a public computer.

In most systems, this is done by providing a sort of sign out hyperlink or button which destroys the session and sends the user to the sign in page as is popularly implemented.

If this is forgotten, a user may leave a computer and just before the time-out for the session occurs, another user may gain access that the initial user's accounts and resources when he/she tries to use the same web application and the same features. This way, it may be possible to gain access to certain probably, financial information. Which will be very, very bad for your other user and subsequently, bad for your program.

PART C

FINANCIAL BENEFITS

A list of possible financial benefits of owning and/or running a website is numerous. Because this study is not a study on business opportunities associated with running a website, only a few have been mentioned in this part. Via search engines, other strategies can be found and hence, implemented.

3.1 CONDUCTING FINANCIAL TRANSACTIONS

If your business target lies within Nigeria, it is easy to conduct financial transactions via your website but if your target audience for your website is international, certain difficulties exist.

In most cases, you can place your bank account(s) on your website and users can make payments to the bank accounts and when the payment is confirmed, you can now provide the service for the payer. Due to fraud which is most common in Nigeria, numerous users feel reluctant to pay their money to bank accounts. They prefer to meet the person or know the person's office before transacting business.

It will help to remind them that the Federal Government, with the aid of the Economic and Financial Crimes Commission (EFCC) treat fraud as a grievous offense hence, you can go no where with their money. Also, because of fraud, banks ensure they have all the information they can about their account holders and work closely with law enforcement agencies so acts of fraud cannot go unpunished.

Another way of conducting financial transactions is incorporation with a financial switching company such as Interswitch Nigeria. Interswitch currently provides this service to website merchants. This way, visitors to your website may make payments using data from their debit cards. This service costs over One Hundred Thousand Naira to purchase but its long benefits are good.

More light can be shed on this issue of conducting financial transactions especially on international financial transactions but this is subject to change almost constantly hence, inquiries can be made at financial institutions for ways in which financial transactions can be made with services provided on websites. Given, the current competition financial institutions face, you are certain to have a listening ear.

3.2 FINANCIAL BENEFITS OF BEING A WEBSITE BUILDER

Building a website has its numerous financial benefits. If a lot of work and brilliant strategies are implemented, a website could be a gold mine.

3.2.1 PAYMENT FOR WEBSITE BUILDING SERVICES

Depending on bargaining power and quantity of work being done, a lot of money can be made from building websites and more greatly, web applications for people.

Websites are growing in popularity and use. Numerous companies and individuals are currently using websites as a means to promote their goods and services. The chances of getting a website job are more now than they have ever been. Hosting a website on shared hosting currently costs about Ten Thousand Naira. Hence, for a simple web page, you may charge the client Thirty Thousand Naira thereby making approximately Fifteen Thousand Naira plus job execution costs.

3.2.2 GOOGLE ADSENSE

Through affiliate marketing and adverts, it is possible to host adverts on behalf of Google, on your website. A program Google currently uses, is Google's AdSense.

Google AdSense is the program that can give you advertising revenue from each page on your website—with a minimal investment in time and no additional resources.

AdSense delivers relevant text and image ads that are precisely targeted to your website and your website content. AdSense delivers relevant text ads that are targeted to the Google search results pages generated by your visitors' search request.

Becoming an AdSense publisher is simple. All it takes is a single online application. Once you're approved, AdSense takes only minutes to set-up. Just copy and paste a block of HTML and targeted ads start showing up on your website.

3.2.3 AFFILIATE MARKETING

Affiliate marketing with a website is easy. Simply build a website, and get numerous other websites to come advertise on your website.

It helps though to have something other than adverts on your website. Sometimes, providing personal content which can range from photos, blog, videos, etc. but note that it is advisable to not put copyrighted content on your website or you could face some serious copyright infringement lawsuits.

3.2.4 ELECTRONIC COMMERCE

Electronic commerce can be conducted on the World Wide Web even in Nigeria. The goods and services being sold do not have to be yours. Some cases, you may promote other websites and their products via your website.

Owning a website gives you the opportunity of a world wide audience. How you attract the attention and patronage of this world wide audience is totally up to you. There are numerous opportunities that people are not implementing. You may do so today. In the website you design or your design for someone, you can put pictures and descriptions of the products and/or services and with the aid of electronic commerce, such products and/or services can now be made available to clients all over the world.