

**WEB SITE DESIGN WITH DATABASE MANAGEMENT FACILITY**

**FOR**

**FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA**

**BY**

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**98/7738EE**

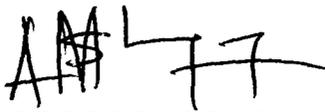
**DEPT OF ELECTRICAL AND COMPUTER ENGINEERING**

**FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA**

**SEPTEMBER 2003**

## CERTIFICATION

This to certify that this project titled “WEB SITE DESIGN WITH DATABASE MANAGEMENT FACILITY FOR FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA” was carried out by Okoronkwo Emmanuel A. for the award of a Bachelor of Engineering (B.Eng.) in the department of Electrical and Computer Engineering, Federal University of Technology, Minna Niger State.



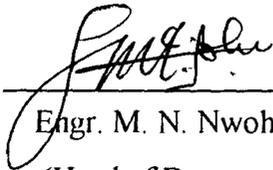
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## DEDICATION

This project work is dedicated to the Immortal, Invincible, Everlasting and Almighty GOD, for his Love, Mercy, and Faithfulness and to the memory of my late father Mr. I. N. Okoronkwo.

## **ACKNOWLEDGEMENT**

I wish to acknowledge those who have, one or the other contributed to the success of this project and my stay in this school in general. In this regard I will have to start with my supervisor and lecturer, Engr. M. S. Ahmed, thank you for your advice and contribution. Then to my project partner Mrs Blessing Adagbasa whose hard work and commitment to work made this project a success, thank you.

I am indebted to my lovely and caring mother Mrs. Rose Okoronkwo, my brothers, sister, in-laws, uncles, aunts and family friends for their moral and financial support towards my success.

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Above all, I am saying a big thank you to him that holds my future, my source of inspiration, the great I am, the lifter of my head, my protector, the Lord God Almighty for making me who and what I am today.

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## **ABSTRACT**

This project work presents the design of a web site connected with a database system for the Federal University of Technology, Minna. This site contain information about the school, intended to show case the school and her activities to the rest of the world. The associated database contains the academic result of students of the institution and it is intended to allow students to check their results on-line.

Web language HTML, JavaScript, VBScript as well as web and picture editing programs were used to add effects to the site. Navigation in the site was simplified by providing links between relevant pages.

This site can be accessed on the Internet after hosting and as such students can check their results on-line.

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# CHAPTER ONE

## GENERAL INTRODUCTION

### 1.0 INTRODUCTION

The world of computers and information processing is growing rapidly and at the center of this amazing growth is the World Wide Web, also known as the Web and WWW. A little while ago, the Web was a medium for sharing documents among people and computers via the Internet. Today, it is fast becoming a distributed development environment capable of providing information and other application resources to millions of people around the world. In addition, corporations are implementing internal Webs and Web-based applications, known as INTRANETS, to facilitate communications and sharing of information among employees. Intranets implement the same technologies as their Web counterparts and are springing up in organizations literally everyday and night in some cases, thus changing the way business is conducted.

The Internet has made a clear statement, it seems to saying "I has come to stay". It has cut a niche for itself in the world of communication and information. It has given birth to a new field of study, INFORMATION TECHNOLOGY (I.T). The Internet has brought a big and noticeable change in the field of communication.

It is entirely a new form of information dissemination. The Internet has changed the information technique and culture of the people of the world. It has taken the dissemination of information beyond the known convention of use of transistor radios, televisions, newspapers, etc. It has strengthened the other forms of information dissemination and has become an acceptable technology (for information).

Information on the Internet reaches many people at the same time or at different times more than any other means of communication. Information can be accessed easily via the Internet from anywhere in the world and this is done in a matter of seconds. It has really revolutionized the way business transactions are carried out in the world today.

Today's competitive business environment continually forces businesses to evaluate means by which they conduct business and the ways in which they quickly and effectively implement changes in response to competitive pressures and changes in the market place. Companies have realized that information technologies are effective and essential if they must survive in today's competitive business environment and with the introduction of Web-based technologies, business concerns are dramatically reshaping the ways in which the use information technologies to address their problems.

A major source of steady information on the Internet is Website. Websites are made up of pages (web pages) located in a particular web server and it contains information that is, of course kept for the consumption of certain persons that may require the information. This information are packaged in a very attractive and interesting manner, some of the pages are empowered to receive feedback.

All concerned has accepted the Internet as a source of information and as such it will be out of place for an institution like the Federal University of Technology Minna to be left out, hence this project work. Information about the school has to be made available to the students and the public as well. Creating a website for the school will help to bridge the communication gap between the school on one hand and the general public on the other, intending students will also have access to information about the school. This website will

seek to present the Federal University of Technology Minna to the world as a competent institution of learning.

Since the advent of the Internet, there has been tremendous improvement in the quality of services on it, one of which is the presentation of data on the Internet. Putting data on the Internet in the form of a fully accessible, searchable database can open up a wide variety of possibilities, such as teaching, learning, research etc. For example when connected to a simple web page form, a database can be used to collect social research data cheaply and easily using on-line survey.

Web connected databases can produce search result tailored to user's query and as such enabling the online publications of bibliographic, statistical and other databases. There are sophisticated applications in which web-connected database can perform the entire task required for automated, on-line booking or catalogue systems (like conference registration and online sales.).

In addition, when fully integrated with a website, a database can be used to develop interactive self directed study or testing exercises for students or it can even provide systematic control over a website's organisation or appearance.

The online services aspect of the Internet is not only for profit oriented business and as such this work will rely upon one of the numerous Internet technologies to make available academic result of students available to them from anywhere in the world.

## 1.2 HISTORY OF THE INTERNET

The Internet as we know it today owes its existence to the 1957 launch of a Soviet satellite called Sputnik, this event actually set off a chain of events that eventually resulted in the evolution of the Internet.

After the launch of Sputnik, the then President of United States of America, President D. D. Eisenhower recognised the need for the United States to maintain technical superiority over the Soviets and as such, the Advanced Research Projects Agency (ARPA) was founded with the charter of being the central research and development agency for the Department of Defence. ARPA's mission was to develop imaginative and innovative research ideas (often with high risk factors), with potentially significant positive technological impact.

In 1962, Department of Defense tasked ARPA to perform research and experiments with the communications links between it and its military contractors. The primary aim was to develop communications systems that could overcome disruptions caused by enemy attacks (remember that this was occurring during the Cold War), considering the fact that a nuclear attack would reduce any conceivable network to dust and the central authority of any network will be an immediate target of enemy missiles. The agency came up with a daring solution that was made public in 1964; a network would be designed to work while in shambles and it would have no central authority. The network was assumed to be unreliable at all times. It was designed from the on-set to transcend its unreliability. Every node in the network will have equal status, each having its own authority to originate, receive and send messages. The messages themselves would be divided into packets, each packet separately addressed.

Each packet would begin at some specific source node and end or terminate at a specified destination node, each of these packets will be passed through the network on an individual basis, and the route taken by the packets will be unimportant. In other words, the packet would be tossed around, (from one node to another) towards its destination, until it ends up at its proper destination. The design made sure that even if parts of the network were to be hit by enemy missile and blown away, the packet would still stay airborne.

In 1968 the first test network was set-up at the National Physical Laboratory in Great Britain. It was the first packet switching network. Packet switching was the idea of Paul Baran of the RAND Corporation. The Department of Defense through the Advanced research Project Agency (ARPA), decided to fund a larger and more ambitious project in the US and as such ARPANET was created (that was in 1969), to help ARPA funded researchers to collaborate more efficiently and effectively. ARPA commissioned Bolt, Beranek and Newman to build Interface Message Processors (IMPs), which were based on the packet switching technology built at RAND Corporations. The first IMPs were positioned at University of California at Los Angeles (UCLA), Stanford Research Institute, University of California at Santa Barbara, and University of Utah at Salt Lake City thus giving birth to the first four Internet network nodes.

The network nodes were high-speed computers, which could transfer data on the dedicated high-speed transmission lines. In 1971, ARPANET had fifteen and by 1972 (a year later) the network grew to thirty-seven nodes.

However before long the mailing list was invented (it was an ARPANET broadcasting technique in which an identical message could be sent automatically to large numbers of network subscribers). ARPA's network grew exponentially over the years; its decentralized

structure made expansion easy and it accommodated many different kinds of machine as long as the packet switching is supported on the machine moreover every other thing about the machines (like their brand names, their content and even ownership) were irrelevant. The standard for communication on ARPA network was known as NCP, "Network Control Protocol". Connection between ARPANET and other individual networks like BITNET and CSNET was difficult as they didn't use the same protocol and as such could not exchange information appropriately. By 1983 ARPANET changed over to a more sophisticated standard protocol TCP/IP, "Transmission Control Protocol/Internet Protocol" which allowed different networks to connect. ARPANET did not changeover to TCP/IP until its military segment broke off and became MILNET.

The basic technology of the Internet was based on decentralization and coupled with sophisticated protocol like TCP/IP, it was difficult to stop people from joining the network, as a matter of fact nobody wanted to stop others from joining the fast growing and branching complex network of computers which is now known and called the INTERNET. In 1984, the National Science Foundation created NSFNET, an Internet backbone with a then record breaking speed of 56kb/s. NSFNET set a nice pace for technical advancement, linking newer and faster super computers through faster links. NSFNET upgraded regularly and expanded at an alarming rate and other Government agencies joined the Internet. Prior to NSFNET just over 1,000 hosts were on the Internet. Over 10,000 began using the Internet the year NSFNET went online and two years later over 60,000 hosts were connected, in other words the exponential growth of the Internet started with NSFNET. On the 1<sup>st</sup> of June 1990, ARPANET was totally dismantled, new networks connected the sites that ARPANET connected. No one suffered any form of interruption in service when ARPANET was

removed, this revealed that the basic technology and principle of the Internet was so effective such that when ARPANET went down, the Internet found other path for the information to travel through.

The Internet has provided access to specialized data and as such increasing the pace of scientific research, it is as a matter of fact the single most important scientific equipment of this century.

### **1.3 PROJECT OBJECTIVES**

The main objective of this project work is to be able to design a website for the school, Federal University of Technology, Minna, which would incorporate a database for the management of student's academic records.

The design of a website as well as a database management solution for accessing students' results is important for the following reasons:

- i.** Communication is a very important feature/factor in any community and a website provides the school with a platform for information dissemination to a large percentage of the students irrespective of their location at any point in time.
- ii.** Students can log on to the website and check their examination results thereby reducing the workload on the lecturers who would no longer need to attend to the students individually.
- iii.** There is need to inform people generally about the institution's achievements, projects, etc. This will encourage interested professionals and industrialist to sponsor such projects or support ongoing work
- iv.** People, who qualify to apply for admission into the school will be able to access necessary and needed information from the website wherever they are.

## 1.4 PROJECT APPLICATIONS

The applications of this design work can be considered from two perspectives; which are

- a). Applications of a website
- b). Applications of a website for the Federal University of Technology Minna.

Generally, websites are used to enlighten members of the public about the activities of an organization. Any individual with an Internet access as well as authorization where necessary, is able to access information about any firm, institution or organization from their website without any physical contact with them whatsoever, and from any part of the world. Websites breakdown the potential barrier to information dissemination that is posed by distance as well as logistics.

Websites are also used as a source of information for members of staff or members of an organization, especially new intakes. It provides an adequate overview of the activities of the group and it aids in the rapid integration of such new intakes.

Websites are powerful advertising tool. New brands, technologies, discoveries etc. can be marketed by use of a good website that can be easily accessed by interested customers. With the advent of e-commerce, general trading of wares are done via companies' websites.

People researching into various areas, go to the websites of firms who are specialized in such areas to obtain useful information. This is very vital to the development of technology, especially in a developing country like Nigeria. Easy access to research materials placed on the website is a major application of this design.

Further more, a website can be useful for transfer of information from one physical location to another since it can be accessed wherever there is Internet access.

Websites are also good sources of data, as it can be used to collect data online when combined with a database, it also allows employees of a firm to still carry out some of their duties and obligations to the firm, wherever they are.

The website of the Federal University of Technology Minna, therefore has the following specific applications

1. It will serve as a source of information to students.
2. It will serve as a source of information to the members of staff.
3. It will also be an aid to industrialists and professionals seeking information about technological institutions.
4. It will serve as a source of information for those researching into the field of Technology where members of staff specialize.
5. The database management will give students easy access to their results, even when they are at home, and it will also help parents monitor and know their children's performance academically.

## **1.5 PROJECT LAYOUT**

This thesis is organized in chapters and each chapter explains explicitly the topic to be discussed. The overall chapters give the relevant information necessary to reveal the design procedure and realization of the project objectives.

Chapter one takes care of the general introduction to the project thesis, the Literature survey, the project objectives and motivations as well as its applications.

Chapter two discusses the Internet, how communication is effected through computers and the benefits as well as services offered by the Internet. It also briefly explains how the Internet is accessed.

Chapter three discusses the website development workflow, the programming language for web design– Hypertext markup Language and how the design proper is done with this language. The chapter ends with a summary of how a site is tested and published.

Chapter four gives or handles the analysis of the procedure involved in the design and publishing of a database. The chapter ends with an explanation on how a site is interfaced with a database server or database manager.

The last chapter, chapter five gives the results of the test run of the site and the databases as well as recommendations for further development possibilities.

## **CHAPTER TWO**

### **THE INTERNET**

#### **2.1 INTRODUCTION**

The world has become a global village and communication has been made much easier by the use of the Internet. This “International Network” called Internet for short, has so many all over the world connected together, based on an internationally accepted standard protocol (TCP/IP) and can access and communicate with one another so long as the accepted standards are met. The TCP/IP, which moves data around the Internet, is not the only protocol used on the Internet, many other protocols make the International network work and all of them with TCP/IP.

#### **2.2 COMMUNICATION**

The Internet is not a single network, it is a vast collection of individually owned and operated networks that are interconnected. There are a variety of contents and services scattered throughout all of these networks. Every computer on the Internet has an address with which it could be contacted and communicated with by others. To communicate with a computer on the Internet, its address will have to be known.

The computer, which was made as a device for computation, has changed to include other functions and as such it is not just a computation device anymore but also a communication device. As a matter of fact, the Internet is responsible for making the computer a communication device. With the Internet, computer has become another means of sending messages between people.

Getting across to someone (anywhere at all on planet earth) via telephone entails using the telephone network provided and maintained by telephone companies, while sending messages or getting across to someone using the computer, entails the use of the Internet. In other words, this network of networks (which is becoming more and more independent of the use of telephone lines), is responsible for computer communication.

Every computer on the Internet is called a "host", each host has an equal capability to communicate with every other computer on the Internet. Some hosts connect to the network via temporary dial-up connections while other hosts have actual permanent connections.

Most individuals and some organization connect to an Internet service provider's network (a secondary network provider), big organizations and the primary network providers connect directly to the major source of the Internet's bandwidth called the BACKBONE.

### **2.1.1 SURFING AND PUBLISHING.**

The primary objective for publishing is to communicate with others and letting them know how you feel about things, much like publishing on paper, the Internet allows you to pass across your message. You are not constrained to printing, copying and distributing your messages on papers instead you are free to electronically pass your message around the world via Internet. However all you need to do to see other peoples messages and work is to surf the web. Surfing or browsing allows you to see other peoples work.

### **2.2 PUBLISHING POWER AND RESPONSIBILITY.**

The Internet through the World Wide Web has given individuals and organizations anywhere in the world the liberty and power to publish and distribute books, broadcast videos etc. Before the advent of the Internet, one would need to be a corporation or the

government itself to publish and distribute books. However as at this about anybody can publish anything from anywhere in the world as long as the Internet and computer are available. Any individual or organization for now (2003) has the power to;

1. Publish and read complex repositories of thought on the Internet.
2. Publish and view visual representation of knowledge, image and art.
3. Broadcast or receive music, radio and video from anywhere in the world on the Internet.
4. Publish and access software, create and utilise direct web relationship with individuals and organisations.

Editing, printing and distributing a book is not as easy as it sounds as it costs a lot of money. A lot of hurdles have to be crossed before a book is considered good enough to be published, however in the case of the Internet the reverse is the case. All that is needed to publish anything on the web is just some knowledge of computer, Internet and Internet connection, no corporate organisation or corporation is needed.

Since anyone can publish anything on the Internet just like a bulletin (Notice) board, it is up to the user of the Internet to tell the good from the bad. Everybody that uses the Internet has the right to judge the quality of a site's content. Since Websites reflects or rather is a reflection of the reputation of the owner, it will be a little easy to judge the content of a website, by knowing the owner of the website. Another way of judging the content of a site is to take the recommendations of people. Finally common sense will tell one whether the content of a website is logical and orderly or not.

As a publisher you also have the responsibility of publishing items that are reasonable especially when the content of the site has to do with schoolwork.

### **2.3 HOW THE INTERNET WORKS**

If the Internet only enabled computers to communicate with one another, it would be nothing more than a really big peer-to-peer network. What makes the Internet so special is the combination of client and server programs that run on Internet hosts.

### **2.3.1 Client Programs**

At one time or another, every host on the Internet acts like a *client*. For a host to act like a client, it must run some sort of client program that consumes information or uses services provided by other programs on the Internet called servers. In this way, clients are consumers. Examples of client programs include:

- Web browsers that display content provided by Web servers.
- Internet mail clients that are used to work with mail messages provided by mail servers.
- FTP clients that download files from FTP servers.
- Chat clients that let one chat interactively with other people via chat servers.

### **2.3.2 SERVER PROGRAMS**

Hosts can run client programs, they can also run server programs to produce content and services that clients consume. *Server* programs process on behalf of client programs when the client programs can't or shouldn't process for themselves. Server programs centralize processing and information, and make it possible for a client program to do things that it ordinarily wouldn't be able to do on its own. Hosts are not servers, but hosts do run server programs such as Web servers and mail servers.

Hosts that run client programs usually don't have too many demands placed upon their resources, thus, even archaic desktop computers are capable of connecting to the Internet and running client programs.

### **2.3.3 PROTOCOL**

A protocol is a language of sorts that two computers use to talk to each other. Computers use protocols to format consistently their messages so that other computers can understand them, acknowledge the receipt of messages, indicate that they're finished sending a message.

#### **2.3.3.1 TCP/IP ON THE INTERNET**

TCP/IP stands for Transmission Control Protocol/Internet Protocol. It's an *asynchronous* protocol because it can handle message traffic from multiple sources and to multiple destinations at the same time. For example, you can download an Internet mail message and update a Web page simultaneously.

TCP handles data integrity (making sure data gets to the destination without errors). It's also responsible for disassembling and reassembling the data. It divides large messages into smaller bits called *segments*. It numbers each TCP segment to indicate its position in the sequence. For example, in order to send a message to a remote host, TCP might break it down into 10 segments and number those segments 1 of 10, 2 of 10, ..., 10 of 10. On the other end, TCP reassembles each of the segments in order when all of them are received.

IP is the protocol that controls how data moves around on the Internet. After TCP divides a message into segments, it stuffs each TCP segment into a packet called an IP datagram. IP labels each IP datagram with the source and destination address of the packet. Then, IP sends the packet toward its destination, handling the problem of routing data from one host to another even though they're not on the same physical network. The IP is able to

this by the use of an Internet called a 32-bit IP address, (the 32bit means that 4bytes are used to hold the data) this addresses usually appear in dotted-decimal form, like this  
123.64.12.88.

However there are better schemes with which to refer to computers by name, rather than IP address and we can let the machines do the work of translating the numbers, and we can instead refer to computer resources in a somewhat more meaningful fashion, such as [www.futmin.edu](http://www.futmin.edu) or [eaokoronkwo@hotmail.com](mailto:eaokoronkwo@hotmail.com).

The first example ([www.futmin.edu](http://www.futmin.edu)) is called a *fully qualified domain name*, or FQDN while the second is an e-mail address.

## 2.4 DOMAIN NAMES.

The last two addresses include domain name. The *domain name* is the last part on the right, such as com or gov. The Internet is divided into several domains, or hierarchies. This is part of the solution to the problem of how to accurately deliver electronic packets among the billion (or so) computers on the Internet. A domain name is similar to the name of a state or country on the envelope of a piece of regular mail. In fact, some domain names are *exactly* that. Here are just a few of the common domain names:

- com—Commercial businesses
- net—Network-related
- gov—Government agencies, branches, and departments
- org—Organisations, usually non-profit
- mil—Military research facilities
- edu—Universities and educational institutions

- jp—Japan
- de—Germany
- ca—Canada
- uk—United Kingdom
- au—Australia

When an electronic packet of data is address, the computers on the Internet will take turns passing the message along until it reaches its destination. Actually, not every computer gets involved; it is just the gateway computers,(also called a router, it is a special kind of computer that is given the job of looking at an IP packet and determining whether to keep the packet for a computer on the local network or pass it to the next network in the chain and let it figure it out). Passing the packet along is called *making a hop*. If a packet is lost or corrupted along the way, TCP will see to it that the packet is sent again.

## **2.5 WHY DO PEOPLE WANT TO BE “ON THE INTERNET”**

The Internet is an example of a true, modern, functional anarchy. There are no official censors, no bosses, no board of directors, and no stockholders, there is nothing like “Internet Inc”. The nature of the Internet offers freedom to those who use it and as such one of the main reason why people want to be the Internet is freedom.

The Internet is also a bargain. The Internet as a whole, unlike phone system, doesn’t charge for long-distance service. And unlike mot commercial computer networks, it doesn’t charge for access time, either. In fact the “Internet” itself, which doesn’t even officially exist as an entity, never “charges” for anything. Each group of people accessing the Internet is responsible for their own machine and their own section of line.

## **2.6 RESOURCES AVAILABLE ON THE INTERNET**

The resources/services available on the Internet are;

- (a) Internet Mail
- (b) UseNet Discussion Groups.
- (c) File Transfer Protocol (FTP)
- (d) Chatting and conferencing

### **2.6.1 INTERNET MAIL**

Internet mail was one of the first services developed for the Internet. It is used to exchange text messages and file attachments with others who are connected to the Internet. It has changed considerably over the last years allowing one to create rich text messages that contain formatting, images and even HTML. One can also subscribe to news services that deliver content to ones mailbox each day. One of the most important uses of the Internet is *mailing list*. People of like mind on issues of interest make use of mailing list. When a message is posted to a UseNet newsgroup, that message finds its way to all of the news servers on the Internet so that other people can read it. Outlook express and Netscape messenger are the two most notable client programs that supports both mail and news.

### **2.6.3 FILE TRANSFER PROTOCOL (FTP)**

FTP was the first service developed for the Internet. It was developed so that government and educational institutions could easily exchange files and it hasn't changed much from its original form. Many Internet services use some form of FTP behind the scene in order to move data from host to host.

FTP client (program) is used to browse the files on the host and then to download or upload a file, which may be a text or binary file. A web browser can be used to download files from the Internet, even if the file is on an FTP server.

#### **2.6.4 CHATING AND CONFERENCING**

Some forms of chat programs have been available since the beginning of the Internet, however with recent conferencing software one can actually have audio and videoconferences over the Internet. An example of conferencing software is Microsoft Net meeting, which is a client program that allows you one to participate in audio and videoconferences collaborate on documents or share a virtual white board. Computers needed for audio conferencing must be equipped with sound card, speakers and microphone and it has to be equipped with a video camera for it to be used for video conferencing.

## **CHAPTER THREE**

### **3.1 WEB DEVELOPMENT WORKFLOW**

The web development workflow, starts with the process of defining a site's strategy or goal, progress to design (where you work out the look and feel of a prospective site) and then the production or development phase (where the site is built and pages are coded). Afterward the site is tested for functionality and to see if it meets its defined objectives and then the site is published. Many developers also schedule periodic maintenance to ensure that the site remains current and functional. The standard approach to web development involves the following processes;

1. Site planning
2. Design
3. Development
4. Testing
5. Publishing
6. Maintenance

#### **3.1.1 SITE PLANNING AND DESIGN**

A website is a set of linked documents with shared attributes, such as related topics, a similar design, or a shared purpose.

The term 'site' can refer either to a web site or to a local storage location for the documents belongings to a web site. When thinking of creating a web site , one has to follow a series of

planing steps to make sure the site succeeds. Even if it is just the creation of a personal home page that only friends and family will see, it is still advised to plan the site carefully.

### **3.1.2. SITE GOALS**

Deciding what the site goals are, is the very first step to be taken when creating a web site.

The goals of this work (website for Federal university of Technology Minna) are as follows;

1. Show casing the school achievement to world.
2. To stir up interest in science and technology development in Nigeria.
3. To open up opportunities for students to sell their ideas and innovations.
4. To help students access their results from anywhere in the world.
5. To create awareness of the school on a general note.
6. To encourage more candidates to apply for admission into the school.
7. To serve as a guide to old and new students.

### **3.1.3 CHOOSING A TARGET AUDIENCE**

After deciding what is to be accomplished with the website, there is need to decide who the visitors to the site will be. It is difficult to create a website that every single person in the world will be able to use since people use different browsers, connect at different speeds, and may or may not have media plug-ins. These factors can affect the use of the site and as such there is need to determine a target audience.

In considering the people who will be attracted to this site, the following questions have been carefully answered,

- ❖ What kinds of computers will they be using?
- ❖ What might be the dominant plat form (Linux, windows, Macintosh, OS2)?

- ❖ What will be the average connection speed (3.3.6 modem, DSL etc)?
- ❖ What kinds of browsers and monitor size will the use?

In this case the target audience is

1. The entire world, particularly students of the school as well as all the people that are interested in educational institution.
2. Government and religious as well as non-governmental organisations that are interested in youth development.
3. Technical people and firm that are involved in the technological advancement of Nigeria.

The predominant platform is likely to be windows with 15-inch monitors, screen resolution of 800 X 600 pixels and Internet explorer 3.0 or later.

Few viewers may use Netscape navigator on a Macintosh or windows plat form.

### **3.1.4 ORGANISING SITE STRUCTURE.**

Organising the site carefully from the onset will definitely save time. Creating of documents and pages without knowing the folder hierarchy they would be placed in, should be avoided. To set up a site a folder will have to be created on the local disk, this folder is to contain all the files for the site. This approach is better than creating and editing files on the live public website itself, as it allows for testing of changes in the local site (located in the local disk) before making them publicly viewable. Afterwards breakdowns the site into categories, related pages are put together in the same folder, so as to make site easier to maintain. It is a good practice to put all non-HTML items to be used on a site into one folder, which may also contain other folders. Below is an example of site structure.

## Site

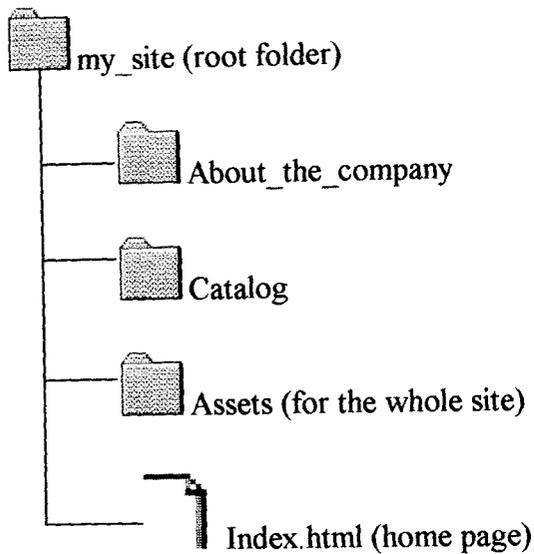


Fig. 3.1: Site Structure Example

### **3.1.5 CREATING A DESIGN LOOK**

It is good to make a simple design layout. This layout could as simple as a mock-up drawing of how site should look. It is important to maintain consistency in the page layout and design. Users should be able to click through the pages in the site without getting confused.

### **3.1.6. NAVIGATION SCHEME.**

Considerations should be given to how visitors move around and the following points should be considered.

1. Visitors should easily know where they are in the site and how to return to the top-level page.
2. Searching and indexes make it easy for visitors to find any information they want.
3. Feedback provides a way for visitors to contact the web master, and other relevant people associated with the company or the site.

## **3.2 WEB SITE DESIGN**

After all the plans that go into the plan of website design, it is time to design the site. This can only be done with HTML, (HYPERTEXT MARK UP LANGUAGE).

### **3.2.1 HYPERTEXTS MARK UP LANGUAGE.**

The hypertext mark up language or HTML is the language of the web, it is kind of programming language that is used to design web pages, as a matter of fact, web pages are HTML file. Although web pages could be designed using web editor programmes (like macromedia dreamwaiver), everything still boils down to HTML as the web editor programmes writes the HTML codes. The numerous web editor programmes has made web design very easy. One need not learn HTML to design website. All the same, it is important that a web master has to knows and understands HTML codes as it helps one to,

1. Think symbolically.
2. It is quite engaging.
3. It teaches one to control computers rather than merely using them.
4. It is the basic of the web.
5. There might be need to edit the codes written by the web pages tom perform specific actions.

Every web page (which is a file) is made up of two things:

1. The actual web page.
2. The HTML code that the browser interprets and displays as the web page.

In the design of web pages, text and pictures would be used to communicate to people.

TEXT: - To put texts in a web page, all that are needed are texts themselves and some instructions to tell the browser how to display the texts. All normal formatting carried out in

a word processor like bold fonts, italicised fonts etc. is very much possible in a web page, all that is needed is the right instruction code.

**PICTURES:** - A picture has to undergo digitalisation and then saved as a file before it can be used or inserted into a web page. Pictures for web pages can be collected in any of the following ways;

- ◆ **Scanner:** - It is used to scan the picture and then saved as a file.
- ◆ **Photo CD:** - When the pictures are developed, they can be put on a compact disk (CD). Each will be one file on the CD.
- ◆ **Digital Camera:** - The picture can be taken and the file downloaded.
- ◆ **Graphics Program:** - The picture is drawn and saved in a file using any graphic software.

A picture file tells the browser how much of each kind of colour to put on the screen and where to put it. There are different formats for storing pictures, however JPEG is the best format for photos, other formats are GIF, PNG etc.

Apart from texts and pictures there are other features of web pages, such as,

**BACKGROUND COLOUR:** - The computer monitor, also referred to as an RGB monitor (that is Red, Green, Blue) creates its thousands of colours by squirting different levels of red, green and blue at each little pixel (i.e. dot) on the screen. There are colour charts available on the Internet that could be represented in hexadecimal numbers. An example is FFFFFFFF representing white. All that is needed is to include "BGCOLOR = colour1" in the HTML code, where colour1 is the desired colour. Here are some other colours.

FFFFFF — White

FF0000 — Red

00FF00 — Green

0000FF — Blue

000000 — Black

A close look at the colour code reveals a pattern which shows that the first two characters controls how much red is squirted on the screen, the middle two characters determines how much green, and the last two characters control how much blue is squirted on the screen where 00 means no colour and FF means lots of colour.

**LINKS:** - The web is based on an idea called hypertext— a method of connecting content by moving from one page or file to another via links. On the web, links are a different colour (usually blue) and are underlined, when the cursor is over a link a little finger is displayed. When a link is clicked on the browser displays the page to which the link point.

### **3.3 TESTING AND PUBLISHING A SITE**

At the end of the development of a web site, when it is ready to be published on a server, it has to be tested. Depending on the size of the project, client specifications and kinds of browsers that visitors will use, there might be need to move the site a staging server where it can be tested and edited. When corrections have been made, the site is published where the public can access. Once the site is published, a maintenance circle is established to ensure quality response to user feedback, and update the site's information. The purpose of testing and troubleshooting a web site locally is to make sure the pages look and work as expected in the target browsers, that there are no broken link and that the pages don't take too long to download. If a web editor is been used, it will be wise to run a site report before publishing. The following guidelines are helpful in the creation of a good experience for visitors to a site;

— Pages should be made to function as expected in the target browsers and fail gracefully in other browsers. The pages should be legible and functional in browsers that do not support styles, layers, plug-ins or JavaScript. The check browser behaviour can be used to automatically redirect visitors to another page.

— Previewing the pages in as many different browsers and on as many different platforms as possible is very helpful. This gives one an opportunity to see difference in layout, colour, font size and default browser window size that cannot be predicted in a target browser check.

— The site should be check for broken links and fixed. The size of the pages and the time they take to download should be monitored.

— The entire site can be checked for problems such as untitled documents and empty tags. Once the bulk of the site has been published, it has to be continuous updates and maintained.

### **3.3.1 CHECKING FOR BROWSER COMPATIBILITY**

Web pages can be constructed with elements that are supported by all browsers as well as elements that are supported only by newer browsers. The check target Browsers features, tests the HTML in the document to see if any tags or attributes are unsupported by the target browsers. The check does alter the document in any way. A target browser check can be done on a document on a directory or on an entire site, the check however does not check script in the pages.

Check browsers can be used to send visitors to different pages depending on their browser brands and versions. For example, it might be intended for visitors to go to one page if they have Netscape Navigator 4.0 or later, and to go to another page if they have Internet Explorer 4.0 or later, and to stay on the current page if the have any other kind of browser.

### **3.3.2 PREVIEWING IN BROWSERS**

It is easy to catch errors early and prevent the propagation of such errors, if the pages in a web site are tested by previewing them in browsers.

During previewing, all browser-related functions work, including Scripts, document relative and absolute links, ActiveX controls and plug-ins, as long as such plug-ins and ActiveX controls are installed. Links are not active within the document window, and as such have to be verified and tested by previewing pages in a browser.

### **3.3.3 CHECKING LINKS IN A PAGE OR SITE**

Fixing broken links on a large site can be tedious and time consuming as large site can contain hundreds of links to internal and external documents and the links may change over time. Orphaned files have to be removed as they may take up disk space.

### **3.3.4 CHECKING DOWNLOAD TIME AND SIZE**

The size and estimated download time of the current page appear at the bottom of the preview document window. A good guideline to use when checking download times for a particular web page is the 8sec (eight- second) rule. That is, most users will not wait longer than eight seconds for a page to load fully. If a web site is developed using web editors, a report can be compiled and generated for several HTML attributes by using the report command. This command enables the checking of external links, combinable nested font tags, missing Alt text, redundant nested tags, removable empty tags and untitled documents. At the end of the testing and troubleshooting, the website will then be ready for publication on a web server and can be viewed publicly.

## CHAPTER FOUR

### DATABASE

#### 4.1 INTRODUCTION

With the increasing popularity of the Internet, the world has actually become a global village as information accessibility increase by the day. Large and small organizations have sites on the World Wide Web (WWW). Most organizations have Intranets (an internally networked web) containing information for speedy delivery of services. For some multinational companies this dedicated network (Intranet) is connected to the Internet, so as to allow workers carry out their duties from various location, it also allows end users to have access to information (with permission where necessary). Distributing information through the Internet is very useful and important, it has the advantage of;

1. Making information dissemination fast and reliable.
2. Reduces administrative overhead cost (use of stationary is reduced drastically).
3. Information can be accessed from almost anywhere in the world.

A lot of work goes into collection and processing of data into useful information. A lot of data is generated as a result of the day-to-day activities in an organisation. A college or university for instance will have to maintain an enormous amount of information which will include, information about lecturers, students, courses, examinations, etc., this type of information can be displayed on the Internet after the have been collected together in a **DATABASE**.

Databases are the root of all business computing today, and at some point it is always desired to integrate a company's database with its web site.

#### **4.2 DATABASE MANAGEMENT SYSTEMS (DBMS)**

**DATABASE:** - This is a collection of data related to a particular subject or purpose, organised and stored in a particular or specific order of arrangement aimed at allowing easy and fast means of location or retrieval of data.

There are databases everywhere around us, such as phone directory, hospital record cards, library catalogue scheme etc. In every database there is a clearly defined order of arrangement of information to allow for easy location and subsequent retrieval of a particular record.

Databases stored in computers are referred to as electronic databases and are flexible and fast in retrieving records, they save a lot of time and manipulation of large databases takes little or no time at all. Electronic databases have the following advantages;

1. Finds specific information with little effort.
2. Easily change database information when required to do so.
3. Access information in many different ways.
4. Generate multiple reports from database.
5. Avoids unnecessary duplication of records.
6. More efficient management of stored information.
7. Information can be accessed from remote locations connected to a computer network.

DBMS is a collection of programs that stores, processes and retrieves data stored in files.

Examples of database management software are Microsoft Access, Microsoft FoxPro, Borland Dbase, Lotus Approach, Oracle database etc.

Microsoft Access 2000 is used in this work as it is readily available, it is user friendly and it has provision for an interface (web page) with the Internet. This interface could connect to the database easily.

#### **4.3 TYPES OF DATABASE APPLICATIONS**

1. **FLATFILE DATABASE:** - In this type of database, all the information you want to keep on an individual or object is placed in one file. This is useful for most kinds of general day-to-day information, such as the telephone book, food menu or an address book. This type of database does not allow combination of information from several database files.
2. **RELATIONAL DATABASE:** - This type of database is actually a collection of related data tables that are linked together through common fields. This allows changes to be made to a large database without having to go through the entire database.

#### **4.4 DATABASE DESIGN SOFTWARE**

Microsoft Access 2000 (which is the software used for this work) is a product of software giants Microsoft. It is well equipped for use in network environment. It is a fully featured Internet equipped software (this is in line with the emerging trend in the computer world towards the Internet) and it is this Internet feature that made it the choice software for this work.

##### **4.4.1 MICROSOFT ACCESS 2000 DATABASE OBJECTS**

There are seven main components or objects in Access 2000, which are;

1. **TABLES:** A table is a set of information about a particular subject (it could contain information about students in a University). Tables contain records (which actually represent the row of the table) in it that is related to the subject of the table. Each record is made up of fields (columns of the table) that contains specific information about what the record represents (if each record contains information about University students then the fields will contain information like student's Name, matriculation number, e-mail address etc.)
2. **QUERIES:** - Queries are used to manipulate the information in the tables of a database this includes sorting, calculating, retrieving records that satisfy certain criteria. There are several types of query but the most widely used are the **SELECT QUERY** and **UPDATE QUERY**.
3. **FORMS:** - Entering data into the database is made easy by the use of forms. Forms allow information in a table to be viewed one at a time and it is used to enter or edit information in a table, forms not only enters data into a particular table but enters data to all related tables as well.
4. **REPORTS:** - Reports are used to present available information in an organised manner. Access provides very easy means of designing reports (just like other objects) to meet all necessary requirements. Once a report has been generated for a particular record it cannot be edited.
5. **MACRO:** - Macros are used to automate action or tasks that are performed regularly in a database. Macros could also be said to be named collections of keystrokes and menu choices that can be run just by referring to the name of the macro.

6. **MODULES:** - Modules are visual basic programs which are used to make your database perform and run as you wish. It is used to automate database actions just like macros however it is more powerful and more flexible than macros.
7. **PAGES:** - This object was not available in lower versions of Access; it came into existence with Access 2000. This object creates an HTML file called DATA ACCESS PAGE connecting it to a database quickly and efficiently. In other words this object serves as an interface between a website and a database. The data access page allows web user to view or edit data in an Access database.

#### **4.5 DATABASE DESIGN AND DEVELOPEMENT**

Before building the tables, forms and other objects that will make up a database, it is important to design the database. This is the keystone to creating an effective, and efficient and accurate database. Steps involved in the design of database are as follows;

- a) Determination of the purpose of the database.
- b) Determination of the tables needed in the database.
- c) Determination of the fields required in the tables.
- d) Determination of relationship between tables.
- e) Refining the database to be sure that there are no flaws in it.
- f) Entering of data and creation of other database objects.

This work made use of most of the Microsoft Access database objects (the data access page will be discussed in detail, as it is the database interface with the website). the database used in this work comprises of six tables, twelve queries, six forms, three data Access pages, one general module. The data access page which is an HTML document generated by Access,

From fig 4.1 it can be seen that data is passed back and forth between the three tiers or components in the form requests and results.

## **4.7 PUTTING DATA ON THE INTERNET USING DATA ACCESS PAGE**

Data access pages lacks many capabilities of Microsoft Access forms and reports however it is used to put an Access database (MDB files) or Microsoft Access project on the web.

### **4.7.1 HOW DATA ACCESS PAGE WORKS**

The HTML code automatically generated by Access contains special HTML tags <META>, <OBJECT> etc. that it uses to bind a database to the page. Like other web plugins, the objects referred to in these tags are special software libraries that need to be installed and registered with the web browser. The web browser calls up these libraries whenever it sees these tags. The primary object in a data access page is the Microsoft Office Data Source Control (MSODSC), which actually acts as the liaison between Internet Explorer and the underlying database. These data access web pages work only with Internet Explorer 5.0 or later.

Designing data Access page is quite easy however to enhance it's performance, some codes have to be written to control its behaviour. Since it is basically a web page, the same type of programming (Scripting) that applies web pages also applies to it. For this work VBScript (a Scripting edition of Visual Basic) was used. This scripting language, which also supports SQL, makes it possible for us to query the database and return answer to the browser. This page after development is stored on a server while the database resides in

database server. After testing, the page is published for public use and can be linked with its database.

#### **4.8 SECURITY ISSUES FOR DATA ACCESS PAGES**

Data access page is made up of a short cut or link stored in the Access database and a corresponding HTML file and as such it presents three major security concern, which are;

1. Security for the links to data access page stored in the page object in the Access database.
2. Security for the data access page files itself.
3. Controlling access to the database that a data access page is connected to.

## CHAPTER FIVE

### RESULT, RECOMMENDATION AND CONCLUSION

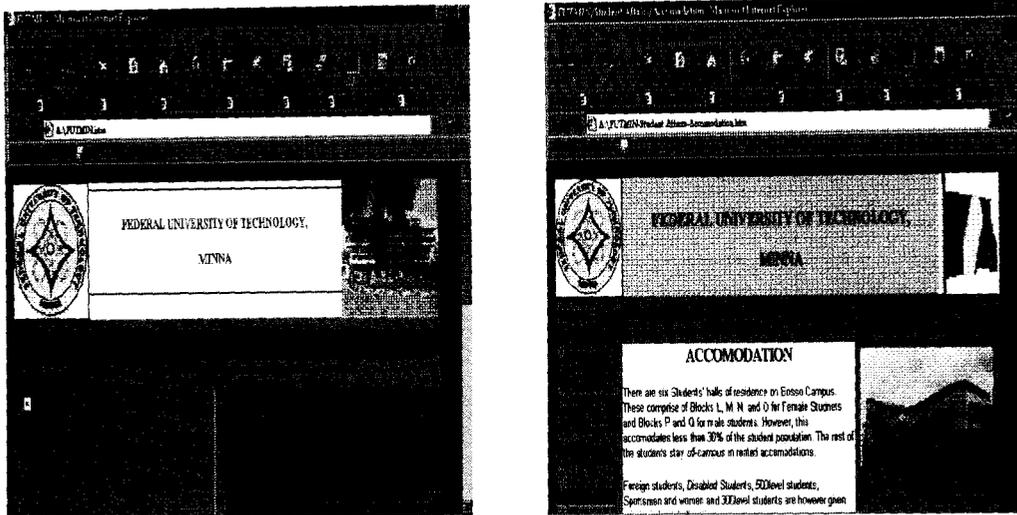
#### 5.1 INTRODUCTION

After the design and development of the website and database, they were both tested on a local disk. The test data in the database are not correct they were just generated for test purposes, however some names were with permission of the concerned students while some other names are fictitious.

#### 5.2 RESULT OF TEST ON THE WEB SITE

This website <http://www.FUTMIN.edu>, was tested for browser compatibility, broken links, untitled documents and empty tags. It performed well in Internet Explorer 5.0. The site is made up of thirty-six pages in all. The file structure is shown on fig 5.1 below. This site can be accessed after hosting, by entering <HTTP://WWW.FUTMIN.EDU>, in the address bar of a browser. The database was designed to be run by an administrator that will manage it and give access right to lecturers and other users of the network. The lecturers will have right to enter the scores of students (the database assigns grade to the scores, calculates the SGPA and CGPA of students and also generate report to that effect if it is required). This database can be accessed from the web site through a *result link* provided in the web site. A sample of the home page and result sheet is shown below in fig. 5.2

The samples were extracted from Internet Explorer 5.0 on a windows 98 platform and a 15” monitor.



**Fig 5.1: Samples of the web page**

### **5.3 RECOMMENDATION**

This project work can be improved on and expanded. The database could also be improved upon. Anyone wishing to improve on this work may consider the following;

- 1) The security of the database management system can be improved on, in such a way as to prevent anyone even lectures from tampering with already approved results. Care should be taken to prevent unauthorised access.
- 2) More animation could be added to the site, as new techniques and technology for web site design comes up. The site should be updated as at when due.
- 3) The school can incorporate on-line services to manage the sales of admission forms, this will surely improve the quality of services rendered by the school.

I also would like to recommend that this institution, Federal University of Technology Minna, should;

- 1) Install a local Intranet and maintain a local network system, this will definitely enable the database to be used effectively and efficiently.

- 2) Install and own a server and database server, which would not only serve the school but also other people that wish to be on the Internet.

#### **5.4 CONCLUSION**

The aim of this project work was achieved. The website projects the school to the target audience and when published will serve as a dynamic source of information. This site has been designed for easy maintainability and expansion. All files in the site have been named according to their function.

The development of this site and its database management facility required a great deal of patience and a good knowledge of the Algorithms and programming. This work has been done using the Hypertext mark up language, which is the language of the web. A web editing package- dreamwaiver 4.0, educational version, as well as an image-editing package, macromedia flash, was used to enhance the features of the pages and for better file management.

The results of the test run show that the site is up and running and so is the database. The site is compatible with the target browsers and does not contain broken links, untitled documents, and empty tags and redundant nested tags. The site is ready for publishing.

## REFERENCES

1. Slater William, Internet Society isoc All about the Internet history  
[www.isoc.org/internet](http://www.isoc.org/internet) history
2. Dav Kristula, The history of the Internet  
[www.davesite.com/webstation/net-history](http://www.davesite.com/webstation/net-history).
3. Wanda Wigglebits, Building a school web site  
[www.wigglebits.com](http://www.wigglebits.com)
4. Leban Roy, Programming data access page  
[www.msdn.microsoft.com/library/default.asp?url=/library](http://www.msdn.microsoft.com/library/default.asp?url=/library). Microsoft Corporation,  
January 1999
5. Tanzer Brett A., Connecting data access pages together  
[www.msdn.microsoft.com/library/techart/connectdap.htm](http://www.msdn.microsoft.com/library/techart/connectdap.htm)., Microsoft Corporation  
January 1999
6. Aptech World wide, Web page designing with dreamweaver 4.0
7. Fapohunda Akin, Database Management Manual  
Abuja: Aflon Limited, 2000
8. Giles Roosevelt, The Cisco CCIE study Guide,  
New York: McGraw-Hill, 1998

## PROGRAM LISTING

```
<html>
<head>
<title>FUTMIN/SET</title>
<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1">
</head>

<body bgcolor="#000099" text="#000000">
<table width="746" border="0" cellpadding="0" cellspacing="0" bgcolor="#0099FF">
<tr>
<td valign="top" rowspan="3" colspan="4"></td>
<td valign="top" height="52" colspan="20" bgcolor="#CCCC00">
<div align="center"><font size="5"><b><font face="Algerian"
color="#000099">FEDERAL
UNIVERSITY OF TECHNOLOGY, MINNA</font></b></font></div>
</td>
<td valign="top" colspan="5" rowspan="3"></td>
</tr>
<tr>
<td valign="top" height="64" colspan="20" bgcolor="#CCCC00">
<div align="center">
<hr>
<font color="#993300" size="4" face="Charliesworth"><b>SCHOOL
ENVIRONMENTAL
TECHNOLOGY</b></font></div>
</td>
</tr>
</tr>
</tr>
```

```

<td colspan="20" height="33" valign="top" bgcolor="#CCCC00">
  <hr>
</td>
</tr>
<tr>
  <td height="23" colspan="2" valign="top"><object classid="clsid:D27CDB6E-AE6D-
11cf-96B8-444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#versio
n=4,0,2,0" width="100" height="22">
  <param name="BASE" value=".">
  <param name=movie value="button44.swf">
  <param name=quality value=high>
  <param name="BGCOLOR" value="#009900">
  <embed src="button44.swf" quality=high
pluginspage="http://www.macromedia.com/shockwave/download/index.cgi?P1_Prod_Versi
on=ShockwaveFlash" type="application/x-shockwave-flash" width="100" height="22"
bgcolor="#009900" base=".">
  </embed>
</object></td>
  <td width="10"></td>
  <td valign="top" colspan="5"><object classid="clsid:D27CDB6E-AE6D-11cf-96B8-
444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#versio
n=4,0,2,0" width="100" height="22">
  <param name="BASE" value=".">
  <param name=movie value="button45.swf">
  <param name=quality value=high>
  <param name="BGCOLOR" value="#009900">
  <embed src="button45.swf" quality=high
pluginspage="http://www.macromedia.com/shockwave/download/index.cgi?P1_Prod_Versi

```

```

on=ShockwaveFlash" type="application/x-shockwave-flash" width="100" height="22"
bgcolor="#009900" base=".">
  </embed>
</object></td>
<td width="1"></td>
<td valign="top" colspan="5"><object classid="clsid:D27CDB6E-AE6D-11cf-96B8-
444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#versio
n=4,0,2,0" width="100" height="22">
  <param name="BASE" value=".">
  <param name=movie value="button46.swf">
  <param name=quality value=high>
  <param name="BGCOLOR" value="#009900">
  <embed src="button46.swf" quality=high
pluginspage="http://www.macromedia.com/shockwave/download/index.cgi?P1_Prod_Versi
on=ShockwaveFlash" type="application/x-shockwave-flash" width="100" height="22"
bgcolor="#009900" base=".">
  </embed>
</object></td>
<td valign="top" colspan="3"><object classid="clsid:D27CDB6E-AE6D-11cf-96B8-
444553540000"
codebase="http://download.macromedia.com/pub/shockwave/cabs/flash/swflash.cab#versio
n=4,0,2,0" width="100" height="22">
  <param name="BASE" value=".">
  <param name=movie value="button47.swf">
  <param name=quality value=high>
  <param name="BGCOLOR" value="#009900">
  <embed src="button47.swf" quality=high
pluginspage="http://www.macromedia.com/shockwave/download/index.cgi?P1_Prod_Versi
on=ShockwaveFlash" type="application/x-shockwave-flash" width="100" height="22"
bgcolor="#009900" base=".">

```

enables one to create data bound web pages that can be viewed in Microsoft internet explorer 5.0 or later and can also be used to edit data in a database.

#### 4.6 ESTABLISHING WEB DATABASE CONNECTIVITY

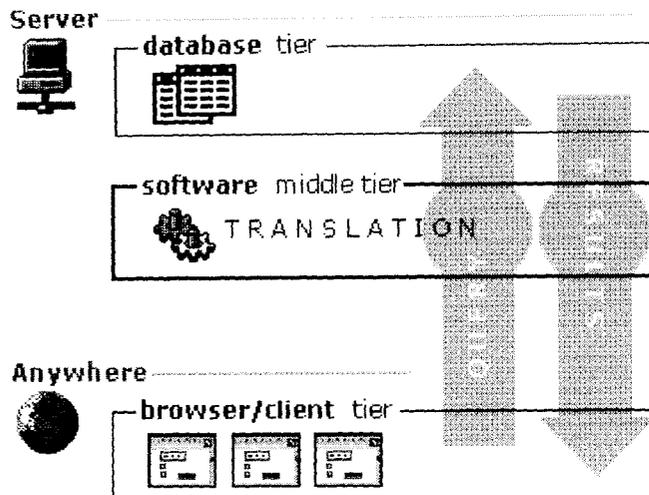


Fig 4.1

Products used in establishing web-database connectivity vary greatly in their cost, efficiency and complexity, they all have a number of components and technology in common (see fig above). They all make use of special software that resides on servers. Special software forms the middle component or tier in what is commonly known as a three Tier system, which is comprised of;

1. Database Tier: - The data or database file residing on the server, also known as database server.
2. Middle Tier: - Database connectivity software that make the database to be securely available on the web.
3. Client Tier: - The client or browser used to search and modify database records.

```

    </embed>
  </object></td>
  <td width="9"></td>
  <td valign="top" colspan="5"><object classid="clsid:D27CDB6E-AE6D-11cf-96B8-
444553540000"
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