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# Web Based Housing Management System

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**Abstract** - This research developed a web based housing management system. The system is to manage the housing for senior staffs and to enhance easy application/update for accommodation. It also helps the housing unit to have easy access to data, increase its productivity, and save cost of production. The value of information system for an organization is generated from the value of information processed for decision making.

Relevant literature on housing management, modern information system concepts, its needs and components, were reviewed to further explain the need for such an information system. Interview, observation and record inspections were used to collect data from and about the Unit. Also, the existing system has its problems, these were discussed and development of an alternative system was also discussed. In this study, the methodologies adopted for developing the web based system were Adobe Creative Suite 5 which was used to develop the front end, while the graphics on the pages were designed using CorelDraw Version 15, the XAMMPServer version 5.3.5 containing PHP and MySQL applications, were used to make the site pages dynamic. The PHP served as the middleware while the MySQL sufficed as the web portal backend.

The new system justified its need and indispensable features in the areas of information capturing and processing, database management, etc. In conclusion, the housing management system intends to process information, management data, allow for easy access to accommodation application, this must be done in order to develop mechanisms and institutional arrangement for decision making. However, recommendations were made on the need for further improvement like incorporating mobile alert, payment system notification.

**Keywords:** Web, Database, Information System, Housing, Housing Management

## I INTRODUCTION

The current global trend for information capturing, storage, processing and retrieving is electronic. Using manual system wastes time in information keeping and management. Also, large space is occupied for storage and documents are prone to permanent damage and loss. The problems associated with manual record keeping system often prompt the elective alternatives.

The process of storing and retrieving data constitutes a vital index in any organization's efficiency and effectiveness. Information systems are mechanisms through which one or more information activities are performed to satisfy the information and information needs of people or organisation (Tiamiyu, 2005). In recent years growth of the Information and Communication Technology (ICT) has had a substantial impact on the way organizations and institution function which ranges from student learning, staff housing management and so on. The use of ICT in institution is on the rise worldwide offering online services. (Gupta et al, 2008). One of such services is housing management.

Web-based housing management systems can make use of browsers, data handling devices and other internet technology to create a network for sharing and manipulating institutional information in a way that will assist housing management to complete work on time and within budget. With the aid of a housing management system, data created would be efficiently managed in a procedure called information management which is the collection, processing and management of information from one or more sources and the distribution of such information to one or more audiences. This sometimes involves those who have a stake in, or a right to that information. One of the issues in information management is getting the right information to the right person at the right time and in a usable form (Robinson, 2005), that is, making it easier for the deserving recipient and difficult for the undeserving.

In a paper-based or manual system, a lot of physical spaces are being used. In order to minimize physical space occupied by database and management system of occupants, the web based management will be a tool that will handle this thereby improving on effectiveness and efficiency of the existing system.

There is need also for the housing committee to know the occupants that have stayed beyond retiree period especially through the age of the occupant. The effective management of information helps an organization or institution to achieve its goals and objectives. There is need to provide avenue to make online application for accommodation while the possibilities of running a check on the status and notifying the occupant of an accommodation by the housing committee is also made available.

Considering the relevance of web in today's world, there is need for housing to have cognizance of the paradigm and use these changes as a spring board to greater height and effectiveness in management. It is to this end that the web based housing management system is considered important and designed so as to enhance the effective management of quarters of the University of Ibadan and also to keep pace with globalization trend in which manual records and management systems are been overhauled and replaced with the web based or electronic one. This system will also improve quality of information flow and exchange within housing committee for senior staff in University of Ibadan.

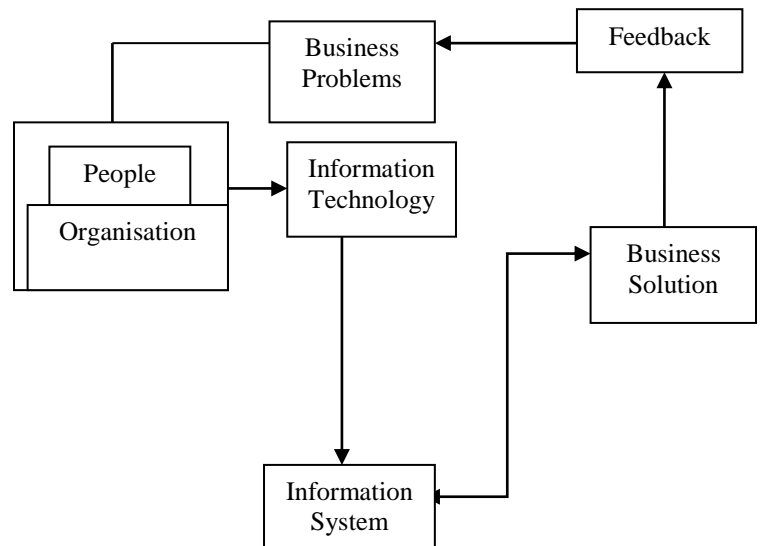
The main objective of the study developed a web based housing management system that manages the accommodation of the senior staffs, the information details of accommodation occupant and of course it will be dynamic because the occupants changes from time to time. The study developed a housing management system with interactive web pages and electronic database. The interactive web pages will give room for senior staff of the University of Ibadan to apply for accommodation, make enquiries or suggestions. It is intended that the system will be used only within the confinement of the Senior Staff of the University of Ibadan.

## II LITERATURE REVIEW

Information system is a group of interrelated components that collectively work to carry out input, processing, output, storage and control actions in order to convert data into information products that can be used to support forecasting, planning, control, coordination, decision making and operational activities in an organisation. (Barry et al.,2003). Today the most profound effect on the way in-house IS that are developed are the technologies of the World Wide Web.

In a very broad sense, the term information system is frequently used to refer to the interaction between people, algorithmic processes, data and technology (Kroenke, 2008). Durodoye (2005) opined that two of the vital functions of the information system are the abilities to output information to support

decision making, coordination, control, analysis etc, and receive feedback from which further inputs can be derived.



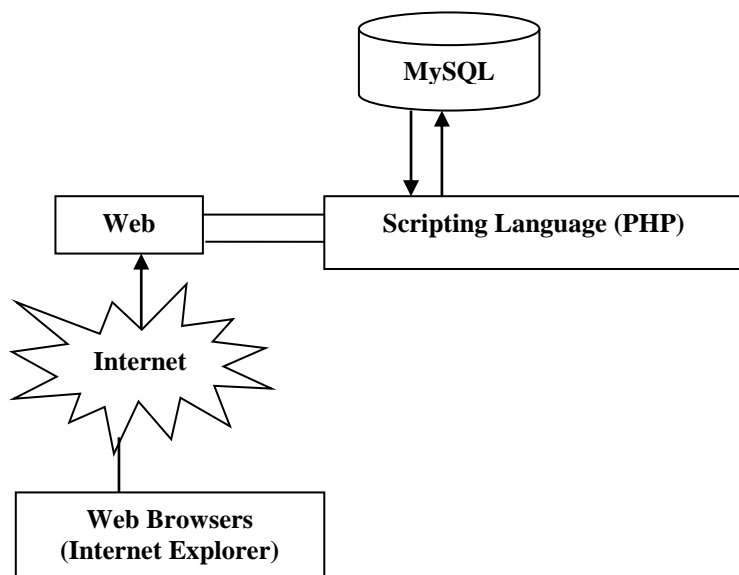
**Figure 2.1. Illustration of a typical Information System**  
(Durodoye, 2005)

Housing has been recognized as the second most important essential human need. Housing all over the world has remained an interdependent phenomenon that affects every facets of mankind. The house is an economic resource providing space for production and access to income-earning opportunities. Housing can therefore be defined as the process of providing a large number of residential buildings on a permanent basis with adequate physical infrastructure and social services in planned, decent, safe and sanitary neighbourhoods to meet the basic and special needs to the population.

Apart from the provision of staff quarters and subsidized tenancy for their staff, some universities, like University of Lagos have gone ahead to initiate staff housing programmes beneficial to staff, while still in the employment of the University and on his retirement from the system (Otubu, 2008). This programme is designed, irrespective of the National Housing Fund, to make staff a house-owner on or before his retirement from the services of the university. The University authorities have themselves realized the impact of good housing system on the health and productivity of their staff. It is in the light of this that the University administration strives hard to provide staff quarters and subsidized tenancy to their staff.

### 2.1 Housing Management System Tool

The exponential growth of web based application due to its numerous offers has necessitated its implementation in every aspect of human activities including housing management. Access to information system resources, such as web developer, internet, programmers and computer, is critical for developing and fine tuning a web-based system for housing coordination. There are several tools that can be used in developing and managing a Housing Management System, but this research makes use of Hypertext Preprocessor as the scripting language, MySQL as database, Apache as Web server which can be accessed through the internet from a web browser.



**Fig 2.2 Tools in the Web development process**

## 2.2 Database Management System (DBMS)

A collection of components that support data acquisition, dissemination, maintenance, retrieval and formatting. DBMS is designed for the purpose of managing data based on the variety of data models. A DBMS is a complex set of software programs that controls the organization, storage, management, and retrieval of data from the database. DBMS are categorized according to their data structures or type.

A DBMS includes:

1. A modeling language to define the schema of each database hosted in the DBMS, according to the DBMS data model.

a. The four most common type of organization are the hierarchical, network, relational and object model. A given database management system may provide one or more of the four model, the optional structure depend on the nature organization of the application data, and on the application requirement (which include speed, reliability, maintainability, scalability and cost)

b. The document model in use today is the ad hoc, one embedded in SQL (Structured Query Language). Many DBMS also support the open database connectivity that supports a standard way for programmers to access the DBMS.

2. Data structure (fields, records, files and objects) optimized to deal with every large amount of data stored on a permanent data storage device (which implies relatively slow access compared to the volatile main memory)

3. A database query language and report writer to allow users to interactively interrogate the database, analyze its data and update it according to the users privileges on data.

a. It also controls the security of the database

b. Data security prevents unauthorized users from viewing or updating the database. Using passwords, users are allowed access to the entire database or subsets of it called subschema.

4. A transaction mechanism to ensure data integrity, despite concurrent user accesses (concurrency control), and faults (fault tolerance)

a. It also maintains the integrity of data in the database.

b. The database can maintain the integrity of the database by not allowing more than one user to update the same record at the same time.

The DBMS can help prevent duplicate records via unique index constraints; for example, no two staff with the same staff id (key fields) can be entered into the database.

When a database is used, information system can be changed much more easily as the organization's information requirement change. New categories of data can be added to the database without disruption to the existing system.

### 2.2.1 Physical and Logical View of a DBMS

The physical view of information deals with how information is physically arranged stored and accessed on some type of storage device such as a hard disk. The logical view of information, on the other hand, focuses on how you as a knowledge worker need to arrange and access information to meet your particular business needs.

DBMS helps to specify the logical organization for a database and access and use the information within a database. (Haag *et al.*, 2004). Web-enabled DBS takes its data input from the website; thus allow many users to access the database in as much as they can access the web pages attached to the database. DBMS engine accepts logical requests from the various other DBMS subsystems, converts them into their physical equivalent, and actually accesses the database and data dictionary as they exist on a storage device.

A database may be centralized or distributed; if it has all files in one physical location it is centralized but if it has a complete or portions of a database in more than one physical location, then it is said to be a distributed database (Kroenke, 2004).

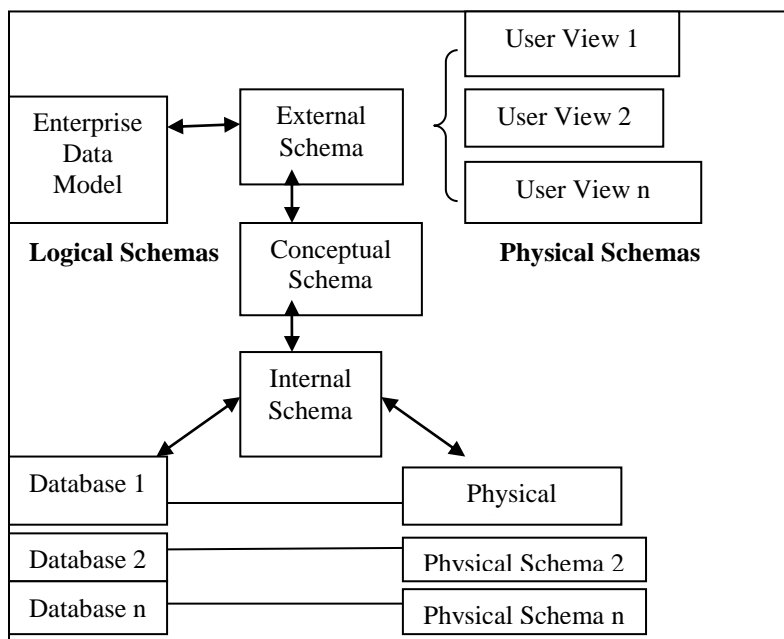


Figure 2.3: Three Schema Architecture for Database (Source: Jeffrey et al., 2009)

### 2.3 World Wide Web (WWW)

The World is already a global village in which diverse geographical locations are already connected together and sharing information. The World Wide Web (www) has allowed information to be accessed and shared through the internet.

The World Wide Web (commonly abbreviated as the Web) is a system of interlinked hypertext documents accessed via the Internet. With a Web browser, users can view Web pages that may contain text, images, videos, and other multimedia and navigate between them using hyperlinks. The World Wide Web enabled the spread of information over the Internet through an easy-to-use and flexible format. It thus played an important role in popularizing use of the Internet (Vimalanandan, 2009). A Web page is viewed on the World Wide Web either by typing the URL of the page into a Web browser, or by following a hyperlink to that page or resource. The Web browser then initiates a series of communication messages behind the scenes in order to fetch and display it (Craig, 2009).

The server-name portion of the URL that is resolved into an IP address using the global, distributed Internet database. This IP address is necessary to contact the Web server. The browser then requests the

resource by sending an HTTP request to the Web server at that particular address. Having received the required files from the web server, the browser then renders the page onto the screen as specified by its HTML, CSS, and other web languages. A Web browser knows how to go to a Web server on the Internet and request a page, so that the browser can pull the page through the network and into your machine. This also knows how to interpret the set of HTML tags within the page which is displayed on screen.

### 2.4 Web based Application

Web based applications (WBA) have come a long way and now offer competitive advantages to traditional software based systems. Over the years, web based applications have evolved significantly with improvements in security and technology giving room for a safe and efficient room for interaction and operation in different activities.

The ability to update and maintain web applications without distributing and installing software on potentially thousands of client computers is a key reason for their popularity and this can all be done on the server thereby making it simpler, simply put, it is more manageable. (Spencer, 2010)

#### Advantages of Web Based Applications (WBA)

1. **Easy deployment:** Due to the manageability and cross platform support, deploying web applications to the end user is far easier. They are also ideal where bandwidth is limited and the system and data is remote to the user. At their most deployable you simply need to send the user a website address to log in to and provide them with internet access.
2. **Security:** data being used and moved about in secured in this case unlike the movement in a larger complex systems. In web based systems these systems and processes can often be consolidated reducing the need to move data around thereby ensuring the data are secured.
3. **Highly economical:** Web based applications can dramatically lower costs due to reduced support and maintenance, lower requirements on the end user system and simplified architecture, as a result of additional savings can often be found.
4. **Cross-platform compatibility:** Typically the minimum requirement would be a web browser of which there are many. The inability to access information due to disparity in systems and its applications does not pose a problem for information found on WBAs. One of the numerous problems of IT and its developments is application integration but the web based

application enhances cross-platform compatibility.

5. **Easy access to Database:** We can communicate with, access databases and publish almost anything we wish at relatively low costs and at ever increasing speeds.

#### 2.4.1 MySQL

MySQL is a fast, easy-to-use RDBMS used for databases on many Web sites. MySQL is popular with Web developers. Its speed and small size make it ideal for a Web site. The advantage for using MySQL is that it is fast (which is the main goal), it's inexpensive (it can be gotten under an open source license), it is easy to use (you can interact with a MySQL database by using a few simple statements in the SQL language, which is the standard language for communicating with RDBMSs), it can run on many operating systems, technical support is widely available, it's secure, it supports large databases. (Valade 2004).

#### 2.4.2 Pre-Processor Hypertext (PHP)

PHP is a scripting language designed specifically for use on the Web. This means that PHP code is embedded in HTML code. It is a tool for creating dynamic Web pages. PHP stands for HyperText Pre-Processor. In its early development by RasmusLerdorf, it was called Personal Home Page tools. The PHP language's syntax is similar to the syntax of C. PHP is particularly strong in its ability to interact with databases and the popularity of PHP is rapidly growing because it's fast, it's inexpensive, it's easy to use, it can run on many operating systems, it's secure, it's customizable.

One PHP statement may be used to connect to the correct database, telling PHP where the database is located, its name, and the password needed to connect to it. The database doesn't need to be on the same machine as the website: PHP can communicate with a database across a network. Another PHP statement should be used to send instructions to MySQL. An SQL message can be sent across the connection, giving MySQL instructions for the task that the programmer wants done. MySQL returns a status message that shows whether it has successfully performed the task. If there was a problem, it returns an error message. If the SQL message asked to retrieve some data, MySQL sends the data that were asked for, and PHP stores it in a temporary location where it is available to user. Then one or more PHP statements may be used to complete the application task. (Wang, 2010). PHP statements may be used to display data that retrieved in the course of a search. Or PHP statements might be used to display a status message in the browser, informing the user that the data was saved.

### III SYSTEM ANALYSIS

System analysis is an important operation in which analyst examines information gathered from the organization or individual for its relevance to some other elements or processes in application development. Manual systems are frequently replaced by new systems and the process of replacing old systems by new ones happens in a series of stages, this whole process is known as System Development Life Cycle. This is made up of several stages and they are shown in the FIG 3.1 below;

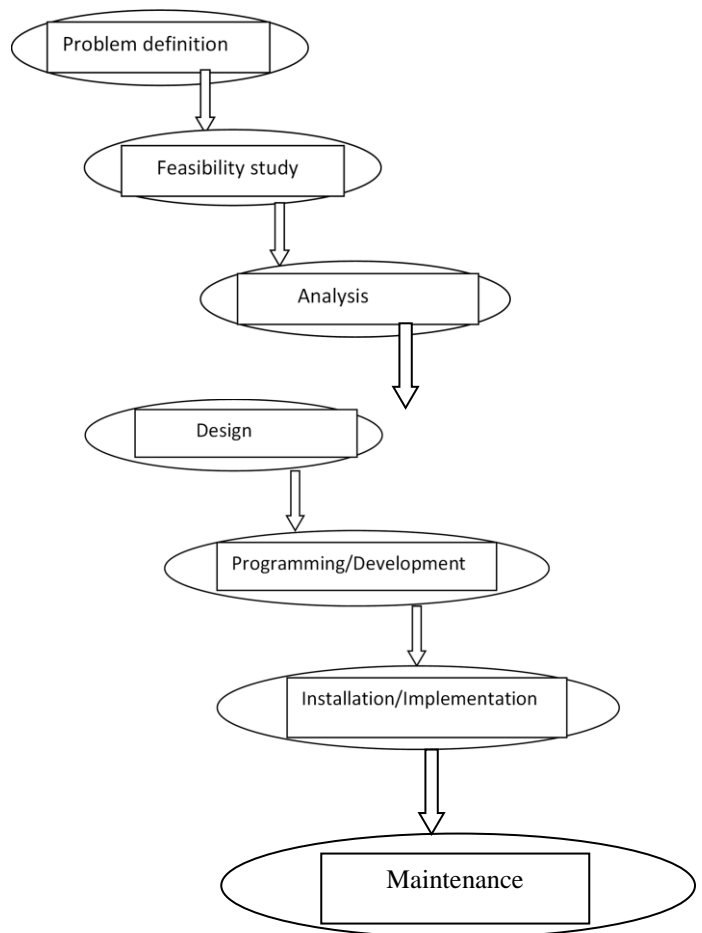


Figure 3.1: System Development Life Cycle

#### 3.1 Methods of Data Collection

The methodology employed to collect the data and information relevant to the review of the existing system is referred to as System Investigation. Relevant data and information to the study were collected through interview, record inspection, and observation.

### 3.2 Description of the existing system

The University’s Housing Unit has sections for both the senior staff and the junior staff. This research that is concerned with the senior staff has a provision for the staff to come to the office to fill form for application for quarters whenever they need, which will be given to the member of staff and will be returned after being filled. All records on daily operations such as requests for quarters within the university are kept manually in a file cabinet.

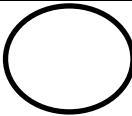
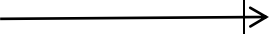


The conventional way of passing across information to the university’s community is through the University’s periodic bulletins. Any piece of information for public consumption emanates from the office of the chairman housing committee of which a copy is sent to the Registrar who includes the information into manuscript of the proposed bulletin before it is sent to the University Press for publication. Another copy is kept in Records unit of the Housing Unit in paper-based form.

Also the housing unit accepts and responds to general enquires and communicates about situation in the application for, maintenance, and daily operations manually in a paper-based form.

there are a lot of paper records, this make the task of information retrieval complex and difficult to achieve.

- Each time senior staff wants to make application for quarters, he/she has to get the estate unit of the registry; the existing system does not give room for application to be filled at convenience.
- Likewise, sending regular notifications or updates to the entire senior staff occupying the quarters is impossible because the only method of disseminating information to the senior staff in the quarters is through bulletin or memo, a reasonable percentage member of the senior staff in occupying the quarters may be left out.
- There is no room to run a fast check of the number of accommodation that are available or not available neither does it give room for quick access to record when needed because of the large volume of data.

**Table 3.1 Tools used in describing the Existing System**

Symbol	Name	Description
	Process	Circles are used to represent processes. Processes are actions taking place to transform inputs to outputs
	Data flow	Lines represent data flows between processes, data stores and external entities. Data flows should be named to identify the piece of data.
	External Entity	Boxes are used to represent external entities. These are any item, person or organisation sitting outside the systems
	Data store	An open-ended rectangle is used to represent data store. Data stores include electronic or non-computer based stores of data.

### 3.4 Alternative to the existing system

The alternative to the existing system is the web based housing management system. A web-based system that has the capability of storing billions of applications/records without physically taking up office space ensuring time and effort efficiency in capturing, storing, retrieving and disseminating information in an electronic format without any physical movement of paper documents. This system can take its data input from the web pages developed; thus allowing many users to have access to the database. Different occupants and applicants’ details of the senior staffs that have applied for the quarters or are occupying the quarters will be kept in the online database, and this will assist housing committee members in quick access to the address and names of occupants.

From time to time, there is need for improvement in the management of the staff quarters. Suggestions and comments from individuals and stakeholders about the application and the procedure of will and this will be enhanced through an avenue which will be created for senior staff to give suggestion without actually coming to the office. This will also improve quality of information flow and exchange within the university committee especially for housing committee for senior staff quarters.

In order to minimize physical space occupied by database and management system of senior staff quarters occupants, the web based management will be

### 3.3 Problems of the existing system

The problems associated with the existing system are as follows;

- The existing system is typically characterized with paper-based information management practices. A lot of space is being occupied as

a tool that will handle this thereby improving on effectiveness and efficiency of the existing system. In a paper-based or manual system, a lot of physical spaces are being used in accommodating the application and record of the applicant. There is need also for the housing committee to know the occupants that have stayed beyond retiree period especially through the age of the occupant and the year in service of the occupant, all these through the DBMS will be made possible.

To aid the university in their decision making in respect to housing, the need for accurate and timely delivery of generated reports to the appropriate authorities is also a paramount issue which could be addressed through the web based housing management system. Reports could be generated anywhere, anytime when there is access to the internet. Also the information management practice can be carried out anywhere, since the authorized housing staff can access

the database system from anywhere there is internet connection.

#### 4. SYSTEM DESIGN

The new system developed is a web-enabled application connected to a database and resident on a web server and be accessed by web browsers. The web application relies on hyperlinks as a means navigating from one web page to another. The new system is divided into two sections namely: User and Administrative. The user section consists of various web pages that can be accessed by anyone especially the senior staff while the administrative section consists of access to the database by the Estate Unit authorized staff.

##### 4.1 Logical View of the New System

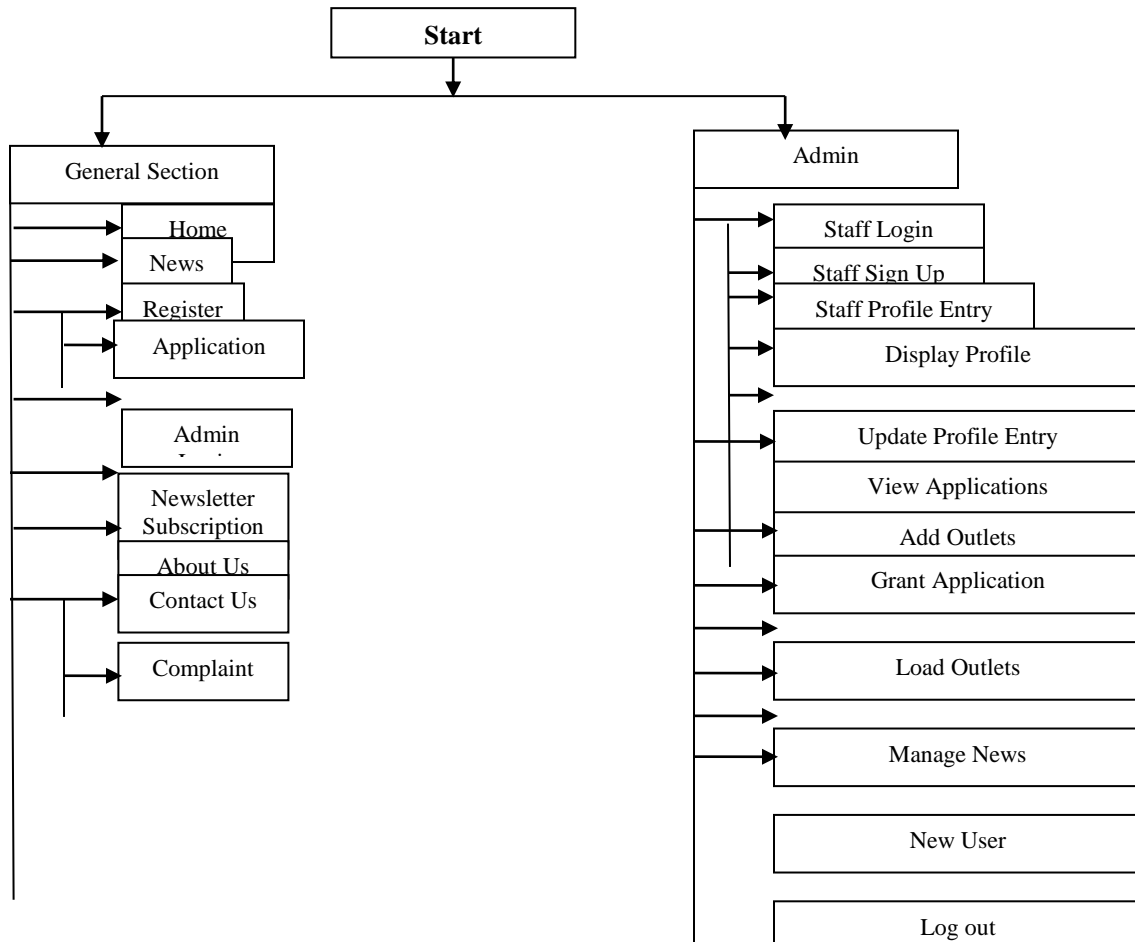


Fig. 4.1: Logical View of the New System

The design technique adopted for the development of this housing management system is the bottom up approach. A bottom-up approach is the piecing together of systems to give rise to grander

##### 4.2 Design Technique



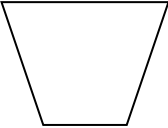

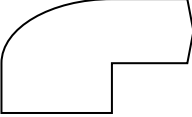
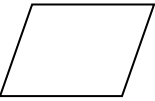

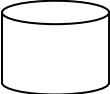
systems, thus making the original systems sub-systems of the emergent system. In a bottom-up approach the individual base elements of the system are first specified in great detail. These elements are then linked together to form larger subsystems, which then in turn are linked, sometimes in many levels, until a complete top-level system is formed. This approach required the system developer to design the system based on the information gathered and represented in the database.

**4.2.1 System flow chart**

The graphical representation of the movement of information in and out of the system is what we refer to as System Flow chart. That is how information is captured for the system and displayed for the users. Also how information is captured from the users. The users in this case are the senior staff of the University of Ibadan.

The tools used in describing the new system are specified below:

**Symbols Representations/Denotations**

- 1.  Manual operation or processing
- 2.  Process
- 3.  Paper document
- 4.  Input/output
- 5.  Visual display unit
- 6.  Magnetic disk



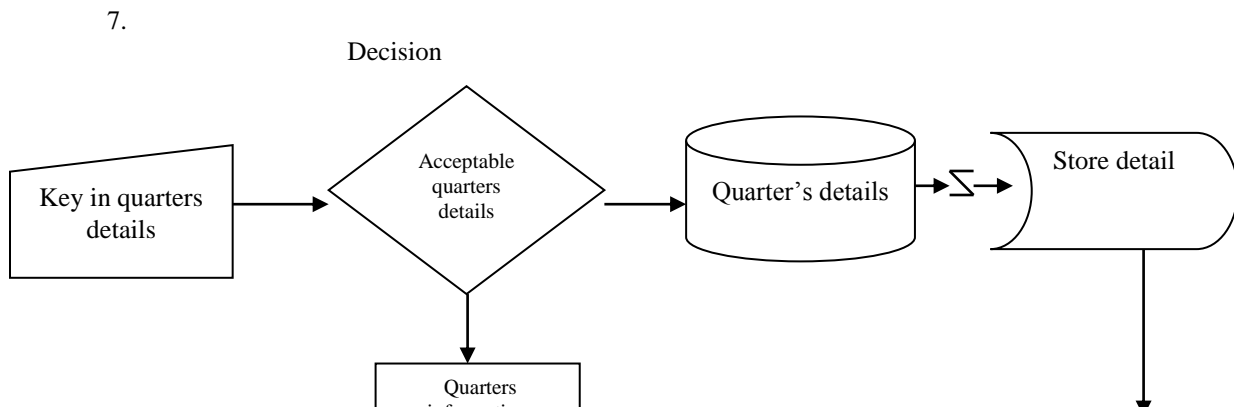
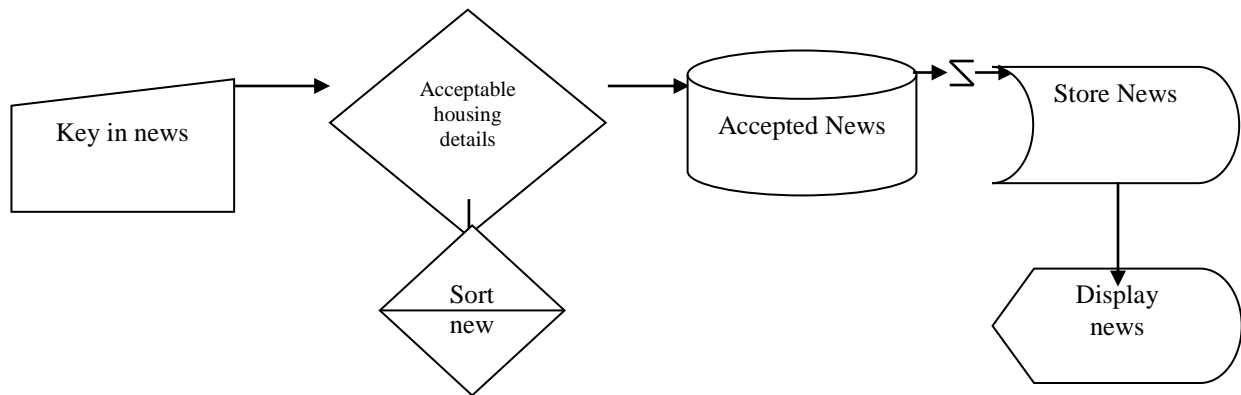
- 8.  Communication link
- 9.  Online storage

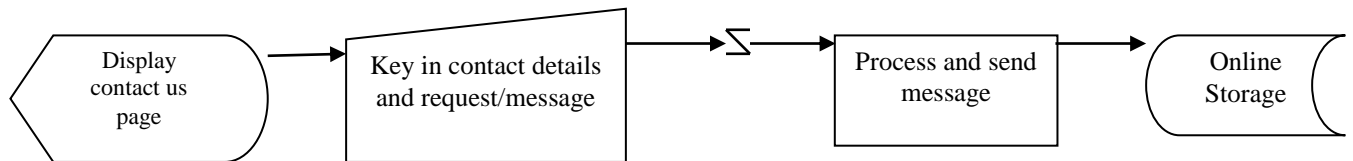
Figure 4.2 below present how information about a quarter is captured and displayed. The system administrator keys in the quarters details and it is stored in online database. From time to time, the senior staff needs update on new development in regards to the management of housing, figure 4.3 presents how news is captured and displayed for the new system, figure 4.4 present how information is captured from users through the complaint page while figure 4.5 shows how sent messages from the users are processed and replied. The administrative section of the new system gives room for effective management of housing details, applicants. Figure 4.6 shows the profile record of the administrative staff.



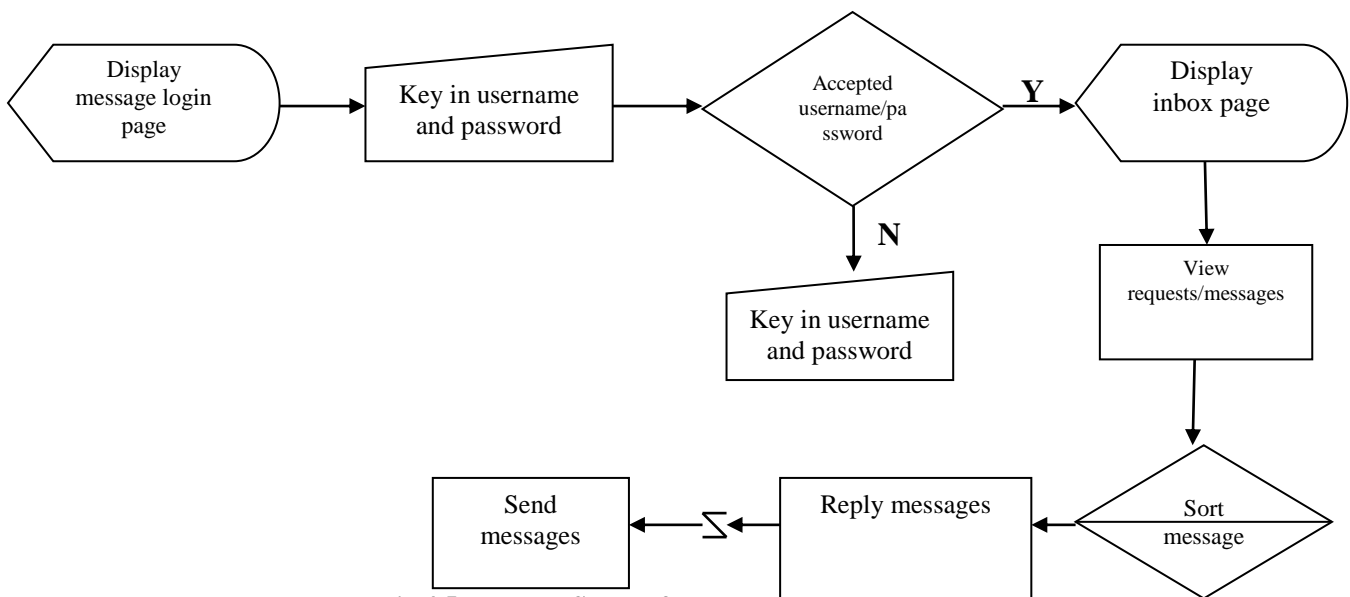
**Fig 4.2** System flow chart for quarters listing



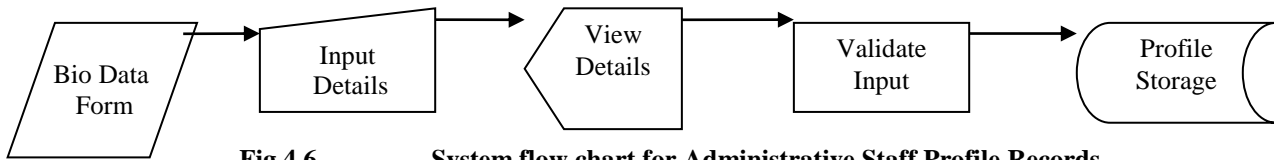
**Fig 4.3** System Flow chart for news display



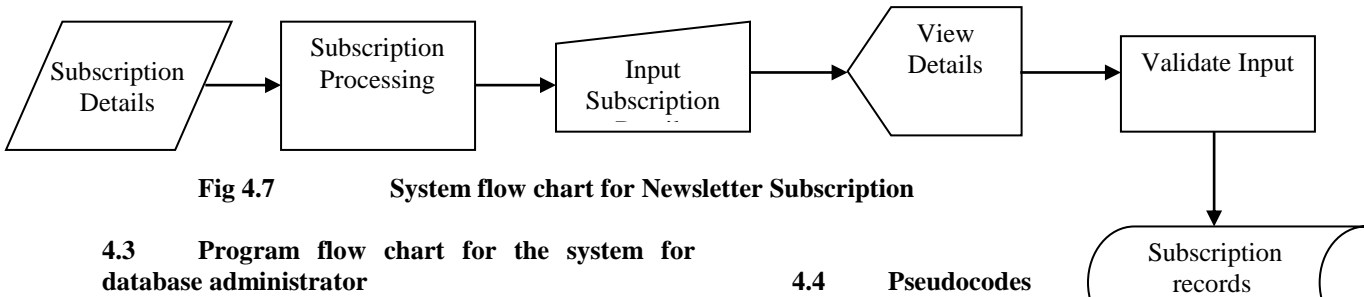
**Fig 4.4** System flow chart for contacting the administrator



**Fig 4.5** System flow chart for replying users

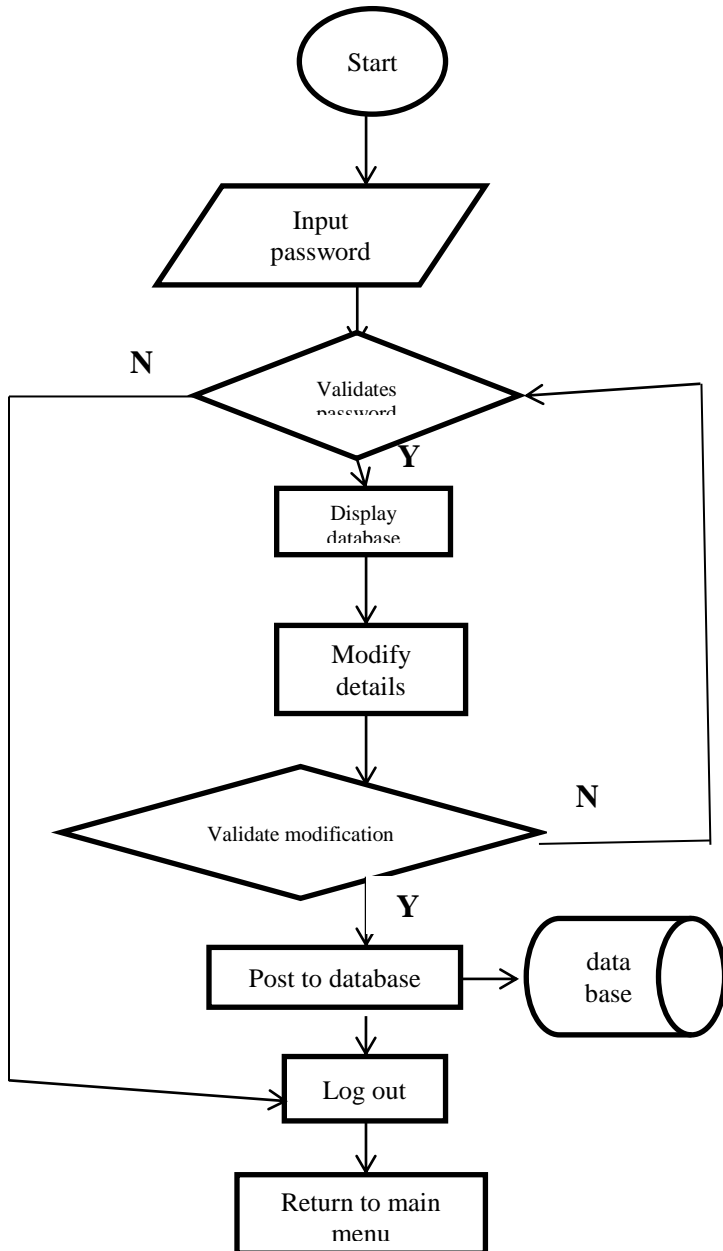


**Fig 4.6 System flow chart for Administrative Staff Profile Records**



**Fig 4.7 System flow chart for Newsletter Subscription**

**4.3 Program flow chart for the system for database administrator**



**4.4 Pseudocodes**

The representation of an English-like form is referred to as pseudocode. It is used to represent the precise logic of procedure by writing it out using control structures such as sequence, iteration and selection (using the 'if' 'then' 'else'). Pseudocode can easily be understood by users, and can be easily translated to programming languages.

**i. User Admin login code**

Start  
 Program log in  
 Display login form menu  
 Enter username  
 Enter password  
 If Username is null and password is null then  
 Display error message  
 Else  
 If Username is not null and password is null then  
 Display error message  
 Else  
 If Username is correct and Password is correct then  
 Display the full pages on the portal  
 Stop

**ii. User Registration**

Start  
 Program – Insert- Record  
 Click on Register as a new user  
 Fill the registration form  
 If the password 1 equals password 2  
 Then accept as a new user  
 Else  
 Display error message  
 Stop

## V.

### SUMMARY AND CONCLUSION

The newly developed system is a combination of tools based on the information systems for housing to enhance management of housing and foster easy access to application for the senior staff quarters. The Web Based Housing Management System project was done after an analysis of the existing system has been carried out. The problems of the current system were identified and the reasons for an alternate system were highlighted. A feasibility study was also carried out, this is to consider the technical, operational and financial feasibility of the newly developed application for the housing management and data detailing the operations and manual management of quarters were collected from the housing committee chairman, estate officer and some members of staff through interview and personal observation and record inspection.

The developed web based Housing Management System was done using Adobe Creative Suite version 5 to create friendly user interface that gives room for users to navigate from one page to another ranging from the Home page, About Us, News, Quarters Categories, Registration module, etc. Graphics were designed using Corel Draw version 15. The web based application has MySQL version 5.0.51b as its backend where the database resides and PHP as the middleware where portal pages were made dynamic through script coding, XAMPP Server version 1.6.7 was used to integrate all the modules together and relevant literatures on information system, housing management, web portal, web development, web hosting, web 2.0 concept and tools were reviewed.

Also the portal is intended to provide an administrator console through which the site manager can regulate the content and manage the website, update the records in the database and generate report needed for decision making.

### 5.1 Conclusion

The Housing Management System provides basic information about senior staff housing and also gives room for application for quarters. The newly designed and developed web based application was able to satisfy the indicated objectives of this study by providing necessary and basic information on housing and an easy way for information update and also alert users on such development. The portal serves as a mechanism and institutional arrangement for managing housing information.

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