

# Design And Implementation Of Digital Library Management System. A Case Study Of The Niger Delta University, Bayelsa State

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**Abstract-** Libraries have been a fundamental fragment of educational and information sector of any university. The success of any library largely depends on proper management. Several libraries, including the Niger Delta University library, have suffered catastrophe as a consequence of insufficient administration and weaknesses in handling delicate information as regards members of the library, difficulty in storage space restraint, searching for, and finding desired books, availability of library and library materials at all times etc. It is therefore the purpose of this study to design and develop a digital library system (DLS) for the Niger Delta University, which digitalizes and answers difficulties confronted by the traditional library and support in positioning the library to meet its incessant increasing demands. The traditional system used by the University was analyzed using a standard procedure recognized worldwide for such purposes, known as “Structured System Analysis and Design Methodology” (SSADM). PHP Scripting Language and other software development tools such as HTML and CSS were used in building this system.

**Index Terms-** Digital Library, FPE Library, Library, Library Management System, Digital Library System, Electronic Library, Digital Repository, Paperless library, electronic library, virtual library, libraries without boundaries

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## I. INTRODUCTION

In this study, electronic library is the use of digital technologies to acquire, store, reserve and make available access to information and material originally published in a digital form or digitized from existing print audio-visual or other forms. Consequently, it has necessitated a scientific technique to information and for revelation of its most characteristic properties which has led to two primary vicissitudes in explanation of the perception of information. It was initially expanded to embrace information exchange not only between machine and machine but also between man and man. The users of traditional library system have too much difficulties in finding records, there are also the

problems of limited space, funding of library buildings, round the clock availability, etc.

The existing system used by the Niger Delta University is the traditional manual library system. The traditional system entails documentation of borrowed books, return date, lease date, library users’ details and other documentations on paper files. Books are physically indexed and library users must be physically present in the library to access contents of the library system.

The Individuals information needs have long been studied by researchers in information technology, education, and marketing. Individuals, scholars, educationists, businessmen, etc, brings different types of information needs to libraries. Researchers from Information technology has identified that there are different levels of information needs, which includes specified conscious, visceral, formalized, and compromised levels. That entities differ on a congregation of mental, physical, and emotional physiognomies are defining condition of humanity. Psychology is much enthusiastic to identifying the indispensable dimensions of human behaviour.

As a solution to the problems faced by traditional library, this research work proposes the design, implementation and use of a Digital Library System (DLS), which will focus on collection of digital objects that will encompassing visual material, text, audio/video material, and store them in electronic media formats, along with techniques for the organization and retrieval the files and media confined in the library collection and making them available online, in a searchable form

## II. JUSTIFICATION OF THE PROPOSED SYSTEM

The proposed system will play a vital role in enhancing the overall library process in Niger Delta University. The proposed system has the following advantages.

- Eliminate data redundancy and improve data integrity
- They are much cheaper than buying and maintaining a library
- They are more portable, because you can download a huge number of cases to a laptop or memory stick and carry them with you, rather than having to print reams of paper

- Centralized database model to manage student information
- By using cut and paste techniques they cut down on the amount of time required to prepare briefs and motions.

### III. ADVANTAGE OF THE PROPOSED SYSTEM

The system would support round the clock availability, that is, the library system can be accessed at any time, 24 hours a day and 365 days of the year. Other advantages of the system include:

- Structured approach: The system would provide access to much richer content in a more structured manner i.e. one can easily move from a catalog to a particular book then to a particular chapter.
- Information retrieval: A user would be able to use any information (book title, author, ISBN, department, faculty or level) about a book to search for and retrieve the book.
- No physical boundaries: A user can access the library from anywhere, as long as internet connection is available. A user needs not to go to the library physically.
- Multiple access: The same resources can be accessed and or use at the same time by a number of users at same or different locations.

### IV. BACKGROUND OF THE STUDY

From the point of view of information management, digital libraries are systems which combines the technology of digital computing, storage, communication, the content and software required to replicate, emulate, and spread the services of cataloging, collecting, finding and publishing information presented by the traditional libraries which is based on paper and other materials.

From the point of view of a user of digital libraries, they are systems that offer a community of users with dependable access to a largely organized source or repository of information and knowledge.

Generally, digital library (digital repository electronic library; as sometimes referred to) is an intensive assortment of digital objects which can comprise of text, audio/video material, visual material, stored as [electronic media](#) formats (in contrast to print, [micro form](#), or other media in the traditional libraries), along with techniques for organizing, storing, and retrieving the files and media confined in the library collection and making them available online, in a searchable form.

### V. STATEMENT OF THE PROBLEM

One of the problems with the traditional library and its manual methods of organizing of information and materials is that it does not license the concurrent or multiple use of the same library materials by different library users at same time – dissimilar to the digital library services. It is considered unproductive and time uncontrollable, hence the need to exploit the advantages of the digital library which provides all library functions and or feature and make them accessible online at all time.

Traditional libraries are restricted by storage space. A physical library has to employ large amount of money for the imbursement of staff, payment of rent, maintenance of book, and procurement of additional books. Library today, are made up of sophisticated tools that facilitate the finding of best information resources, delivering them to user's desktop, smart phones or mobile computing devices, which the traditional library cannot achieve. As to Michael Lesk [Lesk95] the biggest problem of the traditional libraries at the moment is the cost crisis now affecting their current services. Others problems are:

1. Lack of security.
2. Data redundancy
3. Unavailability of library resources at all time
4. Too much paper wastage.
5. Time consumption
6. Paper takes up a massive amount of room in the site.

The distance which parts the library user and the library is one major difficulty: the yearning to visit a library deterioration by the remoteness. Most users of the library basically lack the time to go to the library.

### VI. AIM AND OBJECTIVE OF THE STUDY

The main aim of the research work is the design and implementation of an electronic library system for Niger Delta University. This research work will create a platform where users can access the library content without considering opening or closing time of the library.

### VII. SIGNIFICANCE OF THE STUDY

Digitalization can offer numerous advantages to libraries and library users. Some of the benefits stated by T.B. Rajashekar ([Raja02]) are mentioned below:

- Digital libraries make it superfluous for user of the library to go somewhere. A user can access a deal of information right from his/her home or at work, provided there is a computer and internet connectivity.
- Library contents/information can be updated continuously and much more easily. Keeping information up-to-date is made easier.
- Information and library content can be shared with friends and family with ease. By placing digital information on a server connected to the internet makes it accessible to everyone
- Ubiquity: a single electronic copy can be concurrently accessed from a great number of locations by multiple users.
- Information replication is achieved easily and economically, whereas replication of paper material is usually very expensive

- Digital libraries in contrast with conventional libraries allow collaboration and exchange of ideas
- Digital libraries are considered economical, since expensive building is not required, employment of professional staff and maintenance necessitated by conventional libraries are not no longer relevant.
- Access to Information is not limited by geography, it does not matter where in the world the document located.

#### VIII. SCOPE OF THE STUDY

The verdicts of this study were completed in the library section of the Niger Delta University (NDU). The scope of this study includes storage of digital books and materials. The management, tracking of digital assets and naming conventions, and the capability of making them available online, in a searchable form, for easy access.

#### IX. WORKS RELATED TO DIGITAL LIBRARY

The history of university library development in Nigeria dates back to pre-independence time when the University of Ibadan and its library were established in 1948. As pointed out by Aguolu (1996), since independence in 1960, there has been unrelenting upsurge in the establishment of educational institutions at all levels especially university education. The proliferation of universities, despite the economic recession in the country since the 1980s, has increased the problems of the universities and their libraries so much that now their future seems uncertain. Added to these problems are the problems of ICTs in Nigerian universities as related to library development became obvious in the 70s, the developed world has devised various systems to simplify the flow of information both within and across countries. Developing countries are bidden to take lead of these devices. However, this invitation is not frequently willingly accepted by the developing nations like Nigeria due to some influencing factors. These include human factors, fear, and the

level of development-cum substructure of the nation. The instance of application of up-to-the-minute technology in the library should start with the acceptance of the new technology as these technologies had come to stay, not resenting with accept or not.

Libraries in Nigeria and their users gave the imprint that we don't know of the proficiencies and abilities of the ICT or that we don't need ICT to improve our services or that it will take jobs away from us. There is no area of library operations to which the computer has not been applied with incredible advantages. You can unconditionally state that libraries in Nigerian were neither here nor there in the past ten years. In the past decades, whatever has been done in terms of modern technological applications or automation has not interestingly gone deep enough to make any palpable influence. The incapability of Ibadan University Library to update its Serials Catalogue that were produced by computer in 1975 has cast uncertainties in the minds of several Librarians in relation to how energetic it will pursue their other automation and programmes in information technology.

#### X. METHODOLOGY

The methodology used for this research work is the waterfall methodology. Waterfall methodology is a methodical and chronological approach towards software development process and the phases are conception, initiation, analysis, design, construction, integration and testing, implementation and maintenance. Another methodology used in the research work is the use of Oral interview. Each stage begins or originates only after the previous stage has finished.

#### XI. SYSTEM MODULES MOCKUP

Designing system modules for digital libraries in the Niger Delta University required systematic examination of the university and lead to multiple system solutions. The studied system is divided into three (3) main modules; the administration module, the bursary unit module and the student/staff /user module. Each with different levels of functionalities, which are shown in the use case diagram below.



Fig 3.6.1 Use case diagram of the system

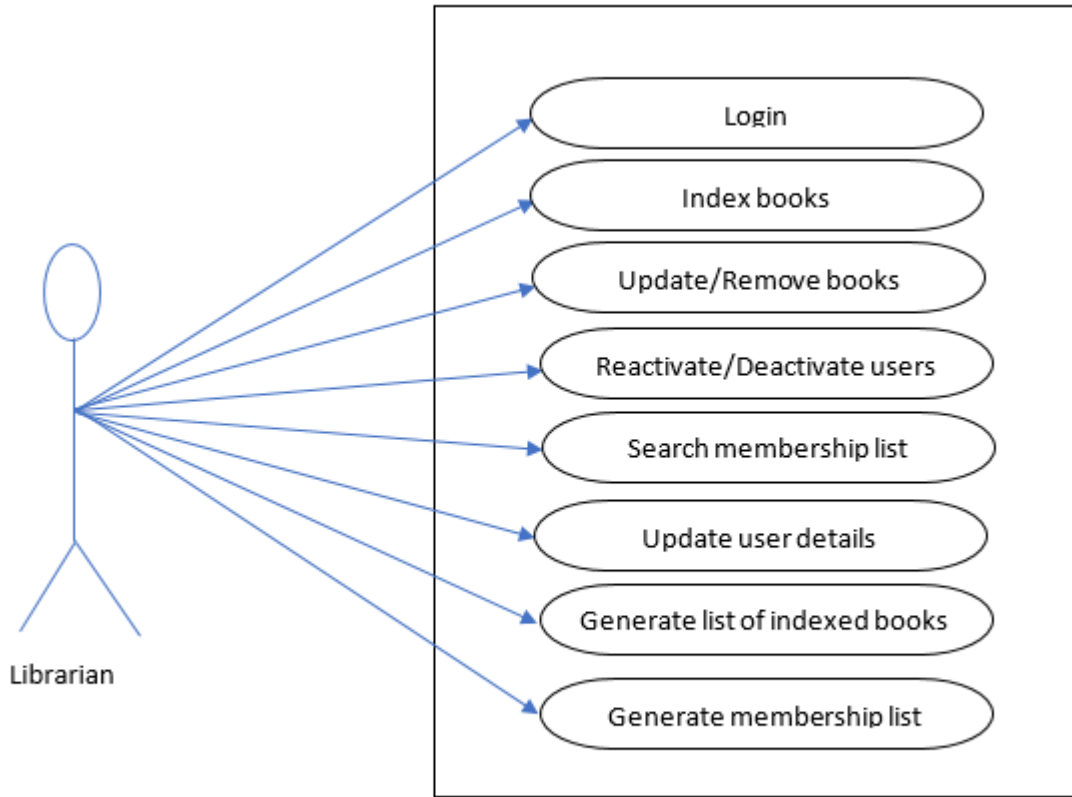


Fig 3.6.1 Use case diagram of the Librarian Admin.

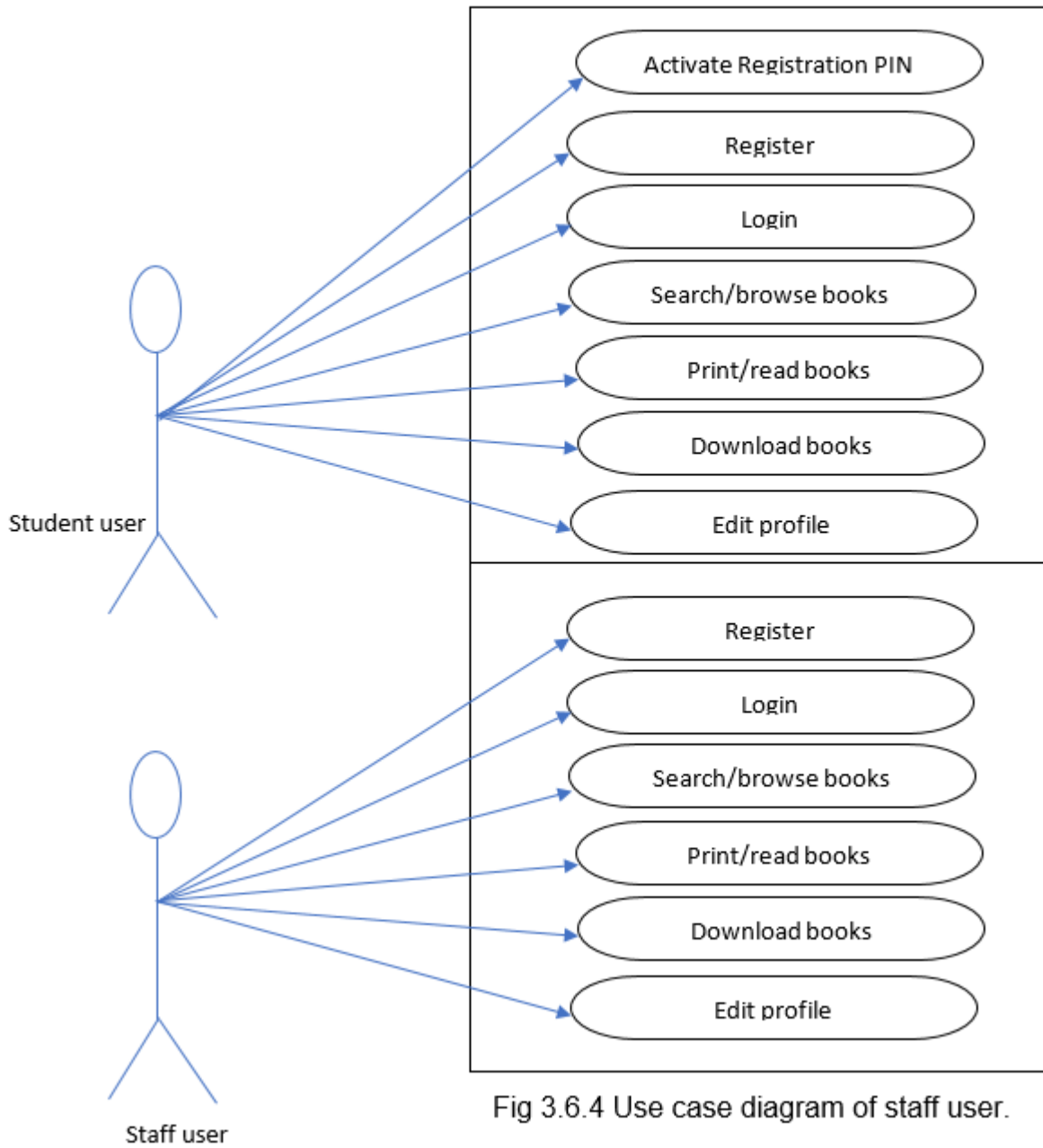
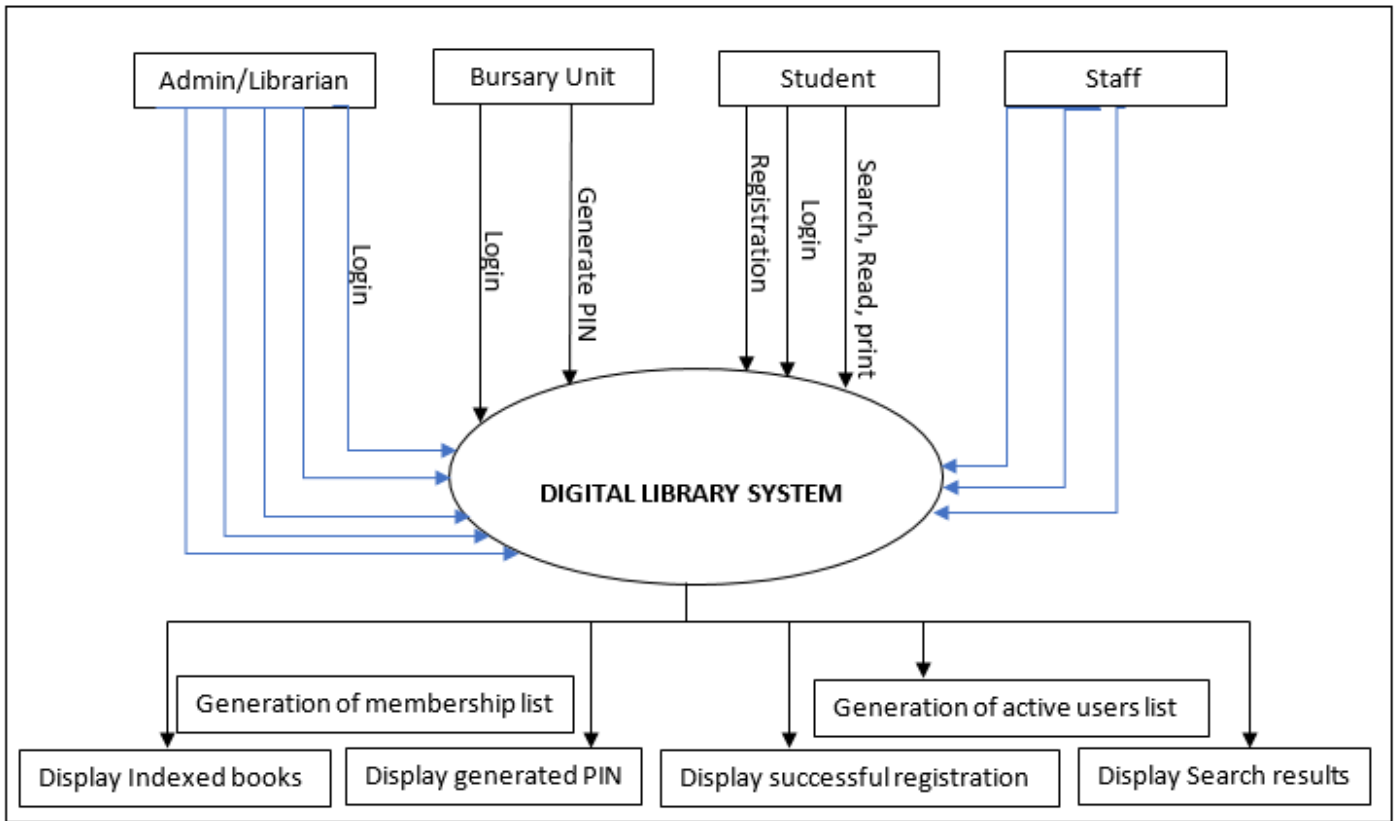
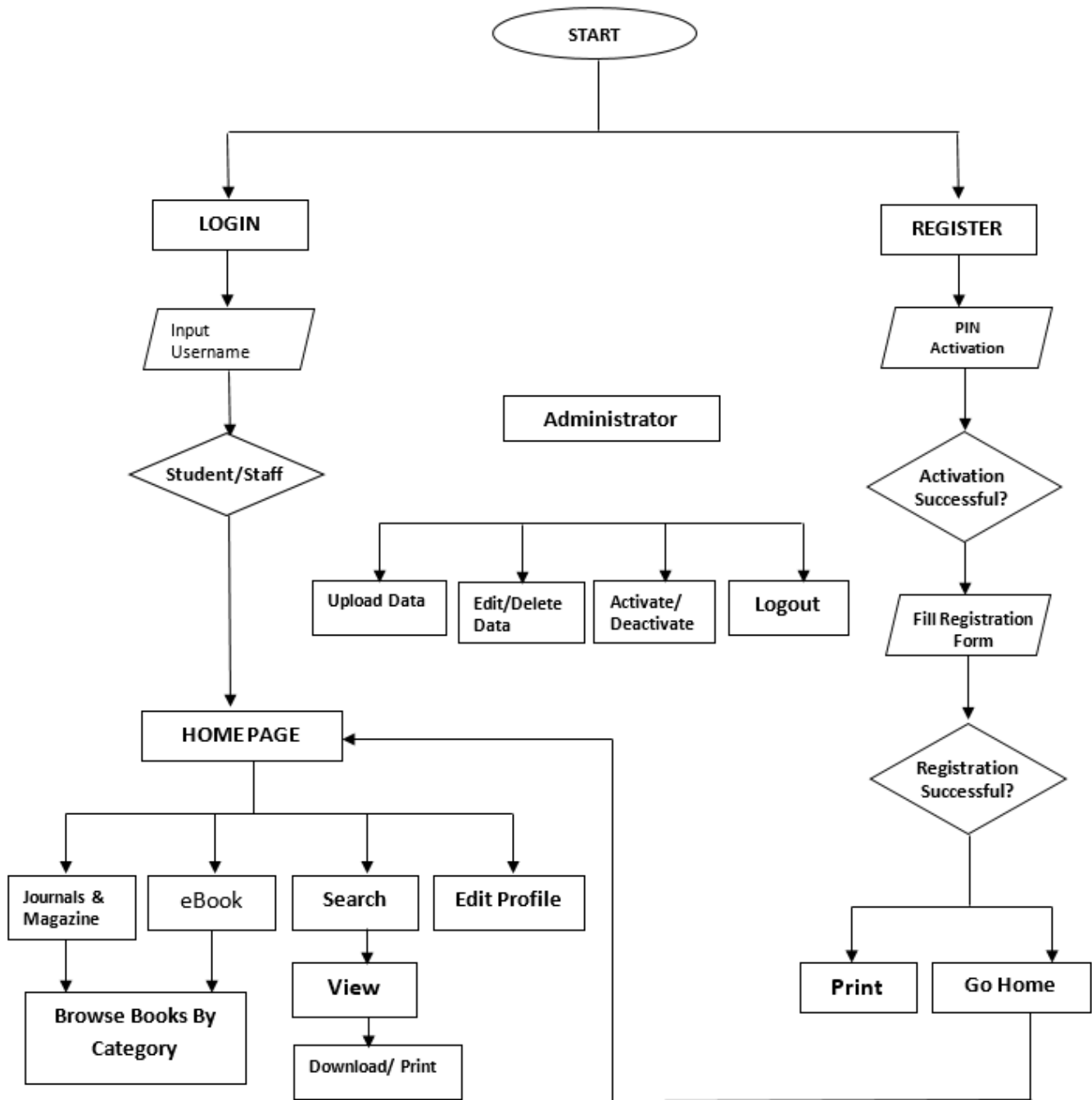


Fig 3.6.4 Use case diagram of staff user.



Level zero dataflow diagram of the system



Level one dataflow diagram of the system

### Technology for Software Development

Multiple software technologies were employed in the development of the system. This is always the case in web application development. There is currently no one technology that does it all as opposed to desktop and mobile application development. These technologies include:

- HTML5 for webpage structuring and client-side scripting
- CSS3 for styling modules
- JavaScript for user feedback.
- PHP for server-side scripting



- MySQL Database

## HTML5

The first thing to realize about HTML5 is, it is not a single entity. It is comprised of many elements, including the fifth revision of HTML, CSS3 and many JavaScript APIs. It allows you to use the multimedia experience of the desktop on the web. Prior to this technology, experiences of this kind could only work on the desktop. With HTML5, developers can create apps and websites that function like desktop applications, which allow you to use the web platform to reach all of your users at once. Users no longer have to download apps for multiple devices; they can start an app by clicking on a link or button and not have to worry about having the latest update. An interesting aspect of HTML5 is that it will allow you to create apps that function even when not connected or when your system is offline. The trick is being able to store the assets and content locally. When this done, the app works, regardless of where you go or if your system is online. Another positive aspect of the offline features is being able to store data in the cache or in such a way that allows the data to be retained even if the page is reloaded. With HTML5, you can make use of a wide variety of graphics elements, such as animation, games and movies (Nathan, 2013).

## CSS

Cascading Style Sheet (CSS) is used to style modules and interfaces written in HTML, the language can be applied to any kind of HTML document. CSS is a cornerstone specification of the web and almost all web pages use CSS style sheets to describe their presentation. CSS is design primarily to enable the separation of document content from document presentation, including elements such as the layout, colors, and fonts. This separation can improve content accessibility, provide more flexibility and control in the specification of presentation characteristics, enable multiple pages to share formatting and reduce complexity and repetition in the structural content.

## PHP

PHP is a server-side scripting language designed for web development but also used as a general-purpose programming language. As of January 2013, PHP was installed on more than 240 million websites (39% of those sampled) and 2.1 Million web servers. Originally created by Ramus Lerdorf in 1994. PHP originally stood for Personal Home Page, it now stands for PHP (Hypertext Preprocessor), a recursive acronym. PHP code can be simply mixed with HTML code, or it can be used in combination with various template engines and web frameworks.

MySQL Database was used for the database implementation of the system because it is flexible and easy to understand. The major reasons for using MySQL include:

## XII. CONCLUSION

This study has recognized that digitization is an indispensable job in current day libraries. If a library is to live up to present challenges, it must go digital, that is, provide digital contents and services. This will empower it preservation of threatened library resources, improve the productivity of information search mechanisms and boost access to library resources. It is indispensable for the library management to provide policy guidelines and eloquent plans for the exercise. Digital library, also known as virtual library, has fully-fledged to a special field of study. Courses of training and research opportunities are now made available in this area of specialization by some university

## XIII. RECOMMENDATION

With the knowledge of the significance of digitization, it is my suggestion that a yearly division or pecuniary allocation be made for it the use of library. This is necessitated due to the fact it is not a one-time activity. Libraries keep on obtaining materials, some of which have to be digitized. In Nigeria, ten percent of all financial allocations to the university are meant for the university library. Such practice should be extended to digitization exercise.

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