**DESIGN AND IMPLEMENTATION OF A COMPUTERISED PAYROLL SYSTEM**

**CHAPTER ONE**

**INTRODUCTION**

* 1. **BACKGROUND OF THE STUDY**

A payroll is a company's list or records of its employees, which is often used to refer to the total amount of money that a company pays to its employees.

A payroll system is software which organizes and arranges all the tasks of employee payment and the filing of employee taxes (Wikipedia). These tasks may include keeping tracking of hours, calculating wages, withholding taxes and deductions, printing and delivering checks and paying employment taxes to the government. Payroll software plays several roles for the user, the employees and the company, such as: giving you supper easy ways to manage employee calendar (e.g, sick leave, absences and overtime), gives you latest tax updates you when by notifying you when the updates arrive, allows you to quickly and easily generate payslips for all your employees, serves as a reminder. Payroll also makes deductions from employees’ wages for taxes, wage garnishment, health and life insurance, spending accounts and retirement investments. Payroll works with your accounting department to ensure that wage deductions and other payroll expenses are paid and properly reported.

**1.2. Statement of Problem**

Manual systems of payroll always put pressure on people to be correct in all aspect of their work.  With manual systems the level of service is dependent on individuals and this puts a requirement on management to run training continuously for staff to keep them motivated and to ensure they are following the correct procedures.  It can be all too easy to accidentally switch details and end up with inconsistency in data entry or in hand written orders.  This has the effect of not just causing problems with customer service but also making information unable be used for reporting or finding trends with data discovery.  Reporting and checking that data is also a problem and can be time consuming and expensive.

Other problems caused by the manual payroll system are:

* Inconsistency in data entry, room for errors, miskeying information.
* Large ongoing staff training cost.
* System is dependent on good individuals.
* Reduction in sharing information and customer services.
* Time consuming and costly to produce reports.
* Lack of security of data.
* Duplication of data entry.

**1.3. Objective of Study**

The objectives of this study is to design a computerized payroll system for an organization,

* To design a computerized system for calculating basic salary and allowance of staff.
* To design a computerized payment platform.
* To design a system that accurately stores employee data and retrieves payment history when needed.
* To design a computerized system for tracking vacation time, maternity and paternity leave.

**1.4. Significance of the study**

The study will aid in reducing errors, fraud, increase speed and also aid growth in organizations if successfully implemented. Manual payroll systems in organizations will be totally eliminated with this computerized system in place. The study will also serve as a guide to other student researchers who may want to conduct further research on the subject matter. Findings and recommendations from this system will aid in developing newer versions to serve optimally.

**1.5. SCOPE/LIMITATION OF THE STUDY**

The scope of this study is centered on the design and implementation of an epayroll system.

**Limitation**

**Financial constraint**- Insufficient fund tends to obstruct the efficiency of the researcher in sourcing for the relevant materials, literature or information and in the process of data collection (internet, questionnaire and interview).

**Time constraint**- The researcher will at the same time engage in this study with other academic work. This consequently will cut down on the time devoted for the research work.

**1.6. DEFINITION OF TERMS**

**A payroll**: is a company's list or records of its employees, which is often used to refer to the total amount of money that a company pays to its employees.

**A payroll system**: is software which organizes and arranges all the tasks of employee payment and the filing of employee taxes.

**Payslips:** a note given to an employee when they have been paid, detailing the amount of pay given and the tax and insurance deducted.

**Employer:** a person or organization that employs people.

**Employee:** a person employed for wages or salary, especially at nonexecutive level.

**W-4 tax form:** is a form completed by an employee to indicate his or her tax situation (exemptions, status, etc.) to the employer. The W-4 form tells the employer the correct amount of tax to withhold from an employee's paycheck.

**Internal Revenue Service** (IRS): A United States government agency that is responsible for the collection and enforcement of taxes.

**Social Security Administration** (**SSA**): is an independent agency of the United States federal government that administers **Social Security**, a social insurance program consisting of retirement, disability, and survivors' benefits.

**CHAPTER TWO**

**LITERATURE REVIEW**

**2.0 INTRODUCTION**

A payroll is a company's list of its employees, which is often used to refer to the total amount of money that a company pays to its employees, a company's records of its employees' [salaries](https://en.wikipedia.org/wiki/Salary) and [wages](https://en.wikipedia.org/wiki/Wage), [bonuses](https://en.wikipedia.org/wiki/Bonus_payment), and [withheld taxes](https://en.wikipedia.org/wiki/Withholding_tax), the company's department that calculates and pays these. Payroll in the sense of "money paid to employees" plays a major role in a company for several reasons (Onyeoma 1990). From an accounting perspective, payroll is crucial because payroll and payroll taxes considerably affect the net income of most companies and because they are subject to laws and regulations (e.g. in the US payroll is subject to federal, state, and local regulations). From a human resources viewpoint, the payroll department is critical because employees are sensitive to payroll errors and irregularities: Good employee morale requires payroll to be paid timely and accurately. The primary mission of the payroll department is to ensure that all employees are paid accurately and timely with the correct withholdings and deductions and that the withholdings and deductions are remitted in a timely manner (Agozie: 2013). This includes salary payments, tax withholdings, and deductions from [paychecks](https://en.wikipedia.org/wiki/Paycheck).

**2.1. CONCEPTUAL FRAMEWORK**

A payroll system includes everything that has to do with the payment of employees and the filing of ­employment taxes. This includes keeping track of hours, calculating [wages](http://money.howstuffworks.com/wage.htm), withholding taxes and other [deductions](http://money.howstuffworks.com/personal-finance/personal-income-taxes/tax-deductions.htm), printing and delivering checks and paying employment taxes to the government.

The payroll system begins when a company hires its first employee. In the United States, every new employee must be reported to the state along with a completed W-4 tax form. The W-4 determines how many allowances the employee qualifies for when calculating the federal income tax that should be withheld from each check. Generally, the more dependents you have, the less income tax you have to pay (Rex: 1997).

As an employer, the W-4 is the first of many forms that you must keep on file as part of your payroll system. In fact, the W-4 needs to be kept on file up to four years after the employee is fired or quits [Bright: 1999]. You must also keep track of the employee's important personal information, like the address to which checks are sent, or in the case of direct deposit, the bank information and account number where the money is wired. All of this information is highly sensitive, meaning that a good payroll system should also be very secure. Withholding and paying taxes is one of the most important responsibilities of the payroll system. In the United States, the following are the major withholdings required by the government:

* Federal income tax
* State and local income taxes (where applicable)
* [Social Security](http://money.howstuffworks.com/personal-finance/financial-planning/social-security.htm) tax
* [Medicare](http://health.howstuffworks.com/medicine/healthcare/medicare.htm) tax

­When an employer withholds taxes from a paycheck, he acts as the trustee for those funds until they are paid to the IRS, the Social Security Administration (SSA) or other government agency. To avoid confusing this money with profits or other business income, all withheld taxes must be held in a separate bank account or trust fund.

In the case of Social Security and Medicare withholdings, when it's time to hand that money over to the government, the employer is required to match the employee's contributions. For example, if an employee is paying 6.2 percent of every check for Social Security, then the employer has to pay an equal 6.2 percent.

There are numerous other possible deductions, withholdings and contributions that can be subtracted from an employee's gross wages and that need to be tracked by the payroll system: [health insurance](http://health.howstuffworks.com/health-insurance/health-insurance.htm) or [life insurance](http://money.howstuffworks.com/personal-finance/financial-planning/life-insurance.htm) premiums, [401(k)](http://money.howstuffworks.com/personal-finance/retirement-planning/401k.htm) or [other retirement fund](http://money.howstuffworks.com/personal-finance/retirement-planning/roth-ira.htm) contributions, workman's compensation, [union](http://money.howstuffworks.com/labor-union.htm) dues, vacation days, [sick days](http://money.howstuffworks.com/call-in-sick.htm), employee loans, court-ordered, wag­e garnishments (for outstanding [debts](http://money.howstuffworks.com/personal-finance/debt-management/debt.htm)), child support payments.

At the end of the year, an employer uses the payroll system to take all of the wage and withholding information from the previous year and summarize it on a W-2 form for full-time employees or a 1099 form for contract workers. Copies of that form must be sent to the employee, the Internal Revenue Service (IRS) and the Social Security Administration (SSA).

It will be difficult for a small business owner to keep track of all of these withholdings, pay all pertinent employment taxes and still mail the paychecks on time. That's why so many businesses use payroll services, which we'll talk about next.

**2.2. PAYROLL SYSTEM**

Payroll software systems can be programmed to perform manual human resources tasks, giving you time for you to run or grow your business. They can be used to archive your employee slips and monthly reports, giving you a concrete payment history. And as an automated program, payroll systems pay your employees on time and according to the parameters that you set, leaving little margin for human error.

QuickBooks goes that extra length to offer you payroll systems that are tailored to suit your business needs, whether you’re just starting out as a micro-enterprise or in need of some advanced, premier accounting tools. While QuickBooks’ payroll systems focus on internal processes, you gain premier insight on where to make adjustments in your budget and what informed decisions you can make going forward.

**2.3. MANUAL PAYROLL SYSTEM**

Running an efficient and effective in-house payroll function can be a complicated and challenging task. Those operating a manual payroll system often find themselves facing countless issues that can impact on productivity and profits.

There are three most common issues faced by companies operating in-house payroll systems and simple solutions your business should consider.

Absence management:

Keeping track of employees' annual leave and sick days can be a challenging endeavor, particularly when monitoring these numbers manually. If an employer cannot track who is on a short- or long-term absence, they will be unable to resource effectively, which can seriously impact productivity.

Fortunately, there are a wide range of payroll software solutions available to efficiently store and track employee absence and leave allocation.

Administration:

A manual payroll system involves a significant amount of paperwork, creating a massive administrative burden for your HR staff. While many companies address this issue by hiring more employees, investing in payroll software can be a more cost-effective measure.

In particular, outsourced payroll management allows the entire administrative burden to be controlled and dealt with by a third-party professional. This means your HR team can concentrate on more important matters, such as increasing productivity and employee engagement.

Tax and legislation compliance:

In today's increasingly litigious market, remaining compliant with tax laws and legislation can be a complicated task. This is particularly challenging when a company operates across multiple countries or legal jurisdictions.

Legislative compliance is a crucial requirement for all businesses to avoid costly complaints and government investigations. Fortunately, an outsourced payroll solution can mitigate this risk.

Allowing a professional and dedicated team to run your payroll system means you can operate your business with the peace of mind that your HR process is fully compliant and up-to-date. This is because a third-party payroll service is committed to understanding and adapting to any official legislative changes and reforms.

**2.4. E-PAYROLL SYSTEM**

No organization should be without ePayroll. ePayroll reduces our organizations risk of non compliance when paying wages. ePayroll is compliant with the tax laws of the day by implementing any changes required. This trust, together with the easy to use program and great reporting means so much time saved to get on with other value added tasks.

**2.4.1. The advantages of an epayroll system**

One of the most difficult tasks that the [HR system](http://hrxpayroll.com/workers-compensation/) handles on a regular basis is the reckoning and delivery of the worker’s remuneration. This is not so complicated in the scale of small corporations who only have a handful of laboring teams to look after. But for an esteemed firm that composed of over thousands of employees, the need for a more fluid way of doling out wage or salary is very apparent and it entails utilizing a much improved and up-to-date [payroll processing software](http://hrxpayroll.com/). There are three known advantages that electronic payroll system has over traditional types.

**Direct Pay**

Mainstream reimbursement methods require three parties to function properly. The corporation’s human resource accountant, the banks and the workers who are also bank clients. In order for funds to be transferred effectively, the company would do either two things. They would issue paychecks directly to the workers in order for the latter to withdraw the funds in the bank.

In other cases, firms would directly deposit on the worker’s bank account and the paid employee would either withdraw through the automated teller machine or extract it through the bank tellers themselves. People may get used to this arrangement but the banks often compromises this exchange whenever they unintentionally close down branches or undergo some difficulties of their own. Electronic payroll bypasses this difficulty since it makes use of direct automated transaction between companies and workers.

**Fool-proof checks**

Paychecks were clever in the earlier times because it allows people to conduct trade without the exact legal tender being used. However, these days fraudulent schemes have also evolved well enough to prey on those who make constant use of paychecks. The bouncing of checks could be one of the most disheartening experiences of workers who only want to receive their hard earned money to pay some bills.

Aside from technical glitches that may occur more frequently than it does in the past, paychecks have the tendency to get lost or misplaced in the time they are needed the most. But electronic payroll cards issued by current [epayroll companies](http://hrxpayroll.com/about-us/) function in the same way as debit cards and avoid the inconvenience that traditional paychecks often incur as a result.

**Company’s Ease**

Electronic payroll system is a relief to both the corporations who hire employees and the workers who are paid by the firms. One of the things that really get in the way of the human resource management’s fluid pace is the fact that traditional payroll processing requires extra paper work and back-office overhaul tasks in case of particular errors in the paycheck issuance. What is even more interesting about electronic payroll is that it cuts down the time needed to transfer the funds that the usual transaction always entails.

Lastly, electronic payroll is the latest most secure payment method known in contemporary times. Security against criminal schemes often poses as the most important concern in electronic payroll system done manually, an automated payroll system will save you time and help considerably with compliance.

**2.5. OTHER REVIEWS OF PAYROLL SYSTEM**

The Affordable Care Act and changes to the minimum wage in many states and for many federal contractors has made payroll compliance more complex than ever. For 2014, the ACA (aka ObamaCare), and its health insurance exchanges and tax credits had the biggest impact on payrolls across the country:

* Market reforms to health (HRA), flexible spending (FSA) and other healthcare arrangements,
* Minimum value determination, and
* Increasing tax credits when the employer contributes at least half of the employee-only premium

Thank goodness there is some relief in the informational reporting requirements, which go into full effect in 2015.

CPA Practice Advisor reviewed the key payroll software packages designed for accounting and payroll service providers, with the exception of CompPay/BenefitMall.  Since merging in 2013, they have been working on a new version to complement the enhanced online usability and real-time calculations of the new version of BenefitMall, released in July, 2014.

On the whole, this was a consolidation year for payroll systems, with developers focusing on improving the online calculations and user experience of their cloud based solutions.  This year’s reviews include:

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**Six Tips to Reduce the Effect of Minimum Wage Increases:**

Recent legislation in thirteen states to raise the minimum wage, various increases in some cities across the country, and news that an executive order may soon mandate an increase on federal contracts, means small business owners will face yet another challenge to build, sustain and grow their business in a difficult economic environment.

If the federal minimum wage increases, 31 states that do not have a higher minimum wage would be mandated to a new federal standard.  Right now, the Congressional wage bill is seeking $10.10 as the federal minimum.  In an election year, expect to hear a great deal more on the subject. Small business owners can take steps to mitigate the impact.

Here are six steps to prepare for potential negative impact.

1. Understand profit margins, projections and business requirements to ensure profitability.
2. Determine permanent hiring vs. contracting decisions for staffing needs.
3. Make good hiring decisions - mistakes can be costly since training/onboarding new employees is a considerable investment.
4. Invest in employees - turnover decreases productivity and increases business costs.
5. Be sure to employ time and cost saving tools to standardize back office tasks.  Consider outsourcing to easy affordable services that allow you to focus on growing business not administrative functions.
6. Research competition and adjust pricing accordingly.

**CHAPTER THREE**

**SYSTEM DESIGN**

* 1. **INTRODUCTION**

This chapter describes in detail the system design methodology. It focuses on the system structure and interactions. The proposed system is a payroll system. It is created to be a desktop application or deployed on the web and is aimed at providing application processing services for an insurance company. This chapter begins by examining the Systems Requirement Specification (SRS) document which is majorly focused on only the functional requirements to be provided by the system. It proceeds to the system design which consists of the logic design. The logic design consists of various user interfaces and the chapter also explains the system design using UML diagrams.

* 1. **SYSTEM REQUIREMENT SPECIFICATION**

The system requirement specification is a structured document that collects information which encompasses the requirements of a system. This section would focus mainly on the functional requirements of the proposed system and these include:

1. The system should be able to validate all user input and respond to exceptions appropriately.
2. The system should enforce the policy of non-multiple users of an account using standard authentication processes.
3. The system should allow users to create and maintain staff details and also be able to delete staff from accessing the system.
4. The system should allow for secure financial transactions as related to staff payment.
5. The system should be able to track insecure penetrations and prevent unauthorized intrusions.
6. The system should also allow users to maintain an online profile.
   1. **SYSTEM DESIGN**

This section explains the design methodology, data and modules for the proposed system. The system design incorporates both UML diagrams and user interface designs.

* + 1. **LOGICAL DESIGN**

The logical design of the system is concerned with the underlying logic of the proposed system which would be abstracted from the various interfaces of the system. The interfaces discussed would be the input design, output design and menu design.

* + 1. **INPUT DESIGN**

This section includes the various input design interfaces in the system. The input design interfaces to be considered would be the login form interface, Add Staff form, Edit staff form interfaces.

**LOGIN WINDOW**

**Login Now**

**[Forgot Password]**

**User type:**

**Password:**

**User Name:**

**User Login**

**Figure 3.1: Login Interface**

The Login interface allows authorizepersonel to login into the system to make change and obtain appropriate results. The actual form contains more detailed information as seen in the application.

**Choose Payment Details (Input)**

|  |
| --- |
| Choose Dates |
| From Date (Y/M/D)  To Date (Y/M/D) |

**Figure 3.2: Choose Payment Interface**

The Choose Payment Interface allows the user to access payment details ranges from one month to another.

* + 1. **OUTPUT DESIGN**

This section describes the various output of the system to the user. The format of output for the system is majorly text. The output that would be discussed would be the

COMPREHENSIVE PAYMENT DETAILS (Output window)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| BASIC SALARY |  | | XX | | |
| ALLOWANCE | | | | | |
| EDUCATION ALLOWANCE | | XX | |  | |
| TRANSPORT ALLOWANCE | | XX | |  | |
| HEALTH ALLOWANCE | | XX | |  | |
| GARDEN BOY ALLOWNACE | | XX | |  | |
| SECURITY ALLOWANCE | | XX | |  | |
| FEEDING ALLOWANCE | | XX | |  | |
| GROSS INCOME | |  | | XXX | |
| DEDUCTION | | | | | |
| PENSION CONTRIBUTION | | X | |  | |
| LOAN (SALARY ADVANCE) | | XX | |  | |
| TAX | | XX | |  | |
|  | | | | | |
| NET INCOME | |  | | | XXXX |

STAFF DETAIL PAYROLL SHEET (Output window)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Staff ID | Staff Name | Email | Mobile No | Activate payment |
|  |  |  |  | [payroll] |

Payroll Details – View

|  |
| --- |
| Edit/Add payroll Details:: |
| Staff Name  Staff ID  Basic Salary  Education Allowance  Transport Allowance  Health Allowance  Garden Boy Allowance  Security Allowance  Feeding Allowance  Pension Contribution  Loan (salary Advanced)  Tax   |  | | --- | | PAY STAFF[ NAME] | |

* + 1. **MENU DESIGN**

The menu design describes the various paths or menus available to the user of the system. The menu design below shows the major options provided for a user:

MENU

STAFF WELCOME

PAYROLL

VIEW STAFF

PAYROLL

LOGOUT

ADMIN ADD NEW STAFF

STAFF DETAILS

**Figure 3.5: Payroll Menu Design**

* + 1. **USE CASE DIAGRAM**

The use case diagram is a UML diagram that shows the users of a system and the various interactions that exists between the user and the system.

**Figure 3.6: The Use Case Diagram**

The above use case shows the interaction between the user and the application.

* + 1. **ACTIVITY DIAGRAM**

Activity diagrams are representative of step wise activities and actions in a system. They describe the operational step-by-step work flow of components in a system.

Display UI

Enter command

Show registration form

Enter registration of data

Store data in database

Grant Access

Show Employee list

Choose Duraton of Pay

Print Payment Details

View Payment Details

Edit Payment Option

Pay staff

Payroll

[PayStaff]

[Register]

**Figure 3.7: The Activity Diagram**

* 1. **STRUCTURE OF DATABASE DESIGN**

The proposed system makes use of a relational database to store and maintain records. This database will consist of three (3) relational tables discussed below:

**TABLE**

**TBL- PAY**

|  |  |  |
| --- | --- | --- |
| **FIELD** | **DATA TYPE** | **DESCRIPTION** |
| ID | INT (II)  (auto-increment) | Unique ID primary key Auto-increment |
| Cid | Int(ii) | Secondary key (from staff table) |
| Basic | Varchar (50) | Basic Allowance |
| edu | Varchar (50) | Educational Allowance |
| health | Varchar (50) | Health Allowance |
| Gad | Varchar (50) | Garden Bag Allowance |
| sec | Varchar (50) | Security Allowance |
| feed | Varchar (50) | Feeding Allowance |
| pen | Varchar (50) | Pension Allowance |
| loan | Varchar (50) | Loan |
| tax | Varchar (50) | Tax |
| trans | Varchar (50) | Transport Allowance |
| dated | Varchar (50) | Date |
| Staff ID | Varchar (50) | Staff identity |

**STAFF TABLE**

**TBL-ENGINEER**

|  |  |  |
| --- | --- | --- |
| **FIELD** | **DATA TYPE** | **DESCRIPTION** |
| Eid | Int (10) | Staff ID (primary key) table ID |
| ename | Varchar (40) | Staff Name |
| Epass | Varchar (40) | Staff password |
| Address | Varchar (200) | Staff Address |
| Email | Varchar (40) | Staff Email |
| e-mobile | Varchar (20) | Staff Mobile Number |
| data-time | datetime | Date and time posted |
| Staff ID | Varchar (50) | Staff identity number (unique) |

**CHAPTER FOUR**

**SYSTEM IMPLEMENTATION**

* 1. **INTRODUCTION**

This chapter focuses on the implementation of the system. The features of the implementation languages used in this research- PHP and MYSQL will be discussed extensively. The system testing strategies, the target computer requirements as well as the software maintenance issues that would arise in the system would be discussed also.

* 1. **FEATURES OF IMPLEMENTATION LANGUAGES**

The programming languages used in the implementation of this project are PHP (Hypertext Preprocessor) and MYSQL programming languages. PHP is a general purpose server side scripting language originally designed for web development to produce dynamic web pages. It has also evolved to include a command line interface capability and can be used in stand-alone graphical applications.

The following features make PHP a preferred implementation language for this project:

1. PHP has its root in C and C++. PHP syntax is most similar to C and C++ language syntax, so programmers find it easy to learn and manipulate.
2. PHP can run on both UNIX and windows. Hence it is compatible across various operating systems.
3. PHP has powerful output buffering that further increases over the output flow. PHP internally rearranges the buffer so that the header comes before the content.
4. PHP is platform independent: this is because it is parsed by the web browser hence compatibility issues do not arise when code written in PHP is ported to a different platform.
5. PHP can be used with a large number of relational database management systems, runs on all of the most popular web servers and is available to many different operating systems.
6. PHP is fully an object oriented programming language and its platform independence and speed on LINUX servers help to build large and complex web applications.
7. PHP has also attracted the development of many frameworks that provide building blocks and design structure to promote Rapid Application Development (RAD). Some of these include cake PHP, code igniter, Yii framework and Zend framework.
8. PHP IDS add security to any PHP application to defend against intrusion. PHPIDS detects cross-site scripting (XSS), SQL injection, header injection, directory traversal, remote file execution, local file execution and Denial of Service (DOS).

MYSQL is a relational database management system written in C and C++, that runs as a server providing multi user access to a number of databases. MYSQL is used basically to create a relational database structure on a server in order to store data or automate procedures. The following features make MYSQL also a preferred implementation language in this research:

1. MYSQL is written in C and C++ and tested with a broad range of different compilers. It also functions on different platforms.
2. It uses multi-layered server design with independent modules.
3. It is designed to be fully multi-threaded using kernel threads to easily use multiple CPUs if they are available.
4. It is a server/client system. The database server (MYSQL) and the arbitrary many clients (application programs) which communicates with the server to query data and save changes.
5. MYSQL is designed to make it relatively easy to add other storage engines. This is useful if you want to provide an SQL interface for an in-house database.
6. It provides transactional and non-transactional storage engines, uses very fast B-tree disk tables with index compression and a fast thread-base memory allocation system.
7. It executes very fast joins using an optimized nested loop join; implements in-memory hash tables which are used as temporary tables.
8. It implements SQL functions using a highly optimized class library that should be as fast as possible.
9. It provides the server as a separate program for use in a client/server networked environment and as a library that can be embedded (linked) into stand-alone applications. Such applications can be used in isolation or in environments where no network is available.
   1. **SYSTEM TESTING STRATEGIES**

This section is concerned with testing and debugging of the programs and general processes involved in achieving the objectives of the system requirement. System testing is conducted on a complete integrated system to evaluate the system’s compliance with its specified requirements. System testing falls within the scope of black box testing and as such should require no knowledge of the inner design of the code or logic. During system testing, the focus is on the software design, behavior and even the believed expectations of the customer. So we can also refer to the system testing phase as investigatory testing phase of the software development life cycle. The system testing strategies used in this system include the unit test and integration test.

* + 1. **UNIT TEST**

The primary goal of unit testing is to take the smallest piece of testable software in the application, isolate it from the remainder of the code and determine whether it behaves exactly as it is expected to behave. Each unit is tested separately before integrating them into modules to test the interfaces between modules. Unit testing has proven its value in that a large percentage of defects are identified during its use.

The most common approach to unit testing requires drivers and stubs to be written. The driver simulates a calling unit and the stub simulates a called unit. The investment of developer time in this activity sometimes results in demoting unit testing to a lower level of priority and that is almost always a mistake. Even though the drivers and stubs cost time money, unit testing provides some undeniable advantages. It allows for automation of the testing process, reduces difficulties in discovering errors contained in complex pieces of the application. During the unit testing of the application, errors uncovered by the researcher were rectified and the result was satisfactory.

* + 1. **INTEGRATION TESTING**

Integration testing is a logical extension of unit testing. In its simplest form, the units that have already been tested are combined into a component and the interface between them is tested. A component, in this sense, refers to an integrated aggregate of more than one unit. In a realistic scenario, many units are combined into components, which are in turn aggregated into even larger parts of the program. The idea is to test combination of pieces and eventually expand the process to test your modules with those of other groups. Integration testing can be done in a variety of ways which include top-down approach, bottom-up approach and the umbrella approach.

In the integration testing of the software, satisfactory results were obtained from the test using the bottom-up approach.

* 1. **TARGET COMPUTER SYSTEM REQUIREMENTS**

This section considers the requirements that must be met by the target system to enable the developed software application function as required. The target computer system requirement will be discussed in the area of software and hardware requirements.

|  |  |
| --- | --- |
| **Component** | **Requirement** |
| Operating system | Windows 2000, XP, Vista |
| Memory | 128MB or higher |
| Database | MySQL 5 |
| Web server | WAMP server |

**Table 4.1: software requirement for target computer system**

|  |  |
| --- | --- |
| **Component** | **Requirement** |
| RAM | 256MB of RAM |
| Hard disk | 10GB of hard disk space |
| Processor | 333Hz or higher |

**Table 4.2: hardware requirements for target computer system**

* 1. **SOFTWARE MAINTENANCE ISSUES**

This section focuses on software maintenance issues. Software maintenance is the modification of a software product after delivery to correct faults, improve performance or other product attributes or to adapt the product to a new or changing environment. It also serves as an opportunity to improve the performance o the software to suit the needs of the users if it becomes necessary for the user requirements to be improved upon or changed.

Maintenance would be seen in three areas in this research; corrective maintenance, preventive maintenance and adaptive maintenance.

* + 1. **CORRECTIVE MAINTENANCE**

Corrective maintenance is a maintenance task performed to identify, isolate and rectify a fault so that the failed system can be restored to an operational condition within the tolerances or limits established for in-service operations. Necessary corrections in the form of removal, modification or addition of program modules should be permitted by the software to allow for optimal use of the application.

* + 1. **PREVENTIVE MAINTENANCE**

This is a schedule o planned maintenance actions aimed at the prevention of breakdowns and failures. The primary goal of preventive maintenance is to prevent the failure of software before it actually occurs. It is designed to preserve and enhance software reliability by replacing error-prone components before they actually fail. Recent technological advances in tools for inspection and diagnosis have enabled more accurate and effective software maintenance. Measures like regular diagnosis, database backups, creating system mirrors preserve the integrity of information stored in the application. If these are strictly followed, limited instances of such occurrences would be noticed in the use of the software application.

* + 1. **ADAPTIVE MAINTENANCE**

This involves enhancing the system by adding features, capabilities and functions in response to new technology, upgrades, new requirements or new problems. Since the environment in which the application would be running is dynamic, it should be made to suit whatever requirements that may change in the long run.

**CHAPTER FIVE**

**5.0 Introduction**

This chapter focuses on summary, conclusion and recommendations.

Here, the entire summary of the research from the problem stage to the implementation stage, the relevant conclusion and recommendations are discussed.

**5.1 Constraints of the Study**

The problems encountered during the course of carrying out this research project include:

1. **Time**: Time for the research project was too short coupled with researcher’s academic time table.

2. **Fund**:There was limited fund to take care of the research properly in terms of transportation and other expenses especially when visiting attraction sites.

3. **Research Materials:** Lack of access to research materials on the topic in the school library and even public libraries were also major constraint in the cause of this project.

4. **Payroll System:** Access to existing payroll system pose a great challenge as industries and other business around were a bit discrete with their manual payroll system.

**5.2 Summary**

Implementation of an online and offline payroll system has been created.

The existing method of checking for staff payment slips and verifying from higher authority before signing staf payment draft has been eliminated by the system. Where user details are all stored in the system and staff payment also attached to each staff differently. The new system would be very easy to use because of its accuracy and reliability. Information about staff and his payment for a particular period of time can be promptly assessed easily.

**5.3 CONCLUSION**

BVN is a biometrics identification of customers in the financial industry launched by the Central Bank of Nigeria (CBN) in February 2014, which is aimed at revolutionizing the payment system in the country. An Online Bank Verification Number System for Nigerian banks was produced in this application. Through the new system, customers will be assigned a single identity within the financial system. It will help people who cannot read and read and write to use their biometrics which cannot be replicated, to tackle incidence of identity theft and enable banks to really identify their in the overall context of Know Your Cusomer (KYC) initiative.

**5.4 Recommendations**

Having designed, tested and implemented the new system, the following must be put in place to fully achieve the objective of which the software is designed.

1. **Maintenance:** The system needs to be maintained. This implies that any fault detected should be reported to the programmer for correction at any point in time.
2. **Internet Connection:** The system needs to be connected to the internet before the user can access the features of the software online else it can be deployed ofline using a remote server(local server: WAMP, XAMP, MANP e.t.c).
3. **Research:** More research should be conducted on the topic to assess it effectively.