**THE UNIVERSITY OF ZAMBIA SCHOOL OF NATURAL SCIENCES**

**DEPARTMENT OF COMPUTER STUDIES**

EMPLOYEE MANAGEMENT SYSTEM

**BY MWEEMBA SIMAANYA**

**A thesis submitted in partial fulfillment of the requirements for the award of Bachelor’s Degree of Computer Science.**

Copyright 2014

**DECLARATION**

I, the undersigned hereby declare that the Employee Management System is my own work, that it has not been submitted for any degree or examination in any other university to my knowledge, and that all sources I have used or quoted have been indicated and acknowledged by complete references.

**Name: Mweemba Simaanya**

**Signature:.............................. Date:……………………………**

**Supervisor**

**Name: Mr. Martin Phiri**

**Signature:................................ Date:……………………………**

**Course Coordinator**

**Signature:................................ Date:…………………………….**

**ACKNOWLEDGEMENTS**

I am greatly indebted to the following for their contribution to my work:

The Almighty God, who gave me the insight and perseverance to accomplish this work. My parents for all the support. My siblings, Nanchengwa, Sylvia, Chimwemwe, Mwenzi, Karen and Boniface who I never had time for due to my busy schedule.

My supervisor, Mr. Martin Phiri who’s sounding advice helped me steer this project in the right direction, a work I will forever cherish.

Members of staff at the Computer Studies department for the solid knowledge-base that enabled me carryout the research.

Musafili Chilembo, who’s in-depth knowledge in advanced Web Technologies such as AJAX, JSON and JQUERY was a great asset to my project.

Finally, my classmates who’s technical and moral support throughout my stay at the Computer Studies department was of great help.

**DEDICATION**

I dedicate this work to my parents who have always supported my dreams and aspirations, and given me all the financial support a child can ever need.

**LIST OF TERMINOLOGIES**

EMS – Employee Management System MSS – Management Self-Service

HRMS – Human Resource Management System HRIS – Human Resource Information System HR – Human Resource

HOD – Head of Department ESS – Employee Self-Service

WBS – Work Breakdown Structure ERP – Enterprise Resource Planning

**ABSTRACT**

Employees are the backbone of any company therefore their management plays a major role in deciding the success of an organization [1]. Employees Management Software makes it easy for the employer to keep track of all records. This software allows the administrator to edit employees, add new employees, transfer/promote/terminate employees. Each employee in the database is associated with a position can be added and edited when need arises. Employees can be transferred between positions easily without having to retype back their information in the database. You can check to see if there are duplicate positions/employees in the database. Most of all, the employer can assign tasks to employees and assess their progress in order to keep track of employee performance.

A flexible and easy to use Employee Management software solution for small and medium sized companies provides modules for personnel information management thereby organization and companies are able to manage the crucial organization asset – people [2]. The combination of these modules into one application assures the perfect platform for re-engineering and aligning Human Resource processes along with the organizational goals. This system brings about an easy way of maintaining the details of employees working in any organization.

It is simple to understand and can be used by anyone who is not even familiar with simple employees system. It is user friendly and just asks the user to follow step by step operations by giving easy to follow options. It is fast and can perform many operations for a company.

The goal of this project is to design and develop an employee management system to fill existing gaps in the electronic management of employees.

**Table of Contents**

1. [CHAPTER ONE: INTRODUCTION TO THE RESEARCH 11](#_bookmark0)
	1. [PROBLEM STATEMENT 11](#_bookmark1)
	2. [PROJECT BACKGROUND 11](#_bookmark2)
	3. [OBJECTIVES 12](#_bookmark3)
	4. [SCOPE 12](#_bookmark4)
	5. [EXPECTED BENEFITS 13](#_bookmark5)
	6. [REQUIREMENTS AND CONSTRAINTS 14](#_bookmark6)
		1. [Functional Requirements: 14](#_bookmark7)
		2. [Non-Functional Requirements: 16](#_bookmark8)

[Since EMS application is a web-based application, internet connection must be established 16](#_bookmark9)

[The EMS software personal database model will support MySQL environment as DBMS. 16](#_bookmark10)

* 1. [SUMMARY 16](#_bookmark11)
1. [CHAPTER TWO –RESEARCH 17](#_bookmark12)
	1. [INTRODUCTION 17](#_bookmark13)
	2. [LITERATURE REVIEWS ON TOPICS RELATED TO THE PROJECT 17](#_bookmark14)
	3. [REVIEWS ON SEVERAL SOFTWARE METHODOLOGIES 18](#_bookmark15)
	4. [REVIEW OF POSSIBLE DEVELOPMENT TOOLS AND SOFTWARE TO BE USED 20](#_bookmark16)
		1. [Back-end Technology 20](#_bookmark17)
		2. [Database Management System 22](#_bookmark18)
	5. [REVIEW OF SIMILAR SYSTEMS 24](#_bookmark19)
	6. [SUMMARY 28](#_bookmark20)
2. [CHAPTER THREE: SYSTEM ANALYSIS 29](#_bookmark21)
	1. [INTRODUCTION 29](#_bookmark22)
	2. [SOFTWARE DEVELOPMENT METHODOLOGY OF CHOICE 29](#_bookmark23)
	3. [SYSTEM DESIGN 29](#_bookmark24)
		1. [Use case analysis 29](#_bookmark25)
		2. [Class diagram 36](#_bookmark26)
	4. [DEVELOPMENT TOOLS 37](#_bookmark27)
		1. [Front End Technologies 37](#_bookmark28)
		2. [Back End Technologies 38](#_bookmark29)
	5. [SUMMARY 39](#_bookmark30)
3. [CHAPTER FOUR: DESIGN 40](#_bookmark31)
	1. [INTRODUCTION 40](#_bookmark32)
	2. [EXPLANATION OF THE PROPOSED SYSTEM 40](#_bookmark33)
	3. [SYSTEM AND ALGORITHM FLOWCHARTS 41](#_bookmark34)
	4. [SYSTEM STRUCTURE CHART DFD AND ERD 43](#_bookmark35)
		1. [Data Flow Diagram (DFD) 43](#_bookmark36)
		2. [ENTITY RELATIONSHIP DIAGRAM (ERD) 44](#_bookmark37)
	5. [STORYBOARD 45](#_bookmark38)
		1. [Sequence Diagrams 45](#_bookmark39)
	6. [INTERFACE DESIGN 47](#_bookmark40)
	7. [Sketches of graphics 48](#_bookmark41)
	8. [SUMMARY 50](#_bookmark42)
4. [CHAPTER 5: IMPLEMENTATION 51](#_bookmark43)
	1. [INTRODUCTION 51](#_bookmark44)
	2. [DESCRIPTION OF DEVELOPED SYSTEM 51](#_bookmark45)
		1. [Accessing the system 51](#_bookmark46)
	3. [TECHNICAL DETAILS OF IMPLEMENTED SYSTEM 52](#_bookmark47)
		1. [Model View Controller architecture (MVC) 52](#_bookmark48)
		2. [MySQL Triggers 53](#_bookmark49)
		3. [Algorithms 54](#_bookmark50)
		4. [Pseudocode 55](#_bookmark51)
	4. [SCREENSHOTS OF DEVELOPED SYSTEM 57](#_bookmark52)
	5. [SUMMARY 57](#_bookmark53)
5. [CHAPTER SIX: TESTING AND VERIFICATION 58](#_bookmark54)
	1. [INTRODUCTION 58](#_bookmark55)
	2. [SCOPE 58](#_bookmark56)
	3. [TESTING GOALS 58](#_bookmark57)
	4. [CONFIRMATION TESTING 58](#_bookmark58)
	5. [REGRESSION TESTING 58](#_bookmark59)
	6. [TEST PLANS AND RESULTS 59](#_bookmark60)
	7. [SUMMARY 62](#_bookmark61)
6. [CHAPTER SEVEN: CONCLUSION 63](#_bookmark62)
	1. [INTRODUCTION 63](#_bookmark63)
	2. [RESULTS 63](#_bookmark64)
	3. [PROBLEMS FACED 63](#_bookmark65)
	4. [LIMITATIONS 63](#_bookmark66)
		1. [Custom report generation 63](#_bookmark67)
		2. [Head of Department heads all Projects 63](#_bookmark68)
		3. [Leave Management 64](#_bookmark69)
		4. [Browser support 64](#_bookmark70)
	5. [FUTURE WORK 64](#_bookmark71)
		1. [Leave Management 64](#_bookmark72)
		2. [Integration with payroll system 64](#_bookmark73)
		3. [Employee Performance 64](#_bookmark74)
		4. [Information archiving 64](#_bookmark75)
	6. [LEARNING EXPERIENCE 64](#_bookmark76)
	7. [CONCLUSION 65](#_bookmark77)
7. [REFERENCES 66](#_bookmark78)
8. [APPENDIX 68](#_bookmark79)
	1. [Appendix A – Sequence Diagrams 68](#_bookmark80)
		1. [Report generation 68](#_bookmark81)
		2. [Edit account details 68](#_bookmark82)
	2. [Appendix B – Sample Code 69](#_bookmark83)
		1. [Database Connectivity 69](#_bookmark84)
		2. [User Authentication 69](#_bookmark85)
		3. [PDF Library 71](#_bookmark86)
		4. [Leave application 71](#_bookmark87)
		5. [Create new project and add member 73](#_bookmark88)
	3. [Appendix C – Screen shots of developed system 74](#_bookmark89)
		1. [Employee interface 74](#_bookmark90)
		2. [Admin interface 74](#_bookmark91)
		3. [Leave management 75](#_bookmark92)
		4. [Edit profile 75](#_bookmark93)
	4. [Appendix I – Testing 76](#_bookmark94)
		1. [Login 76](#_bookmark95)
		2. [Add new user 76](#_bookmark96)
		3. [Edit Account 77](#_bookmark97)
		4. [Leave request denied due to pending leave 77](#_bookmark98)
		5. [Leave request successfully submitted 78](#_bookmark99)
		6. [Create Project WBS 78](#_bookmark100)
		7. [Generate reports 79](#_bookmark101)

# CHAPTER ONE: INTRODUCTION TO THE RESEARCH

## PROBLEM STATEMENT

Manual handling of employee information poses a number of challenges. This is evident in procedures such as leave management where an employee is required to fill in a form which may take several weeks or months to be approved. The use of paper work in handling some of these processes could lead to human error, papers may end up in the wrong hands and not forgetting the fact that this is time consuming. A number of current systems lack employee self-service meaning employees are not able to access and manage their personal information directly without having to go through their HR departments or their managers. Another challenge is that multi-national companies will have all the employee information stored at the headquarters of the company making it difficult to access the employee information from remote places when needed at short notice.

The aforementioned problems can be tackled by designing and implementing a web based HR management system. This system will maintain employee information in a database by fully privacy and authority access. The project is aimed at setting up employee information system about the status of the employee, the educational background and the work experience in order to help monitor the performance and achievements of the employee through a password protected system.

## PROJECT BACKGROUND

Employees are the backbone of any company therefore their management plays a major role in deciding the success of an organization [1]. Human Resource Management Software makes it easy for the employer to keep track of all records. This software allows the administrator to edit employees, add new employees as well as evaluate an employee’s performance. Employees can be managed efficiently without having to retype back their information in the database. You can check to see if there are duplicate positions/employees in the database.

A flexible and easy to use Employee Management software solution for small and medium sized companies provides modules for personnel information management thereby organization and companies are able to manage the crucial organization asset – people [2]. The combination of these modules into one application assures the perfect platform for re-engineering and aligning

Human Resource processes along with the organizational goals. This system brings about an easy way of maintaining the details of employees working in any organization.

It is simple to understand and can be used by anyone who is not even familiar with simple employees system. It is user friendly and just asks the user to follow step by step operations by giving easy to follow options. It is fast and can perform many operations for a company

## OBJECTIVES

In this world of growing technologies everything has been computerized. With large number of work opportunities the Human workforce has increased. Thus there is a need of a system which can handle the data of such a large number of Employees. This project simplifies the task of maintaining records because of its user friendly nature.

The objective of this project is to provide a comprehensive approach towards the management of employee information. This will be done by designing and implementing an HR management system that will bring up a major paradigm shift in the way that employee information is handled.

The objectives of this system include:

* + - Design of a web based HR management system to fulfill requirements such as project management, leave management, report generation to assist in performance appraisal, ESS and employee trainings.
		- Well-designed database to store employee information.
		- A user friendly front-end for the user to interact with the system.

## SCOPE

The scope of this project will be limited to the following:

* + - Employee profiles:

Employees will have access to their personal profiles and will be able to edit their details.

* + - Electronic leave application:

Complete elimination of paperwork in leave management by enabling an employee apply for leave as well as check their leave status through the system. This will also enable the HR manager to accept/reject leave application through the system

* + - Project Management:

Assign tasks and projects to employees, assign a project team and keep track of the progress.

* + - Report generation:

The HR manager will be able to generate timely reports in order to monitor employees and this can be used for performance appraisals. The reports will be have all the information of an employee from educational background, trainings attended, projects done as well as technical skills.

* + - Recruitment Process:

The admin will add an employee and a default password and employee id will be generated and sent to the new employees email. The HR manager will then have the ability to add an employee’s information to the database.

## EXPECTED BENEFITS

This system is expected to be user friendly and will offer easy access to data as well as services such as online leave management, e-recruitment, and timely report generation, monitoring employee trainings, task management, project management and employee tracking.

The employee is expected to have direct interaction with this system through a password protected user account therefore proposed system is web based to enable accessibility from any location as long as internet connectivity is available. This direct interaction with the system will enable employee self-service.

Without an employee management system, it’s a tedious job for the human resource department to keep track of each and every employee and even harder for a project manager to assign tasks to the project team. The HR management system will be developed to provide information of employees and many other facilities at the click of a button.

## REQUIREMENTS AND CONSTRAINTS

### Functional Requirements:

**Authentication**

* Login- The user can login to the HRMS system with his/her username and password.
* Logout- The user can log out from the HRMS system.

Login failure- If the user does not exist in the database or the user has not yet being authorized by the HRMS admin.

**Authorization**

* User role check- After logging in, the user role will be checked from the database and the user interface will be displayed according to their role.

**Process Data**

* Display- User with defined roles can display the content of the database. Being more specific, employee can only view his/her personal information. HOD can not only see his/her personal information but also employee’s information who are under his/her department or school. Admin and HR can display their personal information and all employees’ information.
* Edit- A user with employee role can edit his/her specific personal information. Dean or HOD can only edit employees’ personal information that is under his/her coverage except user role type. Admin can edit all information related to all employees’ including their user role type.
* Search- User with Dean/HOD role can search the content of database for the employees’ who are under his/her coverage. HR and admin roles can search all the employees’ information in the database. Search feature works on specific keywords showing

employee’s characteristics, peculiarities, skills, features, and etc. For example, HR wants to find employees’ who are well trained in “Java Programming Language”. He/she will write the specific keyword in the search bar and press the available search button.

Afterwards, he/she will find a list of all the employees’ who know “Java Programming”. Update authentication- This feature can be used only by admin role type. Admin can update the role type of a specific user. For example, an employee got promotion and his role type will be changed from employee role id to HOD or Dean role. Admin will be able to update this authentication mechanism.

**Leave Application/Approval**

* Leave application- The user can be able to fill in leave application form in the appropriate fields.
* Leave approval- The admin can be able to approve leave applications based on the reasons stated, length of leave as well as available HR on a department.

Leave days accrued- The user shall be able to check the number of leave days accrued.

**Recruitment**

* Add new employee- HR role type is able to add a new employee to the database. The new employee will have all the required personal information related to him/her. The new created employee will have an id.
* Add a new user- After a new employee has being created by HR role, admin role is responsible for creating a new user by the specified id assigned in the “Add a new

employee” feature. The unique id will be given by the system. Admin will assign a new role such as employee, Dean, HOD, HR, and admin to the new created user.

**Report generation**

* Report generation- HR shall be able to generate a report in pdf format for each employee based on the information in the database.

**Project Management**

* Create project team: The HOD of department or project manager shall be able to create a project and come up with a project team.
* Work Breakdown Structure (WBS): The HOD or project manager shall be able to assign tasks to the project team as well as monitor their progress.

**Trainings and Task Management**

* Trainings: The HOD shall create trainings and assign employees that are required to attend the trainings as well.
* Tasks: HOD shall assign tasks to employees in his/her department.

### Non-Functional Requirements:

**Performance requirements**

There is no restriction on the number of the users to be added to the database.

**Hardware requirements**

EMS should be able to work on a computer with the following minimum hardware specifications:

OS: Windows XP/Vista/7/8 and Linux CPU: Pentium III (700MHz) and above Memory: 128 MB and above

Capacity: 4GB of hard drive

Others: Network interface card, mouse, keyboard, and monitor.

**Software requirements**

Since EMS application is a web-based application, internet connection must be established. The EMS software personal database model will support MySQL environment as DBMS.

## SUMMARY

This chapter began by giving a brief overview of the entire project, the background of the project and the scope. The problem definition and solution highlights the current problems faced with the use of the systems that are in place and outlines briefly the solution system to be developed. The next chapter will focus on the literature review. This is literature that relates to the project and similar systems.