REPUBLIC OF CAMEROON

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PEACE-WORK-FATHERLAND

MINISTER OF HIGHER EDUCATION

REPUBLIQUE DU CAMEROON

****

PAIX-TRAVAIL-PATRIE

MINISTERE DE L'ENSEIGNMENT SUPERIEURE

INTERNSHIP REPORT ON

ENTERPRISE INFORMATION SYSTEM

CASE OF NKAP SARL

An internship report submitted for partial fulfilment for the award of the Higher National Diploma (HND) in Software Engineering.

PRESENTED BY: **KUEDA OLIVIER DETEZ**

UNDER THE SUPERVISION OF

ACADEMIC SUPERVISORS:

Mr. TATSOPTEU ENDELLY

Mr. NKOMBOU BOB

FIELD SUPERVISOR:

Mr. WANSI MATHURIN

2021 - 2022

CERTIFCATION

This is to certify that an internship with the theme "**ENTERPRISE INFORMATION SYSTEM**" was carried out from the 3rd of August to the 5th of October 2020 and this report was written by **KUEDA OLIVIER DETEZ** in partial fulfilment of the requirement for the award of the Higher National Diploma (HND) in Software Engineering.

ACADEMIC SUPERVISOR

MR. TATSOPTEU ENDELLY DATE: _____

LECTURER AT IUC SIGNATURE:

ACADEMIC SUPERVISOR

MR. NKOMBOU BOB DATE: _____

LECTURER AT IUC SIGNATURE:

PROFESSIONAL SUPERVISOR

MR. WANSI MATHURIN DATE: _____

DEVELOPER AT NKAP SARL SIGNATURE

DEDICATION

TO MY FAMILY

AKNOWLEDGEMENT

The search of knowledge must not be done individually but communally, we did not work alone but involved some persons who deserve acknowledgement.

My sincere appreciations therefore go to:

MR. PAUL GUIMEZAP the founder of the UNIVERSITY INSTITUDE OF THE COAST IUC for creating this institution

The school administration of university institute of Coast, in particular the administration of SEAS enabling us to receive a highly qualified education.

The HND Industrial lecturers and particularly Mr. TATSOPTEU ENDELLY and Mr. NKOUMBO BOB, my academic supervisor for guidance, training and enlightenment in the understanding of software engineering concepts. Their suggestions and instructions have served as a combination towards the completion of this report.

We would also like to thank my supervisor on the field Mr. WANSI MATHURIN for his constant suggestions and guidance. His painstaking encouragements boosted morals for the completion of this project.

Then, we will like to thank my family for paying my school fees and necessities to work and study in good conditions.

Nevertheless, my great appreciations dedicated to my friends and classmates who have helped me with their valuable suggestions and guidance which have been very helpful in various phases of my project.

ABSTRACT

The main aim of an internship is to permit the students to have a complete overview of how the job market is going on and gain some professional skills. Due to these I carried out my Internship at NKAP SARL for two months during my internship at NKAP I realise they had many difficulties in managing data.

In addition to these they were to using a system that did not fulfil all their requirements so they still had to manually record some information's.

We made research on the available solution and their possible implementation and so during my internship to attain these objectives, we passed through different phases, the methodology used to attain my objective was the spiral approach which help me in analysis of my requirements and their implementations.

At the end of requirement analysis phase, we came out we requirement specification which permitted us to easily analysis the risk of implementation, the time, ant the cost of implementation. The concept of an application capable of managing projects, task, activities, and employees was given to us as base topic, we worked on the theme "DEVELOPING AN ENTERPRISE INFORMATION SYSTEM".

This report is written based on the knowledge I acquired during the internship the problem I discovered and the prosed solution to this problem.

RESUME

L'objectif principal d'un stage est de permettre aux étudiants d'avoir une vue d'ensemble complète de la façon dont le marché du travail se déroule et d'acquérir des compétences professionnelles. Grâce à cela, j'ai effectué mon stage chez NKAP SARL pendant deux mois pendant mon stage chez NKAP, je me rends compte qu'ils ont eu de nombreuses difficultés à gérer les données.

En plus de cela, ils devaient utiliser un système qui ne répondait pas à toutes leurs exigences, de sorte qu'ils devaient toujours enregistrer manuellement certaines informations.

Nous avons fait des recherches sur la solution disponible et leur mise en œuvre possible et donc lors de mon stage pour atteindre ces objectifs, nous sommes passés par différentes phases, la méthodologie utilisée pour atteindre mon objectif était l'approche spirale qui m'aide dans l'analyse de mes besoins et de leurs implémentations.

À la fin de la phase d'analyse des besoins, nous avons sorti notre spécification des exigences qui nous a permis d'analyser facilement le risque de mise en œuvre, le temps, et le coût de la mise en œuvre. Le concept d'une application capable de gérer des projets, des tâches, des activités et des employés nous a été donné comme sujet de base, nous avons travaillé sur le thème « DÉVELOPPER UN SYSTÈME D'INFORMATION D'ENTREPRISE ».

Ce rapport est rédigé sur la base des connaissances que j'ai acquises pendant le stage, du problème que j'ai découvert et de la solution à ce problème.

PREFACE

With the aim of ensuring suitable development and providing business with a competent and competitive workforce in various fields, the Cameroonian government through the ministry of higher Education has opened the private institution of education. This giving the opportunity to private institutions, to contribute to the acquisition of an academic and professional training in adequacy with the professional world.

This is created the ISTDI (Higher Institute of Technology and Industrial Design) by decree N° 02/OO94 /MINESUP /DDES /ESUP of September 13 2002 and authorization of opening N° 0102/ MINESUP /DDES/ ESUP of 18 September 2002. Located in the coastal region, Wouri department, district of Douala 5Th, in the logbessou district. The ISTDI is then created in University Institute of the Coast (IUC) by decree N° 5/05156/ N/ MINESUP/ DDES /ESUP/ SAC, and comprises to date four (4) establishments in particular;

1. The Higher Institute of Technology & Industrial Design (ISTDI)

With this training oriented towards industrial sectors. One of the peculiarities of this school is that it includes almost all of the trade in its field and advanced equipment made available to students facilitates learning. ISTDI trains in the following cycles and streams

INDUSTRIAL BTS

- Maintenance of computer system (MSI
- Industrial Computing (II)
- Electrical engineering (ET)
- Electronics (EN)
- Cold and air conditioning (FC)
- Maintenance and after sales automobile (MAVA)
- Civil Engineering (GC)
- Wood Engineering (GB)
- Boiler making (CH)
- Mechanical Manufacturing (FM)

INDUSTRRIAL AND TECHNOLOGICAL PROFESSIONAL BACHELOR in partnership with the University of Dschang

- ✓ Network Administration and Security
- ✓ Software Engineering
- ✓ Automatic & Industrial Computing
- ✓ Electrical

- ✓ Electronics
- ✓ Management of Automotive Services
- ✓ Maintenance and Expertise of Automobiles
- ✓ Maintenance of Industrial Systems
- ✓ Energy and Industrial Engineering
- ✓ Civil Engineering
- ✓ Wood Engineering
- ✓ Mechanical and Production Engineering

BACHELOR OF TECHNOLOGY

MASTER PROFESSIONNEL INDUSTRIEL in partnership with the University of Dschang

- ✓ Electrical Engineering & Industrial Computing;
- ✓ Engineering Telecommunication & Networks;
- ✓ Information Systems and Software Engineering

2. School OF Engineering and Applied Sciences (SEAS).

The courses taught in this school relate to the commercial, communication and management sectors. It is here that the senior managers and entrepreneurs in management and international trade are formed, with particularly African; European and Asian. All supported by language stays abroad. This school in the following cycles and streams

COMMERCIAL BTS

- ✓ Assurance (SA)
- ✓ Management Information (IG)
- ✓ Banking and Finance (BF)
- ✓ Commercial Action (ACO)
- ✓ International Trade (CI)
- ✓ Corporate Communication (CE)
- ✓ Accounting and Business Management (CGE)
- ✓ Logistics and Transport (LT)

PROFESSIONAL BACHELOR and MANAGEMENT in partnership with the University of Dschang:

- ✓ Marketing
- ✓ Finance-Accounting

- ✓ Bank
- ✓ Bank-Insurance
- ✓ Human resource management
- ✓ Logistics and transport
- ✓ Control and Audit
- ✓ Quality Management

BACHELOR IOF SCIENCES

EXECUTIVE MBA

PROFESSIONNEL MASTER COMMERCIAL In partnership with the University of Dschang

- ✓ Management of organizations
- ✓ Finance-Accounting

MASTER ISUGA-France in partnership with EMBA France:

3. The Institute of Computer Engineering of Central Africa (3IAC)

3IAC is an institution that has sub regional coverage that offers students the opportunity to train in the fields of industry and technology. Its particularity is to train the holder of the scientific BACs, in the basic sciences, for the direct integration in the third year in a computer engineering cycle at the IUC or in the partner schools. Students have a double degree and a training program in perfect harmony with the model of foreign partners.

This school trains in the following cycle and streams

ICT Cycle in Partnership with CCNB-DIEPPE of Canada

- ✓ Networking and security
- ✓ Programming and Analysis

MASTER EUROPEEN in partnership with 3IL in France

- ✓ Software Engineering
- ✓ Administration of network system

MASTER PROFESSIONNEL in partnership with INSP Yaoundé

- ✓ Civil Engineering
- ✓ Energetic Engineering and Environment;
- ✓ Industrial Engineering and maintenance;

CYCLE ENGINEER Computer scientiste (3IL-France) ;

Innovation and Entrepreneurship Research Centre (PRIE)

4. International Programs of Science and Technology Innovation (PISTI)

This school offers training oriented towards preparatory classes (chemistry, physics and mathematics applied to finance); Agric-food engineering; Biomedical engineering Architecture and design, etc. these programs allow for better preparation (psychology, socio –cultural, linguistic, etc.) of children who obtain a baccalaureate at a very young age so that they can integrate well once abroad.

We find in this school, the following sectors:

Cycle of Preparatory Classes at Grandes Ecole's d'Ingénieurs (CP) in partnership with the University of Maine in France:

- ✓ Preparatory classes;
- ✓ Science & Technology Licenses
- ENGINEERRING CYCLE of industrial Engineering (ESSTIN-France);
- ENGINEERING CYCLE IN BIOMEDICAL ENGINEERING
- ENGINEERING CYCLE IN ARCHITECTURE ETURBANISM

All these schools offer courses of an international character in the sense that they are aligned with the new LMD pedagogical system, and the skills acquired by our students as well as the spirit of openness and adaptation that we teach them allow to carry out the missions entrusted to them in all the organizations and to consider all possible the possible options for their professional future in a changing global context, and whose environment is more and more demanding. The student of the cycle management is held in 2018 to perform a special project during his academic course. This project will allow students to better understand the knowledge acquired and a specially applied to a field of specialty.

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CPM	Cooperate Performance Management
ECM	Enterprise Content Management
ERP	Enterprise Resource Planning
DB	Database
HND	Higher National Diploma
HRM	Human Resource Management
SD	Sequence diagram
SQL	Structured Query Language
UML	Unified Method Language
XAMPP	Cross Platform Apache, MySQL, PHP and Perl

GENERAL INTRODUCTION

The main problem is the laziness and inefficiency of some employees at work, during the internship some of interns and other workers were coming late at work and were submitting their work lately in facts they were inefficient rendering the company less productive.

In addition, they were not having a computerised system, they were recording their presence on papers and they were asking for permissions and leaves in an informal way thus leading to some confusions at the end of the month and during the absence of some workers.

To conclude they need to develop an information system that could be enable widely since the managers of the enterprise were not having the same location but needed to know all what is happening in the company.

During the internship the problems faced leaded to many unanswered questions such as;

Were they going to implements many information systems in other to manage all the aspect of the enterprise?

How were they going to ease the work of the manager who is not base in the country?

How were they going to manage in case of any unforeseen accident and data losses?

How were they going to increase their productivity at a reduced cost?

An Enterprise Information System (EIS) is any kind of information system which improves the functions of enterprise business processes by integration. This means typically offering high quality of service, dealing with large volumes of data and capable of supporting some large and possibly complex organization or enterprise. Enterprise systems create a standard data structure and are invaluable in eliminating the problem of information fragmentation caused by multiple information systems within an organization.

The part one which is the conceptual framework has 02 chapters which are the presentation of the company and the activities carried out during the internship. The part two which also has 02 chapters is concerns with the diagnosis of the existing system and the proposed solution and implementations

PART 1: CONCEPTUAL FRAMEWORK

CHAPTER 1: COMPANY PRESENTATION AND ACTIVITIES CARRIED OUT

COMPANY PRESENTATION

HISTORICAL

GENERAL PRESENTATION OF NKAP GROUP

The start-up NKAP is a SARL that was born in 2016 with the initiative of the computer engineer Lenin DJOUATSA who will later be accompanied by three partners. The idea at the beginning was to bring a solution called NKAP that will facilitate the management of associations, tontines. But very quickly his associates will revise their vision. From now on, the start-up NKAP supports people and organizations in the realization of several projects in the field of ICT (New Information and Communication Technologies) namely: Programming, QA testing, computer networks, computer security... NKAP's vision is to be the service agency WEB and IT leader in Africa, this by providing our customers with an exceptional service, accompanying them in their Web and IT project with Professionalism, with competent staff, the assurance of a quality service and competitive prices.

ORGANISATIONAL

DIFFERENT DEPARTMENTS OF NKAP

NKAP is organized into four departments namely: Marketing and Sales, Technical, Human Resources and Finance.

MARKETING AND SALES DEPARTMENT

The Marketing and Sales department manages the sales and marketing services as well as the implementation of the commercial and marketing strategy of NKAP products and services.

Through its different missions namely

Trade missions

The company's trade missions are as follows:

- Management and prospecting of key accounts;
- Management and prospecting of prospects, business introducers, influencers;
- Management and prospecting of foreign distributors;
- Development of the business strategy, turnover objectives and budget;
- Responsible for E-Commerce and e-merchant;
- Management of the sales team (Sales – Sales Administration, Sales Promoter and Intern) in achieving sales objectives;
- Management of the budget of the Marketing and Sales department.

Marketing tasks

The company's marketing missions are as follows:

- Implementation of tools to improve sales and the sales force;
- Reflection on the declination of the concept on all media;
- Analysis of product performance, launches and development of the marketing plan;
- Management of the graphic designers and marketing/social media team;
- Marketing budget management;
- Development of marketing tools related to launches (product sheet, ambient visual,

Communication tasks

The company's communication missions are as follows:

- Management of the communication officer in the development of the com plan, partnerships;
- Coordination of press agency.

TECHNICAL DEPARTMENT

Our missions are to provide technical solutions to the needs of our customers. Whether in the management of their meetings / associations with ever more advanced functionalities and show innovation to offer them an ever more qualitative service.

These technical solutions can also deal with more varied needs such as website design, emailing campaigns or any other IT need.

In addition, we are also involved in the construction of a computerized system in order to provide field teams with tools adapted to their work and allowing them to meet the expectations of our customers.

PRESENTATION OF SERVICES

The Application NKAP APP

NKAP App which is the first invention of the Start-up NKAP is a set of tools (mobile application and website), whose objective is to revolutionize the management of associations. The traditional system of management of meetings and tontines is most often at the origin of many conflicts, especially because of the concerns of calculations of interests, trust and transparency between the different members.

Programming

We design and develop your web applications, mobile applications and desktop applications at a lower cost. It is about creating a website capable of editing content (CMS), managing your customers, PDF reports and statistics, E-commerce Newsletters, File Manager, Forms Manager, Inventory Software, Reservations, Billing, News and Blog. Prototypes, Design and interfaces, android and iOS (order taking, electronic signature, rugged terminals.

QA. TESTING

In addition to supporting the development of your application, we guarantee you a quality follow-up through our expert team in the field of QA. Testing.

CHART DESIGN

We give your company a visual existence by following you in the design and implementation of your graphic charter, various impressions, packaging, web and design.

MARKETING DIGITAL

Here we offer services and training in Community management, e-mail marketing, SEO and the Digital Marketing Strategy at competitive prices.

BUSINESS

Take advantage of our assistance in E-Commerce Site Management, Project Management, Business Plan, Load Book Montage and HR Management Board.

TECHNOLOGIES

We accompany you here in various fields such as: Computer Network, Database Management, IT Security, Audit of Web Projects, and Cloud Management.

HIERACHICAL

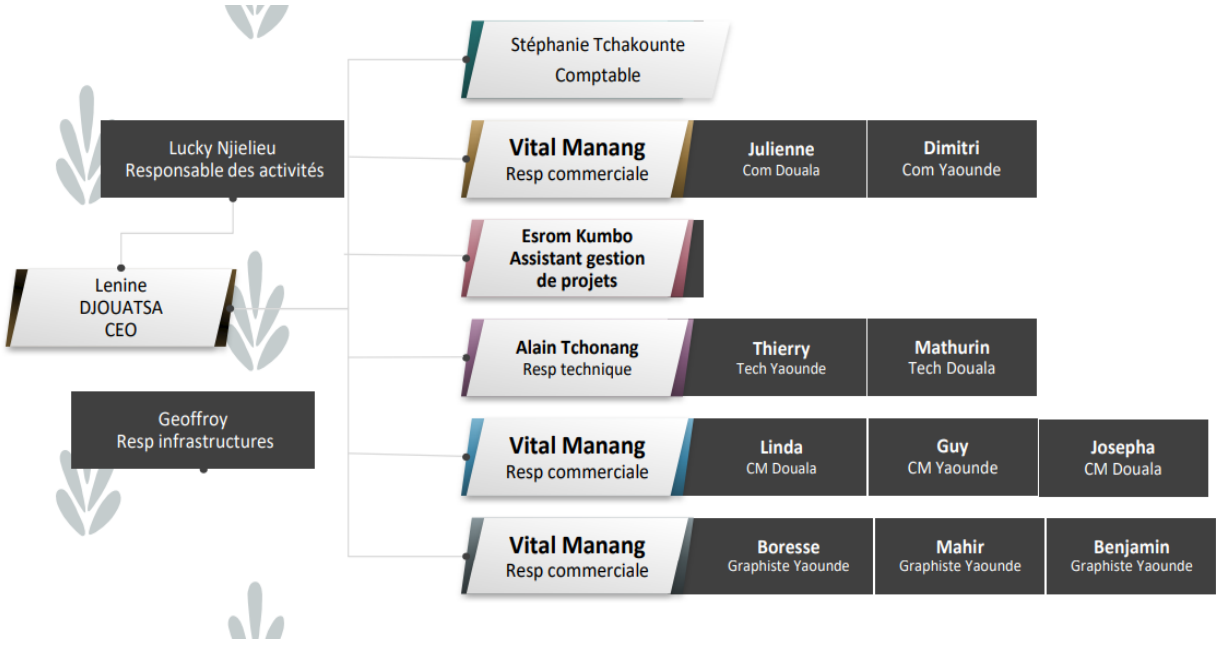


FIGURE 1 :HIERACHY OF THE ENTERPRISE

FICHE SIGNALITIQUE

Raison Social	**NKAP GROUPE**
Judicial Status	SOCIETE A RESPONSABILITE LIMITES
Board of Director	DJOUATSA LENINE
Addresses	Tel: (+237)697285494 Yaoundé Cameroun
Siege social	Montée Jouvence face DOVE Yaoundé
Sites	Yaoundé – Douala – Dschang
Activities Sectors	ICT and New Technologies
ISP	CAMTEL – ORANGE – LAWAL CENTER
Competitors	DJANGUI – TONTEO – TONTINE PLUS
Social Capital	950000FCFA

LOCATION

NKAP is located at Makepe Sainte-Monique not far from Rolux Beauty

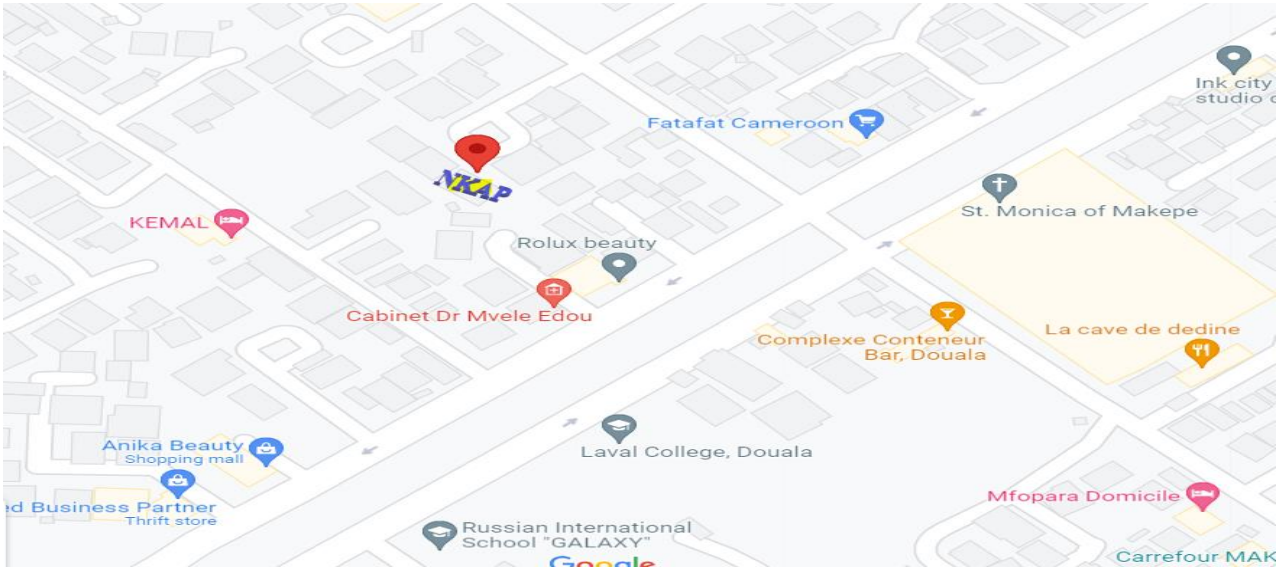


FIGURE 2:LOCATION OF THE ENTERPRISE

EVOLUTION OF INTERNSHIP ACTIVITIES

WEEK	PERFORMED ACTIVITIES	DIFFICULTIES ENCOUNTERED	SOLUTIONS PROPOSED	SKILLED ACQUIRED
Week One	Introduction to company and other interns in my field Introduction to activities to be carried out during the internship period	No major problem was encountered	No problem hence no solution required	Socialization Skills
Week Two	Site Testing and Bug reporting	Some knowledge about responsivity testing where not yet known	Meeting was organized in other to explain and introduce us to website testing	Website Testing and Bug reporting
Week Three	Explanation and Introduction of the project to be done for the defence	No knowledge on System Analysis and Design and System Development life cycle	Carry out research on system analysis and design methods and on SDLCs	System Analysis and Design skills
Week Four	Analysis of the System to be done	Difficulties on the comprehension of UML	Research on UML and videos tutorials	Skills on how to use UML

Week Five	Explanation and Introduction of the system to be done for the enterprise (Creation of an API Newsletter)	Some knowledge about APIs and tools (Symfony, GIT) to be use where not yet known	Meeting was organized in other to explain and introduce us to tools to be use Research on APIs and videos tutorials	Knowledge on APIs and GitHub
Week Six	Web development (HTML, CSS, JavaScript, Bootstrap, Frameworks)	Some knowledge about Web development where not yet known	Meeting was organized in other to explain and introduce us to Web development to be use Research on Web development and videos tutorials	Knowledge on Web development
Week Seven	Explanation and introduction of the Framework Symfony and React JS	Some knowledge about Frameworks where not yet known	Research on frameworks, videos tutorials and trainings	Knowledge on frameworks
Week Eight	Finalization of Projects End of Internship	Not full knowledge acquired on frameworks The school project was not yet terminated	The manger decided to let the interns go letting us work on our projects at home And to contact him in case of problems.	

TABLE 2:ACTIVITIES CARRIED OUT DURING THE INTERNSHIP

CHAPTER 2: OVERWIEW OR GENERALITIES ON THE TOPIC STUDIED

INTRODUCTION

An enterprise information system (EIS) is any kind of information system which improves the functions of an enterprise business processes by integration. This means typically offering high quality of service, dealing with large volumes of data. A system which looks to improve the functions of an enterprise business processes by integration of many sub systems.

The system is design in other to help the enterprise to boost out the efficiency of each employee by integrating modules that will help in the fast realisation of their tasks and activities. Leading to an increase in the company productivity, these modules are;

1. ERP (Enterprise Resource Planning) - System for planning (managing) enterprise resources.
2. HRM (Human Resource Management) - the field of knowledge and practices, aimed at ensuring the staff organization and its optimal use. HR is primarily concerned with the organization of people resources within companies.
3. CPM (Corporate Performance Management) - corporate performance management concept, which covers the whole range of tasks in the area of strategic and financial administration of the company. It is the process of monitoring and managing an organization's performance, according to key performance indicators
4. ECM (Enterprise Content Management) - a strategic infrastructure and technical architecture to support a single life cycle of unstructured data (content) of various types and formats. Primarily used to capture, manage, store, preserve, and deliver content.

CHARACTERISTICS AND FEATURES

The system has the following characteristics and features;

Firstly, it's flexibility and reliability the system ensures a flexible quality of information with flexible attributes in other to enhance or boost the efficiency of the employee and its also ensures the complete integration between each sub modules including a reliable access procedure

Secondly it allows secure and confidential access to information with the information been relevant, timely and validated.

Thirdly since it is a web application it is accessible at many places and by all at the same time.

FUNCTIONAL REQUIREMENT

As functionality the system is capable of;

Firstly, managing the employee, by keeping track of their activities and attendances thus permitting to track their efficiency and their productivity.

Secondly it permits a complete management

BENEFITS AND ADVANTAGES

The system has the following advantages;

Firstly, it is easy to understand and use and it integrates all the module necessary to help in the easy management of an enterprise thus increasing the productivity of the enterprise

Secondly the system allows one to integrate all activities in one place. This removes the risk of information being deleted, or lost which can vastly improve the efficiency of the work a team is carrying out daily. The system allows one to monitor all client activity throughout the team which means work is not being duplicated and one can assess whether enquiries are being dealt with effectively and efficiently.

In addition, its teamwork in the sense that it is easier for a team member to get to a colleague for a help on a particular issue in the project. Team members can make available shared ideas within the system which can easily be accessed by other team members at any time, increasing team collaboration. Inputs of each team member can be seen and an effective output will encourage others to work.

Equally the system allows employees to analyse the tasks and projects they have in front of them, and then prioritize them in the most effective way. Using Enterprise information software allows the individual to achieve deadlines, avoiding clashes with meetings or other tasks in a way that cannot be handle with paper and calendar-based systems. The software will store deadlines, meetings and other activity already inputted into the system, helping the user to manage their time more effectively

Finally, the software allows the tracking of time each employee spends on a task. It allows the efficiency in which individual team members are working to be monitored. This information can be used when reviewing the activeness of an employee. The information on time taken to work on project can help in efficiently pricing the cost of the work of an external client's project.

DISADVANTAGES

The drawbacks in an Enterprise Information system software can be counted on fingers; with mostly only benefits, these systems have a few countable downsides. Often, applications face minor technical glitches and these systems are no exception but, rectification is immediate. Only people who are accustomed to regular use of smartphones or computers can operate this software. Extensive modules and features make it difficult for a user to use the application. With huge flow in traffic, the application is prone to performance issues. Absence of proper internet-network makes it difficult for a user to access information, which is a significant disadvantage. The risk of data mishandling might be bothersome; but all these drawbacks can be evaded by choosing proper, cost-efficient and best software that best benefits an organization.

CHAPTER 3: DIAGNOSTIC OF THE EXISTING SYSTEM

INTRODUCTION

The existing system was a software that was just helping them to manage their tasks and projects, it wasn't permitting them to manage their employee and their efficiency, it was not user friendly and it was difficult to understand, the old system did not permit them to manage the resources of the enterprise and didn't also permit them to manage the employee salary. In addition to these problems, it was costly.

Even with this application they were oblige to manually records many information's the attendances of each employee, their leaves and their requests.

RESEARCH METHOD

In the course of my research, I used several methods to identify the problem

- INTERVIEW; I asked questions to the employees in order to find out how effective the system they use to work from home is, and how they keep track of the tasks the carryout. I asked the secretary the method she used to save data about the employees working on each project.
- OBSERVATION; While working at NKAP, I observed that communication between team mates while working from home was slow and ineffective. Also, the manager had to call each member one after the other on phone to inform them about the projects they were to work on and with whom they were to work with.
- INTERNET; I used the internet to further my research on how the problem could be solved easily.

SYSTEM ANALYSIS OF THE EXISTING SYSTEM

Use Case Diagram

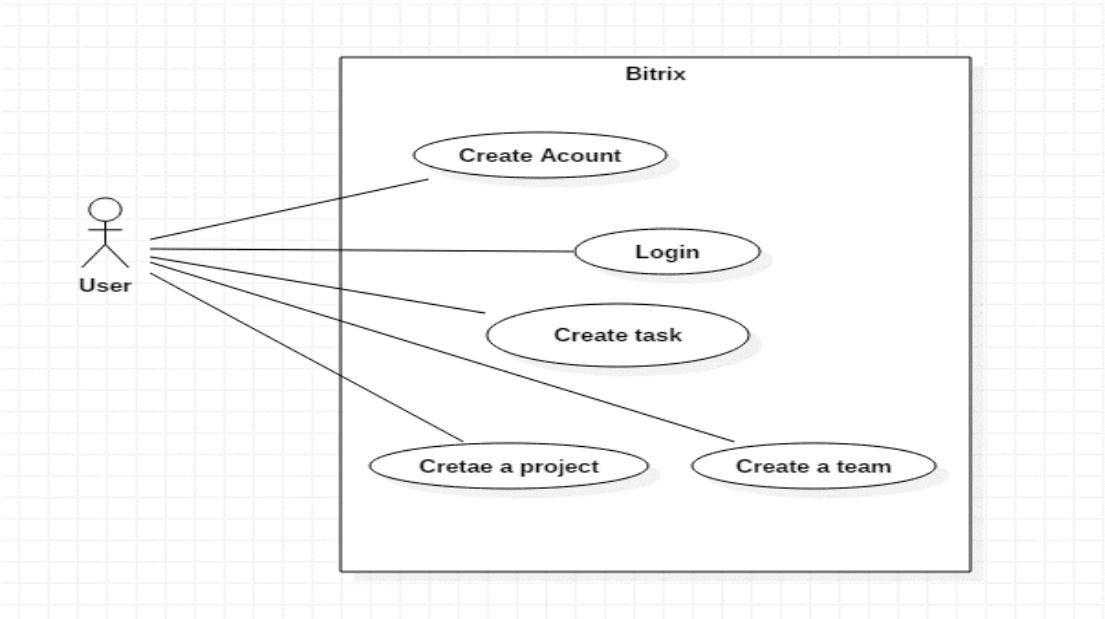


FIGURE 3:USE CASE OF OLD SYSTEM

Class Diagram

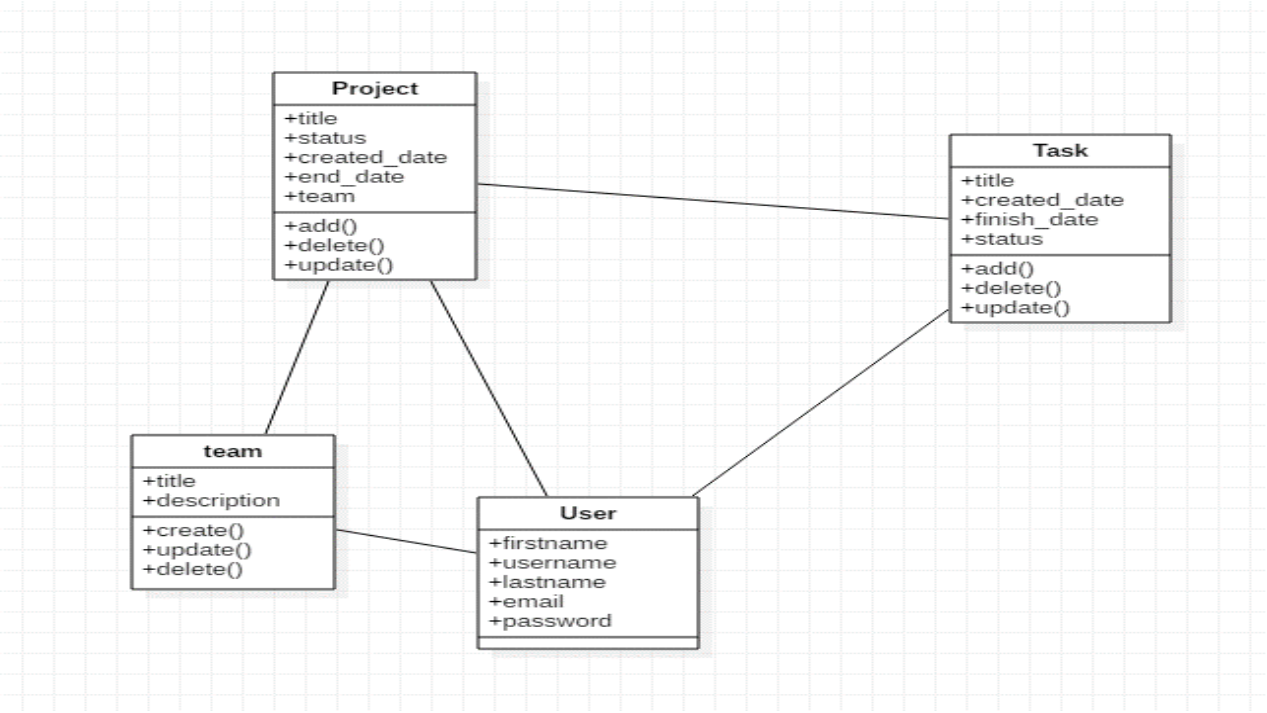


FIGURE 4:CLASS DIAGRRAM OF OLD SYSTEM

Data Flow

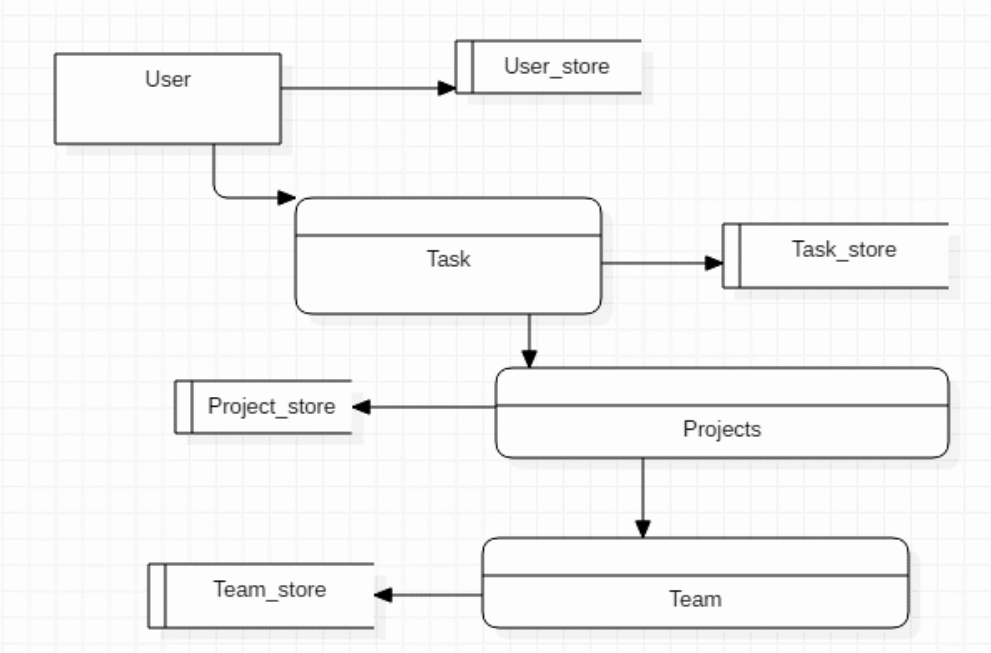


FIGURE 5:DATA FLOW DIAGRAM OF THE OLD SYSTEM

Flowchart Diagram

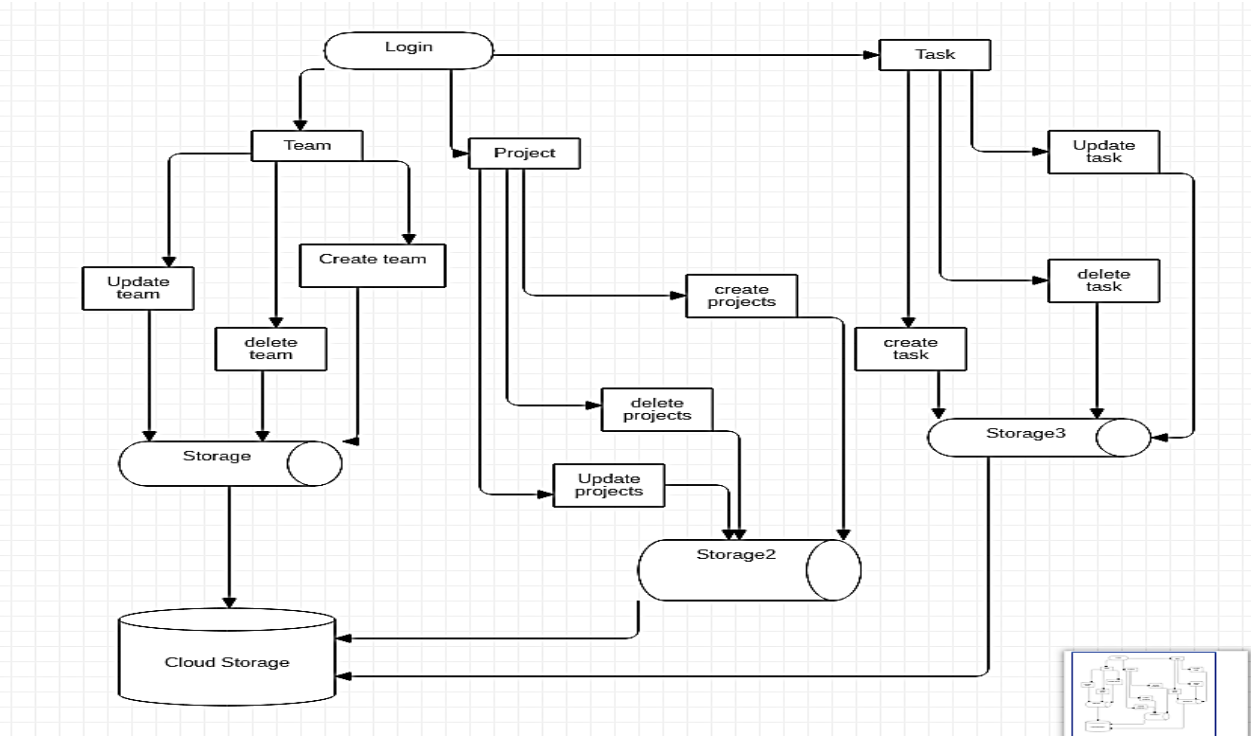


FIGURE 6:FLOWCHART DIAGRAM OF THE OLD SYSTEM

PROBLEMS OF THE EXISTING SYSTEM

The existing system had so many limitations which were,

Firstly, it could not keep track of the activities of each employee, it could not also manage the available resources of the enterprise thus leading to inefficiency and a reduction in the productivity of the enterprise.

Secondly it was not design to be capable of managing all their data thus they were a need for recording manually partial information that the system could not integrate or manage.

To conclude the existing system had many implications which render it ambiguous and complicated, and it did not fulfil all the required functionalities so they had the need for the implementation of a new system which could help them to manage their enterprise.

CHAPTER 4: PROPOSED SOLUTION AND IMPLEMENTATION

INTRODUCTION

In order to bring forward an effective solution, a thorough analysis had to be made. The analysis phase is the first critical phase in software development. Therefore, in this chapter, I will present a complete analysis of the system I have proposed, stating the methodology I will use, requirements, design and implementation of the system.

PROPOSED SOLUTION

Here we are to describe the different tools use, the different interfaces, the number of users, the UML diagrams to explain the different functions carried out by the users, the methodology used. The approach used for the analysis and design of this project is an enterprise-based method. This method is based on few known methods such as UML modelling. It is articulated according to two axes: the four phases of (Launch, Development, Construction, Transition) which correspond to those of UP and seven activities.

These different activities are as follows:

1. Evaluation

Business Modelling: It consists of knowing better and understanding the processes in which the future computer system will be integrated.

Functional requirements: It consists in defining what the application of the business point of view must do.

2. Risk Analysis and Planning

It consists of analysing and carrying out a feasibility study of the system to be implemented.

3. Requirement Analysis

Usage Case Analysis: Provides a computer view of the system.

Synthesis of the analysis: It consolidates and validates all the analysis of the use cases.

Design: It allows defining and setting up technical architecture choices and completing the technical description of the system.

4. Coding and Testing

Implementation: it consists of realizing the application;

Tests: it consists of performing tests on the application.

SYSTEM DEVELOPMENT LIFE CYCLE(SDLC)

SDLC is a term used in Information Systems (IS) and Software Engineering (SE) to describe a process for building an application. It is subdivided into the Planning, Analysing, Designing, Coding, Testing and Maintenance.

The approach used for the analysis, design and implementation of our project is based on UML modelling as mentioned above and we have decided to use the **SPIRAL MODEL** for the implementation of our system because;

It is said to a structured model because it has well defined structure for developing software. It is also known as Metamodel. It is best suited for complex and mission critical projects. Each trip around the spiral traverses four basic quadrants.

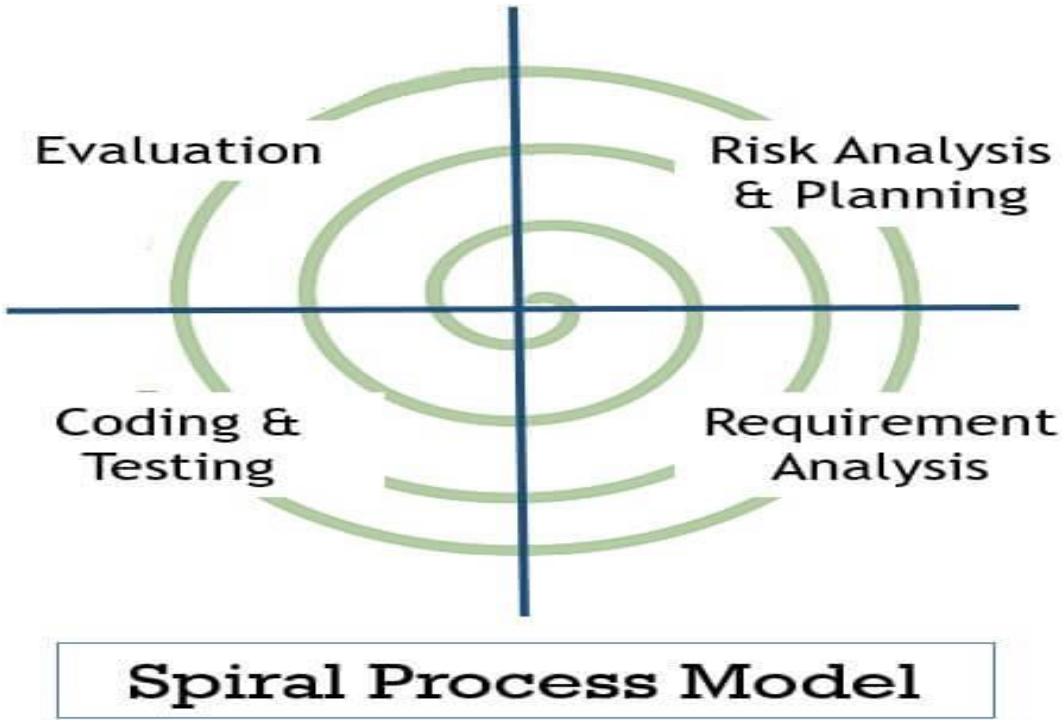


FIGURE 7:SPIRAL METHODOLOGY

Software development is divided into smaller parts and risky parts. Requirement change during development can be accepted. It is best for critical software development and it uses more prototypes

DETAILED ANALYSIS OF PROPOSED SOLUTION

PLANNING PHASE

This phase is also known as the requirement gathering phase and is one of the most important and fundamental stages in the SDLC of a project. It consists of drafting a work plan and carrying out detail feasibilities and preliminary studies about what is to be done and involves studying the present system if any is in place and need for amelioration. For the case of my project, the pen and paper system were used to manage activities. Hence, I decided to build a web application that will facilitate company project and task management. I gathered my requirements using **non-structured interview, observation and internet research.**

SYSTEM ANALYSIS AND DESIGN

This phase serves to set the stage and bound problems. It involves breaking down the system into different pieces to analyse the situation, analysing the project goals, breaking down what needs to be created and seeing how the system can be created without affecting the company negatively.

USE CASE

A use case is a list of actions or events typically defining the interactions between a role and a system to achieve a goal. The role is known in **UML** as **an actor** and may be human or an external system. A use case diagram consists of the **boundary** which defines the system of interest in relation to the world around it, the actors which are usually individuals involved in the functioning of the system, the use cases which are specific roles played by the actors within and around the system and finally the **relationships** between and among the actors and the use cases.

i. System Use Case

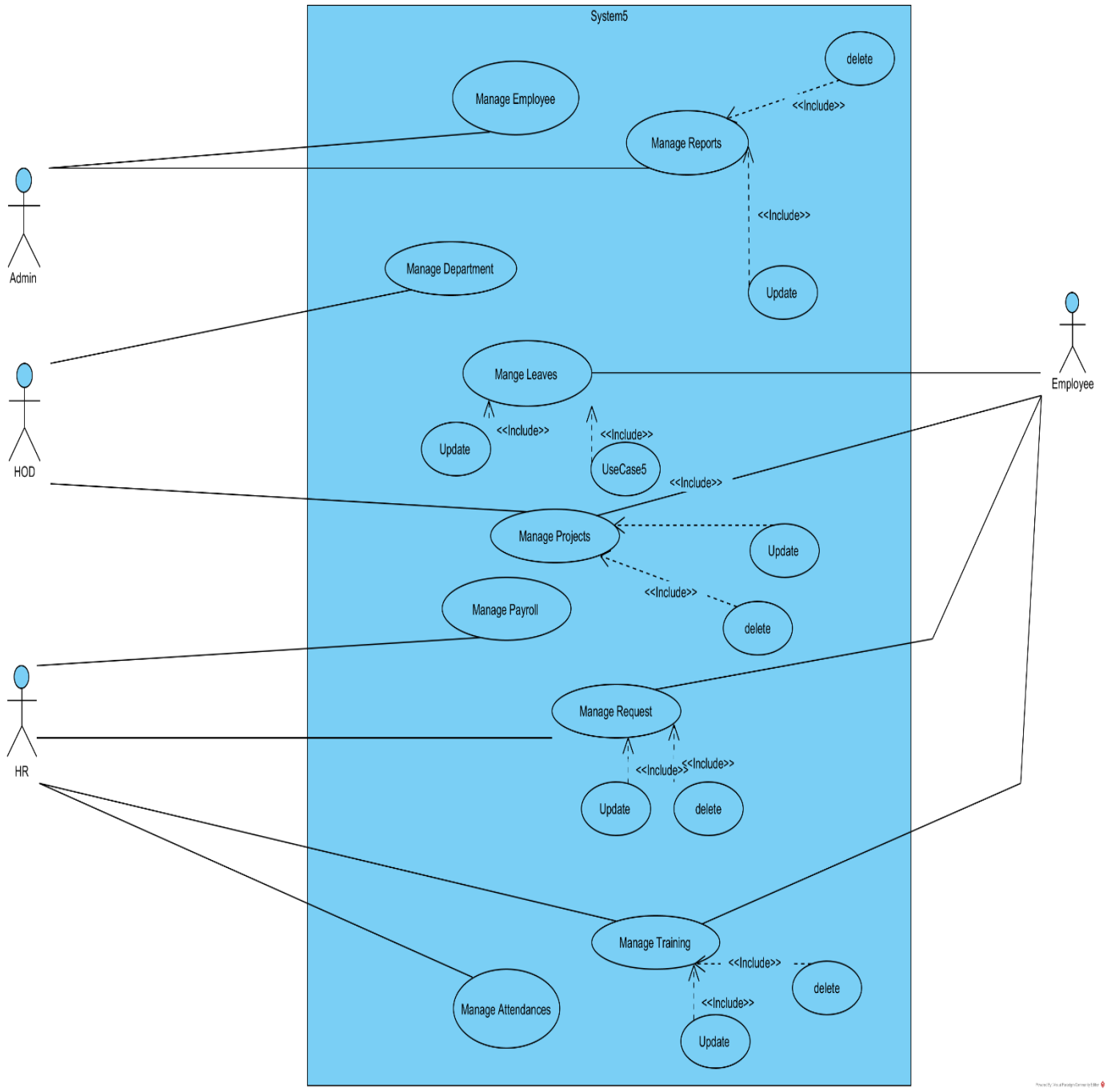


FIGURE 8:USE CASE

ii. Admin Use Case

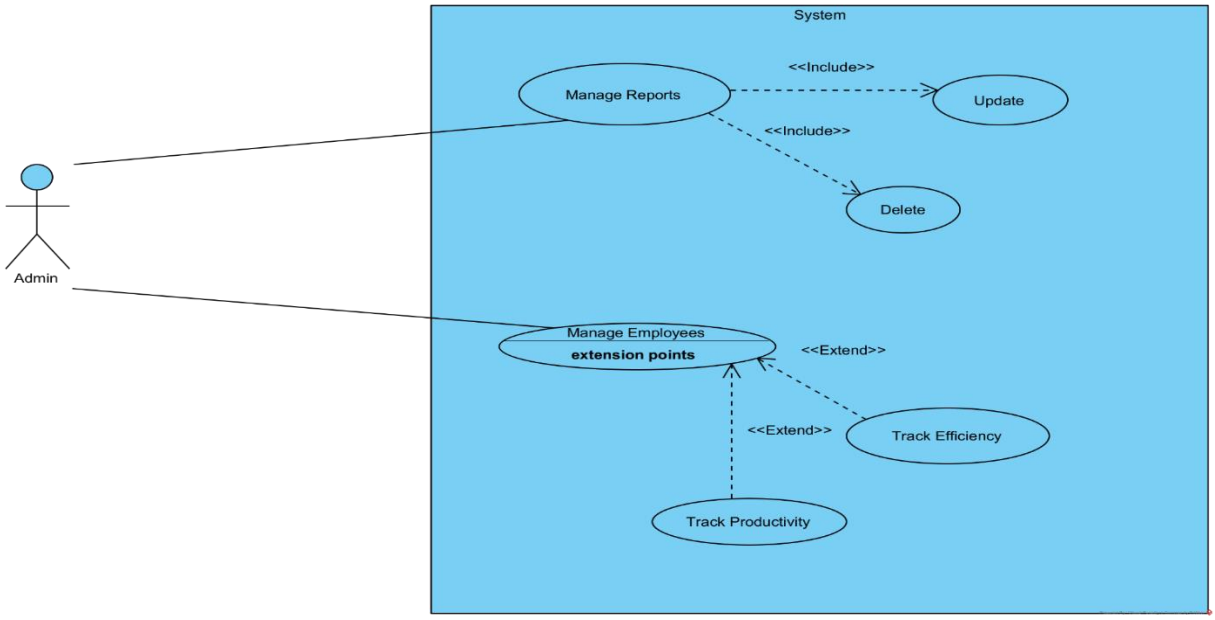


FIGURE 9:ADMIN USE CASE

iii. Employee Use Case

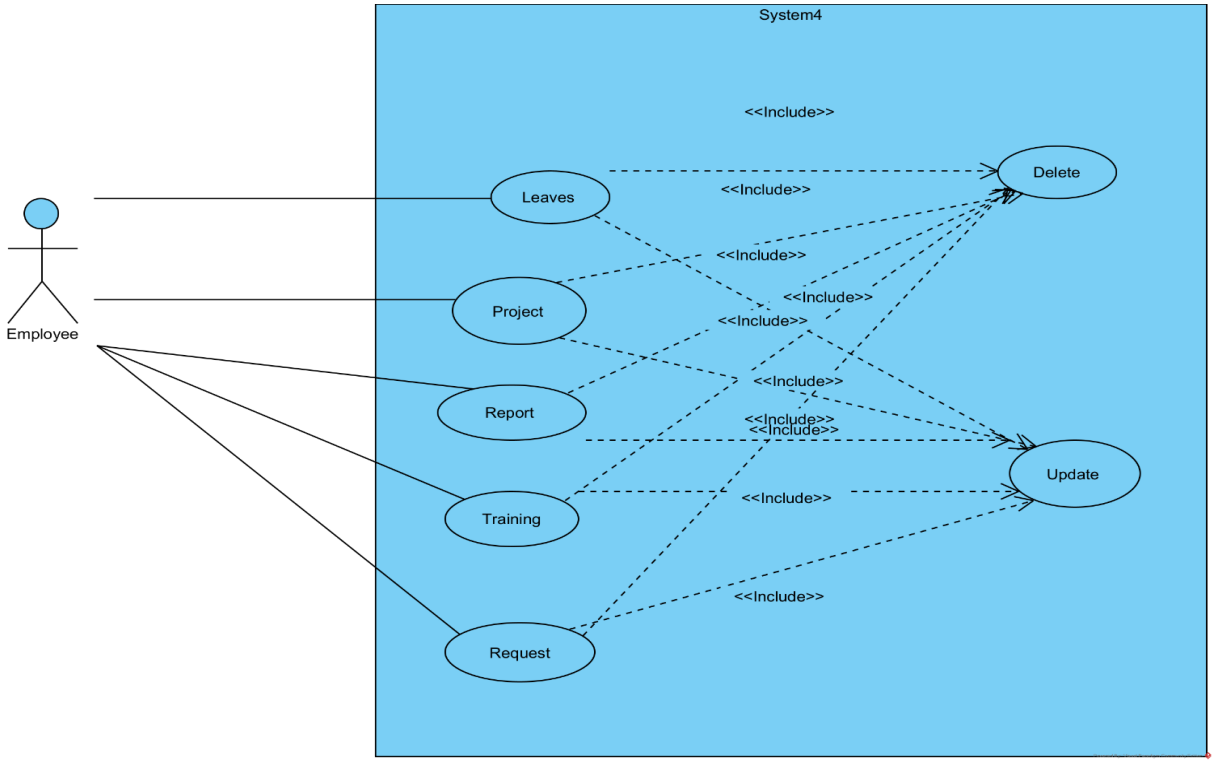


FIGURE 10:EMPLOYEE USE CASE

iv. HOD Use Case

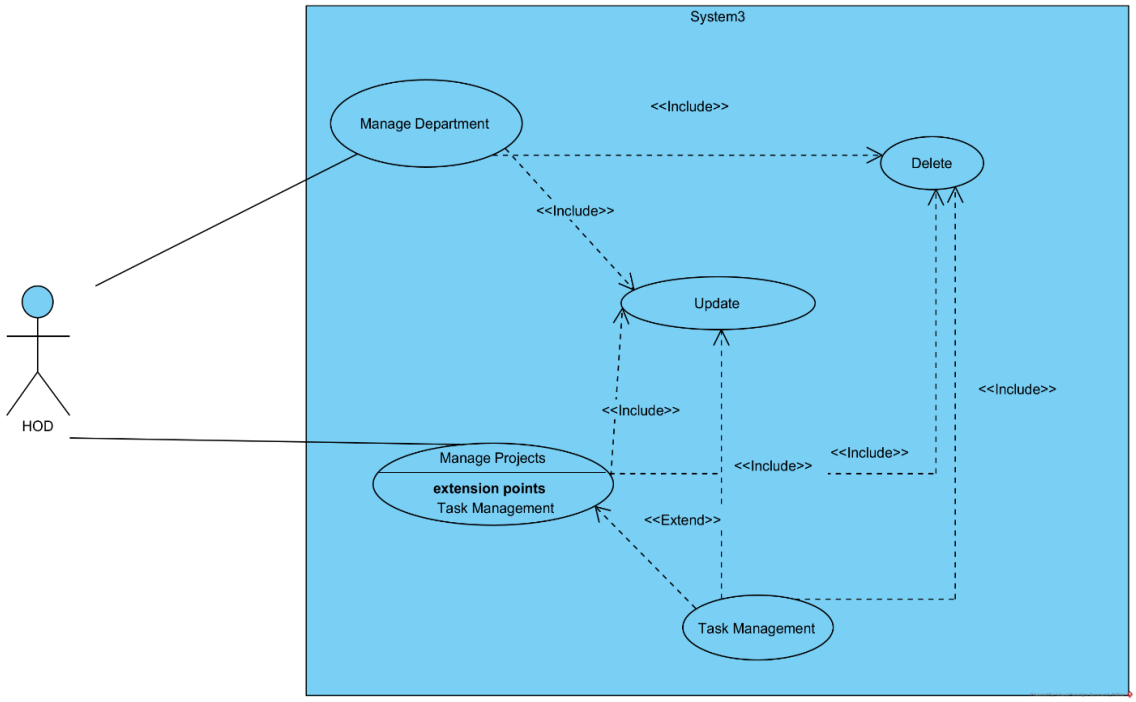


FIGURE 11:HOD USE CASE

v. HR Use Case

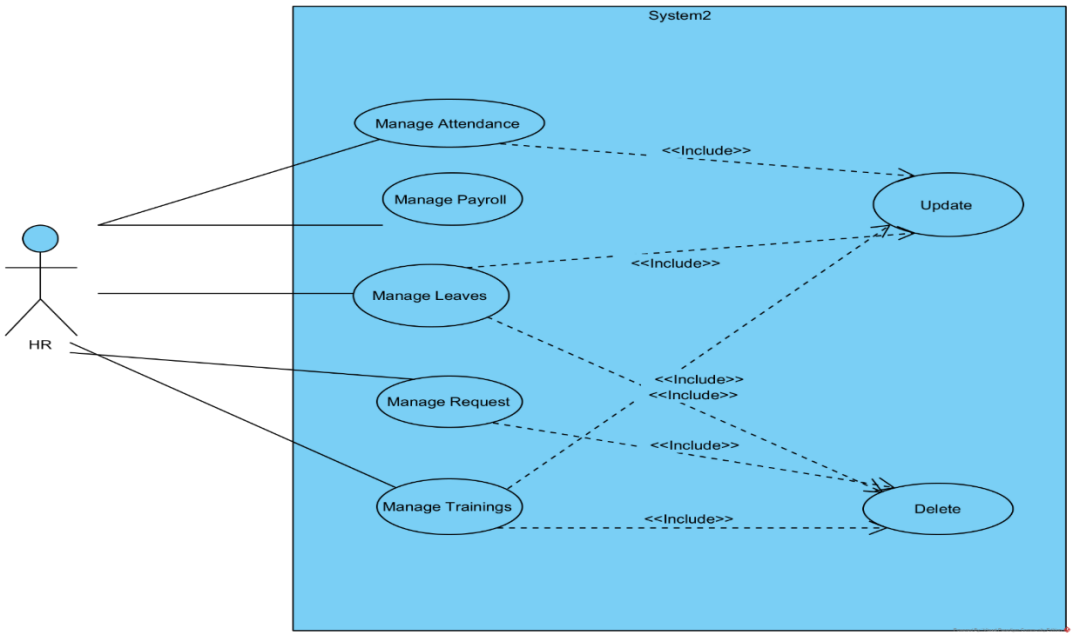


FIGURE 12:HR USE CASE

Actors Description

Actors	Description
Administrator	He is the only actor managing complete all the other actors. He is the actor responsible for the tracking of the efficiency and the productivity of the enterprise He is the actor monitoring all the system
HOD	He is the actor that performs the role of managing the departments and the resources of the enterprise He is the one in charge of monitoring the work of the employees in each department
HR	He is the actor in charge of managing the human resources i.e. He is capable granting permissions, creating training session etc.
Employee	He is the actor in charge of take in part all the operation of the system i.e. He is the employee of the enterprise so he is the one working under the supervision all the others actors

Use Case Description

Use Case Name	Login
Use Case Description	• The user authentify his identity in other to take part in the system • The system verifies and validate the credentials of the users
Actors	All actors
Pre-conditions	No access to the system
Post-conditions	Access to the system according to the role entered
Constraint	Me be an actor of the system
Status	Major

Use Case Name	Manage Report
Use Case Description	• The system creates, updates, read and delete reports written by users
Actors	Administrator, Employee
Pre-conditions	The user must login into the system
Post-conditions	Have a displayed page of all the written report
Constraint	Me be an actor of the system
Status	Major

Use Case Name	Manage Employee
Use Case Description	• The creation of an employee and assign to him a particular role • The modification and suppression of employee details
Actors	Administrator, HOD
Pre-conditions	The user must login into the system
Post-conditions	• Creation of an employee • Assign to him a user role
Constraint	Must have the role administrator
Status	Major

Use Case Name	Track Efficiency
Use Case Description	• The system records the efficiency of each employee according to the work done and the task accomplished
Actors	Administrator
Pre-conditions	The user most login into the system
Post-conditions	Have displayed graphics showing the efficiency of each employee during a particular period of time
Constraint	Must be an Administrator
Status	Major

Use Case Name	Track Productivity
Use Case Description	• The system records the productivity of each employee according to the work done, absence and output produce
Actors	Administrator
Pre-conditions	The user most login into the system
Post-conditions	Have displayed graphics showing the productivity of each employee during a particular period of time
Constraint	Me be an Administrator
Status	Major

Use Case Name	Manage Payroll
Use Case Description	• The system records the salary and payment information of each user base on his efficiency and productivity • Receive notifications about available or newly created payroll
Actors	HR, Employee
Pre-conditions	The user most login into the system
Post-conditions	Have displayed forms showing the salary and payment information of each employee during a particular period of time
Constraint	Me be an Administrator
Status	Major

Use Case Name	Manage projects and tasks
Use Case Description	• The system creates projects and assign tasks to each employee according to the role he occupies in the project • Receive notifications on new created projects and tasks
Actors	HOD, Employee
Pre-conditions	The user most login into the system
Post-conditions	Have displayed information about the projects and task assign and their status or progress
Constraint	Must have the role HOD, Employee
Status	Minor

Use Case Name	Manage Department
Use Case Description	• The creation and of departments and the assignation of employees and their roles in the department • The updating and deleting of department details and roles of each employee
Actors	HOD
Pre-conditions	The user most login into the system
Post-conditions	Have displayed page showing departments and each under its employee
Constraint	Must be an HOD
Status	Minor

Use Case Name	Track Attendances
Use Case Description	• The system tracks the attendances of each employee using his location and time he logged into the system
Actors	HR

Pre-conditions	The user most login into the system
Post-conditions	Have a displayed page showing the attendances of each employee during a particular period of time
Constraint	Must have the role HR
Status	Major

Use Case Name	Manage Attendances
Use Case Description	• The system tracks the attendances of each employee using his location and time he logged into the system
Actors	HR
Pre-conditions	The user most login into the system
Post-conditions	Have a displayed page showing the attendances of each employee during a particular period of time
Constraint	Must have the role HR
Status	Major

Use Case Name	Manage Leaves
Use Case Description	• The system tracks the leaves of each employee according to the number of leaves the employee has requested • The creation of leave request
Actors	HR, Employee
Pre-conditions	The user most login into the system
Post-conditions	Have a displayed page showing the leaves of each employee during a particular period of time
Constraint	Must have the role HR or Employee
Status	Major

Use Case Name	Mange Request
Use Case Description	• The system tracks the requests of each employee according to the number of requests the employee created • The creation of request
Actors	HR, Employee
Pre-conditions	The user most login into the system
Post-conditions	Have a displayed page showing the request of each employee during a particular period of time
Constraint	Must have the role HR or Employee
Status	Major

Use Case Name	Mange Trainings
Use Case Description	• The system creates trainings and assign tasks to each employee according to the role he occupies in the project • Receive notifications on newly created trainings and tasks
Actors	HR, Employee
Pre-conditions	The user most login into the system
Post-conditions	Have a displayed page showing the trainings of employees during a particular period of time
Constraint	Must have the role HR or Employee
Status	Major

CLASS DIAGRAM

The class diagram is the main building block of object-oriented modelling. It is used for general conceptual modelling of the structure of the application, and for detailed modelling translating the models into programming code. Class diagrams can also be used for data modelling. The class diagram is as shown in the figure below

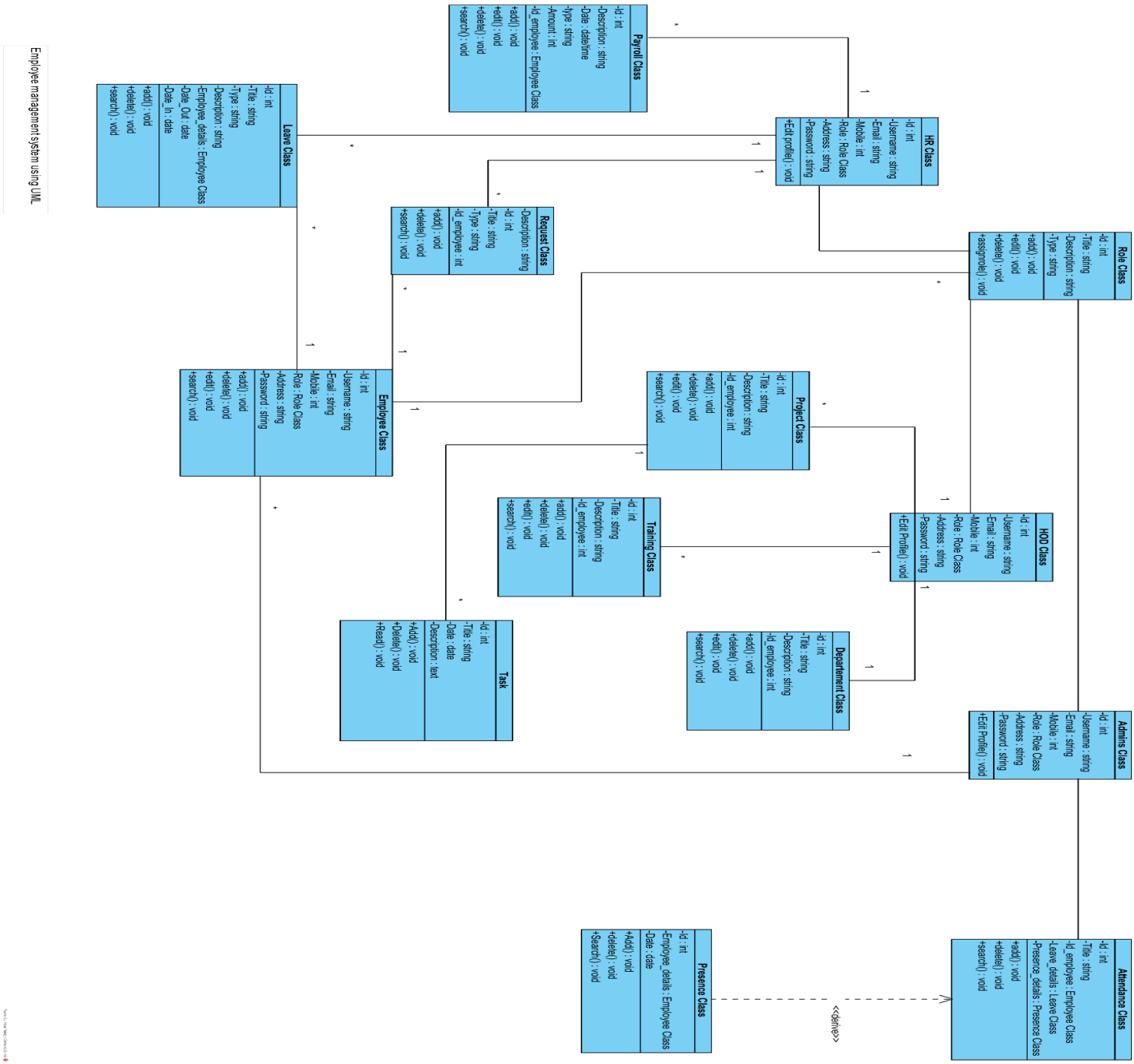


FIGURE 13:CLASS DIAGRAM

SEQUENCE DIAGRAMS

A sequence diagram simply depicts interaction between objects in a sequential order i.e., the order in which these interactions take place. We can also use the terms event diagrams or event scenarios to refer to a sequence diagram. Sequence diagrams describe how and in what order the objects in a system function. Student login sequence diagram is as shown below

i. Login Sequence

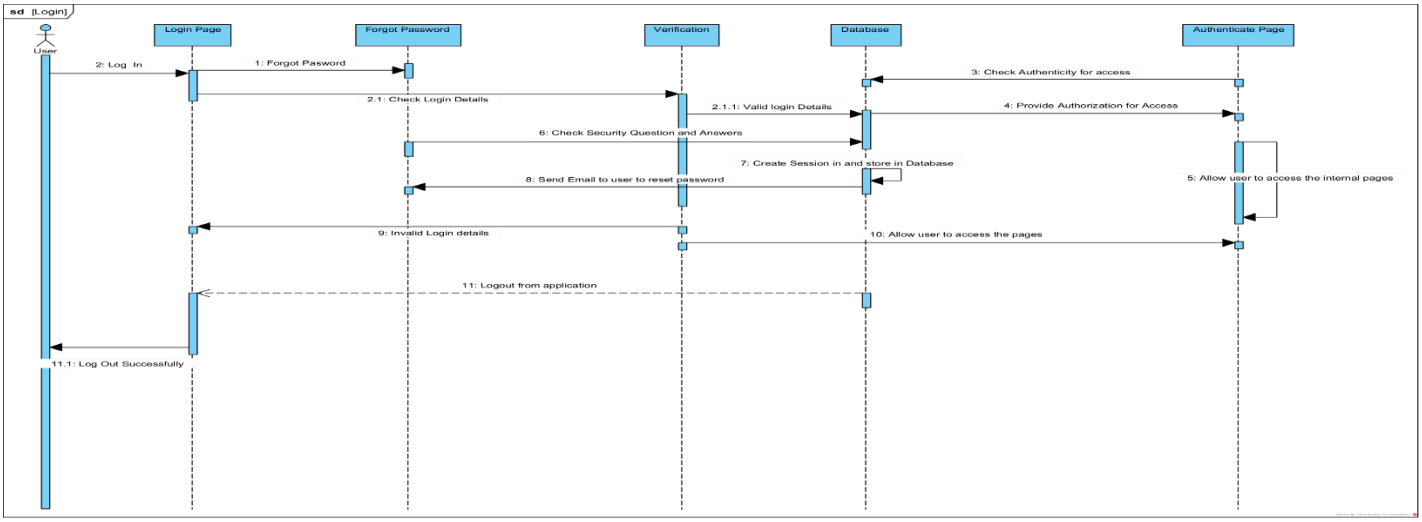


FIGURE 15:LOGIN SEQUENCE DIAGRAM

ii. Track Efficiency Sequence

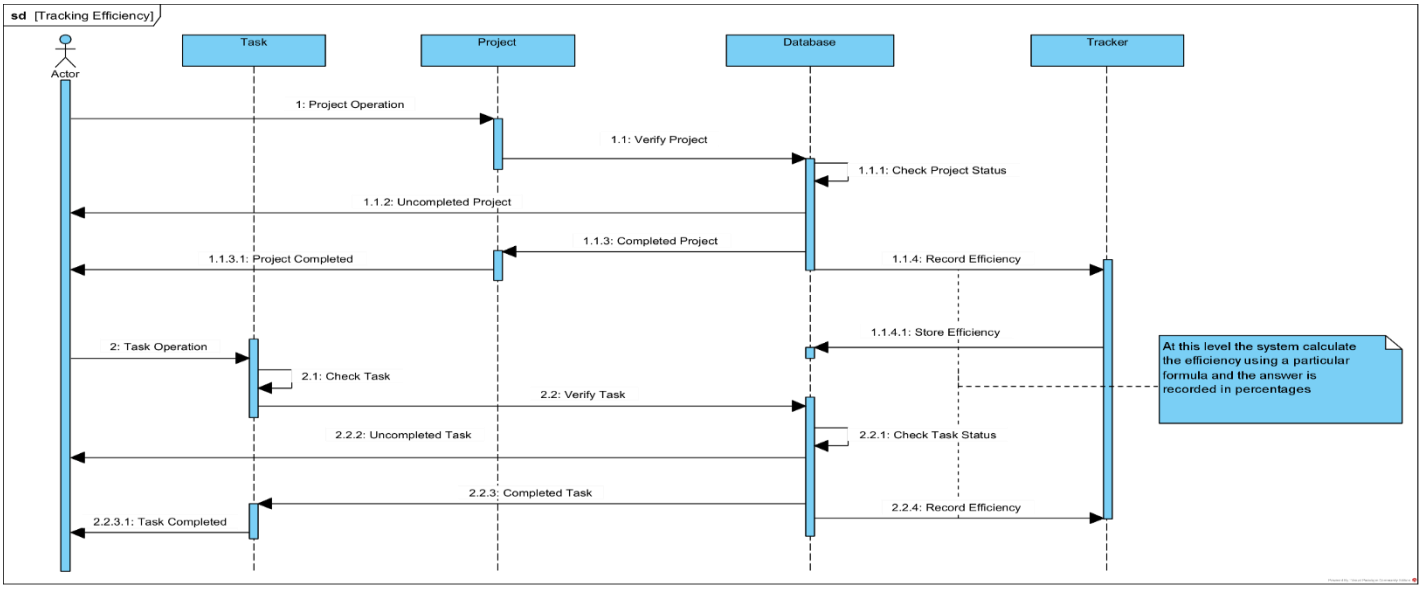


FIGURE 16:TRACK EFFICIENCY SEQUENCE DIAGRAM

iii. Track Productivity Sequence

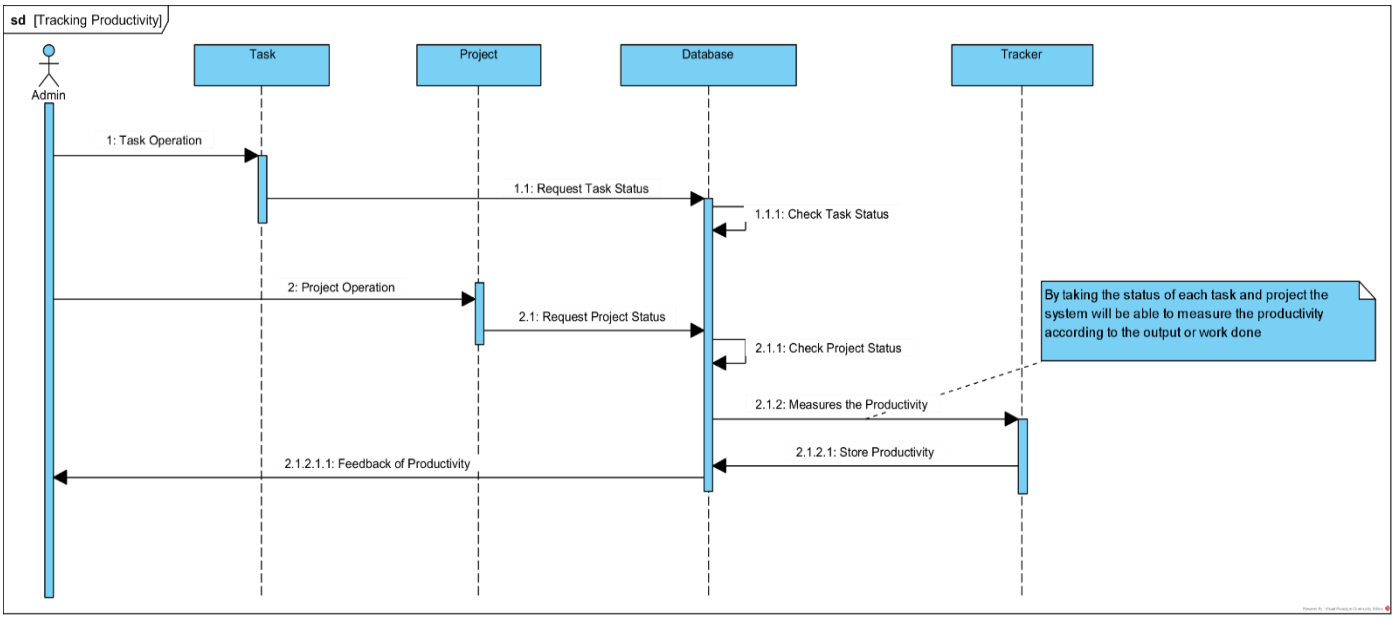


FIGURE 17:TRACK PRODUCTIVITY SEQUENCE DIAGRAM

iv. Payroll Sequence

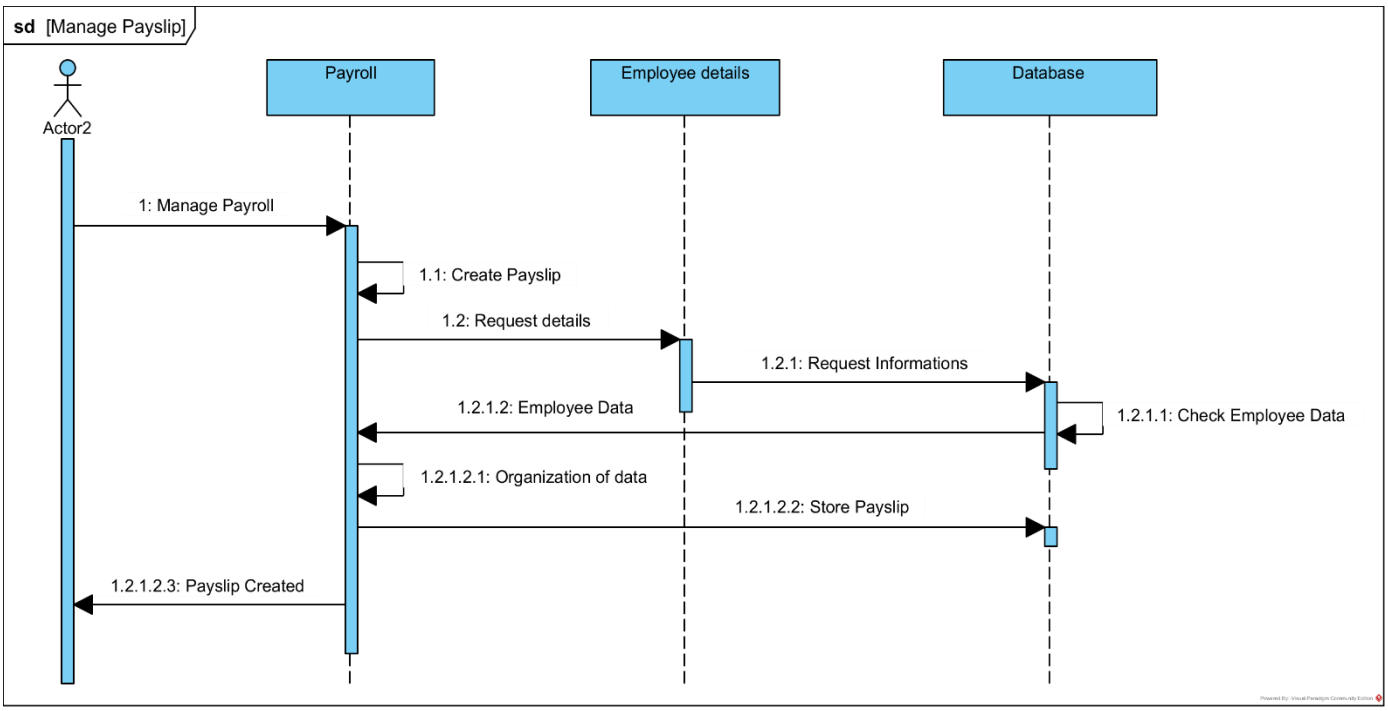


FIGURE 18:PAYROLL SEQUENCE DIAGRAM

ACTIVITY DIAGRAMS

An activity diagram is a behavioural diagram i.e., it depicts the behaviour of a system. An activity diagram portrays the control flow from a start point to a finish point showing the various decision paths that exist while the activity is being executed. The activity diagram is shown below.

i. Tracking Productivity Activity

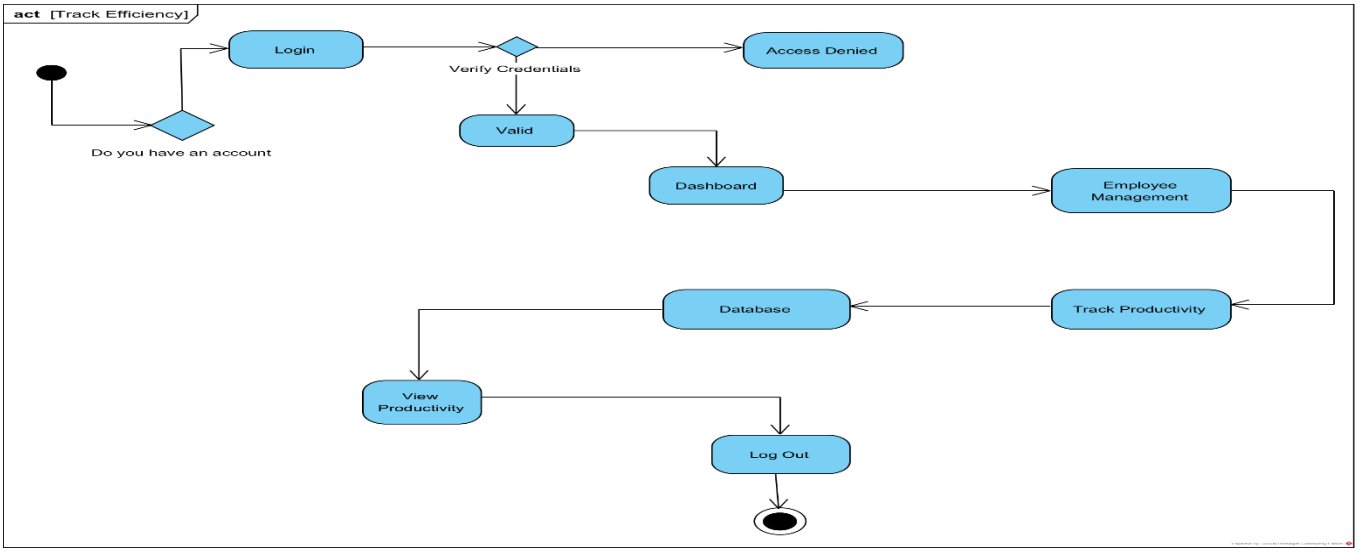


FIGURE 19:TRACK PRODUCTIVITY ACTIVITY DIAGRAM

i. Tracking Efficiency

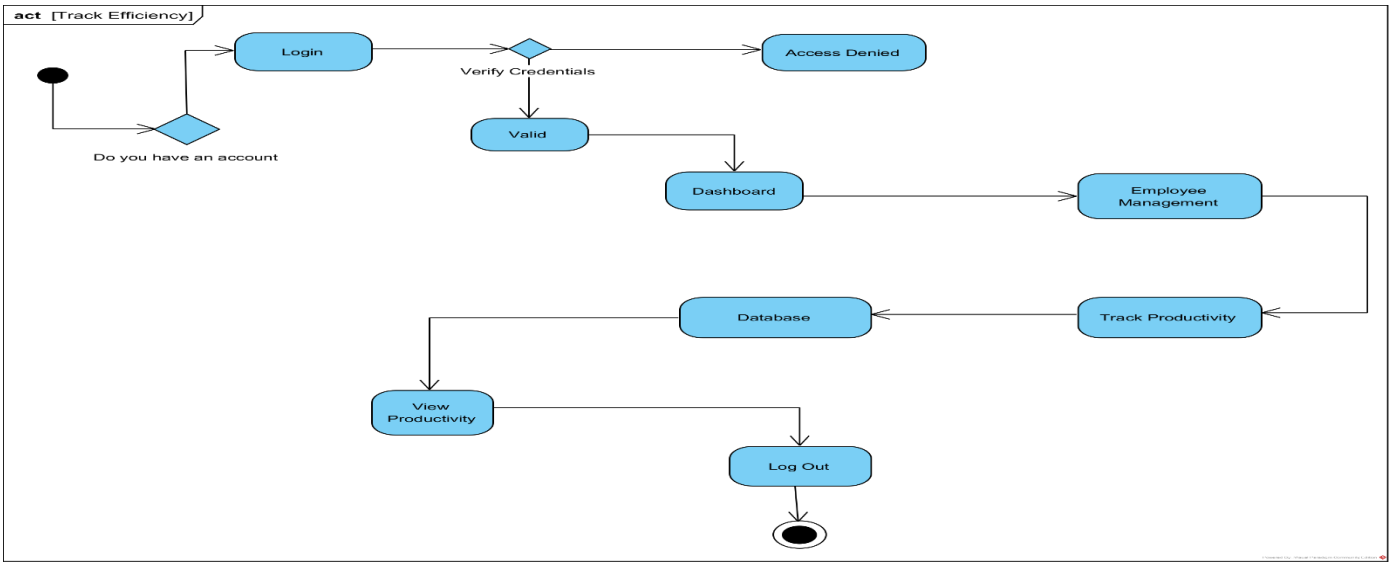


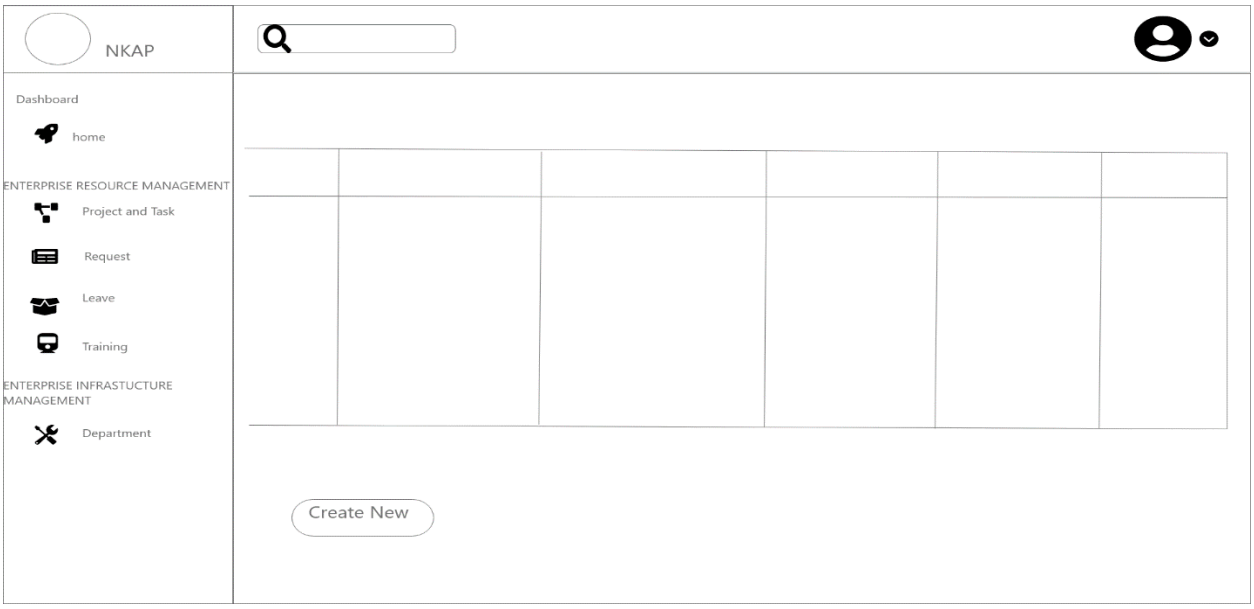
FIGURE 20:TRACK EFFICIENCY ACTIVITY DIAGRAM

INTERFACES DIAGRAMS

WELCOME PAGE

HOME PAGE

IINDEX



DESIGNING PHASE

After the analysis phase, we started designing the application. The designing phase will talk about the hardware and software specifications.

DEVELOPING TOOLS

NKAP SARL web application was develop using web development tools (Symfony, HTML(Twig), CSS, JavaScript) and these tools are used differently to bring out different modifications, styles, designs, animations and beautification of the various web pages.

PROGRAMMING LANGUAGES

PHP

PHP is a general-purpose scripting language geared towards web development. It was originally created by Danish-Canadian programmer Rasmus Lerdorf in 1994. The PHP reference implementation is now produced by The PHP Group. PHP originally stood for Personal Home Page, but it now stands for the recursive initialism PHP: Hypertext Pre-processor.

Symfony

Symfony is a PHP web application framework and a set of reusable PHP components/libraries. It was published as free software on October 18, 2005 and released under the MIT license which respects the MVC Architecture.

Doctrine

Doctrine ORM is an object-relational mapper (ORM) for PHP 7.1+ that provides transparent persistence for PHP objects. It uses the Data Mapper pattern at the heart, aiming for a complete separation of your domain/business logic from the persistence in a relational database management system.

JavaScript

JavaScript is a programming language commonly used in web development. It was originally developed by Netscape as a means to add dynamic and interactive elements to websites. While JavaScript is influenced by Java, the syntax is more similar to C and is based on ECMAScript, a scripting language developed by Sun Microsystems.

JavaScript is a client-side scripting language, which means the source code is processed by the client's web browser rather than on the web server. This means JavaScript can run after a webpage has loaded without communicating with the server. For example, a JavaScript function may check a web form before it is submitted to make sure all the required fields have been filled out. The JavaScript code can produce an error message before any information is actually transmitted to the server.

Bootstrapping

Bootstrap is a giant collection of handy, reusable bits of code written in HTML, CSS, and JavaScript. It’s also a frontend development framework that enables developers and designers to quickly build fully responsive websites. Essentially, Bootstrap saves you from writing lots of CSS code, giving you more time to spend on designing webpages.

Twig

Twig is a modern template engine for PHP Fast: Twig compiles templates down to plain optimized PHP code. Secure: Twig has a sandbox mode to evaluate untrusted template code. Flexible: Twig is powered by a flexible laxer and parser.

SOFTWARES

Web Server

XAMPP is a free and open-source cross-platform web server solution stack package developed by Apache Friends, consisting mainly of the Apache HTTP Server, MariaDB database, and interpreters for scripts written in the PHP and Perl programming languages. Since most actual web server deployments use the same components as XAMPP, it makes transitioning from a local test server to a live server possible.

Modelling

For this system, we used;

- Visual Paradigm for UML to design the UML diagrams
- Adobe XD to design the different interfaces
- Star UML to design the old system

Text Editor

On this web application, the text editor we used was Visual Studio Code. It provides an editor for PHP, HTML, CSS, JavaScript, Symfony and SQL with on-the-fly code analysis, error prevention and automated refactoring.

Web Browser

For this task we decided to use Google Chrome but also used other web browsers like Firefox and UC Browser to test if the style is compatible with them.

Hardware

An HP computer with the following characteristics

- Intel Core I7
- 6GB RAM
- 1TB hard drive
- Processor speed 2.00GHz and 2.60GHz
- Windows 10 Pro (64bit 220H3)

When the planning, analysing and designing phase was done, the next step was to clearly define and document the Software Requirement Specifications (SRS) and get it approved by the supervisor.

TESTING AND MAINTENANCE

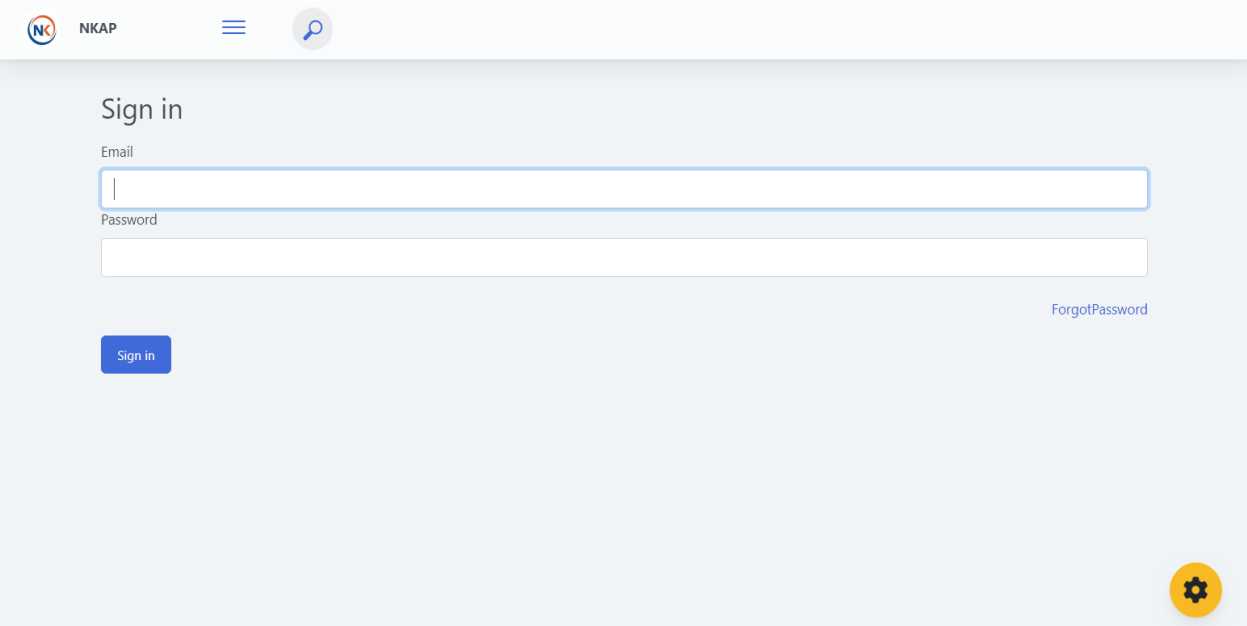
This section consists of presenting and testing the web application with the professional supervisor if it works as we wants it to. If any mistake found, we correct it and test it once more until successful result is attained.

Use case	Input	Actions	Expected Output	Actual Output
Track Efficiency	Project (name, id, date) Database,1,23/03/2022	Check the actual status of the project	Provides information about if the project is terminated or not and gives the efficiency of each employee working on the project	A chart representing the actual progression of the project and the activities of each employee and their completion
Track Productivity	Project (name, id, date) Web design, 1, 11/03/2022 Testing, 2, 12/03/2022	Check the completion of the projects selected base on a particular time frame	Provides information about if the project is terminated or not and provide the actual productivity of each employee working on the project	A chart representing the actual progression of the project and the activities of each employee and their completion base on a particular time frame
Track Productivity	Project (name, id, date) Projet_AK005, 33, 21/05/2023	Check the completion of the projects selected base on a particular time frame	Provides information about if the project is terminated or not and provide the actual productivity of each employee working on the project	The selected project does not exist
Track Efficiency	Project (name, id, date) Project_AK05,001,10/02/2023	Check the actual status of the project	Provides information about if the project is terminated or not and gives the efficiency of each employee working on the project	The selected project does not exist

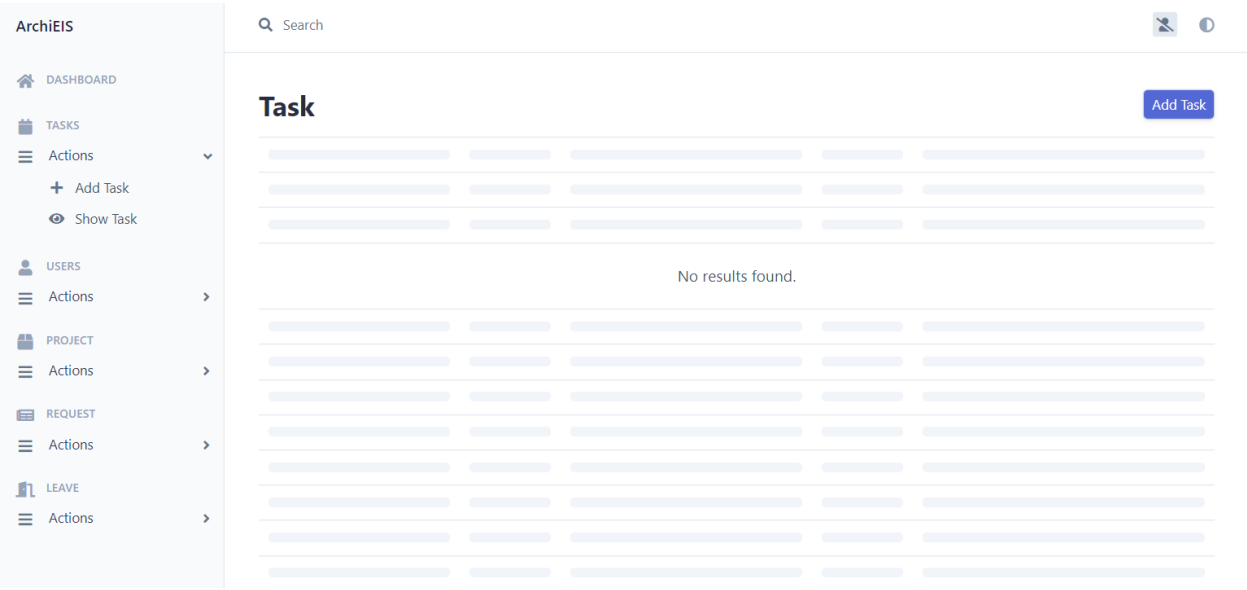
IMPLEMENTATION OF THE SYSTEM

This consist of the implementation part of the web application. It's made up of images of web application after testing and validation by the professional supervisor and the critics and the suggestions.

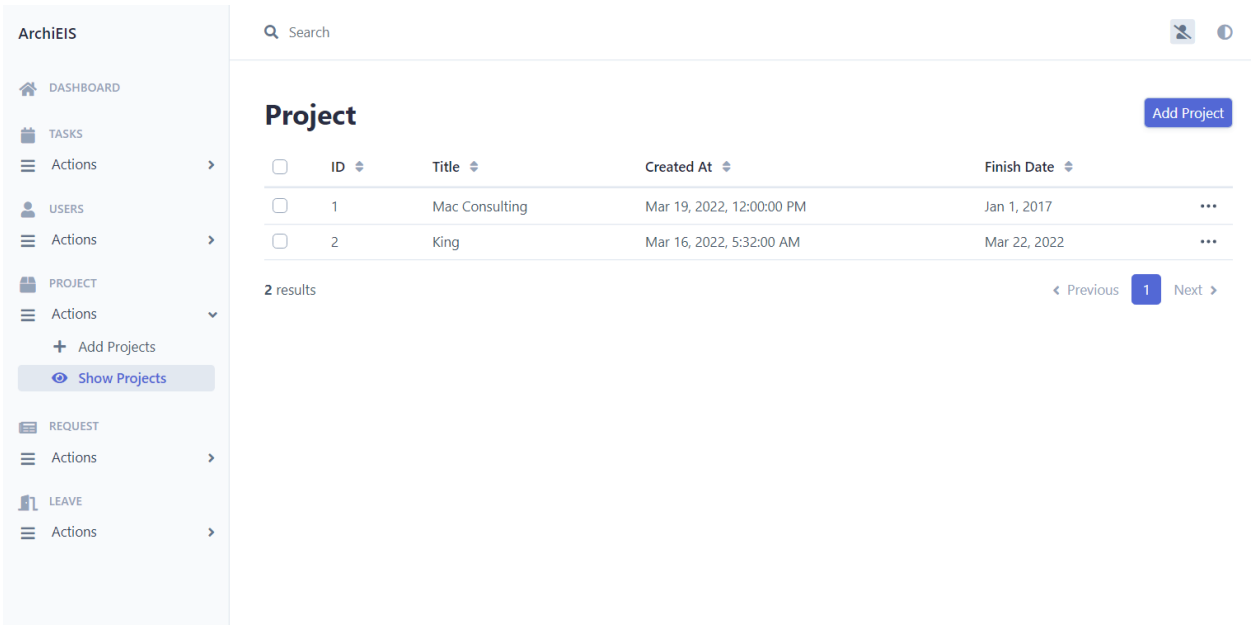
Login Page



Admin Dashboard



Project Index


ArchiEIS
Search
DASHBOARD
TASKS
Actions
USERS
Actions
PROJECT
Actions
Add Projects
Show Projects
REQUEST
Actions
LEAVE
Actions
Project
Add Project
ID
Title
Created At
Finish Date
1
Mac Consulting
Mar 19, 2022, 12:00:00 PM
Jan 1, 2017
2
King
Mar 16, 2022, 5:32:00 AM
Mar 22, 2022
2 results
Previous
1
Next

GENERAL CONCLUSION

In this project, the development of the Enterprise Information System was to facilitate the management of the enterprise. The system is a low-cost, simple, user-friendly system and calculations are done within few seconds. The system contains multi-features for the effective management of the company's I learned a lot from developing this project, research done from the internet increased my skills and abilities as a Software developer especially in developing databases and program designing.

Finally, my internship at NKAP SARL was very constructive and enriching because one thing led me to learn many other things. I honed my solution-construction aptitudes which is a must-have skill in the job environments today. I learnt many things in software engineering especially on web development that helped me to come out with the ENTERPRISE INFORMATION SYSTEM. In conclusion the internship was very good.

PERSPECTIVES

As technology keeps on developing and new requirements come up every day, our work cannot be said to be complete. The work we have done meets the requirements and objectives set at the beginning of the internship. However, it can still evolve and be improved.

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