



Adama Science and Technology University
School of Electrical Engineering and Computing

A master's Project on
Web Based Micro and Small Enterprise Information System for Adama
Micro and Small Enterprises Development Bureau

Submitted in Partial Fulfilment of the Requirements of the Degree
of

M.Sc. in Technical Teachers Education in Information Technology
Management

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Declaration

We hereby declare that the project entitled in web based micro and small enterprises information system for Adama MSE development bureau is submitted in partial fulfillment of the requirement for the award of the MSc degree in Technical Teacher Education in Information Technology Management, Adama Science and Technology University, is a record of our own work carried out by us in the academic year of 2015 under the supervision and guidance of Ato Amanuel Zewge , and co-advisor Ato Belay kahsay, Department of Computing, School of Electrical Engineering and computing. The extent and sources of information are derived from the existing system of the MSE development bureau and literature review. The matter embodied in this work is original and has not been submitted for the award of any other degree, either in this or any other University.

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Abstract

Web based small and micro enterprise information system for Adama micro and small enterprises development bureau is a web based system that enable them to manage micro and small enterprises. Specifically our project try to solve the problem of existing system that use flat file format and manual system and we proposed new system for managing enterprises. The project has aimed to analyze the current working environment and design the new system.

To develop the new system we interview the manager of the bureau about the day to day activities, we use document analysis and observation to gather different facts about the existing system. We follow object oriented software engineering methodology to solve the existing problem and UML diagram used for structuring the system. In this work, PHP was used as programming language that is server side scripting language and CSS, HTML were used for the style and layout respectively. To store records, this system uses MySQL as a database.

At the end, the web based MSE information system is developed. The system enables employees to handle the required information related to enterprises and also enables enterprises to view current information on the site, manage their employees and their financial information. The system is accessible by authorized user only and data can be retrieved easily. Thus, it will help to solve current problems that are being faced by the bureau and enterprises. Its usage will reduce human data entry error found in manual system and speed up the performance of responding time over the manual work. And finally we collect feedback from users about the functionalities of the system and it is important for the users to speed up their day to day activity.

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List of abbreviation and acronyms

Admin	-	Administrator
CSS	-	Cascading Style Sheet
GUI	-	Graphical User Interface
GUI	-	Graphical user interface
HR	-	Human Recourse
HTML	-	Hyper Text Markup Language
HTTP	-	Hyper Text Transfer Protocol
ICT	-	Information communication Technology
IS	-	Information System
IT	-	Information Technology
MSE	-	Micro and Small Enterprise
MSME	-	Micro, Small and Medium Enterprises
MySQL	-	Microsoft Structured Query Language
OMT	-	Object Modeling Technique
PHP	-	Hypertext preprocessor
RAD	-	Requirements Analysis Document
RDBMS	-	Relational Database Management System
SDD	-	System Design Document
UML	-	Unified Modeling Language
UPS	-	Uninterruptible Power Supply
URL	-	Uniform Resource Locator

CHAPTER ONE

Introduction

As the technology is improving from time to time, this is not possible to stay without the use of Information Technology which is an important factor for making fast, reliable, cost effective and flexible and good communication. Changes in Information Technology and web based application system and information handling become very important and critical for any organization which allows them to utilize databases and web applications. Thus, most organizations switch to the online-based system because of its affectivity to acquire process, store and retrieve information from the Internet. Now a day's new technologies become a driving force for managing small and micro enterprises and more new promises introduce new working environment for organizational performance among those new technologies web based MSE management system is the one.

Web based MSE information system is the one which makes accessing of information online and needs sufficient information handling and one of the changes that came about is the online-based applications. These applications improved the traditional manual processing systems. That is why we initiated to develop web based MSEs information system to solve existing problems of the sector. Despite the recognition of the significances of MSEs, however, availability of reliable and timely data on the sectors' involvement has been inadequate. There is no computerized as well as online system that used to manage these enterprises to provide the needed information to stakeholders. The bureau uses manual data handling and processing system that is difficult to manage and to search information of enterprises. The availability of up-to-date data would improve the understanding of the employees of the MSE development bureau and minimizes the obstacles that hold back. Nowadays, MSE information system become more difficult with manual system as the number of enterprises in the city increases from time to time and as some of the enterprises drop out from the system because of many reasons. So, it requires up-to-date information about enterprises. And also it requires fast and efficient working environment to achieve the required goal of the organization. As a result, more information needs to be recorded, and more perspectives need to be considered.

In this project the team organized to develop such a system to solve the existing problems of MSE development bureau and enterprises.

1.1. Statement of the problem

MSEs in Adama city is government strategy to solve unemployment in the city and focuses on laying the ground for the transformation of the economy from agriculture to industry. Currently, all activities of MSE management process are performed manually (paper based) and flat file system. In the current manual system, it is very difficult to find the enterprise record and other information because it has been keep on the paper and it is easy to loss. The employees faces difficulty to manage enterprise data manually due to time to time incremental of MSEs in the city. They uses printed paper and sometimes they use handwriting papers to record and maintains their records and put it in file cabinet, however it is not possible to share the data from multiple system in multi user environment, to search data quickly, to give proper decision, to prepare reliable report to the stakeholders etc., the data is lost by different reason, a lot of duplicate work, and chance of mistake and face physical damage of files due to dust, moisture etc. When the records are changed they need to update each and every Excel or Word file one by one. There is no option to find and print previous saved records if it is updated with mistake. There is no security that is anybody can access and delete, update sensitive and confidential data. Data is manually collected and processed to produce any report this is lack of accuracy and time consuming because data is collected from various records on paper. To update the enterprises information and to prepare required report to stakeholders each employee needs to go each kebele to now the current status of enterprises like the current employee number, the current capital etc.

1.2. Objectives of the Project

1.2.1. General Objective:

To design and develop a web-based MSE information system for Adama city MSE development Bureau that creates easy relationship between enterprises and bureau.

1.2.2. Specific objectives

- To critically analyze the current working environment.
- To identify information requirements in the existing system of the bureau and enterprises
- To gather functional requirements to develop the new system

- To design a new system that will provide easy way to manage enterprises.
- To design and develop database that record day to day activities that manage MSE data
- To determine appropriate security and control measures

1.3.Scope and Limitations of the Project

1.3.1.Scope of the project

Even though, MSE bureau has numerous roles, it is very difficult to cover all activities in our project due to shortage of time and cost. So our web based application project primarily focused on capacity building, enterprise support and facilitate department activities such as the record available enterprises in the city by categorizing on their appropriate sector and subsector and store on database and retrieve as required, identify technologies that innovated by the enterprises, record support given such as training, record experience shares, post different announcements and promotions, news that are important for enterprises, record auditing status of enterprises, and on the enterprises side enterprises can register and update their capital and their employees etc. Developing the database and web based application that record enterprises day to day activity which allows enterprises to get information about the current activities of the bureau, produce reports for enterprises, easy to provide common information online to each enterprises, developing user-friendly system both for employee and user, and provide different user privilege to secure access system.

1.3.2. Limitation of the project

- Due to time, cost and other constraints the system do not encompass the following:
 - The system is not included the whole departments of MSE system like, loan process of micro finance.
 - Do not include staff management system like payroll, attendance, and leave clearance system of staffs of the bureau.
 - The new system also do not include the activities of once service center of each kebele found in Adama city but register organized enterprises.
- While developing the project we faced some difficulties such as
 - Time constraint: there was extremely shortage of time in implementation of this project. Better result will be achieved if the project period is extended.

- Language conversion: all Adama MSE bureau documents and forms are in Oromiffa language so we face language translation problems.
- Resource constraint: Lack of enough document that describes the organizational structure and describe about the flow of data within the organization, document related to literature review. The managers and other responsible persons in the organization was busy for interviewing.

1.4. Significance of the Project

The project will be significant for the MSE development bureau, enterprises, team and others for the following reasons:-

- ✚ Assist the team member to face real world problem rather than theoretical awareness.
- ✚ Provide fast and reliable retrieval of enterprise information
- ✚ Create comfortable working atmosphere for MSE employees and administrators
- ✚ The interface will be simple, easy to understand and use so enterprises, employees and other visitors use the system without difficulty.
- ✚ Easy file management such as recording, updating and deleting enterprise information
- ✚ Enable bureau employees to provide fast service for their customer, save time and Cost, manage and maintain enterprise data quickly, generate report when required and keep the bureau to the required standard.
- ✚ Enterprises can get fast service from the bureau and they get up-to-date information on the site in trouble freeway.
- ✚ Enables data sharing: Sharing of data for better communication.
- ✚ Ensure data accuracy: human being may create mistake while processing data but if make it online, once it is loaded in appropriate manner there is no mistake creation and provide warning for in appropriate input of data to the database and when delete and update data from the database.
- ✚ Minimize manual data entry: MSE bureau handle large amounts of information and huge volume of records.
- ✚ Minimum time needed for the various processing: Quick and timely information availability about different enterprises.
- ✚ Greater efficiency: Creation and maintenance of databases on MSE records and digital form for sharing by all the stakeholders in the system is therefore very essential in order to effectively meet the challenges of managing, easily search and

finding enterprise information from the database, minimize human error, reduce cost and time.

✚ Economical: Reduces wastage of copier ink, man power and paper

1.5. Methodology

For the successful completion of this project, a number of data gathering, analysis and design and programming tools and techniques are put into use.

1.5.1. Requirements Gathering

The data collection instruments used to gather accurate information about the existing system and the requirements for the new system. In our project, we use two of data gathering methods. They are: Primary data collection and Secondary data collection.

1.5.1.1. Primary data collection

In primary data collection, we collect the data by the following methods i.e. interviews the responsible person of the organization and by observation.

1.5.1.2. Secondary data collection

From secondary data collection method, we use document analysis that found in the organization and use internet to know different facts about the MSE.

1.5.2. Requirement structuring tools

In order to analyze the requirements, UML is used. In this project development UML is helped to model the exact activities of the new system, to help understand very well how the system will work and to present a list of tasks to the user. It is a language for visualizing, specifying, constructing and documenting. UML allows us to develop several different types of visual diagrams that represent various aspects of the system using Visio 2003 such as use case diagram, activity diagram, sequence diagram, class diagram etc.

1.5.3. System Analysis and Design Methodology

The software process model used for this project is an Object-Oriented Software Engineering, software design technique that is used in object oriented programming and it consists of requirements, an analysis, design, implementation and testing model. We use Object oriented software engineering to develop high quality systems and easily to break down the system into its various objects. And it used for the project because it is more acceptable due to the following advantage:

- Increased Extensibility.

- Increased Reusability.
- Improved Quality.
- Lesser maintenance cost
- Less complexity
- Increased chance of project success

For successful implementation, a well-organized and systematic approach is crucial. Therefore, several methodologies were developed to encourage the systematic approach to planning, analysis, design, testing and implementation. Methodologies offer various tools and techniques to assist in analysis, design and testing in terms of detailed design of software, data flowcharts and database design. We choose the Suitable Methodologies which is called waterfall that manage better when segmented into phases. It follows a linear structure starting from requirement analysis phase, through design phase, implementation testing phase.

1.5.4. System Development Tools

The system Development tool contains both hardware and software which is used to develop the proposed system in proper ways. We use the following tools:

- ❖ **Database Management:** We use MySQL database as back end for our system.
- ❖ **PHP:** Hypertext Preprocessor, is an open source and cross platform which is used as Server side web scripting language we use to design our project.
- ❖ **HTML:** used as client side coding
- ❖ **CSS:** CSS is cascading style sheet used for designing the pages.
- ❖ **JavaScript:** JavaScript permit some client side programming like dynamic user interaction.
- ❖ **Macromedia Dreamweaver:** use as web editor tool which provide visual editing environment with helpful tools to enhance web creation experience.
- ❖ **Web browser:** To develop this project we use web browser such as fire fox, Internet Explorer and opera mini for searching different documents and to view the output the web project.
- ❖ **Webserver:** We use XAMPP as development environment which includes Apache web server, MySQL database that supports PHP and because of its compatibility with different platforms.

❖ **Application software:** Microsoft Office Word 2013 was used to type the project documentation. We use Microsoft Visio were used to design different diagrams needed for project Microsoft power point for presentation.

❖ **Laptop or desktop computer:** we need such computer to develop the project.

1.6. Feasibility Study

Feasibility study is a test of the project according to its workability, impact of the project to the MSE, ability to meet needs and effective use of the resources, reasonable time measure or schedule, cost effectiveness and meeting user's requirement of proposed system.

1.6.1. Technical Feasibility

Technical feasibility is the measure of practical of specific technical solution or the availability of technical resource and expertise. Because of the following reasons, the new system is technically feasible. The technical needs of the system may include:

During implementation every employee of the organization will be given appropriate training to suit their specific needs and how to use the new system to solve the existing problem. The teams have skill required to properly apply the technology. We select PHP, HTML, and CSS, JavaScript as front end and we selected MySQL server as the backend

1.6.2. Operational Feasibility

The new system is operationally feasible as it very easy for the end users to operate it. It only needs basic information technology skill about Windows platform and how to use computer. The project will be operationally feasible.

- Any authorized user can operate the system
- Operational performed by system is user friendly.
- Easy and navigate the pages.

1.6.3. Economic Feasibility

Economic feasibility concerns cost benefit analysis. In this we weight the cost and the benefits associated with the new system and if it suits the basic purpose of the MSE bureau. This project does not require enormous amount of money to be developed. This can be done economically if planned judicially. The projects reduces costs of printing different manuals and forms and minimize defect and reworking the costing that fund for developing this project it is economically feasible

1.7. Project schedule

Project planning is very important to make sure that the new web based system development activities of this project are on following schedule. The Gantt charts show the work planning for this project development. The chart is prepared using the Microsoft Project 2007 software.

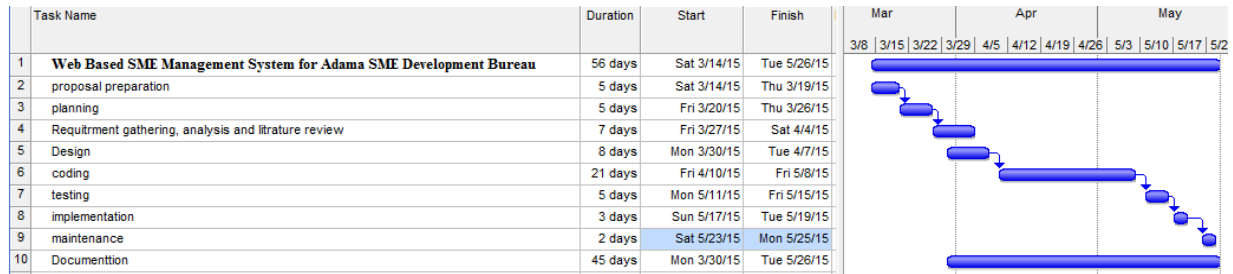


Figure 1.1 time schedule for the project

1.8. Budget of the project

To complete this project we use materials and service budget like print service, training, typing, telephone and transportation, binding etc. And different stationary like paper, external storage devices such as flash disk, CD and DVD and other expenses.

Table 1.1 budget summary of the project

No	Description	Total expense	Remark
1	Equipment and stationary	3790.00	
2	Service	4700.00	
Total		8490.00	

1.9. Organization of the document

This project document contains seven chapters including this chapter which mainly focuses on introduction. Chapter two describes review of related literature. Chapter three describes requirement analysis which includes the current system, the proposed system, functional and nonfunctional requirements. Chapter four describes about design of the project which include design goals using different analysis and techniques, software and hardware mapping with deployment diagram, subsystem decomposition, access control and security, persistent data management etc. Chapter five shows implementation and result include method used, sample input output screen shots and result. Chapter six shows test plan include, test plan overview, features to be tested/not to be tested, approach,

testing materials (hardware/software requirements), test case specification, test case specification identifier, test items, input specifications, output specifications, environmental needs, special procedural requirements, inter case dependencies and finally chapter seven describes about conclusion and recommendation.

CHAPTER TWO

Review of Related Literature

2.1. Theoretical Background

2.1.1. MSE development

MSE is one of the institutions given recognition in the country's industry development plan and is the fact that it serves as vehicles for employment opportunities at urban center and as it underpin the economic development. Thus they should be given prior attention as they are important and serve for sustainable source of job opportunities to our country. They will also be the major productive forces in the manufacturing sectors when our effort towards the country's renaissance is over [6].

2.1.2. Definition of MSE

The formal definition varies from country to country. To this end, different countries and writers in MSEs' define it in different ways. Micro and small enterprises in one country may be small or medium enterprises in the other country. That; is depends on the stage of economic development of the country. The MSE definition is generally consisted of three basic criteria as to other countries experience. These are: Full timer employed manpower, total asset, net asset and paid capital, and annual turnover and they use these criteria independently or in combination. Ethiopia defines MSEs based on the size of the capital and number of labor [6]. According to [11] the working definition of MSEs is based on capital and labor. According to this strategy the small and micro enterprise growth stage in micro enterprises has three stages as startup, growth and maturity. In small enterprises it also has four stages of growth which is startup, growth, maturity and emerging medium.

It is difficult to draw similar experience in the development of modern data handling and management of MSEs across the country. Regions of the country have different contexts with regard to their social traditions and culture. Therefore, bringing a holistic picture of MSE management system is more difficult. However, the success of MSEs largely depends on a number of factors including data and record keeping, financial and skill to proceed with in the business. They usually face a number of challenges including lack of up-to-date information about creativity, availability and use of IT and other new technology for the effectiveness of the enterprises.

2.2. Related Literature

Information is a basic requirement for enterprise creation, growth and survival, and that information and communication technologies (ICTs) are capable of easing information gaps. Unfortunately, little is known about the information-search process and the institutions governing information flow in the MSE sector, the implementation of socially equitable ICT projects and perceptions of entrepreneurs about the ICTs [8]. This study is guided by the question: Is information a problem in Kenya's micro and small enterprise (MSE) sector? If so, what are the prospects that ICT could be applied to empower the MSE's by easing the information bottlenecks? Thus, the objective of the study is to identify the information delivery channels and information gaps in the sector and examine the institutional and social structures governing information flow. In addition, it will identify the information needs and main impediments to information flow. The study also shed some light on how networks and local level institutions complement the information search process and assess the perceptions of entrepreneurs about ICT. A major weakness of most ICT projects targeting MSE's is the assumption that the sector should be provided with technology, information, and knowledge. This underlies the assumption that entrepreneurs in the sector don't produce knowledge and information. In reality, entrepreneurs in MSE's produce information [8]. With the growth in ICT's, there is increasing concern that marginalized sectors need to keep pace with the associated technological, organizational and human resource imperatives. While this concern is justified, MSEs can take advantage of new technologies if the enterprises are supported to access prerequisite "capital stock". This includes the stock of telecommunications equipment; the stock of computers and computer related inputs; and the stock of related human skills [8]. According to this study inaccessibility or poor accessibility of MSEs to infrastructure is one of the key impediments to information flow, competitiveness and growth in the sector. The poor access of these enterprises to crucial infrastructure implies that the MSE's have to spend much time, effort and resources in receiving and relaying information to customers, suppliers and colleagues and supportive IT programs are crucial in the MSE sector to mitigate the high costs of equipment, complex regulatory environment and poor managerial capacity.

1.2.1. ICT adaptation on organizational performance

Despite the potential benefits of ICT, there is debate about whether and how their adoption improves organizational performance. While many studies point to the possibility of market expansion as a major benefit for MSEs. Moreover, it is not easy for MSEs to implement and operate an on-line system, as this involves complementary costs for training and organizational changes as well as direct costs of investing in hardware and software solutions. While many studies provide evidence of the positive effects of ICT adoption on firm performance, others have shown no relation between computer use and firm performance. A study of Canadian manufacturing establishments (plants) with ten or more employees (excluding food processing establishments) drawn from Statistics Canada's Business Register, shows that those with high productivity growth are more likely to be using greater numbers of advanced ICTs [13]. Between 1988 and 1997, advanced technology users grew more in terms of both productivity and profitability than non-ICT users, especially when they used communication technologies, including company-wide and/or inter-company computer networks. At organization level, ICT and its applications can make communication within the firm faster and make the management of the firm's resources more efficient. Seamless transfer of information through shared electronic files and networked computers increases the efficiency of business processes such as documentation, data processing and web based system allow organizations to store, share and use their acquired information. For example, customer databases with a history of client-specific correspondence help managers and employees to respond more effectively to customers [5].

1.2.2. ICT use for better internal communications and organization management

In MSEs, there is often insufficient sharing of information between managers and employees and among employees in part because the personnel's daily routine tends to be extremely busy. To improve a firm's responsiveness to customers, client feedback and information on employees' professional experience, such as know-how for winning a contract, can be electronically stored and thus available to be shared within the company. Some MSEs have exploited ICT effectively to improve internal communications and have improved their reputation through swift responses to customers' complaints and an ability to capture clients' (hidden) needs [14].

communication among employees and reduce co-ordination costs it also helps to provide an effective means of organizational productivity and service delivery, improve decision making and reduce operational inefficiency. ICT brings about customer satisfaction by improving service quality thereby offering new opportunities for companies. The study has emphasized that the implementation and effective use of ICT in organizations brings about competitive advantage. Accurate, rapid and relevant information are considered to be essential for MSE it also need effective information systems [9] to support and to deliver information to the different users. Such information systems would include those technology that support decision making, provide effective interface between users and computer technology and provide information for the managers on the day-to-day operations of the enterprises.

1.2.3. Design and Development of web based application

Creating a quality Web-based instruction project is not the same as simply just publishing information online or creating an informational Web site. Instead, you need pay more attention to the entire IS/IT systems architecture; you need to know what exactly the company does require for now; you need build a perfect project plan with good quality. According to [10], the following initial steps need to be considered, such as:

- Articulate goals and objectives.
- Select the instructional approach.
- Create a site flowchart and determine global navigation.
- Test and review and revise with project team and partners.

1.3.Related Studies

Many researchers in the past have studied many issues relating to MSEs which focuses on MSE's management and application of IS/IT in MSEs. In Australia web based applications were developed but different issues were faced during development such as developers failing to fully understand user requirement and failing accurately specify changing requirement [11]. On the other way in Odisha, department of MSMEs facilitates promotes and enhances competitiveness of MSMEs in the state by implementing web sites. Users can find information related to MSME schemes and projects, services, entrepreneurship etc. In addition guidelines for industrial policies are also available on their corporate web site. In this site the developer divide the enterprises in their sector and departments such as tourism which is responsible for promotion of culture and tourism of

the state and the users can get information about different destinations, festivals etc. Department of industries provide information to stakeholders by using the web application site the industrial opportunities, industry promotion and users can get detail about registered micro, small and medium enterprises and also provides information about products reserved by the sector. In addition the enterprises can send feedback to the department. Users can select type of feedback, report and query. Users should fill details such as name, email and description. Users can get detailed information on the Directorate of handicrafts and cottage industries of Odisha. Information is provided on handicrafts, salt industry and village industry, award winners and crafts etc. In this web based site other visitors can get MSME Development Policy of the state.

In the above findings users of the system are beneficiaries that can easily communicate on line but it has many limitations like it is not include all sectors and sub sectors. The system also have limitation on the information of enterprises and the functionality of the system is used as web site rather than web application that serves specifically for enterprises rather it is community wide and in the site there is no facility to manage the information system of the sector. Our system is web application that is better to manage the information system of the bureau by improving data handling of the organization and enterprises can get and provide information on line and it is functional for enterprise side and bureau.

Summery and remark

In Ethiopia there are many organizations that use web based applications such as banks, hospitals, universities etc. Industries that are developing may take advantage of IT which are being recognized by many previous studies. In fact, there is a need to accelerate the implementation of IT to improve the organization performance of that we have selected in terms of data handling, delivering up-to-date information. By using different studies that described above, as base and by analyzing existing working environment of the organization and enterprises we develop web based MSE management system for Adama MSE development bureau with the objective of designing and developing web based information system. That currently performs their activities in manual form and they need computerized web based system to reduce the manual work and to improve the efficiency of the organization on performance in terms of service quality, information handling and share etc. because there is no any computerized system that used previously in the bureau

CHAPTER THREE

Requirement Analysis

3.1. Introduction

This chapter deals with analyzing the purpose, activities and function of the existing system and about the requirement analysis which includes fact finding about the current system, activities of new system, It produces a broad outline of the proposed system that identifies the function to be performed and the technical aspects that the system must fulfill and briefly describe the existing system functionality, problem of the existing system. It also deals with the functional and non- functional requirements of the proposed system. In this phase, the analyst must become full aware of the root problems and must develop enough knowledge about the existing system to enable an effective solution to be proposed. The first activity is assembling of the formal requirement for the proposed system. The second activity is logical modeling that allows the analysis to view the current system by focusing on *what is does instead of how it does*. It also describes the system completely from the actors' point of view and serves as the basis of communication between the client and the developers.

3.2. The Current system

Within the organization data is flow circularly to each department of the organization and to perform each activity, information plays a leading role. One data is input for one department and output to the other and the head of the organization offers support based on the organizational rules and procedures and coordinate and manage each department in the organization and each department prepare and submit report to the head as required. The current flow of information with in MSE development bureau is indicated in the figure 3.1.

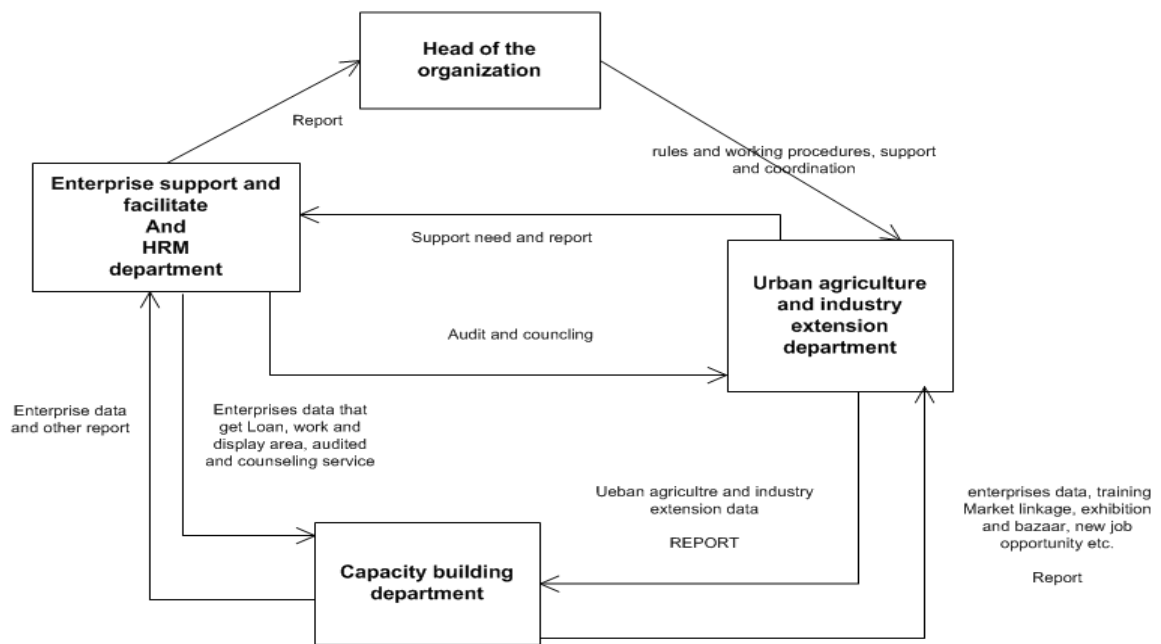


Figure 3.1 current flow of information in the organization

Problem of existing system

Information of input and output: Inaccurate capture of data which is handled in a way that is not efficient for retrieval or processing purpose due to creating error during data recording and Output of inaccuracy in updating important information because of manual processing, inconsistent result obtained from existing system. Less flow of information among several employees of bureau and lack of accurate and up to date information and therefore right decision could not be taken at the right time.

Stored data: the same information is stored in many copies repeatedly in different forms which leads to data redundancy, most files are printed documents which placed on shelves that occupy a lot of physical space.

Manual handling of data is expensive as compared to online system. In general, cost in terms of time is very high, as the number of enterprises increases, the existing manual system will incur cost to handle those requirements

Control: High probability of losing important enterprise documents due to manual system, data is highly exposed to unauthorized access and update and data is stored in different places, it leads to data loss and inconsistency

Time wastage: Employees waste time due to manual data processing of, data entry, report generation, preparation of different forms, communication between employees and lack of file sharing

Material wastage: The organization wastes many materials especially concerning stationery materials, shelves and file cabinets.

3.3. The Proposed system

3.3.1. Overview

The general overview of our proposed system is designed an information system to address the problems of the existing manual system of MSE information system. The aim of this project is to develop a system of improved efficiency and the system provides proper security and reduces the manual work and eliminates problems that exist in existing system. The proposed system overcome problems and limitations in the existing system and reduce paper work. The system will help the user to reduce the workload and mental conflict. The system also helps them to work user friendly and perform their job easily without time wastage. A successful implementation of this System will improve the efficiency of the organization and will help to ensure that enterprise records are managed properly.

3.3.2. Functional requirements

The functional requirements focus on the main functions that the new system will provide. It states *what the system should do* rather than *how it is done*. The major functional requirements of our proposed system are the following:

- The system should manage enterprises data
- The system should manage employee data
- The system should manage sectors and sub-sectors information of enterprises
- The system should manage announcements, promotion and other information related to enterprises
- The system should generate report about MSEs
- The system should allow the administrator to control the site and make necessary changes
- The system should also manage technology innovate by enterprises.
- The system should manage comment of enterprises
- The system should manage the training and experience shared data.
- The system should manage audit information of enterprises.

- The system should manage departments and position (roles) of employees
- The system should provide easy way to view different announcements like exhibition and bazar time, training days, new technology to be transfer, new market linkage for their products and services, about new job opportunities, job vacancies and promotions.
- The system should manage employees of enterprises and their capital.
- The system should manage financial information i.e. income and outcome of enterprises.

3.3.3 Non-functional requirements

The non-functional requirements describe user visible aspects of the system that are not directly related to the functional behavior of the system and focus on the quality of the application systems needed to be developed from different evaluations point of view. Nonfunctional requirements also are defined at the same time as functional requirements are, because they have as much impact on the development and cost of the system. The non-functional requirements of our proposed system includes:-

3.3.3.1. User interface and human factors

The system interface that will be developed must be interactive and easily understandable. And a navigation button that is easily understandable by the user. If users enter invalid inputs to the system, the system will warn the user about the problem. By using the user interface the user easily interact with the system and can enter and watch the output with in a specific time. This system provide easy user interface for the users and the user of this system are expected to have basic skill how to operate a personal computer.

3.3.3.2. Documentation

At each stage of this project all the relevant information's are properly documented and at the completion of the project, every activity in the development process will be documented for future reference, easily access and maintenance of the system at the end of the documentation will include User Manual and Executable file.

3.3.3.3 Performance characteristics

Throughput: the system should be capable of accomplishing requests (queries) quickly that should manage users' requests within a short period of time (high response time).

3.3.3.4 Error handling mechanism and extreme conditions

In our system we use message to handle errors such as run time errors. If user make a mistake when the program runs display information about the errors by using message box. For example if user insert incorrect password the message says “Please Insert the correct Password”. It used to inform the user made a mistake then the user retype the password. And when the user of the system enters invalid username and password for three trial, the system locks login form and the user unable to enter to the system.

3.3.3.5. Quality issues

- ◆ Availability: The system is available for any valid users of the system, as long as the internet connection is available. Therefore, any valid user can access the system whenever he/she likes.
- ◆ Compatibility: is a very important to the software. The software will work in all operating System environments.
- ◆ Robustness: Providing error handling methods enable the user to confirm that details are correct before creation, deletion or modification. The system shall validate data entry and prompt the user when the invalid data is entered. Data validations have been included in the system in almost every area where there is a possibility for the user to commit errors. The system will not accept invalid data. Whenever an invalid data is entered, the system immediately tells the user and the user has to again re-enter in the data and the system will accept the data only if it is correct.

3.3.3.6. System modifications

Whenever modification necessary, the system should support such process because this system is easily modifiable to meet change requirements, correcting errors, changes to the organizational structure and adapt the change of technology and environment. The system is expected to perform well by integrating with enterprise information and programmers can make any modification at any time.

3.3.3.7 Physical environment

This system will be deployed in the organization where there is a network infrastructure with internet connection. The data center should be air conditioned and free of any interferences.

3.3.3.8. Security issues

The system is protected with authentication and authorization security mechanism. Any user who wants to login to the system must have a user name and password to make the system secured from unauthorized access. To handle this, users are required to give their unique user name together with their password at login. It is always important to ensure that only valid data is entered and only valid operations are performed on the system. Access control of data requires user authentication and user authorization. The following commands specify access control identifies and they are typically used to authorize and authenticate the user. Only administrator makes any changes.

Username: The user identification is required to the server for access to its file system. This command will normally be the first command transmitted by the user after the control connections are made.

Password: The command must be immediately preceded by the user name command, and, for some sites complete the user's identification for access control. Since password information is quite sensitive, it is desirable in general to "mask" it or suppress type out. In case of any problem, in order not to lose our reliability, we should better be using a backup server. We may use a firewall to keep our data secure and to prevent unauthorized access to our system.

Once all nonfunctional requirements are identified and described, they are prioritized by importance. Although most nonfunctional requirements are highly desirable, some of them need to be met in order for the system to operate correctly

3.4. Analysis Activities

Analysis is the detailed study of the various operation performed to the system and their relationship to outside the system. The key question is *what must be done* to solve the problem. During analysis data are collected on the available files, decision points etc.

3.4.1. UML Diagrams

UML is a notation that resulted from the unification of OMT (Object Modeling Technique, UML has also been influenced by other object-oriented notations. UML has been designed for a broad range of applications like:

- ✚ **Functional model:** represent in UML with use case diagrams that describes the functionality of the system from the user's point of view.

✚ **The object model:** represent in UML with class diagram describes the structure of the system in terms of object, attribute, operations and associations.

✚ **The dynamic model:** represented in UML with sequence diagram, state chart diagram, activity diagram which describes the internal behavior of the system.

3.4.2. Use case model

Use case model is a model how users interact with the system to solve problems and describe a goal of a user, interaction between user, system and the required behavior of the system in satisfying the goal. The use case model consists of a number of elements that are use case, actor and relationship between them.

3.4.2.1. Actor Identification

Actors are external factors that interact with the system to exchange information such as users of the system. An actor initiates the system activity, a use case, for the purpose of completing some task. We use the following criteria to find actors: Who is using the system; who affects the system; where does then system get information; who install the system; who obtain information from this system and the like. Based on these criteria the following actors are identified.

Administrator, data clerk, HR manager, training facilitator, job opportunity researcher, auditor and entrepreneur.

Table.3.1. actor description

Actors	Description/ role
1. Administrator	He/she manage and control the system such us manage records, change username and generate report and make any change of a system.
2. Data clerk	Register new enterprises, sectors and sub sectors, technologies etc.
3. HR manager	Manage MSE bureau employees and can add new employee, search update and view employee information register departments.
4. Training facilitator	Prepare training schedule and record training taken, record experience sharing, view comment.
5. Job opportunity researcher	Facilitate market linkage and post new job opportunity, promotion, news, announcements etc.
6. Auditor	Checks the enterprises financial status whether audited or not, search and update audit data, generate report.
7. Entrepreneur	Entrepreneur can view announcement, send comment, register their employees and their financial information etc.

3.4.2.2. System Use Case Diagram

Use cases are used during requirements elicitation and analysis to represent the functionality of the system. Use cases focus on the behavior of the system from an external point of view. A use case describes a function provided by the system that yields a visible result for an actor. The identification of actors and use cases results in the definition of the boundary of the system that is, in differentiating the tasks accomplished by the system and the tasks accomplished by its environment. The actors are outside the boundary of the system, whereas the use cases are inside the boundary of the system.

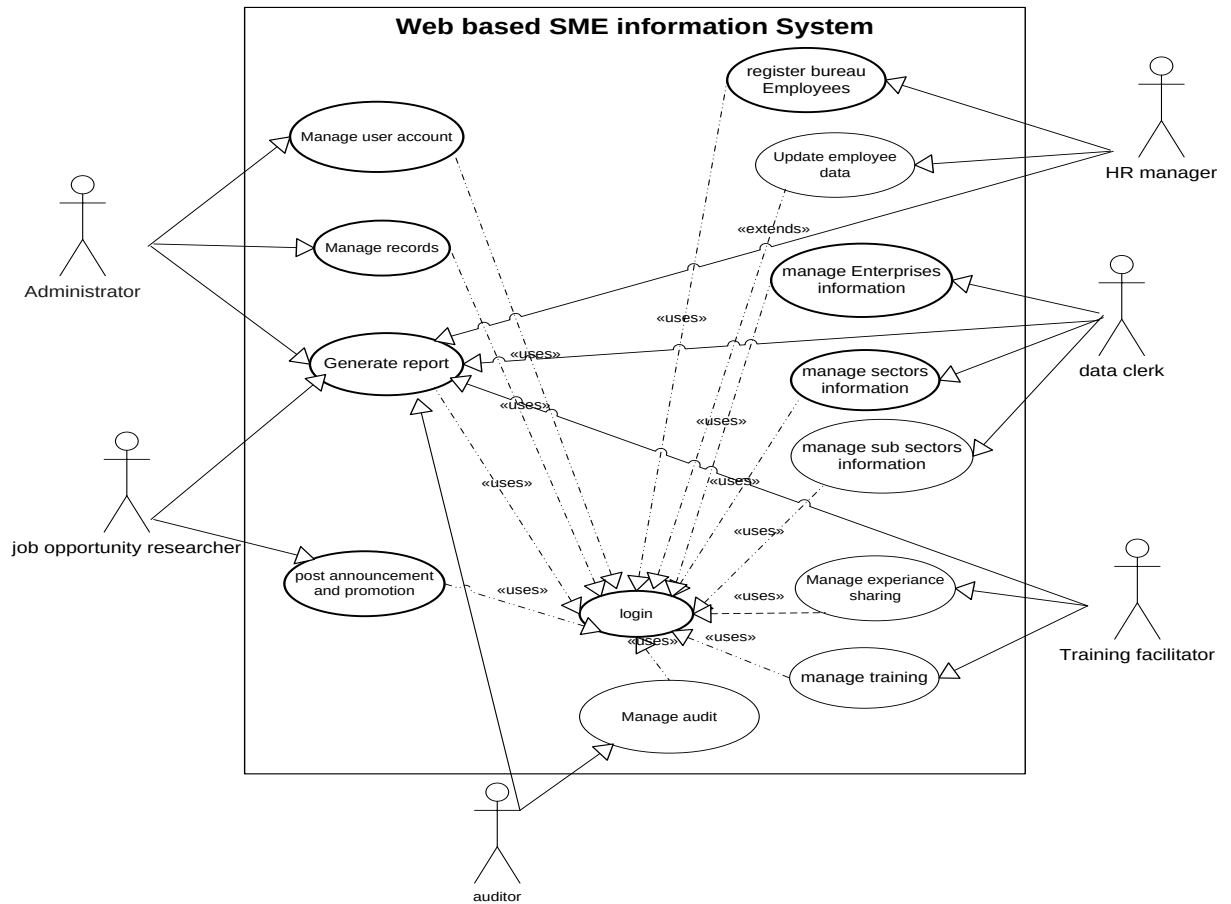


Figure. 3.2. Use case diagram

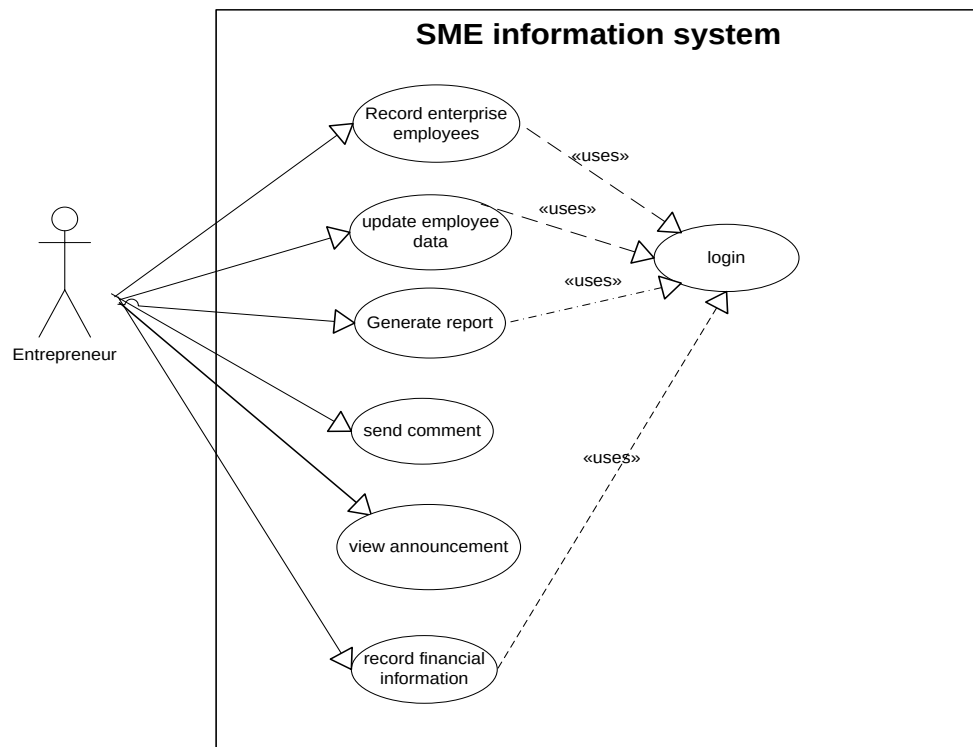


Figure. 3.3. Use case diagram for entrepreneur

3.4.2.3. Use case description of a system

1. Use case description for :Login

Table 3.2. Login use case description

Use case name	Login
Participant	Administrator, Entrepreneur, data clerk, training facilitator, HR manager, auditor
Description	When Administrator, Entrepreneur, data clerk, training facilitator, HR manager, auditor and job opportunity researcher wants to enter to the system.
Include	Change password, sign out
Entry condition	The actor must have user name and password
Precondition	The actor must type URL of the MSE
Flow of information	1. The actor enter in to home page 2. The actors fills the fields that is username and password and on login page and select the appropriate radio button(MSE bureau or enterprise as needed) 3. The system checks and validates the login information. 4. The system displays their homepage. Alternate course A: The entered username and/or password are not correct. A.3 The system determines the invalidity of username and/or password A.4 The system informs the actor to reenter username and/or password A.5 The user resumes at step 3 of basic course of action up to three trial.
Post condition	The users logs in to their home page

2. Use case description record bureau employees

Table 3.3 Use case description record bureau employee

Use case name	Record bureau employees
Actor	HR manager
Include	update and search record
Precondition	The HR manager login to the system
Flow of information	1. The HR manager click on register new employee page 2. The system displays employee registration form 3. The actor fill the fields of registration form 4. The system validate the entry 5. The actor click on submit to save on database Alternate course A: Entry for some field values are not correct A.4. The system determines the invalidity of fields A.5 The system informs the actor to reenter the valid entry A.6 The user resumes at step 4 of basic course of action.
Post condition	Employees successfully registered in to the database

3. Use case description for :create account

Table 3.4. Use case description to Create Account

Use case name	Create user account
Participate actor	HR manager, administrator
Precondition	The actor must successfully login to the system
Description	The actor can create account for users of the system
Flow of events	1. Up on successful login the actor click on new employee registration button 2. The system displays forms 3. The actor fills the fields 4. The system validates the entry 5. The system automatically create user account 6. End use case Alternate course A: Entry for some field values are not correct A.4 The system determines the invalidity of fields A.5 The system informs the actor to reenter the valid entry A.6 The user resumes at step 4 of basic course of action
Post condition	User account created user gets user name and password and the system allows to change their password

4. Use case description for : Record enterprises

Table 3.5. Use case description to record enterprises

Use case name	Register enterprise/user
Participant actor	Data clerk
Description	The Data clerk get the enterprise information and register in to the system
Include	Delete, update, view
Precondition	The Data clerks must successfully login to the system
Flow of information	<i>Basic action</i> 1. the actor click on register button and select enterprise registration option 2. The system displays the new enterprise registration form 3. The Data clerk fill the required fields and click on save/submit button. 4. The system validate the data entered 5. The new enterprise save to the database <i>Alternative course of A:</i> if the entered data is not correct to register new enterprises A.4 The system displays the invalidity of the data entered A.5 The system displays to reenter valid input A.6 The user resumes at step 4 of basic action
Post condition	The enterprise register successfully

5. Use case description for :record sectors

Table 3.6 Use case description for: record sectors

Use case name	Register sectors
Actor	Data clerk
Include	Delete, update
Precondition	Data clerk logs into the system
Flow of information	1. The data clerk click on register button 2. The data clerk click on register new sector option 3. The system displays sector registration form 4. The actor fill the fields of registration form 5. The system validate the entry 6. If enter valid entry click on submit to save on database <i>Alternate course A: If data is entered incorrectly to register sectors</i> A.5 The system determines the invalidity of fields A.6 The system informs the actor to reenter the valid entry A.7 The user resumes at step 5 of basic course of action.
Post condition	Sector successfully registered in to the database

6. Use case description for : record subsectors

Table 3.7 Use case description to record subsectors

Use case name	Record sub sectors
Actor	Data clerk
Include	Update
Precondition	1. The actor should login successfully.
Flow of information	2. The data clerk click on register button and select register sub sector option 3. The system displays sub sector registration form 4. The actor fill the fields of registration form 5. The system validate the entry 6. click on submit to save on database <i>Alternate course A:</i> If data is entered incorrectly to register sub sectors A.5 The system determines the invalidity of fields A.6 The system informs the actor to reenter the valid entry A.7 The user resumes at step 5 of basic course of action.
Post condition	Sub sector successfully registered in to the database

7. Use case description for :post announcements

Table 3.8. Use case description to post announcements

Use case name	Post announcements
Actor	job opportunity researcher
Description	Hot information can be added and the unwanted one can be deleted and updated as required.
Precondition	1. The actor login to the system successfully
Flow of information	2. The actor click on post announcement page 3. the actor select appropriate option 4. The system display registration form 5. The actor fill the fields 6. The system validate the input 7. The system saves to the database <i>Alternate course A: If data is entered incorrectly</i> A.6 The system determines the invalidity of fields A.7 The system informs the actor to reenter the valid entry A.8 The user resumes at step 6 of basic course of action.
Post condition:	New announcements posted and save to the database

8. Use case description for :view announcements

Table 3.9. Use case description to view announcements

Use case name:	View announcements on line
Actor	Entrepreneur, training facilitator, administrator, auditor, data clerk
Description:	The department, employees and enterprise members and employees can get available new information from the announcements page
Precondition:	Actors type URL of the system
Information flow	1. The system display the home page 2. the actor click “announcements” on homepage 3. The system display the information from the database table 4. Use case end
Post condition	The actors can view new information online

9. Use case description for :generate report

Table 3.10. Use case description to generate report

Use case Name:	Generate report
Actor	Administrator, HR manager, data clerk, entrepreneur, auditor, job opportunity researcher, training facilitator
Description.	Generate a report specified
Precondition:	The actors must successfully login to the system
Information flow	1. The administrator select report submenu on admin homepage. 2. The system display report option 3. The administrator selects report 4. The system display report 5. The actor print/ saves the report Alternative course of action. If there is no information A.3 the system display “report not available” on the database
Post condition	Report save and/ or print if necessary

10. Use case description for view comment

Table3.11. Use case description to view comment

Use case name:	View comment
Actors:	administrator
Description:	The entrepreneurs can send their comment about service quality or complain that must be fulfilled.
Precondition:	The actor must login successfully
Information flow:	1. Up on successful login, the actor click comment button from admin page 2. The actor can view comment
Post condition	The actor view comment

11. Use case description for prepare training schedule

Table 3.12 Use case description for prepare training schedule

Use case name:	Prepare training schedule
Actors:	Training facilitator
Include:	Record training taken, view training list, view participant of training, view experience sharing
Description:	Register training given, to be given and when and where the training will conduct and how long it is taken and for how many male and female participants taken.
Precondition:	The actor successfully login to the system
Information flow:	basic action for training schedule 1. The actor click on record new training button 2. The system displays the registration form 3. The actor fill the forms, 4. The system validate the entry 5. The actor click on submit button to save on database Alternative course of action: if the actor not enter valid entry A.4 The system determines the invalidity of each field A.5 The system informs the user to reenter fields A. 6 The user resumes at step 4 of basic action.
Post condition:	training schedule register to the database

12. Use case description for Record enterprise employees

Table 3.13. Use case description for Record enterprise employees

Use case name	Record enterprise employees
Actor	Entrepreneur
Description	Enterprises have their own employees, they can register them by login on their page
Precondition	The Entrepreneur login to the system
Include	update, view
Flow of information	1. Up on successful login, the actor click on register new employee page 2. The system displays employee registration form 3. The actor fill the fields of registration form 4. The system validate the entry 5. submit to save on database Alternate course A: The registration of new employee are not correct. A.4 The system determines the invalidity of fields A.5 The system informs the actor to reenter the valid entry A.6 The user resumes at step 4 of basic course of action.
Post condition	Enterprise employees successfully registered in to the database

13. Use case description for send comment

Table 3.14. Use case description for send comment

Use case name	Send comment
Actor	Entrepreneur
Description	The enterprise can send comment to the bureau
Precondition	The entrepreneur enter to home page to the system
Flow of information	1. Up on successful login the actor click comment page 2. The system displays comment registration form 3. The actor fill the fields of comment registration form 4. The system validate the entry 5. Submit to save on database Alternate course A: The registration of comment are not correct. A.4 The system determines the invalidity of fields A.5 The system informs the actor to reenter the valid entry A.6 The user resumes at step 4 of basic course of action.
Post condition	Entrepreneur successfully send comment to the database

14. Use case description for Record finance information

Table 3.15 record finance information

Use case name	Record finance information
Actor	Entrepreneur
Include	update, record income and outcome, view
Description	The Entrepreneur register daily income and outcome of enterprises and they can change their password, view update and delete entry
Precondition	The entrepreneur login to the system
Flow of information	1. Up on successful log in, the actor click on income or outcome registration page 2. The system displays registration form 3. The actor fill the fields of registration form 4. The system validate the entry 5. submit to save on database Alternate course A: The entered data are not correct A.4 The system determines the invalidity of fields A.5 The system informs the actor to reenter the valid entry A.6 The user resumes at step 4 of basic course of action.
Post condition	Financial information saved to the database

3.4.2.4. Scenarios

Scenarios are concrete examples of the future system in use. Developers use these scenarios to communicate with the user and deepen their understanding of the application domain.

Scenario is a concrete, focused, informal description of a single feature of the system from the viewpoint of a single actor. They are useful to validate use cases and in checking the design of a system.

Use-Case: Logon

Precondition: Before Logon to the system the user must have a user account.

Scenario:

1. If the user has account of the system before, they are login successfully.
2. If the user has no an account before, they are not login successfully.
3. If the user use bad username and/ or password to login
4. The user must try only for three trial
5. The user selects appropriate option that is as SME bureau user or as enterprise user to login

Post condition: The user will login to the system and perform what permitted to them according to user privilege.

Description:

Scenario 1:

1. The user opens the system write URL on browser.
2. The system starts at home page
3. The user inserts username and password to login.
4. Then click on login button.
5. The system checks if the user is authorized.
6. The user enters to their home page.

Scenario 2:

1. The user opens the system write URL on browser.
2. The system starts at home page
3. The user inserts username and password to login.
4. Then click on login button
5. The system tells the username or/and password that the user inserts is not correct.
6. The system forces the user to insert the username and password for three trials.
7. After three trial the user cannot enter and the system locks the login form

Use Case: Enterprise registration

Precondition:

1. The data clerk write the URL on browser.
2. The data clerk enter to home page and login to the system
3. The data clerk must register new enterprises to the database

Purpose: Scenario that describes the use case of new enterprise registration

Individual: data clerk

Scenario:

1. The enterprises are registered correctly
2. The registration process fails

Post condition: The data clerk register new enterprises

Description:

Scenario 1:

1. The data clerk select enterprise management page on the main menu.
2. The system displays the option to select
3. The data clerk selects new enterprise registration option
4. The data clerk register the new enterprises to the database
5. The system displays registration success message

Scenario 2:

1. The data clerk select enterprise management on the main menu.
2. The system displays the option to select
3. The data clerk select new enterprise registration option
4. The data clerk register enterprises
5. If the registered enterprise is already exist on database the system the system displays message that it already exist.

3.5. Class diagrams

We use class diagrams to describe the structure of the system. Classes are abstractions that specify the common structure and behavior of a set of objects. Objects are instances of

classes that are created, modified, and destroyed during the execution of the system. Objects have state that includes the values of its attributes and its relationships with other objects. Class diagrams describe the system in terms of objects, classes, attributes, operations, and their associations.

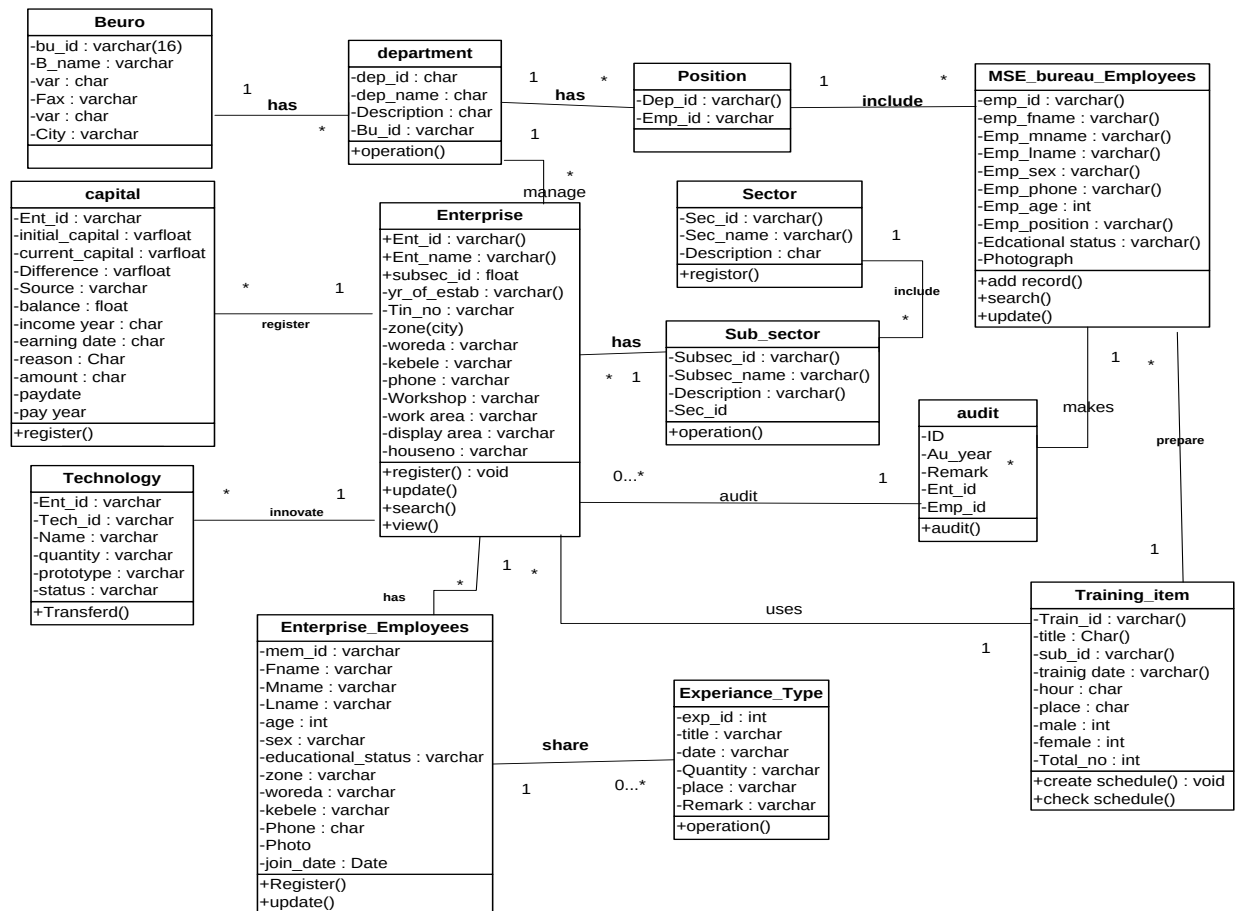


Figure 3.4. Class diagram

3.6. Sequence diagram

Sequence diagrams are used to model the logic of usage scenarios or the description of the potential way the system is used. Sequence diagrams are a great way to validate and flesh out

the logic of use case scenarios and flow of data with respect of a system and to document the design of the system.

Sequence diagrams use to formalize the behavior of the system and visualize the communication among objects. It also represent the interaction that take place among these objects.

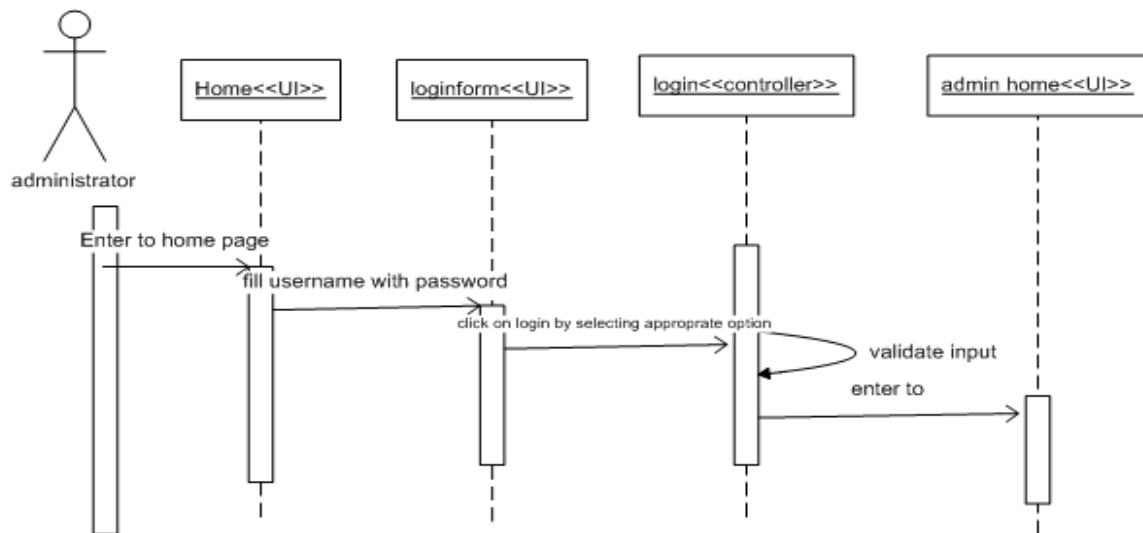


Figure 3.5. Login for administrator sequence diagram for basic course of action

Description of sequence diagram for administrator login basic course of action

1. The actor enters home page of the site
2. The actor fill username with password on the login form
3. The actor selects appropriate radio button whether MSE bureau or enterprise
4. The system validate the entry
5. The actor enters to the administrator home page

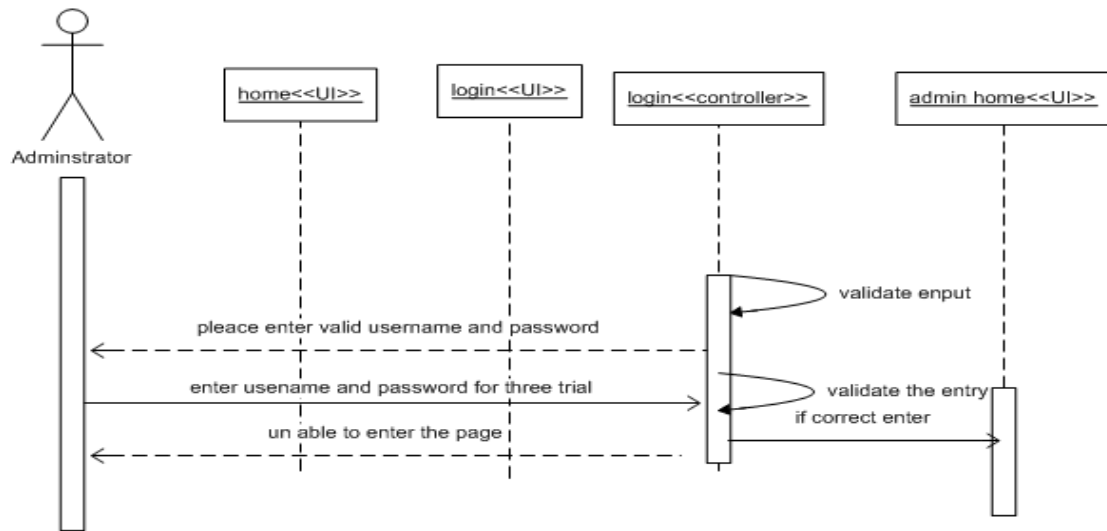


Figure 3.6. Login sequence diagram for alternative course of action

Login Sequence diagram alternative course of action description

1. The system determine the invalidity of username and password
2. Display message to the actor to reenter username and password again
3. the actor enter username and password again the system validate
4. if the user enter invalid password to the system for three trial, the system locks the login form

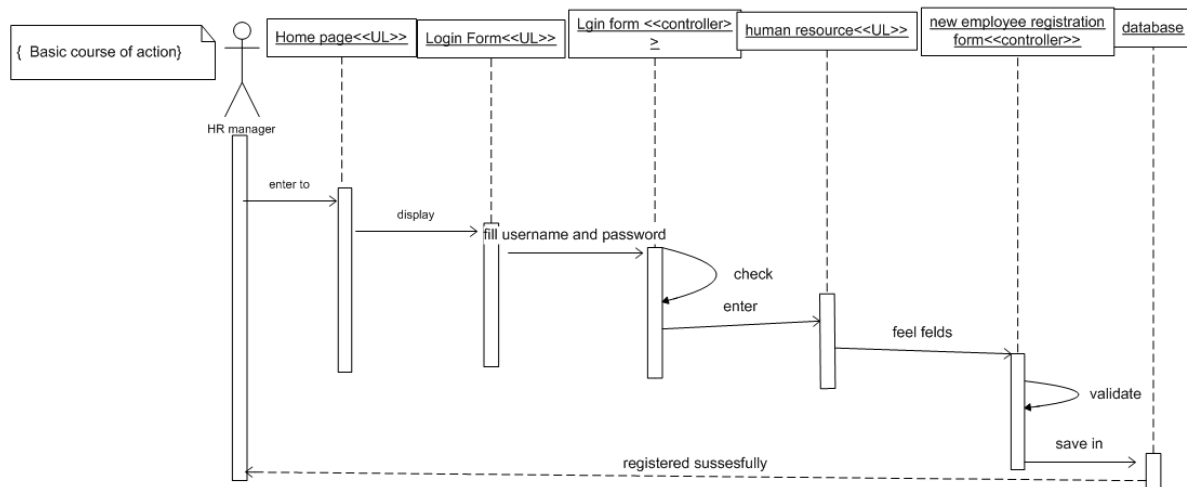


Figure 3.7 sequence diagram for new employee registration basic course of action

Description of sequence diagram for new employee registration basic course of action

1. The HR manager enter to home page
2. Click on login form
3. Enter valid username and password
4. The system check the validity of username and password
5. The actor enters human resource home page

6. The actor click on new employee registration form
7. The system validate the input
8. The employee registered to the database
9. The system displays success message

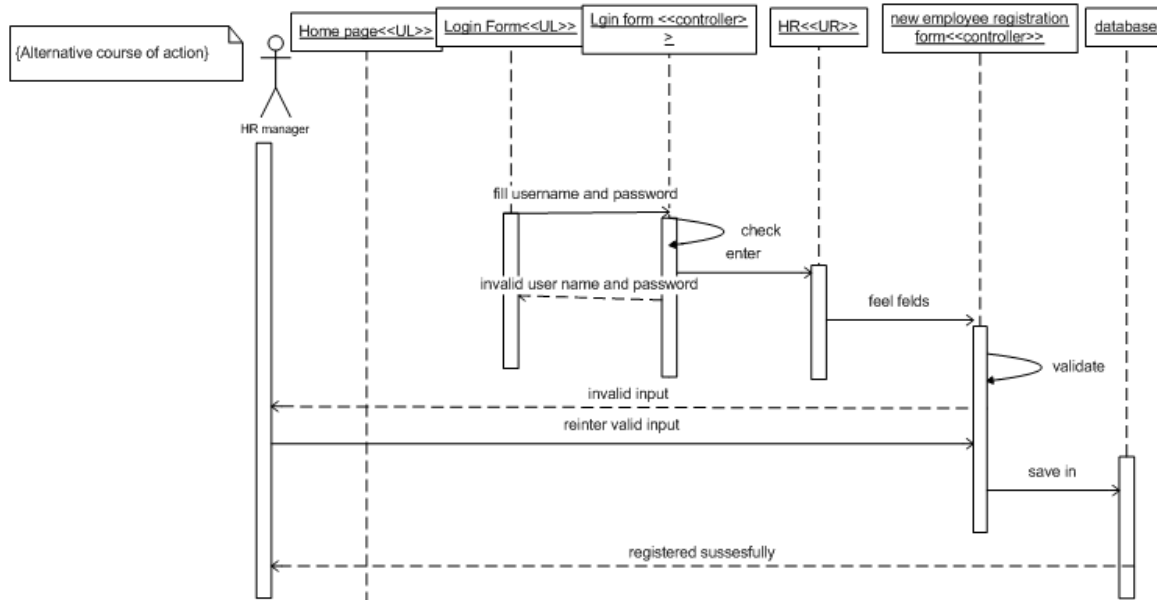


Figure 3.8 sequence diagram for new employee registration alternative course of action

Sequence diagram description for new employee registration alternative course of action

1. The system displays the invalidity of username and password
2. The user reenter username and password for three trial
3. The user enter to the human resource home page fill the new employee registration form
4. The system validate the input and display the invalidity of data
5. The system reenter valid input
6. The system save the entry to the database and display success message

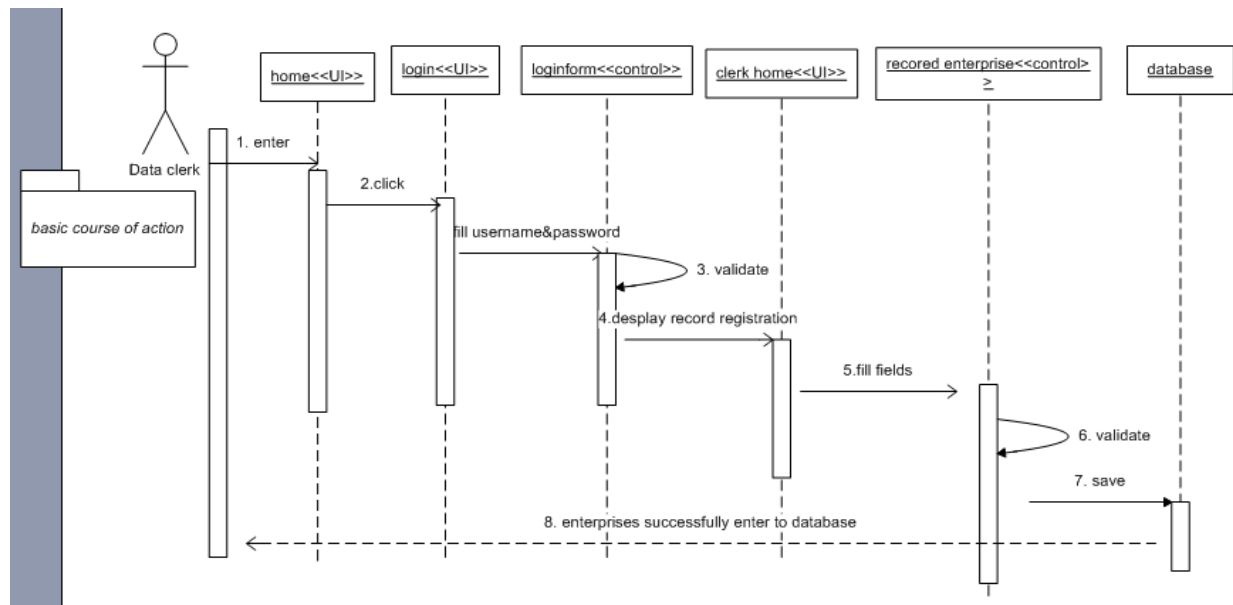


Figure 3.9. Sequence diagram for enterprise registration basic action

Sequence diagram description for enterprise registration basic action

1. The data clerk enter to the home page and enter username and password
2. The system validate and display enterprise registration page
3. The user fills the fields and the system validate the entry
4. The data registered to the database and
5. the system displays confirmation message

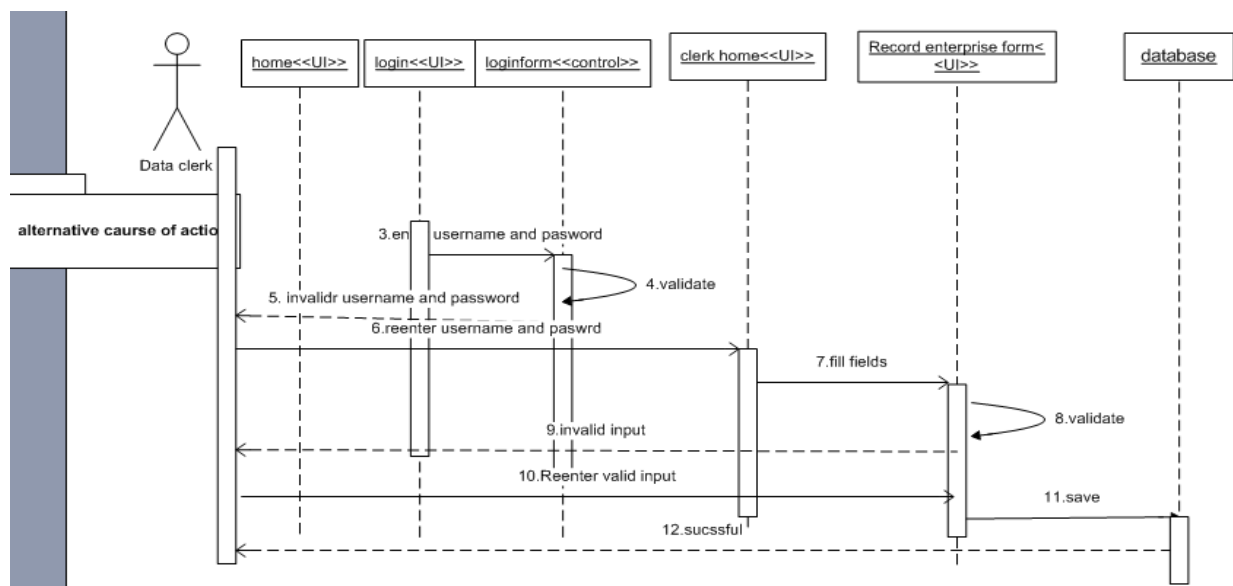


Figure 3.10. Sequence diagram for enterprise registration alternative cause of action

Sequence diagram description for enterprise registration alternative cause of action

1. The system display the invalidity of the entered data
2. The user enter username and password again

3. The system displays new enterprise registration form
4. The system validate and display the invalidity of the input
5. The user reenter the valid data
6. The system saves the entered data and display success message.

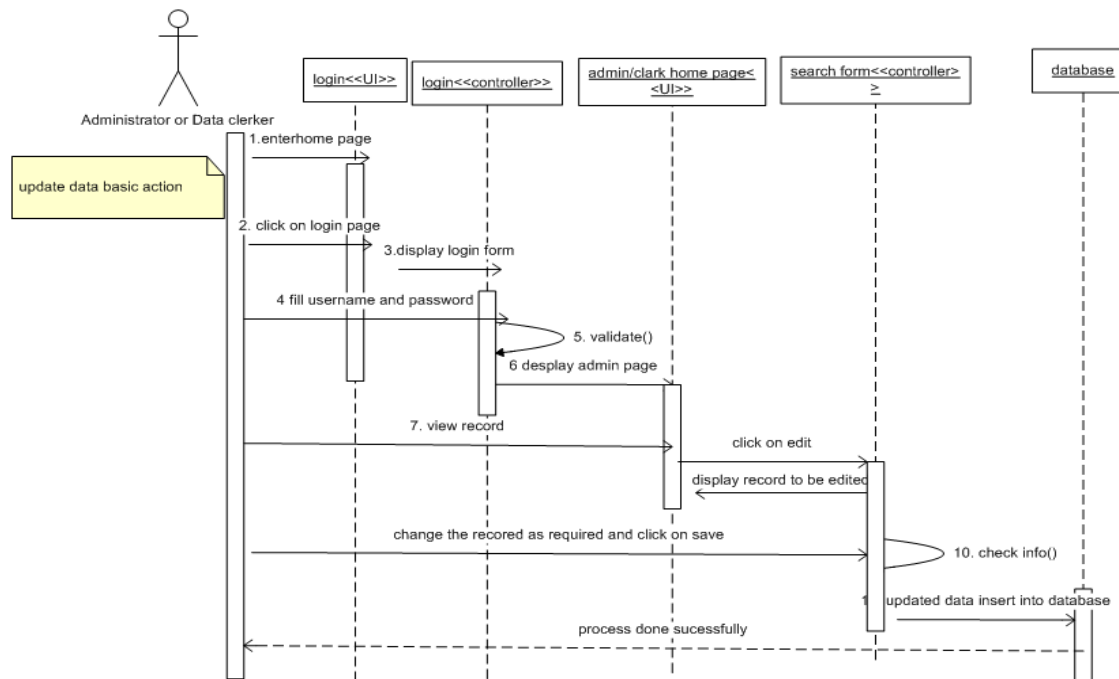


Figure 3.11 sequence diagram to update record.

Sequence diagram description to update record

1. The actors enter to home page and click on login page
2. Fill username and password
3. The system validate the entry
4. Display the admin page if the user is administrator or display enterprise registration page if the user is data clerk.
5. The actor click on update/edit and the system display records to be edited
6. Change the record and the system validate the entry
7. The system save to the database and
8. The system displays success message

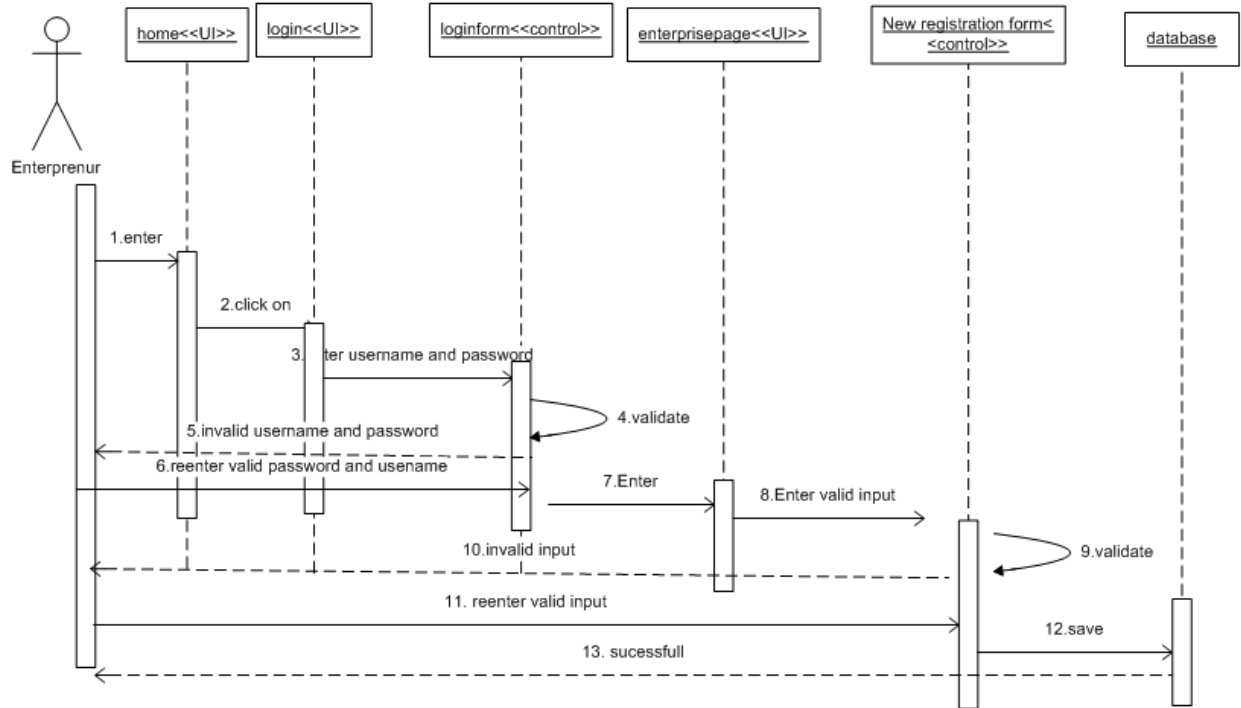


Figure 3.12. Sequence diagram for enterprise employee registration.

Sequence diagram description for enterprise employee registration.

1. The actors enter to home page and click on login page
2. Fill username and password and select entrepreneur radio button
3. The system validate the entry and display error message for the invalidity of data
4. The user reenter valid user name and password and enter to entrepreneur home page
5. The actor click on new enterprise registration form and fill the fields
6. The system displays the error message if the entered data is not valid
7. The actor reenter the valid data
8. The system saves data to the database
9. System displays success message

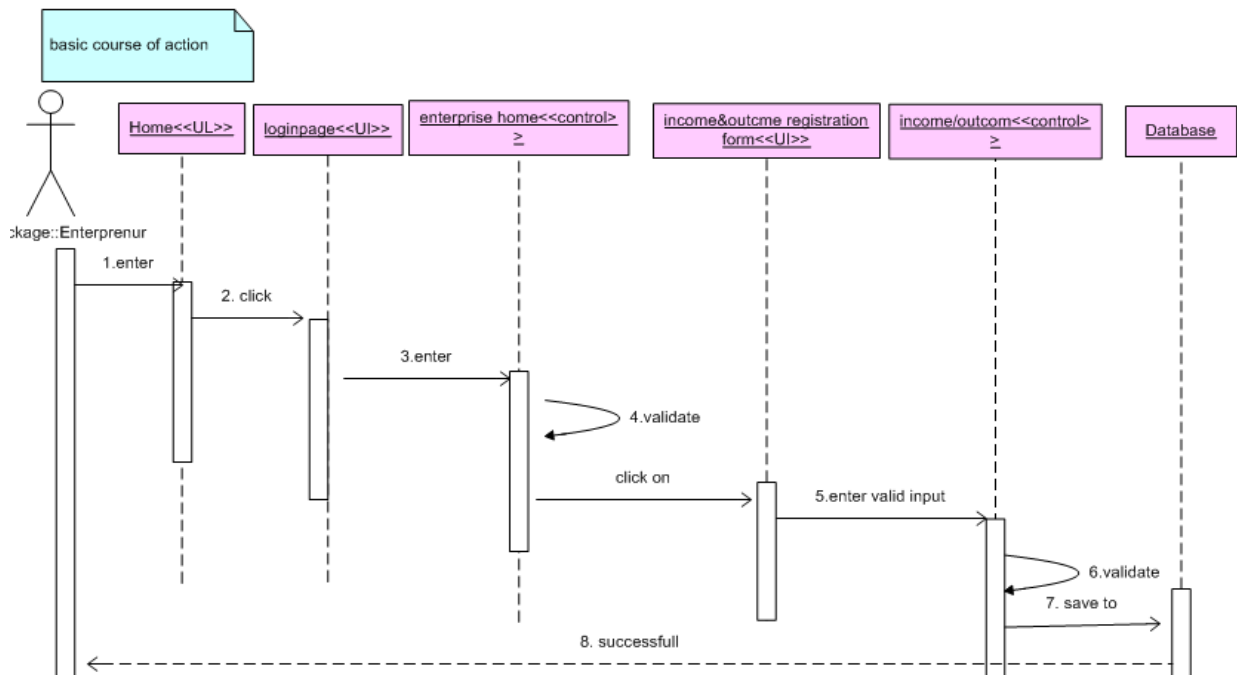


Figure 3.13 sequence diagram for financial information basic course of action

Sequence diagram description for financial information basic course of action

1. The actors enter to home page and click on login page
2. Fill username and password and select entrepreneur radio button
3. The system validate the entry
4. The user enter to enterprise home page
5. The actor click on income and outcome registration form and the system validate the entry.
6. The actor click on save button and the system displays success confirmation message

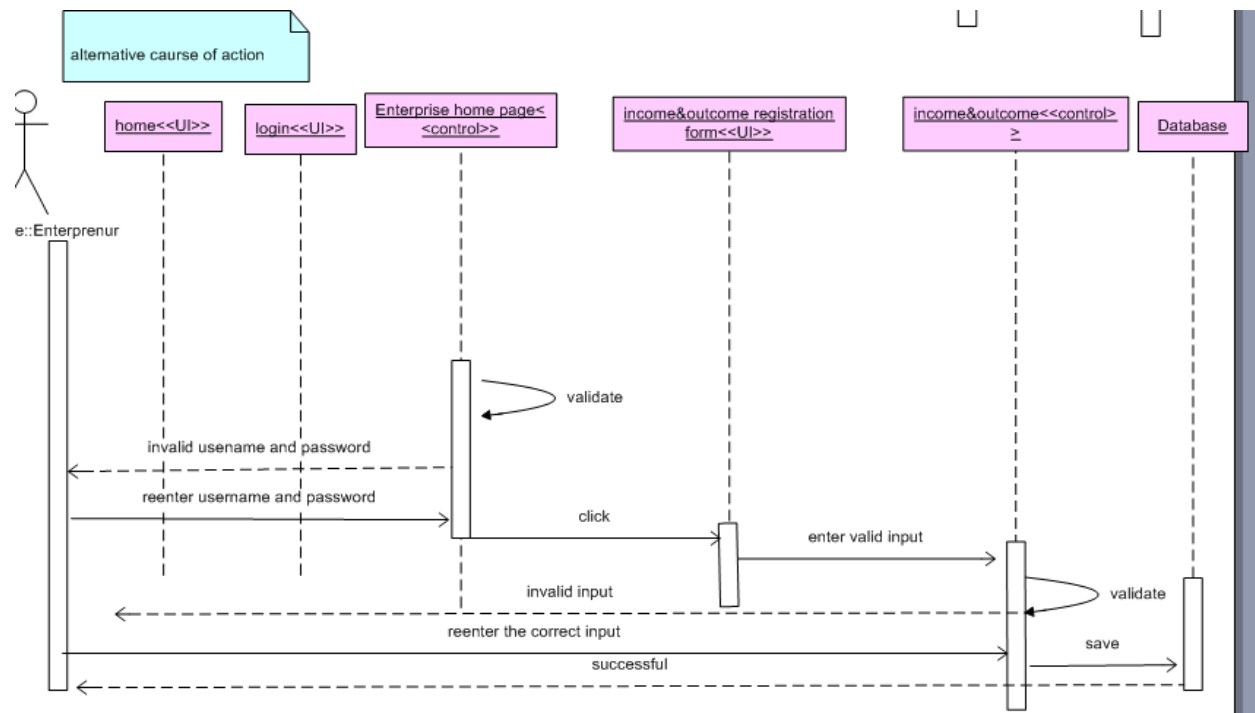


Figure 3.14. Sequence diagram for alternative course of action

Sequence diagram description for financial information alternative course of action

1. The system displays the invalidity of entry
2. The actor reenter the valid username and password and enter to the page
3. the actor fills financial information on the form and the system validate the entry and display the invalidity of the entry data
4. The user reenter correct input and the system saves and display confirmation message.

3.7. Activity diagram

UML activity diagram used to document logic of single operation or method, a single use case or the flow of business process and show the how those activities depend on one another the field circle represent the starting point of the activity diagram and the field circle with border represent the end point. The diamond represent decision point called branch the arrow represent the transition between two activity and the text on the arrow represent condition that must be fulfilled to process of the transition.

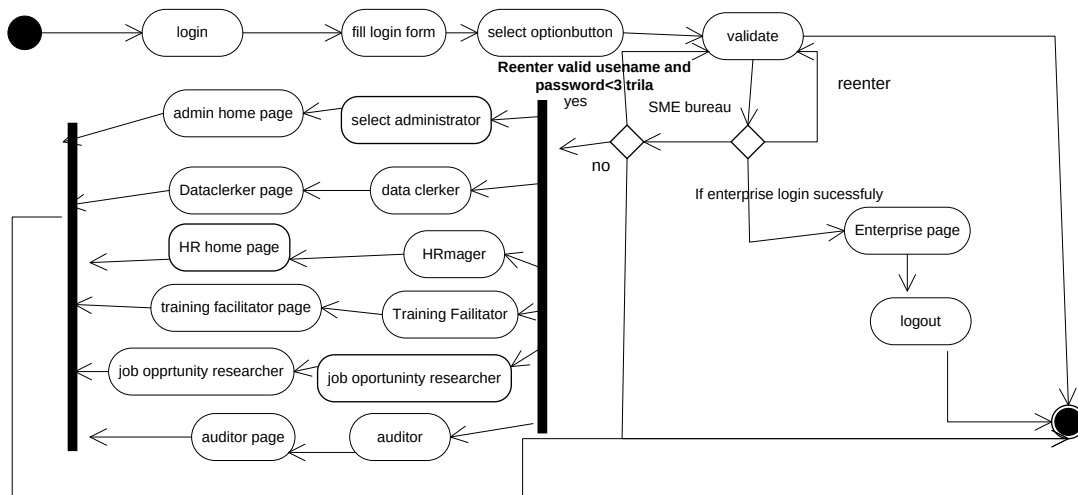


Figure 3.15. Activity diagram for login

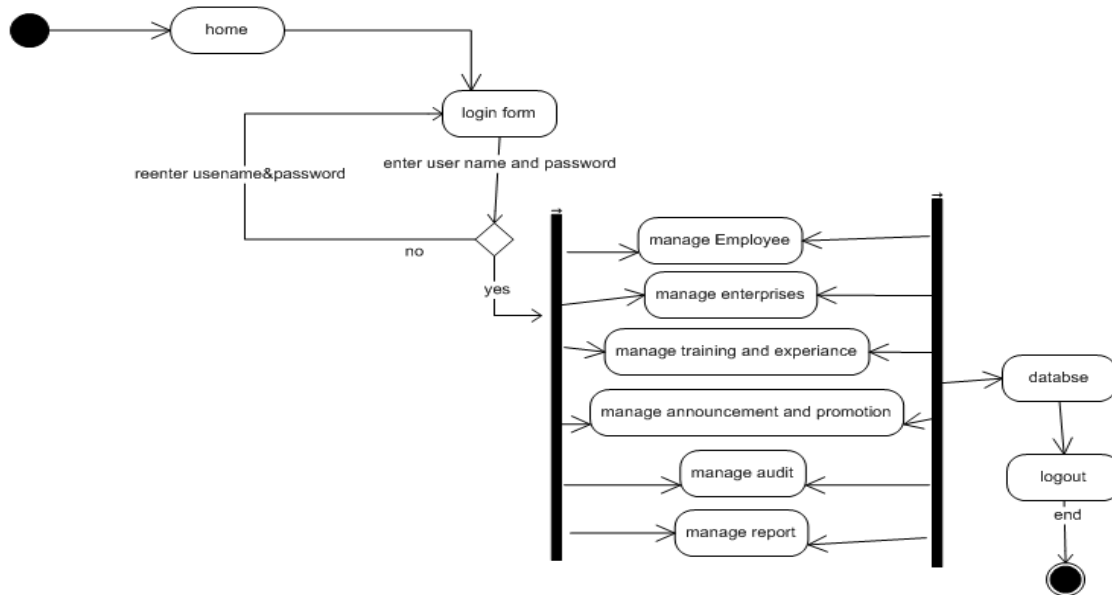


Figure 3.16 activity diagram to enter administrator home page

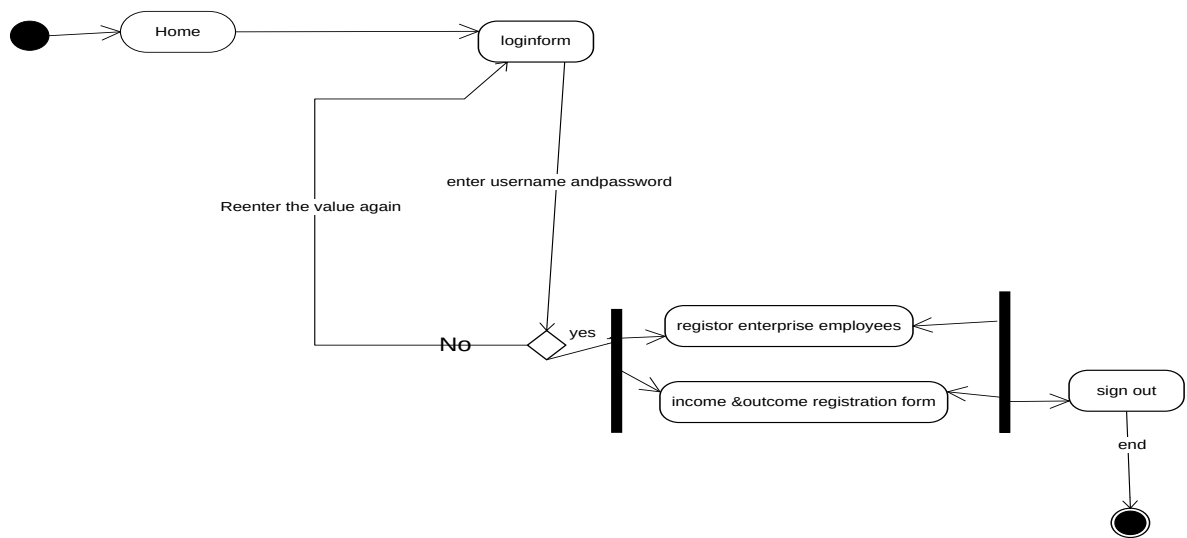


Figure 3.17 Activity diagram to enter enterprise home page

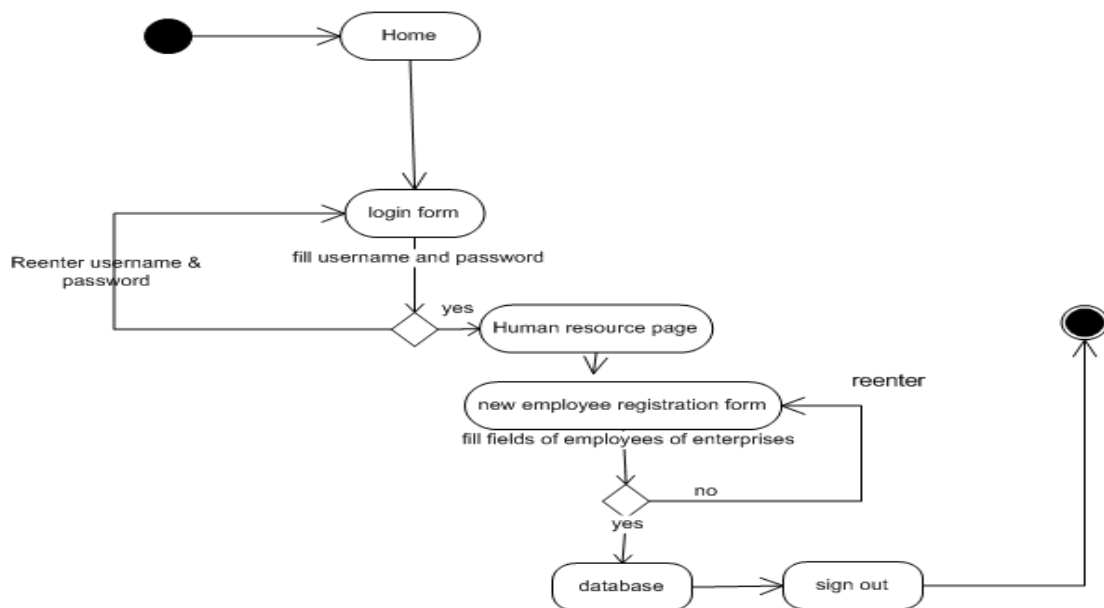


Fig. 3.18 MSE bureau employee registration activity diagram

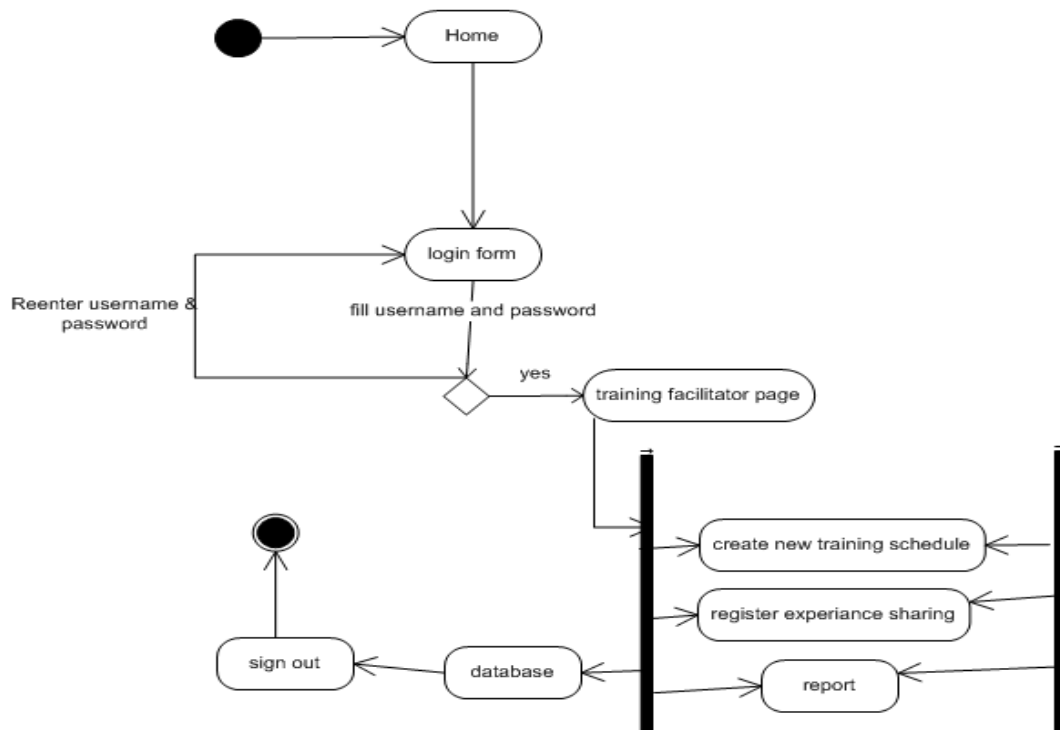


Figure 3.19. Activity diagram for training facilitator

3.8.State chart diagrams

State chart diagrams describe the behavior of an individual object as a number of states and transitions between these states. A state represents a particular set of values for an object. Given a state, a transition represents a future state the object can move to and the conditions associated with the change of state and it models the dynamic aspects of the system by showing the flow of control from state to state for a particular class. Every class will have its own state chart diagram. In practice, only classes with interesting or complex internal behavior will be modeled with state chart diagrams. State chart diagrams are not shared among classes. Whereas an activity diagram models the flow of control from activity to activity, a state chart diagram models the flow of control from event to event. And show how an object reacts to external events or conditions during the course of its lifetime. It describe the behavior of an individual object as a number of states and transitions between these states. A state represents a particular set of values for an object.

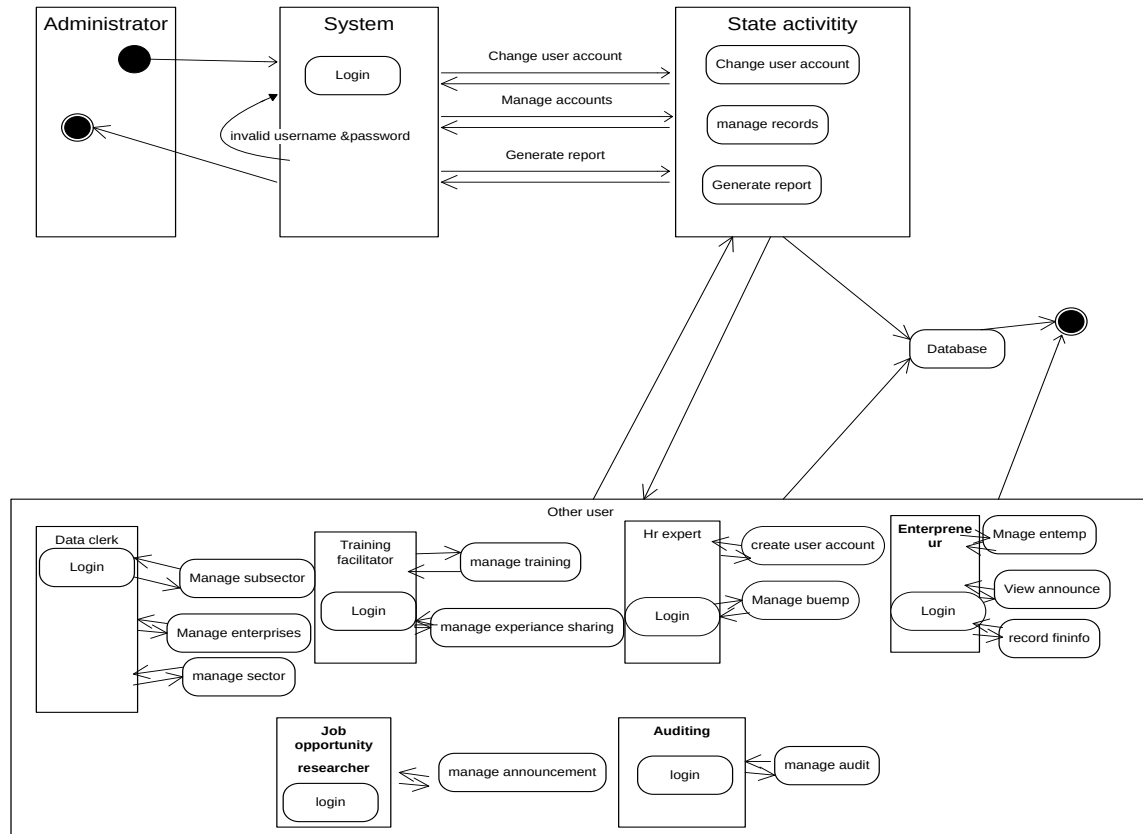


Figure: 3.20.state chart diagram: the above state chart diagram describes states of the system

3.9. User interface and navigational paths

User interface is responsible for the presentation of the application i.e. the user interface, and the all actions done in the application. Drawing user interface mock-ups often helps to find omissions in the specification and help the users build a more concrete picture of the system. User interface design should occur as a separate task once the functionality is sufficiently stable. The user can view different announcements in the announcement page like promotion, exhibition and bazar, new job opportunity and the like. To log in the user has two options that is MSE bureau and enterprises then after login the system displays the pages as the access privilege of system users. The user interface of our system is home page, after login administrator page, entrepreneur page, training facilitator page, HR manager page, data clerk page, auditor page and job opportunity page each page displays to fulfill the

responsibility of each actor and system functionality. In web application, the user interface is presented within a Web browser Simple prototype of the user interface is show in the figure below.

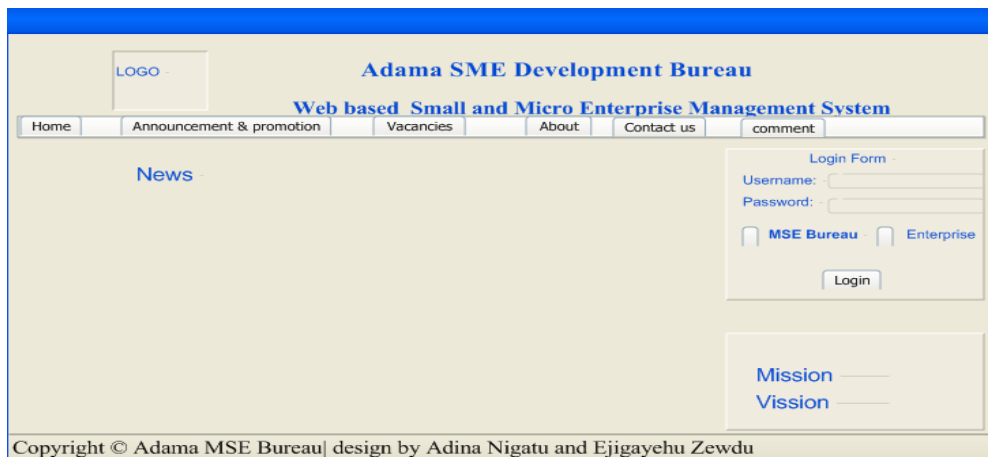


Figure 3.21 user interface for home/ dashboard of system



Figure 3.22. User interface for administrator page

CHAPTER FOUR

System Design

4.1. Purpose of the system

The purpose of system designing is to show the direction how the web application is built and to obtain clear and enough information needed to drive the actual implementation of the web based system. System design is the transformation of the analysis model into a system design model. It consists of transforming the analysis model into the design model that takes into account the nonfunctional requirements and constraints described in the problem statement and the requirements analysis document. During system design, we define the design goals of the project and decompose the system into smaller subsystems that can be realized by individual teams. We also select strategies for building the system, such as the hardware/software platform on which the system will run, the persistent data management strategy, the global control flow, the access control policy, and the handling of boundary conditions. The result of system design is a model that includes a clear description of each of these strategies, a subsystem decomposition, and a UML deployment diagram representing the hardware/software mapping of the system. It also deals with how the system should be realized and how to develop the entire system.

4.2. Design Goals

The definition of design goals is the first step of system design. It identifies the qualities that our system should focus on and derived from the non-functional requirements that guide the decisions to be made by the developers especially when trade-offs are needed and should be achieved and addressed when the system is implemented. Many design goals can be inferred from the non-functional requirements or from the application domain. Others will have to be elicited from the client. The design goals for the system are grouped into three criteria.

- Dependability criteria
- Maintenance criteria and
- End user criteria

4.2.1. Dependability criteria

This design goal criterion determines how much effort should be expended in minimizing system crashes and their consequences. It also determines

- How often the system can crash
- How available to the user should the system be
- The safety rules associated with the system crash and
- The security risks associated with the system environment

Accordingly, the dependability criteria will be describes as follows;

 **Robustness:** The system will face different interactions from user. Therefore; each interaction may bring an invalid input to the system. These invalid inputs may crash the system. For these reasons the system will be implemented to capture any invalid data with Error Handling Mechanism. Therefore; if a user inserts a wrong input, the system should recognize the input and prompt the user to make the necessary corrections. Therefore the system is robust.

 **Availability:** This system is a web based application so that whenever there is an internet connection, the system will be available for any valid users of the system

 **Security:** In order to make the system secure from unauthorized access, the system will be using authentication techniques that enables only authorized user to access the system. To handle this, users are required to give their unique user name together with their password at login. The system protects the user to enter the system unless he/ she has valid username and password. To get username and password the user first register to the system. During registration the system automatically gives username and password then the user can change the password. And also if the user enters invalid password for above three times the system lock the login form and displays error that unable to enter.

 **Fault Tolerance:** This system is fault tolerant to work in the case of failure for the login module. Users can try to login again.

4.2.2. Maintenance Criteria

In this section we determine how easy it is to change the system after deployment.

 **Extensibility:** According to users need, it is possible to add some functionality to the system. So the system's database and current methods are carefully documented to add functionalities easily which makes the system flexible.

- ✚ **Modifiability:** If it is needed to change the functionality of the system, it should be accomplished without the need of rewriting the whole system. This could be achieved without a problem since the system is designed using standard object oriented approach by using classes. So if we want to change something, we look for the package, modify the new requirement and run the system. No need to have the entire system modified. Modifications to one part of the code are made not to have effect on the other subsystems.
- ✚ **Reusability:** This system is divided into subsystems that perform similar tasks. This reduces the complexity of the system to the programmer and keeps functionally related objects together. The other advantage of dividing the whole system to fine subsystems is to make the code in the system reusable for other similar systems.
- ✚ **Portability:** This system is developed using the PHP Programming language, XAMPP web server and the MySQL database management system which are open source and platform independent. This system is developed on a windows machine but it will work on any platform.

4.2.3. End user criteria

This includes qualities that are desirable from a users' point of view. These include usability and utility. The system end user criteria are measured in terms of:

- ✚ **Usability:** The system going to be a user friendly system, so that user can use it easily without confusion.
- ✚ **Utility:** The system is expected to be a great support for the users in their working activities. Since the system is going to be designed to support the day to day activities of the organization.

4.3. Current software architecture

Currently the MSE development bureau uses a manual system in handling the data of management activities. This implies that the organization has no current software architecture.

4.4. Proposed software architecture

4.4.1. Overview

Software architecture describes the subsystem decomposition in terms of subsystem responsibilities, dependencies among subsystems, subsystem mapping to hardware, and

major policy decisions such as control flow, access control, and data storage. This proposed system architecture describes that client computers are connected to the organization web server through internet and make request. After the request is checked by firewall, it passes to the database server then the database server sends the response to the web server and displays the information to web browser. *Clients* use web browser to communicate with the system and a web server software acts as an intermediary between the application client and the application server. Web server route requests from multiple application clients to a single application server and the corresponding responses back in the other way. User Services (Presentation) tier, a Business Services tier, and a Data Services. In three tier architecture, the client should never access the data storage system directly. The server tier corresponds to a so called “middle” tier.

- The **presentation tier** contains the user interfaces elements of the site and includes all the logic that manages the interaction between the users and it describes the various visual interfaces that the user will be interacting with in order to perform the functions specified in the application requirements.

Presentation tier also called the Client tier, is responsible for the presentation of data, receiving user events, and controlling the user interface. The user interaction with the system is entirely through this layer.

- The **business tier** receives requests from the presentation tier and returns a result to the presentation tier depending on the business logic it contains and describes how the presentation tier accesses the business components and which data tier interfaces each component works with.
- The **data tier/ layer** is responsible for storing the application’s data and sending it to the business tier when requested and describes both how the data logically integrate with the physical data stores as well as how they are accessed.

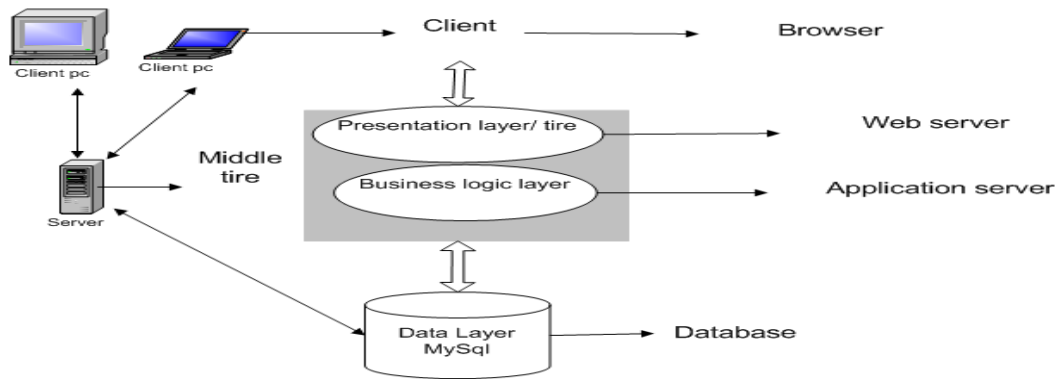


Figure 4.1. The system architecture layer

4.5. Subsystem decomposition

We divide the system into manageable pieces to deal with complexity: Each subsystem is assigned to a team and realized independently. In order for this to be possible, though, we need to address system-wide issues when decomposing the system. To reduce complexity in the solution domain of the overall system, we need to decompose the system in to manageable pieces called subsystems, which are composed of a number of solution domain classes. In the case of complex subsystems, we recursively apply this principle and decompose a subsystem into simpler subsystems. Therefore, we have decomposed our system into the following manageable subsystems. These are

- ✓ Enterprise management subsystem
- ✓ Training schedule subsystem
- ✓ Employee management subsystem
- ✓ Report interface subsystem
- ✓ Announcement and promotion subsystem
- ✓ audit sub system
- ✓ Data base Subsystem

♦ Enterprise management Subsystem

Enterprise management subsystem is responsible for keeping record of the enterprises profile. Like:

1. Register new enterprises: This enables the system to add new record of enterprises to the system.

2. Edit/Update the enterprise profile: This enables the system to update/edit the record the enterprise profile from the record.
 3. Delete the enterprise profile: This enables the system to remove or delete the record from the database.
 4. Search the enterprise profile: This enables the system to display the exact record from the enterprises from the database.
 5. View the enterprise profile: This enables the system to retrieve and display all list of enterprises profile in the database.
- ♦ **Training schedule subsystem:** Training Schedule subsystem is responsible for scheduling the available training which prepare new, update and delete schedule information, view the total participants of training in training given and list experience sharing information.
 - ♦ **Employee management Subsystem:** Employee management subsystem is responsible for keeping information of the employee profile like:
 1. Register employee information: This enables the system to add new employee record to the system/database record.
 2. Edit/Update the employee information: This enables the system to update/edit the employee information record from the database record
 3. Search the employee information: This enables the system to display the exact record of employee from the database record.
 4. View the employee information: This enables the system to retrieve and display all list of employees in the record
 - ♦ **Generate Report:** This subsystem is responsible to generate activity report and print report to transfer to the required stakeholder.
 - ♦ **Announcement and promotion Subsystem:** provide different announcements like exhibition and bazaar, new job opportunity, promotion of new technologies, current news and new vacancies etc.
 - ♦ **Audit sub system:** identify audited and not audited enterprises to know the enterprises growth stage.
 - ♦ **Data Base Subsystem:** This subsystem is responsible to make a connection with other subsystems and also for storing, retrieving and updating all the information's about

enterprises, sectors, sub sector, capital, training, technology, employees and any other information need by the system.

Store – It enables the system to store data on the database.

Retrieve – It enables the system to retrieve data from the database.

Update – It enables the system to update the database.

Delete- it enables the system to delete the record from the database

The figure 4.2 below describes system decomposition

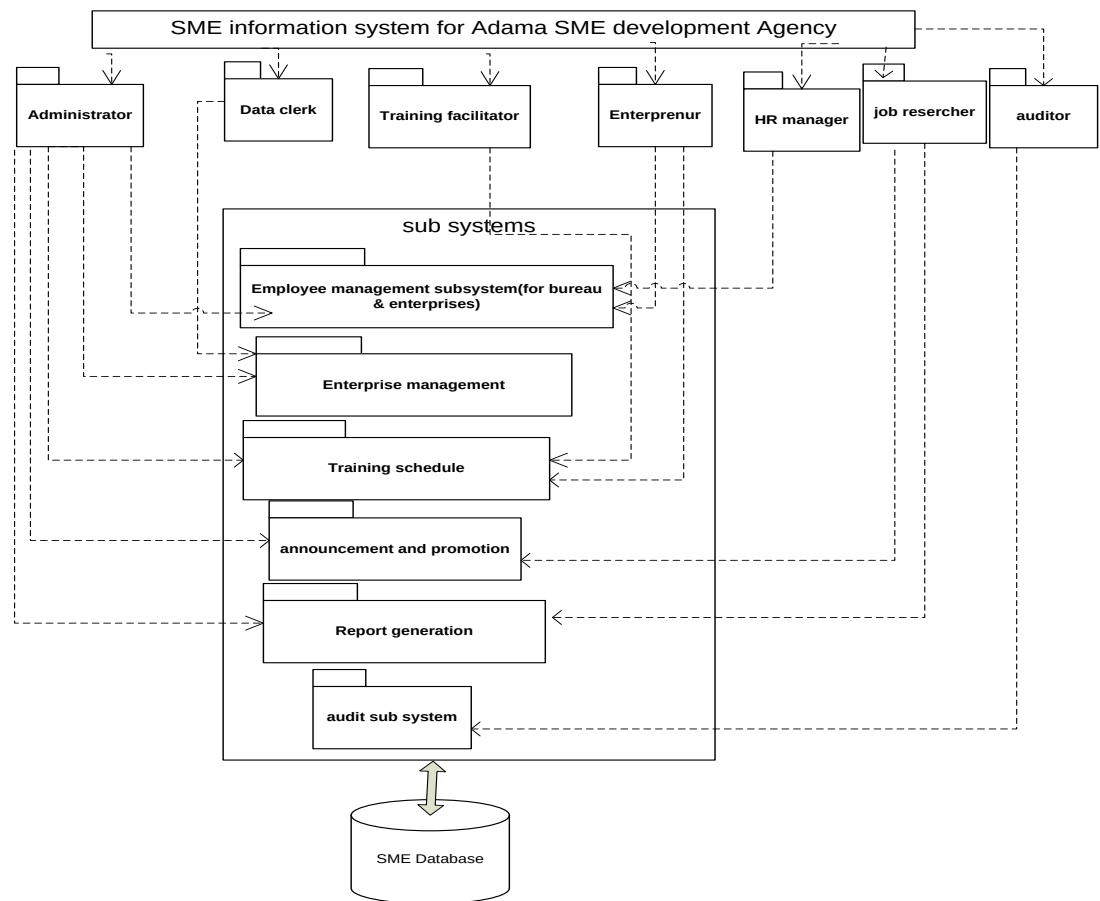


Figure 4.2 system decomposition

4.6. Hardware/software mapping

In this part, we described the overall system software and organization. We try to see list of computer language (with a description of the function). This section provide the information needed for a system development team to build and integrate the hardware components, code and integrates the software modules, and interconnect the hardware and software segments into a functional product. Our system includes three major components namely client, web server and database component. Clients communicate with the server via web browser and the server then communicates with the database via the application server by using HTTP protocol, which allows communication between them.

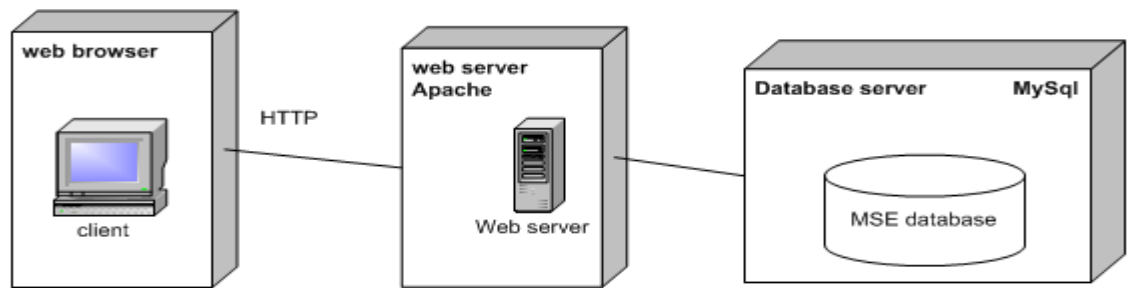


Fig.4.3 Hardware and software mapping diagram

4.6.1. Deployment diagram

UML deployment diagrams are used to depict the relationship among run-time components and hardware nodes. Components are self-contained entities that provide services to other components or actors. The deployment diagram focuses on the allocation of components to nodes and provides a high-level view of each component. Deployment diagrams show the hardware for the system, the software that is installed on the hardware.

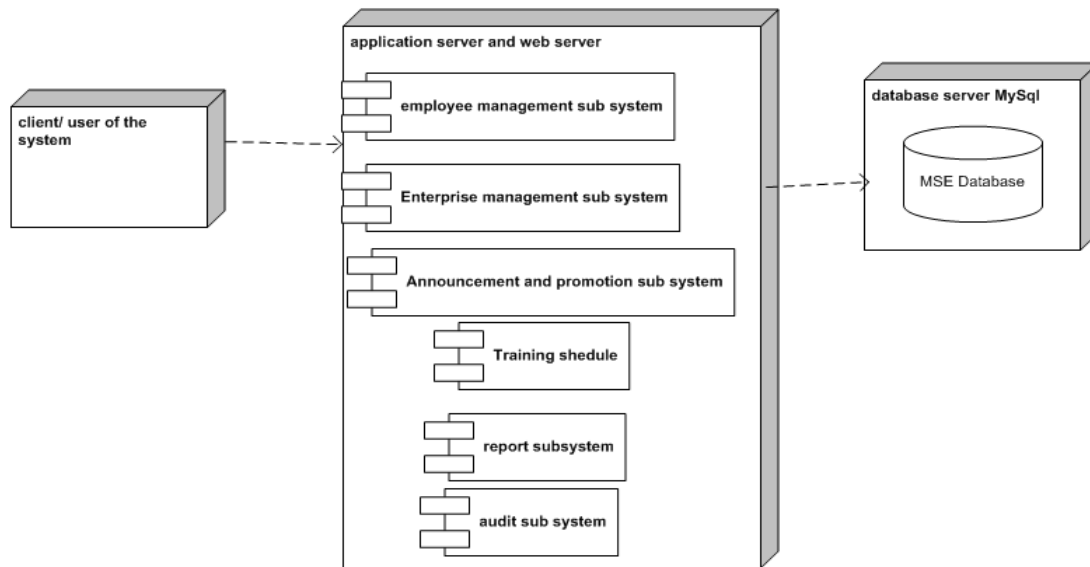


Figure 4.4. Deployment diagram

4.7. Persistent data management

Persistent data management describes the persistent data stored by the system and the data management infrastructure required for it. The data that are stored are very critical to the information exchange during the system's functionalities. Moreover, since the system is going to be accessed by different users, it should be able to keep its data consistently. For this reason the system needs to assure data integrity. In order to achieve all these, the system will be implemented using RDBMS. Relational databases offer fast storage and easy retrieval of stored data thus allowing access to data needed on a daily basis quickly and efficiently.

Mapping

In order to store information persistently we map objects into tables and the attributes into fields to the specific table based on the objects found on the system. Therefore, we identified the major tables that will be implemented on the selected DBMS. In the mapping process each class is mapped to its own table, each class attribute is mapped to a column in the table, an instance of a class represents a row in the table, and one-to-many associations are implemented with a buried foreign key. For this reason, the mapping objects to tables is displayed as in Fig. 4.5 below.

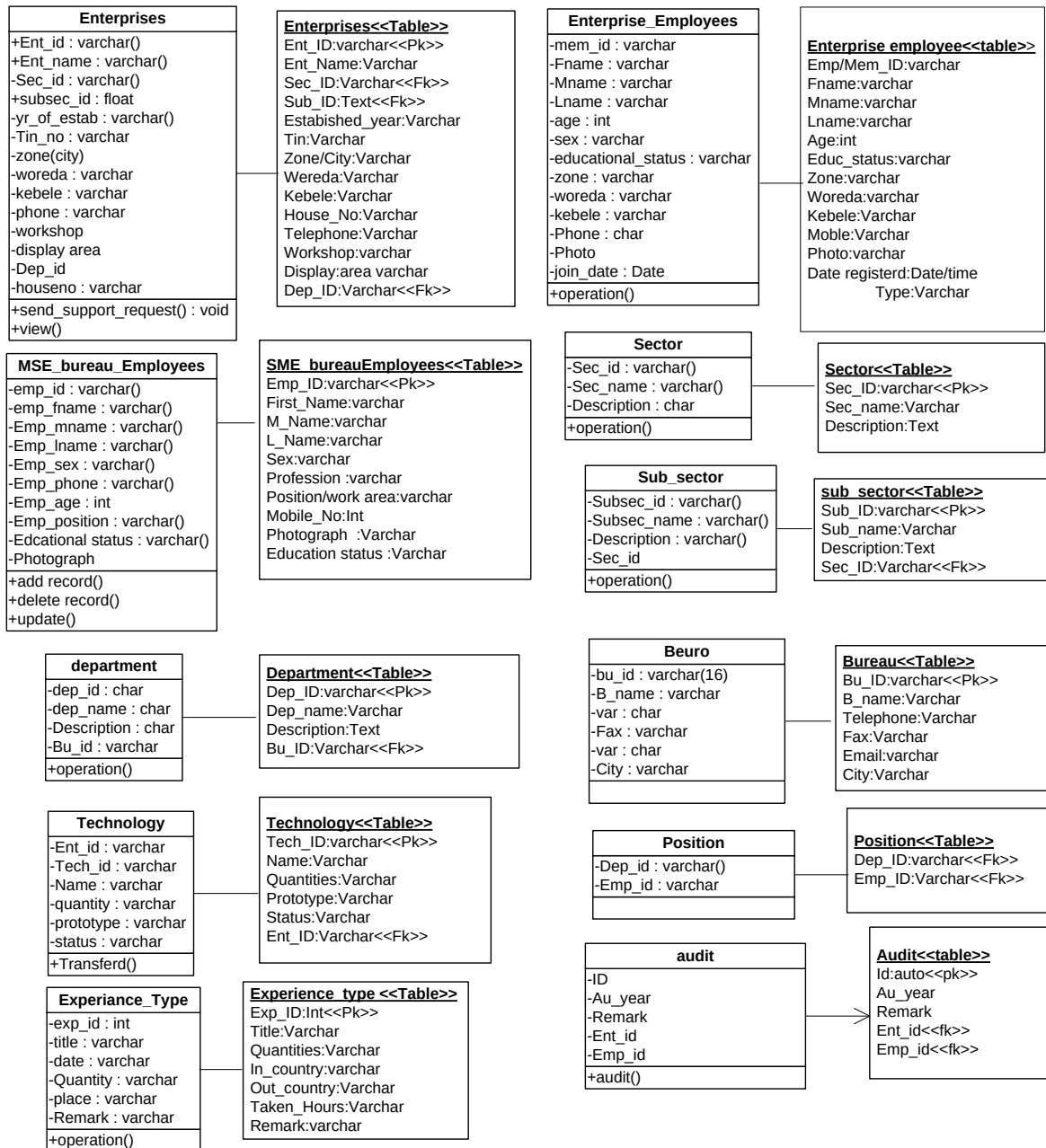


Figure.4.5 persistence diagram

There are classes that are normalized and mapped to tables the capital table is normalized up to third normal form in to three tables and the training schedule class is normalized up to second normal form to minimize data duplication as show as shown on figure 4.6. Below

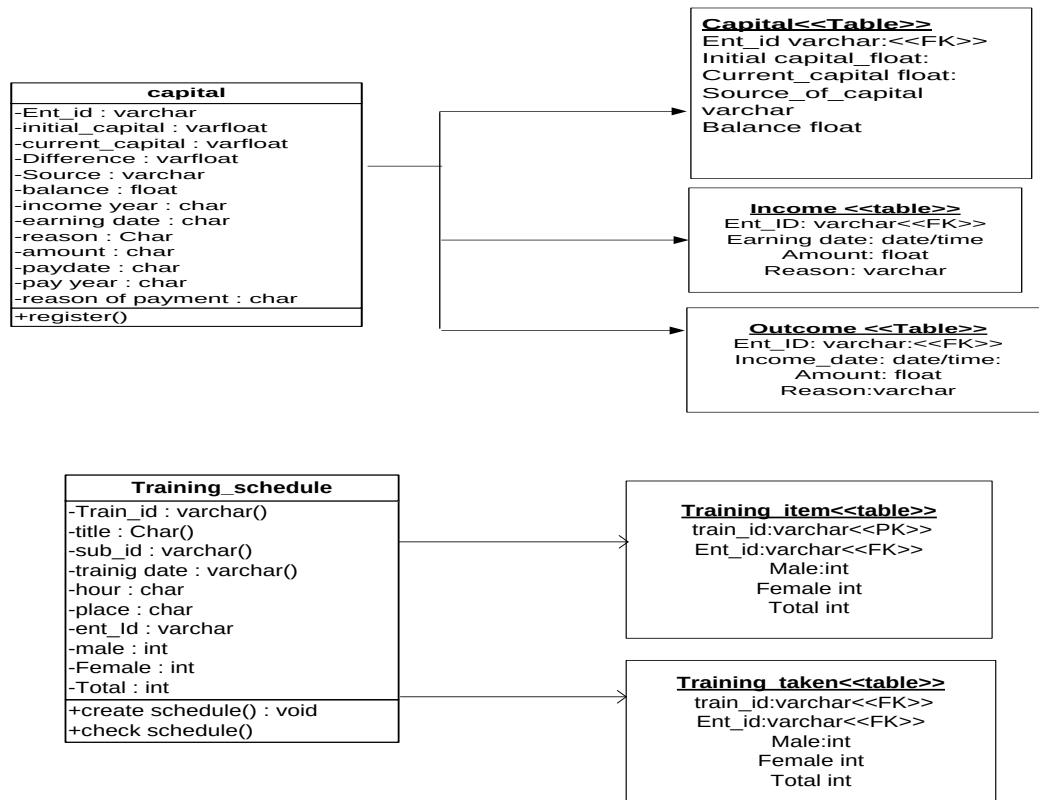


Figure 4.6. Persistence diagrams with normalized tables

4.8. Access control and security

In the system, different actors have access to different functionality and data of the system. During analysis, we modeled these distinctions by associating different use cases to different actors. During system design, we model access by examining the object model, by determining which objects are shared among actors, and by defining how actors can control access. Depending on the security requirements on the system, we also define how actors are authenticated to the system (i.e., how actors prove to the system who they are). Since the system administrator have all authority to make any change, enterprise management is done by the data expert, employee management is done by HR manager and training activities are done by training facilitator etc. The system must have high security to prevent intrusions and data theft. To do this every user must enter into the system using his/her specified username and password. Whenever a user enters his /her password, the system must validate the input. To show the access control we use access control matrix that each row in the access matrix represents a different access view of the classes listed in the columns. All of these access views should be consistent. Usually, however, access views are implemented by defining a

subclass for each different type of (actor, operation) tuple. The process of verifying the association between the identity of the user or subsystem and the system is called *authentication*.

Table 4.1 Access-control matrix

Subsystem	Operation	Actors						
		Administrator	Data clerk	HR manager	Training facilitator	Entrepreneur	Job researcher	auditor
Data Base sub system	Login ()	✓	✓	✓	✓	✓	✓	✓
Employee management	<i>RegisterEmployee()</i>	✓		✓				
	<i>UpdateEmployeeProfile()</i>	✓		✓				
	<i>searchEmployee()</i>	✓		✓				
	Manage enterprise employee					✓		
Enterprise management	<i>RegisterEnterprises()</i>	✓	✓					
	<i>searchEnterprises()</i>	✓	✓					
	<i>DeleteEnterpriseRecord()</i>	✓	✓					
	<i>Update/EditEnterprises()</i>	✓	✓					
	<i>RegisterNew()</i>	✓	✓					
	<i>Update/edit sector()</i>	✓	✓					
	<i>Delete()</i>	✓	✓					
	<i>Update/edit sector()</i>	✓	✓					
	<i>Delete()</i>	✓	✓					
	manage capital()					✓		
Generate report	<i>Enterprise report()</i>	✓	✓					
	<i>Employee report()</i>	✓		✓				
	<i>Training report()</i>	✓			✓			
	<i>Print port()</i>	✓	✓	✓	✓			✓
Training schedule	<i>create Schedule()</i>	✓			✓			
	<i>update()</i>	✓			✓			
	<i>delete()</i>	✓			✓			
	<i>view()</i>	✓			✓	✓		
Announcement and promotion	<i>Post new()</i>	✓					✓	
	<i>Update()</i>	✓					✓	
	<i>Delete()</i>	✓					✓	
	<i>View()</i>	✓	✓	✓	✓	✓	✓	✓
Audit sub system	<i>Manage audit()</i>							✓
	<i>View audit</i>							✓

4.9. Global software control

Control flow is the sequencing of actions in a system. In object oriented systems, sequencing actions includes deciding which operations should be executed and in which order. These decisions are based on external events generated by an actor or on the passage of time. When a user wants to use the system, he/she should first login to the system with a user name and a password and submit it. The system then checks for the validity of the user name and password by looking up in the database. If the user is found to be valid, he/she will be allowed to login to the system. After this the system provides a page for the user according to the level of permission he/she has given. If the user is administrator he/she is at the center of the persistent data management and interacts with all of the subsystems. Figure 4.6 below shows the different interface for user according to their permission and privilege. Once the page is displayed, the user can select whatever he/she wants from the menu and continues to use the functionality that is provided by the system. And whenever the user wants to terminate the system he/she needs to logout and return back to home page. The above sequences describe the event driven control that is used by the system. That is, for the system to do a certain operation, an event must occur first. This kind of control flow (Event Driven Control Flow) has the advantage of leading a simpler structure and to centralizing all input in the main loop.

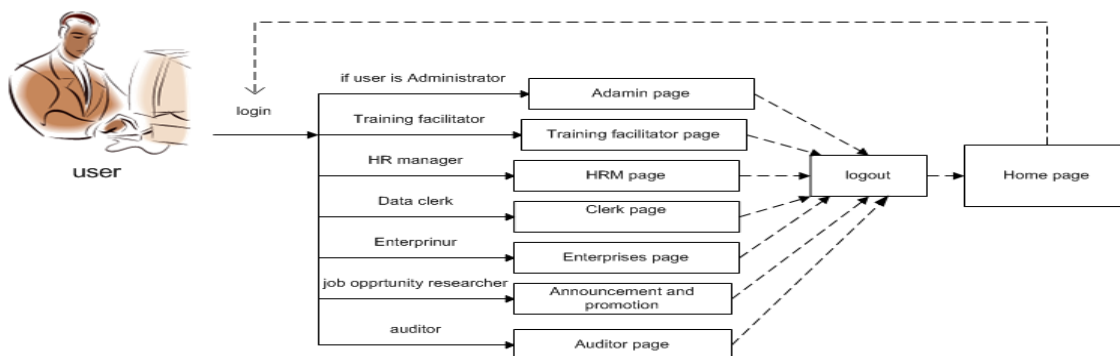


Fig 4.7. Control flow of the system

4.10. Boundary conditions

Boundary conditions is used to decide how the system is started, initialized, and shut down, and we need to define how we deal with major failures, such as data corruption, whether they are caused by a software error or a power outage. In this section system installation, start up and shut down will be identified.

System installation – MSE web based application must be installed in any platform and

the XAMPP (which contains apache, MySQL, and supports PHP) must be installed on it.

Startup – the system is initialized by the request of an authorized user of the system. On start up the system will initialize the login function of the system and the user is expected to give an authorized user name and password. Once the user is logged onto the system, he/she will have the right to access everything as of his/her level of permission

System shutdown -The system shutdowns when he/she clicks “X” button on the browser. The administrator must detect whether it was properly shut down or not and needs to be able to perform consistency checks and repair corrupted data, if necessary.

When examining boundary conditions, we also need to investigate exceptional cases which is an exception that an unexpected event or error that occurs during the execution of the system such as user error that is input data mistakenly that are out of bounds, system failure or software bug.

Apache is a web server which operates on port 80, and MySQL uses port 3306. if we use Skype or some other communication program running, these often uses port 80 meaning, apache won't run, so close it and try again.

Modeling Boundary Conditions

Boundary conditions are best modeled as use cases with actors and objects. We call it boundary use cases or administrative use cases

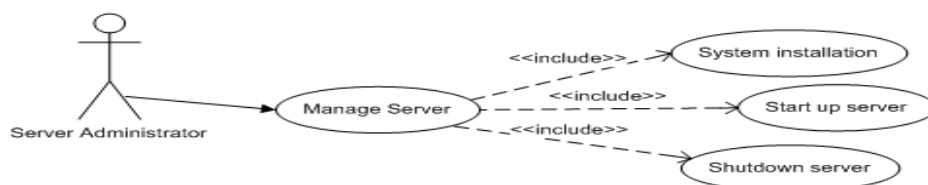


Figure 4.8. Use case for boundary conditions

Use case description

Use case name: manage server

Actor: server administrator

Includes: installation, start-up and shutdown/ termination

Description: the server administrator turns the power on of the server to start up and install the web application and check the room is in the normal temperature, air conditioned and free of any interferences and electric shock. The server administrator also shutdown properly as needed. And handle the exceptions that may occur such as un-expected failure like errors, external problems and bugs during power off in this case the administrator can prevent by using UPS to the server computer and backup the system regularly and by using regularly scan the system.

Post condition: the system installed, start-up and shutdown as required

CHAPTER FIVE

Implementation and result

5.1.Introduction

Implementation is the process of translating the object model into source code. This includes implementing the attributes and methods of each object and integrating all the objects such that they function as a single system. The implementation activity spans the gap between the detailed object design model and a complete set of source code files that can be compiled and it is realization of the system by translating the solution domain model into an executable representation and it is the process of converting a new revised system design into an operational one. Implementation includes all those activities that take place to convert from the existing system to the new system. The new system is replacing an existing manual system to online application. Proper implementation is essential to provide a reliable system to meet organization requirements. Generally this chapter covers the implementation of web based MSE management system.

5.2. Implementation Methods

To implement any web-based application a web server is required. A web server is a piece of software that manages web pages and makes them available to the 'client' browser over the Internet. The web server can be accessed remotely or locally. In the implementation of this project we use the XAMPP server which contains apache server and MySQL running as the back end database and PHP used as the server side language, CSS and HTML as interface design, and Dreamweaver as web editor. We divide this phase as client side development, Server side development and database development.

The implementation methods were chosen carefully taking into consideration the possibilities of hosting this project online on a server. We also use object oriented software engineering methodology and waterfall method and divide the project in phases and also divide to sub systems to overcome complexity of the system. We use three tier software architectures which divide the implementation in three layers, this layers are The **presentation tier** / web server contains the user interface elements of the site, and

includes all the logic that manages the interaction between the system and the client, The **business tier** / application server receives requests from the presentation tier and returns a result to the presentation tier depending on the business logic it contains and the **data tier** is responsible for storing the application's data and sending it to the business tier when requested.

By typing a URL into the address box of the browser the communication between a browser and a web server is started. Each conversation consists of two pieces:

- a **request** for information from the browser software and
- a **response** from the server addressed by the URL.

The principle of communication between a client and a server is composed of successions of requests and responses as shown on the figure below

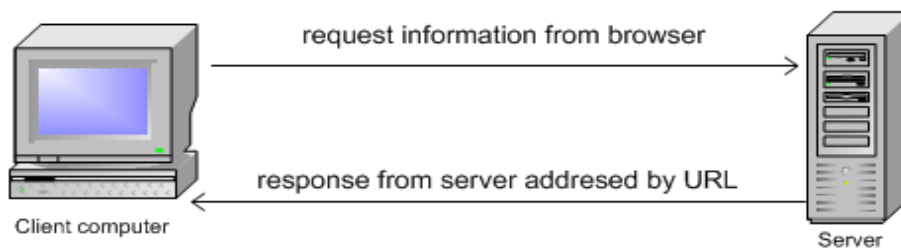


Figure 5.1. Communication between client and web-server

5.3. Sample Input/output Screens

The user of the system can login if he/she has valid username and password. The user of the system may be MSE employee or entrepreneur, so select appropriate user before click on login and shows login form which is used to insert users a username and password, when the username and password is correct the system redirect to the user page otherwise it display an error page in the form as below figure 5.2.

Figure 5.2 login error

The human resource manager register employees of MSE bureau in the following form at human resource page. The last registered employee id display on the page

automatically then the actor register the next new employee by changing the displayed id. Otherwise the system displays error for primary key duplication.



The image shows a web interface titled "Human Resource Page" in blue text. Below the title are four green buttons: "Register Department", "Register Employee", "Search Employee", and "Report". The main heading is "Add New Employees" in red, underlined text. The form contains the following fields: "Employee ID:" with a text box containing "emp/004"; "First Name:", "Middle Name:", and "Last Name:" each with a text box; "Birth Date:" with three dropdown menus for "year..", "month..", and "date.."; "Sex/Gender:" with radio buttons for "Male" (selected) and "Female"; "Profession:" with a text box; "Position:" with a dropdown menu; "Mobile:" with a text box; "Photograph:" with a "Choose File" button and the text "No file chosen"; and "Department ID:" with a dropdown menu. At the bottom left are two purple buttons: "ADD" and "reset".

Figure 5.3 new employee registration form

In the data clerk page new sectors, sub sectors and enterprises are registered, to register sector we have to select sector option, to register sub sector we have to select sub sector option and for enterprises select enterprise option as shown in the figure below:



The image shows a web interface titled "Enterprises Management Page" in blue text. Below the title are three green buttons: "Register", "Update", and "Report". The main heading is "Register Page" in black text. Below this heading are four radio button options: "Register Sector" (selected), "Register Sub Sector", "Register Enterprise", and "Register Technology". At the bottom left is a green button labeled "Continue".

Figure 5.4 option selection to register new sector, sub sector, enterprise and technology

In the enterprise management page the sectors and sub sectors are registered on the form below on fig 5.5 and 5.6 the id of sector and sub sector display on the page that indicate the last registered sector id and sub sector id when new sector or sub sector is added the actor must change the displayed id otherwise the system displays error message for primary key duplication.

The screenshot displays a web interface titled "Enterprises Management Page". At the top, there are three green buttons labeled "Register", "Update", and "Report". Below these buttons is a section titled "Add Sectors" in a large, bold, red font. The form contains three input fields: "Sector ID:" with the value "SEC/trad/0002", "Sector Name:" (empty), and "Description:" (a large text area). At the bottom of the form, there are two green buttons labeled "ADD" and "Reset".

Figure 5.5. Register new sectors

The screenshot displays a web interface titled "Enterprises Management Page". At the top, there are three green buttons labeled "Register", "Update", and "Report". Below these buttons is a section titled "Add Sub Sectors" in a large, bold, red font. The form contains four input fields: "Sub-Sector ID:" with the value "SUB/003/furnitur", "Sub-Sector Name:" (empty), "Description:" (a large text area), and "Sector ID:" (a dropdown menu). At the bottom of the form, there are two green buttons labeled "ADD" and "Reset".

Figure 5.6. Register new sub sectors

In the enterprise management page the new enterprises are registered on the form shown below on fig 5.7. The id is displayed automatically to prevent primary key duplication error.

Enterprises Management Page

Register

Update

Report

Add New Enterprises

Basic Information

Enterprise ID:

ENT/001/SM

Enterprise Name:

Established Year:

Initial Capital:

Capital Source:

TIN Number:

Address

City/Zone:

Wereda:

Kebele:

House Number:

Telephone:

Work Place Condition

Workshop:

Display_Area:

Sub Sector ID:

ADD

Reset

Figure 5.7. New enterprise registration form at data clerk page

phpMyAdmin

127.0.0.1 » adama_mse

Structure

SQL

Search

Query

Export

Import

Operations

Privileges

Routines

(Recent tables) ...

adama_mse

bureau

bureaulogin

capital

department

employee

enterprises

experience type

hrs

income

login

news

outcome

position

sector

subsector

technology

training gave

training item

Table	Action	Rows	Type	Collation	Size
bureau	Browse Structure Search Insert Empty Drop	1	InnoDB	latin1_swedish_ci	16 KiB
bureaulogin	Browse Structure Search Insert Empty Drop	6	InnoDB	latin1_swedish_ci	16 KiB
capital	Browse Structure Search Insert Empty Drop	2	InnoDB	latin1_swedish_ci	16 KiB
department	Browse Structure Search Insert Empty Drop	2	InnoDB	latin1_swedish_ci	48 KiB
employee	Browse Structure Search Insert Empty Drop	6	InnoDB	latin1_swedish_ci	16 KiB
enterprises	Browse Structure Search Insert Empty Drop	0	InnoDB	latin1_swedish_ci	80 KiB
experience type	Browse Structure Search Insert Empty Drop	0	InnoDB	latin1_swedish_ci	16 KiB
hrs	Browse Structure Search Insert Empty Drop	0	InnoDB	latin1_swedish_ci	32 KiB
income	Browse Structure Search Insert Empty Drop	0	InnoDB	latin1_swedish_ci	32 KiB
login	Browse Structure Search Insert Empty Drop	0	InnoDB	latin1_swedish_ci	32 KiB
news	Browse Structure Search Insert Empty Drop	9	InnoDB	latin1_swedish_ci	16 KiB
outcome	Browse Structure Search Insert Empty Drop	0	InnoDB	latin1_swedish_ci	32 KiB
position	Browse Structure Search Insert Empty Drop	0	InnoDB	latin1_swedish_ci	48 KiB
sector	Browse Structure Search Insert Empty Drop	0	InnoDB	latin1_swedish_ci	16 KiB
subsector	Browse Structure Search Insert Empty Drop	3	InnoDB	latin1_swedish_ci	32 KiB
technology	Browse Structure Search Insert Empty Drop	0	InnoDB	latin1_swedish_ci	32 KiB
training gave	Browse Structure Search Insert Empty Drop	0	InnoDB	latin1_swedish_ci	32 KiB
training item	Browse Structure Search Insert Empty Drop	0	InnoDB	latin1_swedish_ci	32 KiB
18 tables	Sum	35	InnoDB	latin1_swedish_ci	544 KiB

Figure 5.8 database and table

5.4. Result

The result of these system shows that how the above forms are enter data and register to the database if we input the valid data, the system display successful confirmation message and display error message if we enter invalid data in to the data base.

Enterprises Management Page								
Register			Update			Report		
No.	Enterprises Name	Sub Sector	Est. Year	TIN	Kebele	Workshop	Display	Telephone
1	ejig internet caffe	internet cafe	2004	123345	14	Given	Given	0918078792
2	Ahadu super market	super market	2000	000014025	04	Given	Not Given	0917078792

Print

Figure 5.9 registered enterprises report

The figure 5.10 below shows at enterprise management page displays error if sector primary key is duplicated

Enterprises Management Page		
Register Update Report		
you are entered existed Sector ID! Please Try Again		

Figure 5.10. Error if sector primary key is duplicated

The figure 5.11 below shows the registered employee report and the report can be printed as required.

Human Resource Page

Register Department Register Employee Search Employee Report

Employees List

Emp_ID	Full Name	Sex	Birth Date	Position	Mobile	Profession
EMPB/001	Ejigayehu Zewdu Alemayehu	Male	28/3/1987	Administrator	+251921685804	Bsc Degree in ICT Teacher
EMPB/002	Demekech Desalegn Mamo	Female	19/10/1987	Human Resource	0911078792	Automotive engineering
EMPB/003	adina nigatu alemayehu	Male	17/11/1982	Administrator	0918078792	wedesigner
EMPB/004	Misgana Belay Zewdie	Female	19/7/1999	Training Facilitator	0938141521	Automotive engineering

Print

Figure 5.11 employee report

The figure 5.12 below shows searching of employees by using id

Register Department Register Employee Search Employee Report

Enter the employee ID Number:

Employee ID:

Search

Figure 5.12. Search employee by ID

The figure 5.13 below shows after clicking search employees by id then edit the required field and save to the database.

Register Department Register Employee Search Employee Report

Emp_ID:

Full Name:

Adina Alemayehu

Nigatu

Sex:

Age:

Profession:

Role:

Mobile:

Save

Figure 5.13. Search employee by ID edit and save

The figure below shows update records in enterprise management system

Enterprises Management Page

Register

Update

Report

Update Page

☒ Update Sector

☐ Update Sub Sector

☐ Update Enterprise

Continue

CHAPTER SIX

Test plan

5.1. Introduction

In this project testing is the process of analyzing a system or system components to detect the difference between specified (required) and observed and a systematic attempt to *find errors in a planned way* in the implemented web application and also it find the difference between expected behavior of the system specified in system models and observed behavior. Testing evaluates the project to ensure that it satisfies its planned purpose. This chapter will address the different standards that will apply to the unit, integration and system testing of the specified application. Unit testing finds differences between the object design model and its corresponding component. Structural testing finds differences between the system design model and a subset of integrated subsystems. Functional testing finds differences between the use case model and the system. Finally, performance testing finds differences between nonfunctional requirements and actual system performance. When differences are found, we identify the defect causing the observed failure and modify the system to correct it. In other cases, the system model is identified as the cause of the difference, and the model is updated to reflect the state of the system

6.2. Test Plan Overview

Test Plan is defined as a strategic document which describes the procedure how to perform various testing on the total application in the most efficient way. We can reduce the cost of testing and the elapsed time necessary for its completion through careful planning. The main purpose of this test plan documentation is to describe the testing details of the use case of MSE management System and to identify the features of the system that will be tested, to identify and define all the activities necessary to prepare for and conduct the testing process, to define the pass/fail criteria for each item that will be tested and to discuss the testing techniques being used to test system. After the conclusion of this test document all subsystems of our project are expected to be tested rigorously according to the test cases we have set in the test case specification part of this document. When the system is deployed the system should be able to ignore invalid inputs and as a result the performance of the system will be enhanced. The security part

of the system is also tested according to the test cases set in the login test case specification and the system is expected to be easily unbreakable.

Functional tests can be developed when the use cases are completed. Unit tests of subsystems can be developed when their interfaces is defined. Similarly, test stubs and drivers can be developed when component interfaces are stable.

6.3. Test Objective

The objective of our test plan is to find as many bugs as possible to improve the integrity of our system and to design tests that exercise defects in the system and to reveal problems. Analysis, design and implementation are constructive activities. Testing, however, is aimed at breaking the system. Consequently, testing is usually accomplished by developers that were not involved in the development of the system.

6.4. Relationship to other documents

The test plan depends on the produced system documents in the development cycle of the project of the MSE management system. Functional and nonfunctional requirements identified in the development of requirement analysis and system design will be used to fully exercise the system to uncover its limitations and measure its full capabilities.

6.5. Features to be tested/not to be tested

The comprehensive analysis and test of the MSE management system during all stages of its development and maintenance in parallel with the development process can only be achieved if the system features to be tested or not to be tested are clearly identified. Hence, the following are list of the features to be tested and not to be tested.

6.5.1. Features to be tested

Functional and nonfunctional requirements of the software will be tested using the system testing strategy.

- ***Basic functional requirement test***

- ✚ Database connection, basic operations: add/update/delete/query records in each table
- ✚ User management that is create user name and Password automatically and change password successfully login of bureau employees and entrepreneurs.

- + Employee management like search by id or by full name, by role or by department and edit as required, view employee information and generate report about employees.
- + Enterprises management system include view, delete, update, search etc.,
- + Sector and sub sector management include add, edit, view the result
- + Training management: prepare training schedule, view training taken and participant of the training, view experience sharing by enterprises and employees.
- + Manage announcements, add news, new announcements, add vacancies, promotion etc.
- + Generate Report, print reports
- + Screen messages like warning messages, success messages and error messages will be tested to make sure that they are correct and clear.

- ***Basic Nonfunctional test***

- Design goals such as security, usability, fault tolerant will be tested.
- Classes and their methods that are participants in use cases will be tested using unit testing strategy.
- An integration testing will be made after each class is tested independently and it keeps testing combination of classes until MSE management system has been integrated.

6.5.2. Features not to be tested

- The recovery and maintenance of the MySQL will not be tested as it is impossible to do a test without any knowledge of their internal logics.
- Other items that will not be tested will be due to the shortage of time.

6.6. Pass/ Fail criteria

The success /fail criteria are the following:-

- If the actual outcome and the expected result are the same the pass/fail criteria is “success”
- If the actual outcome and the expected result are different the pass/fail criteria is “fail”.

6.7. Approach

We follow different testing methodology to test the system. This section of the test plan describes the overall approach for testing of the system. The approach followed for testing the MSE management system ensures that the major features of the project are effectively tested. The system validated and verified to make sure that the system meets the sequence diagram. We try to describe test plan approaches we used for testing our system as follows:

6.7.1. Unit testing

Unit testing focuses on the building blocks of the software system which find faults in participating objects and/or subsystems with respect to the use cases from the use case model. This is mainly done to discover errors in the code, to isolate each part of the program and to check the correctness of the code. Subsystems should be tested after each of the objects/classes within that subsystem have been tested individually.

6.7.2. Integration testing:

It is the activity of finding faults when testing the individually tested components together, all or some of the components of the project developed individually would be combined together and tested as a whole system to test the functional and performance requirements on the major items of the system. The integration testing generally follows unit testing where each module is tested as a separate unit.

6.7.3. System Testing

System testing tests all the components together, seen as a single system to identify errors with respect to the scenarios from the problem statement and the requirements and design goals identified in the analysis and system design, respectively. The goal of system testing is to detect faults that can only be exposed by testing the entire integrated system or some major part of it. There are several system testing activities that are performed:

6.7.3.1. Functional testing

Tests the functional requirements (RAD). The MSE management system will be tested based on the requirements to ensure that we built the right application. In doing this test, we will try to find the errors in the inputs and outputs, that is, we have tested each

function to ensure that it properly implements, and that the resulting value is functioning properly. The behaviors of each function are contained in the web application Specification. Like register new record, edit, delete, search and view information.

In addition, we test:

- The interfaces to ensure they are functioning as desired
- The interaction between the GUI and the backend repository. In this case the data will be inserted and check if they are processed in the backend and give the expected output.

6.7.3.2. Performance testing

Test non-functional requirements and additional design goals from the SDD. This test will be conducted to evaluate the fulfillment of a system with specified performance requirements and this will be performed by:

- Trying to store new record and check it records on database the record is correctly inserted.
- Update the existing record and check if it updates the existing once. The system updates successfully.
- Try to search data that is not found in the database then check the result and the result says not available
- Try to login us un-authorized user and check the result and denied to login for an authorized users.
- Try to fill wrong inputs and observe how the system perform and respond quickly the system displays error message.

6.7.3.3. Acceptance testing.

Usability, functional, and performance tests are performed by the customer in the development environment against acceptance criteria (from Project Agreement)

The purpose of the system testing is to validate an application accuracy and completeness in performing the function of the system. In this project by integrating of all modules we test the whole system.

6.8. Testing materials (Hardware/Software requirements)

In order to test each feature we use different hardware and software material listed below:

- Personal computer
- Printer: To print out the reports and documents.
- Browser: browser used to view the result of our system.
- Internet connection.

6.9.Test Case Specification

A test case is a set of test inputs, execution conditions, and expected results. Test cases specify the inputs, predicted results and execution conditions. Each test case should aim to evaluate the operation of a key element or function of the system. Test case also help to test if the system meets its needs or requirements are described below

Table 6.1 GUI test

Test case Name:	GUI test
Purpose:	This test case is done to ensure the system user could use this GUI to interface with the backend database without any difficulties.
Pass criteria:	System users could use this GUI to interface with the backend database without any difficulties
Result:	Success

Table 6.2 database test

Test case Name:	Database test
Purpose:	This test case is done to ensure the database management system basic operations are normal.
Pass criteria:	Results of all basic operations are normal
Result:	Success

6.9.1. Basic function tests case specification identifier

Table 6.3: Login test case specification

Test case Name	Login		
Purpose:	This test is done to ensure that the valid user login to the system		
Test item	To login to the system		
Precondition test case	Name (can't be empty), User name (should not be null), Password (should not be empty)		
Input specification	Input username and password for three trial		
Output specification	Successfully login to the system		
Special procedural requirement	User must be authorized, try only three trial for invalid entry		
Inter case dependencies	Active status		
Input	Expected Result	Actual outcome	success /Fail
All inputs are valid values	The user can login successfully	The user can login successfully	Success
Input field user name empty	The system displays an error message	The system displays an error message "Invalid username and password"	Success
Input field both password and user name is empty	The system displays error message	The system displays error message "pleace insert username and password"	Success
If either user name or password is empty	The system displays error message	The system displays error message "pleace insert username and password"	success
Input invalid password for three continuous trial	The system lock the login form	The system lock and display message "unable to enter"	sucess

Table 6.4: Register new employee test case specification

Test case Name	Register new employee		
Purpose:	This test case is to ensure that the new employee register successfully done		
Test item	Id should be unique, First name, middle name and last name should alphabet department id should not null and all fields must be filled		
Precondition test case	The data clerk or administrator must login successfully		
Input specification	Fill all fields on the form		
Output specification	Successfully register to the database		
Special procedural requirement	User must be authorized		
Inter case dependencies	Active status		
Input	Expected Result	Actual outcome	success/Fail
All inputs are valid values	The system adds the employees to the database and displays confirmation message	The system adds the employees to the database and displays “process done successfully”	success
Make all fields empty	The system displays error message	The system displays error message “fill all fields”	success
Even one field empty	The system asks the user to fill all fields	The system asks the user to fill the fields sequentially by displaying error message, E.g. "Please fill all fields"	success
First name takes numeric value	The system displays error message	The system displays error message “use alphabet only”	success
middle name takes numeric value	The system displays error message	The system displays error message “use alphabet only”	success
last name takes numeric value	The system displays error message	The system displays error message “use alphabet only”	success
If we use duplicate primary key	The system displays error message	The system must display error message “primary key must be unique”	success

Table 6.5: **Register new sector test case specification**

Test case Name	Register new sector		
Purpose:	This test case is to ensure that the new sector register successfully.		
Test item	Sector id must be unique, sector name not empty and alphabet value		
Precondition test case	The data clerk or administrator must login successfully		
Input specification	Fill all fields on the form		
Output specification	Successfully register to the system		
Special procedural requirement	User must be authorized		
Inter case dependencies	Active status		
Input	Expected Result	Actual outcome	success /Fail
All inputs are valid values	The system register the sectors to the database and displays confirmation message.	The system adds the sectors to the database and displays "process done successfully"	success
Make all fields empty	The system displays error message	The system displays error message "fill all fields"	Success
Even one field empty	The system asks the user to fill all fields	The system asks the user to fill the fields and displaying error message E.g. "Please fill all fields"	Success
Sector id duplicate	The system displays error message	The system displays error message "primary key must be unique"	success

Table 6.6: **Register new sub sector test case specification**

Test case Name	Register new sub sector		
Purpose:	This test case is to ensure that the new sub sector register successfully		
Test item	id must be unique, sub sector name not empty and alphabet value, sector id must not be null		
Precondition test case	The data clerk or administrator must login successfully		
Input specification	Fill all fields on the form		
Output specification	Successfully register to the system		
Special procedural requirement	User must be authorized		
Inter case dependencies	Active status		
Input	Expected Result	Actual outcome	success /Fail
All inputs are valid values	The system registers the sub sectors to the database and displays confirmation message	The system registers the sub sectors and displays "process done successfully"	success
Make all fields empty	The system displays error message	The system displays error message "fill all fields"	success
Even one field empty	The system asks the user to fill all fields	The system asks the user to fill the fields display error message, E.g. "Please fill all fields"	success
Sub Sector id duplicate	The system displays error message	The system displays error message "primary key must be unique"	success

Table 6.7: **Register new enterprises test case specification**

Test case Name:	Register new enterprises		
Purpose:	This test case is to ensure that the new enterprises register successfully		
Test item	Id must be unique, all fields do not empty, sub sector id must not be empty, enterprise name must be alphabet		
Precondition test case	The data clerk or administrator must login successfully		
Input specification	Fill all fields on the form		
Output specification	Successfully register to the system		
Special procedural requirement	User must be authorized		
Inter case dependencies	Active status		
Input	Expected Result	Actual outcome	success /Fail
All inputs are valid values	The system register the enterprises and displays confirmation message	The system adds the enterprises to the database and displays “process done successfully”	success
Enterprise name numeric	The system display error message	the system display “use alphabet value”	success
Make all fields empty	The system displays error message	The system displays error message “fill all fields”	success
Make one field empty	The system asks the user to fill all fields	The system asks the user to fill the fields and display error message, E.g. "Please fill all fields"	success
Enterprise id duplication	The system displays error message	The system displays error message “primary key must be unique”	success

Table 6.8: **Register new training schedule test case specification**

Test case Name:	Register new training schedule		
Purpose:	This test case is to ensure that the new training schedule register successfully		
Tested item:	Id not null, name numeric not empty, and other inputs not empty		
Precondition test case	The training facilitator or administrator must login successfully		
Input specification	Fill all fields on the form		
Output specification	Successfully register to the system		
Special procedural requirement	User must be authorized		
Inter case dependencies	Active status		
Input	Expected Result	Actual outcome	success /Fail
All inputs are valid values	The system adds the training schedule to the database and displays confirmation message	The system registers the training list and display "process done successfully"	success
Make all fields empty	The system displays error message	The system displays error message "fill all fields"	success
Make one field empty	The system asks the user to fill all fields	The system asks the user to fill the fields and display error message, E.g. "Please fill all fields"	success
Training id duplication	The system displays error message	The system displays error message "primary key must be unique"	success

Table 6.9 delete training test case specification

Test case Name	delete training list		
Purpose:	This test case is to ensure that the training list deleted successfully		
Precondition test case	The training facilitator or administrator must login successfully		
Input specification	View and select to be deleted		
Items to be tested	Provide appropriate warning to delete the data		
Output specification	Successfully delete from the system		
Special procedural requirement	User must be authorized		
Inter case dependencies	Active status		
Input	Expected Result	Actual outcome	success /Fail
Delete the selected training list	The system Delete the selected training list from the database and displays confirmation message	The system Delete the selected training list from the database and displays "process done successfully	success
Click on delete button	The system displays warning message to delete the data.	The system displays error message "Do you want to delete?" if you click on no button the data remain as it is.	success

Table 6.10: update employee information

Test case Name	update registered employee		
Purpose:	This test case is to ensure that the employee data updated successfully.		
Test item	Search and update data then asks to save or cancel		
Precondition test case	Log in to the system		
Input specification	Search by id, by full name or by department , by role and change as required		
Output specification	Save the updated data		
Special procedural requirement	User must be human resource manager or administrator		
Inter case dependencies	Active status		
Input	Expected Result	Actual outcome	success /Fail
Update the required employee	The system update the selected employee from the database	The system update the selected employee from the database and displays "process done successfully"	success
Search employee By full name and click on search button	The system displays the forms and fill the correct input to the form that is full name	If the employee is not found in the database The system displays error message "Not found" if the employee is already registered, the system displays the employee list.	success
Search employee By id and click on search button	The system displays the forms and fill the correct id	The system displays the forms and fill the correct id if the id is not found in the database display error message "Not found"	success
Search employee by department and click on search button	The system displays the form to fill the department	The system displays the form to fill the department Display the result	success
Search employee by role and click on search button	The system displays the form to fill the role	The system displays the form to fill the role Display the result	success

Select id to edit	To edit the employee select the id on the searched page The system displays the employee information then update the required data and save successfully	The updated information save to the database successfully display “process done successfully” .otherwise display error message ”process failed”	success
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Table 6.11: print report

Test case Name	print the required report		
Purpose:	print report successfully		
Test item	Print the document		
Precondition test case	Log in to the system		
Input specification	Select report to be print		
Output specification	Print data		
Special procedural requirement	User must be authorized		
Inter case dependencies	Active status		
Input	Expected Result	Actual outcome	success /Fail
Print the required report	The system displays the report on the page	The system allow to print	Success
select data and print	Select the report on the page and print it the system displays the print page.	Select the report on the page and print it the system displays the print page and select and print	Success

6.9.2. Environmental needs

- OS: windows 8,
- Tools: PHP, MySQL, HTML and CSS
- Browser: Mozilla Firefox/ google chrome

Finally we test the functionality of the all system from the users view of point by giving short training to the users and collect feedback about the system overall functionality by preparing feedback questioner. The users accept the system and give us positive feedback and when the system implements correctly the new system have many positive impact to the organization in terms of time wastage, human error and material wastage reduction, information delivery to the enterprises etc. Even if the system is many advantages to their organization and replace the manual work, they use oromiffa language in actual work area so they want to change the system to the local language. But because of many constraints we put it as future work.

CHAPTER SEVEN

Conclusion and Recommendation

7.1. Conclusion

The deployment of information technology is becoming more and more critical to the success of an organization. In line with this MSE management information system is web based system for micro and small enterprise development bureau to overcome the existing problem. It is a great improvement over the manual system. The main focus of this project is to develop web based system that manages enterprises such as capable to provide easy and effective storage of information related to enterprises. It is important system for both the bureau employees and enterprises to get new information and to provide fast service.

We studied the existing system using interview, observation, and document analysis and find out the problems. In doing the project we had tried to follow object oriented system analysis and design methodology. Which have a potential to produce safer, more reliable and maintainable code. Since the success and failure of any system depends on gathering the right information through different fact-finding techniques and user involvements, the team has made the best effort to gather requirements. After a detail review and study of the existing system of MSE management system models have been designed to reflect the new system that is supposed to solve problems.

In order to solve different problems existed, we had tried to propose a solution that at least reduce the existed problems and model the proposed system using different tools and methodologies and we use UML diagrams such as use case diagrams, sequence diagrams, activity diagrams etc.. we believe the different tools and techniques has helped us a lot in capturing real user requirements and model the right system for the users for their day to day transactions. Thus it should have the precedence in know-how and experience in collecting, processing and utilizing information.

The main challenge during the design and implementation of the system is lack of adequate time that can be used for testing system. Currently MSE development bureau uses file/ manual based approach which is very tough task to change it to database

approach we start from zero to design and develop and change the existing system to new system.

7.2. Recommendation

Nowadays, the world is highly becoming a competitive world. Organizations have to divert their attention on using the recent technology to be on the first line and competitive. This can be real if they are able to use information communication technology (ICT) to successfully achieve their objective. As we describe in this document, all activities of the organization is done on manual basis. From the various facts that constitute the project, the following recommendations have come to light:

- Attention should be given to the existing practice in the design, development and utilization of the new system.
- Serious consideration should be given for the introduction of the new system.
- The staffing division should have adequate computer facilities for the use of the new system.
- Behavioral change of the users of the system to adapt the new system.
- The bureau must have internet infrastructure for effectiveness of the new system.

Budget should be allocated to take specific measure:

- To change the obsolete hardware instrument by the new one.
- The bureau have to hire/assign reasonable staff (system Administrator) who can maintain the system frequently.
- And we also recommend the bureau to have server for the effectiveness of the system.

7.3. Result achieved

- All the objectives of this project that has been pointed out in the beginning of the project is successfully achieved.
- Number of personnel required is considerably less
- The system can generate report according to the user requirement
- Provides security that deny to enter unauthorized user to the system
- Make easy way to search and update information in the database.
- Make easy way to interact enterprisers with the bureau and provide up-to-date information to enterprises as required.

- The system minimizes the work load of the employees of the bureau.

7.4. Limitation of the project

- Login and password is used for identification of user and there is no facility for guest to login to the system.
- GUI is only in English: interface of our system can't accept different languages spoken with in the country. MSE development bureau of Adama city uses Oromifa language as work language and all manual work is performed in this language but our system do not support such type of language.

7.5. Future works

This project was developed keeping in mind the functionalities for MSE bureau and enterprises. And provides all the functionalities specified in the project document. We tried to simulate the real world environment by generating loads of data storage from MSE development bureau itself. Much functionality can be added over this project so that, the system has more enhanced features and is more efficient such as including all department functionality of the bureau such as human resource and loan process with microfinance in detail and business process of enterprises. As we know Adama is located in Oromia region and they use Oromiffa language so in the future the system will implemented by their mother tongue language. And the other future work is make the system to accessible by the smart phones.

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Appendix

Interview

Interview was made with the manager chief person and investigator of Adama MSE development bureau to understand how the existing system work, problems of the existing system, and other relevant things.

1. When was the organization established?
2. What is the main objective of the organization?
3. Who are the target customers of the bureau?
4. What does customers should do if they want support from the bureau?
5. How you handle the information of enterprises.
6. What is the organizational structure and how many departments are there in this bureau and the main tasks of each departments and how many employees and their specific task in the departments?
7. Does the current system have problems? If yes please state some.
8. How does your organization manage each enterprises found in the city?
9. How you prepare report?
10. How the organizations members communicate with in the organization and with customers and other external body?
11. Are your staffs computer literate and use computer to do their daily duties?

Some manual forms that use in the existing systems are listed in the following tables:

Table 1 new enterprise registration form

የአዲስ አበባ ከተማ አስተዳደር የመንግሥት ቅጽ																	
ተቋም	የአዲስ አበባ ከተማ	አድራሻ					የተመዘገበበት ዘመን	የተመዘገበበት የዕለት	የተመዘገበበት የወር	የአዲስ አበባ ከተማ አስተዳደር	የአዲስ አበባ ከተማ አስተዳደር	የአዲስ አበባ ከተማ አስተዳደር	የአዲስ አበባ ከተማ አስተዳደር	የአዲስ አበባ ከተማ አስተዳደር	የአዲስ አበባ ከተማ አስተዳደር	የአዲስ አበባ ከተማ አስተዳደር	የአዲስ አበባ ከተማ አስተዳደር
		የከተማ	የወረዳ	የከተማ	የወረዳ	የከተማ											
1																	
2																	
3																	
4																	
5																	

Table 2 Format for training report

Type of training	Name of Enterprise	Sector	Number of employees that take training		
			M	F	Total

Table 3: Report by sector

Gabaasa Carraa hojii dhabbi hanga guyyaa 16/06/07																				kan					
		Manufakturing				Tajajiila				Ijarsa				Daldala				Q/Magaala				Walii- gala			
lak	Ganda	Inta	Dhi	Dul	W/t	Inta	Dhi	Dub	W/t	Inta	Dhi	Dub	W/t	Inta	Dhi	Dub	W/t	Inta	Dhi	Dub	W/t	Waggaa			

User manual to use the system

User guide is documentation which is used to make the system easily understandable for the user. The users of this system are MSE bureau employees and enterprises that found in Adama city. The user who need to use this application, firstly they get homepage which consists basic information. This page has login page that allows them to enter into their page. So dear user if you want to access this system fully you should be registered first and enter to registered user home page and choose the privilege allowed to you.

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Functional testing

Tests the functional requirements (RAD). The MSE management system will be tested based on the requirements to ensure that we built the right application. In doing this test, we will try to find the errors in the inputs and outputs, that is, we will test each function to ensure that it properly implements, and that the resulting value is functioning

Login Form

Username:

Password:

☒ MSE Bureau ☐ Enterprise

Login

To use the system the user must register in the system and get username and password. After getting the username and password follow the below figure instruction to enter to the system but the trial will be up to three times otherwise the system will lock.

The diagram shows a 'Login Form' with a paperclip icon at the top left. It contains the following elements: a 'Username:' label followed by a text input field; a 'Password:' label followed by a text input field; two radio buttons labeled 'MSE Bureau' and 'Enterprise', with 'MSE Bureau' selected; and a 'Login' button at the bottom right. Four callout boxes provide instructions: '1/ Enter username' points to the username field; '2/ Enter password' points to the password field; '3/ Select appropriate option' points to the radio buttons; and '4/ Login to enter' points to the 'Login' button.

1. Enter username
2. Enter password
3. Select the right option if MSE bureau employee/ user, select option MSE bureau and if entrepreneur, select enterprise option.
4. Login to the system

In the following figure the user can change their password click on change password button on the page the system displays change password form fill the current username and password, confirm it and click on change button.

The diagram shows a 'Change Your Password' form with a title bar. The form contains four rows of input fields: 'Current Username:', 'Current Password:', 'New Password:', and 'Confirm Password:'. Each row has a corresponding text input field. At the bottom right of the form is a 'Change' button. Five callout boxes provide instructions: 'Enter current username' points to the 'Current Username' field; 'Enter current password' points to the 'Current Password' field; 'Enter new password' points to the 'New Password' field; 'Re-enter new password' points to the 'Confirm Password' field; and 'Click on change button' points to the 'Change' button.

If the entered new password is not matched the system displays the following error message as shown the figure below

Password	
Current Username:	adina
Current Password:	
New Password:	
Confirm Password:	
Change	

When the entered username and password is not the same the system displays the following error as shown on the figure below.

Password	
Current Username:	adina
Current Password:	
New Password:	
Confirm Password:	
Change	
the password is not matched	

If the user enters the invalid username and password up to three trial the system deny to enter to the system and lock the login form. As shown on the figure below



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Login Form

Username:

Password:

☒ MSE Bureau
 ☐ Enterprise

Your inserted username or password is invalid

When the user tries to enter invalid username and password more than three times the system locks the login form and displays an error message: "Please you are unauthorized".

