UNIVERSITY OF DAR ES SALAAM

COLLEGE OF INFORMATION AND COMMUNICATION TECHNOLOGY (COICT)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (CSE)

Mid semester two project report for Bsc. Computer science

Project title: ELECTRONIC DOCUMENT TRACKING MANAGEMENT SYSTEM

Participants

S/N	NAME	REG#	COURSE
1.	SUDI MUSA KIWELE	2018-04-13415	BSC. IN CS
2.	KIBAKA SIMTOVU MUSSA	2018-04-10964	BSC. IN CS

Project supervisor: DR KENNEDY FRANK.

DECLARATION

Hereby **kibaka simtovu mussa** with registration number 2018-04-10964 taking Bachelor of Science in Computer Science at the University of Dar es salaam I declare that, this report is my own work and has not been copied from any other student from University of Dar es salaam or other University and higher learning Institutions, otherwise no copy or party of this report will be produced without my written evidential document or **COLLEGE OF INFORMATION AND COMMUNICATION TECHNOLOGIES(COICT).**

ABSTRACT

Management of documents in organizations is very important in daily routines because documents are a key element in daily operations for storing information for future retrieval. When it comes to an effective and smooth running office environment, there are certain elements that must be implemented, despite the industry you are in. Many organizations use manual system to request and record the movement of documents. Other than that, when the documents need to be stored, they are stored in physical standard way. In most cases the storing has to be done in alphabetical or numbering order. This system lead to misplacement of documents since there is no a system to track the documents location at that particular moment.

Electronic Document Tracking Management System(e-DTMS) is a web-based application that tracks and manages all the students documents movement at any time from one office to another within the university of Dar es salaam . Any office can receive and send documents request at any time. The system enables documents management, document status monitoring and document movement tracking.

ACKNOWLEDGMENT

Firstly we would like to thank almighty God for keeping us strong both physically and mentally also for making us cooperative during the development of the project from the first stage up to this stage.

Also we would like to express our thankfulness to our project supervisor **Dr. KENNEDY FRANK** for his constant motivation and valuable help through the project work up to this stage .

Table of Contents

List of Symbols, abbreviations and Nomenclature.

e-DTMS -- electronic document tracking management system

Chapter 1 INTRODUCTION

Section 1.1: General introduction

This chapter is mainly provide the introduction about this project. Mainly it states the problem to be addressed in this projelct, it clearly provide the objectives of this project which include main objective and specific objective, also provide the significance of this project, scope and limitations of the project and lastly is the organization of the report.

Section 1.2: Statement of the problem.

Currently there is a problem of locating and tracking the important documents in the different level of organization which leads to poor management documents especially in the university of Dar es salaam when it comes to point of student submitting their letters like when their want to postpone studies letters,de-registration, to resume study, freeze study, to unfreeze study due to different reasons it will require students to submit their letters physically .

So this is conducted physically which made students to be unaware of how their documents are processed and take longer time until to get response.

Therefore we come up with a system electronic document tracking management system(e-DTMS) that will enable students to submit document (letters) and receive response regardless of their physical location

Section 1.3: Objectives.

The objectives of this project are divided into two main parts which are Main Objectives and Specific Objectives. This project is going to solve problems of tracking as well as managing students Documents in the university of Dar es salaam.

1.3.1: Main objectives.

The main objective of this system is to develop a web based electronic document tracking management system.

1.3.2 Specific objectives.

The specific objectives of this system are :-

i. To design a computerized system that will track the documents movement from one level to another within the University of Dar es salaam
ii. To design the system that will generate reports of the documents when needed.
iii. Design the system that gives a notification to the students and staff when the document is received or dispatched.

Section 1.4: Significance of the Project

The implementation of electronic document tracking management system will have the following significance:-

- Student can submit and receive responses of their documents remotly
- Time to search document will me totally minimized since all of its information a in the system.
- The misplacing of documents within organization will be avoided.
- It will increase performance since documents will be received and dispatched at the right time.

Section 1.5: Organization of the report

This project is going to solve one among of the problems within the University. This study reviews the electronic documents tracking management only. There are several technologies that can be applied in such a problem but this project is limited to the application of web based system and will be used only under the availability of Network.

Chapter 2: Literature Review

This chapter aims at exploring the literature review dedicated to this particular project field. Mainly it provides the background of this study, it clearly states the problem being addressed in this project.

Information and Data Exchange Advanced System is an advanced file information system developed by the National Informatics Centre in Kerala, India. It is built on Free and Open Source Software. It is a web based application for file tracking system which records details of the files that come into a government office (ex: petitions which are received from citizens). Officers can use the web interface to record or query information of the petitions or files within their offices using Internet or the government's own State Wide Area Network. Citizens and officers alike can obtain online information about the movement of files. It is currently used in the many offices of Ministers and Administrative Departments in the Kerala Government Secretariat. This system has also been implemented in the Office of the Transport Commissioner, Office of the Director of Technical Education, Legislative Assembly and the Kerala State Planning Board.(KRASNIQI, 2013)

As it is understood, the system is very powerful in managing petitions and it is widely implemented in India's Government Offices. It contains only a powerful search engine which helps finding and tracking petitions or other files you sent to specific office of government. While in the other hand it has a management system that lets responsible persons manage those files. Comparing with File Tracking System, this is one of the projects that have some similar functions with it, or better to say it's a project that tracks files as this FTS does. However this is completely organized in a way to serve the government offices whereas FTS is organized to serve all paper-related offices, especially Institute or University.
This means that IDEAS is organized to work between citizens and government (outside-inside), whereas FTS is organized to work between the offices staff (inside- inside).

Section 2.1 Topic review

Computers have become part of life for accessing almost any kind of information. Life in the 21st century is full of technological advancement and in this technological age it is very difficult for

any organization to survive without utilizing technology. According to (Crede & Mansell, 1998) Information Communication Technologies(ICT's) are crucially important for sustainable development especially in developing countries. ICTs have made it possible to quickly find and distribute information.

Section 2.2 Objectives of Computers in Electonic document tracking System

Computers were developed to simplify work. As more people motivated to use computers the more increase in the expansion of the technology. The simplification of computers in the file tracking system is further more discussed in the following section as follows:

2.2.1 Time Saving

Savings in time is an object of computerization. Computers should be used whenever it is important to save time. It is important that jobs should be completed in a specified time such as tracking file . Time so saved by using computers may be used for other jobs.

2.2.2 Accuracy

Accuracy in various records such as sales is the most important in business. This can be done without any errors or mistakes with the help of computers. It also helps to locate the errors and frauds very easily.

2.2.3 Minimization of Frauds

Computer is mainly installed to minimize the chances of frauds committed by the employees, especially in maintaining sales records and handling cash.

2.2.4 Effect on Personnel

Computer relieves the manual drudgery, reduces the hardness of work and fatigue, and to that extent improves the morale of the employees.

2.2.5 Labor Saving

It refers to annual savings in labor cost or increase in the volume of work handled by the existing staff.

Section 2.3 Advantages of Computerized File tracking

A computerized file tracking system brings many advantages that are unavailable to manual systems. Here are the advantages of using computerized file tracking system in any organizations which are still using a manual way of tracking files. These advantages are narrated as follows:

2.3.1 Better Quality Work

The transferring file with the use of computers are usually uniform, neat, accurate, and more legible than manual job.

2.3.2 Lower Operating Costs

Computer is a labor and time saving devise. Hence, the volume of job handled with the help of computers results in economy and lower operating costs.

2.3.3 Improved Efficiency

Computer brings speed and accuracy in preparing the records and thus, increases the efficiency of employees.

Section 2.4 Related works.

In order to manage and track files as well as Document within an organization, several countries has tried to develop some related works about this field.
The following are some of lite review in this case study :-

a) Case study 1- Easy File Tracking System

Easy File Tracking System was developed for Jabatan Imigresen Ipoh, one of the institution in Malaysia. The purpose of this system was to help staff at administration and financial department to manage the confidential files and records. It also helps staffs to work more efficient and systematic. This system helps staffs to arrange the department confidential files, correspondences and other documents.

Objectives

The main objective of EFTS is to manage all department file and reducing the problem in the current system. A properly designed EFTS is an interactive software-based system intended to help management staff to compile useful information from raw data, documents and business models to identify and solve problems. The objective of the system is;

i. To produce online files management

ii. To facilitate staff to manage the department files.
iii. To give action for new contents of files
iv. To generate files management database
v. To procure and update files record
vi. To generate report for files management
vii. Reducing administrative costs.

b) Case study 2-File tracking system for university of kashmir .

This is a system developed for the university of kashmir also called FILE TRACKING AND MONITORING SYSTEM (FTMS) . The system is used to monitor the movement of files and receipts and assist in their easy tracking. Its features include generation of receipts and files, updating its status, opening of new files, tracking the movement of files, dispatching letters/files, recording their track.

b) File Tracking System in New Delhi, India

Other system, which was implemented in New Delhi's Government and which was done by the Department of Personnel and Training of the same National Informatics Center in India, had some similar functions with FTS. It is a web application used inside government to create, send and track their files (receipts). It enables the users to maintain a consistent watch over the movement of various important files in the process of decision-making. It contains a single module for all the staff. The adminisotrator (person responsible for receipts) was the one who created the file (receipt) and forwarded to dealing person to deal with it. The dealing person entered the module and went to the forwarded files section to see the file for further instruction. If the file was ok at all, the dealer was the one who closed the file (cannot be forwarded anymore). This web application was developed for a Forest Department of Pradhya, India. Comparing with File Tracking System it has a lot of disadvantages. One of them is the security issue. In any possible hacking situation, all the files could have been manipulated because of only one module. Also having only a module can make managing harder. A solution to those issues is the creation of multiple modules, independent from each other. Furthermore it is a simple web application that deals only with tracking of file. No other functions are implemented, whereas FTS system has an activity log also implemented in tracking of files.(Bandaya, Sheikha, & Ratherb, 2015)

As a conclusion both of these platforms play a similar role in archiving files however they differ from each other a lot, because one has to deal with physical interference while the other one has to deal with virtual interference

Chapter 3

Methodology.

This chapter presents the methods and techniques used to structure, plan and develop the system.

Refer to the framework used to structure, plan and control the process of developing the system which helps to meet the objectives of the system, the choice of the methodology was based on the requirements specification of the system from the intended user, time to complete the project, the nature of the project and team of developers.

This project uses the Agile System Development Life Cycle Model. Agile SDLC model is a combination of iterative and incremental process models with focus on process adaptability and customer satisfaction by rapid delivery of working software product

Agile Development is based on the idea of completing bits of the work in small chunks called sprints. The product is built bit by bit, feature by feature, and at each stage, analysis takes place to see if the product needs to evolve from its original scope. In this project therefore, the computerized system to be developed was broken into small incremental builds. These builds were then provided in iterations. The result of these iterations were small incremental releases with each release building on previous functionality.

The choice of Agile SDLC Model was due to the following reasons:

- The project could easily be divided into discrete features.
- The model fits well in development of time critical applications. Unlike the waterfall model, in agile model very limited planning is required to get started with the project.

- The project welcomes late changes. Using Agile SDLC Model, new changes can be implemented at very little cost because of the frequency of new increments that are produced.

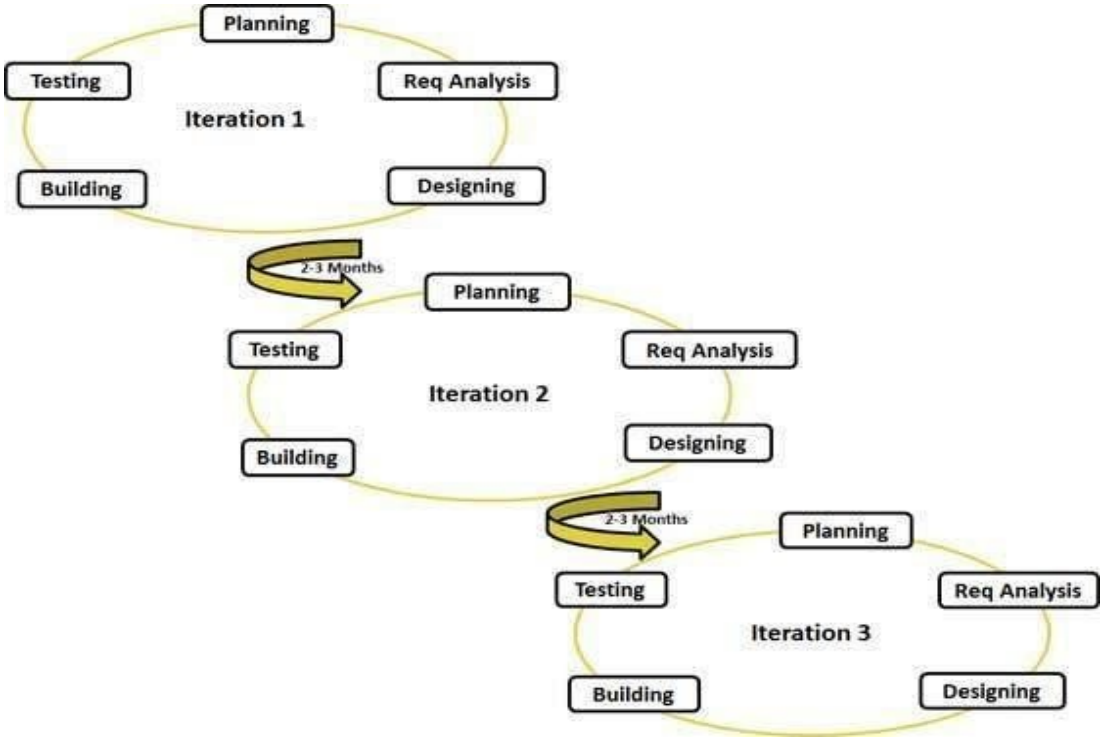


Figure 1 Agile methodology iteration

The agile methodology which we used was extreme technology

Extreme programming (xp)

Is a methodology that aims at delivering software within a short time interval, it allows flexibility within the modelling process. The main goal of XP is to lower the cost of change in software requirements, as for us it was favorable because we are not expert, during the development we have to learn also so we may need many changes.

The practice that make Xp to be better is test driven development and pair programming, continuous

integration and design improvement, small releases, simple design and system metaphor collective code ownership

Using this methodology make us a lot of achievements because it allows us to interact with each other and supervisor as we have a small release of the user story which has specific function, give us the opportunity to learn as reducing the length of development and feedback cycles. Because of early testing, we only write code to meets actual needs at the present time in a project and to reduce the complexity and duplication in the code. Also allows to rewrite some codes when becomes complex, work in pairs, sharing one screen and keyboard (which also improve communication) so that all codes can be reviewed when written**z**C stem Analysis and Design hapter 4 - Sy

- Section 4.1 - Requirements Gathering

Requirements gathering is one of the most essential parts of any project and adds value to a project on multiple levels. When it comes to smaller budgets, tighter timelines and limited scopes, exact documentation of all the project requirements become crucial.

—Requirement gathering is a communication process between the parties involved and affected in the problem situation.

—The tools in elicitation are meetings, questionnaire, interviews, video conferencing, e-mails, and existing documents study and facts findings.

In our project ,we conducted different interviews asking secretaries from different departments on how they manage documents , explained to us the whole procedure on how documents flow from one office to another and what sort of document that a student is able to submit to the university of dar es salaam

- Section 4.2 - Requirements and System Analysis

Requirement is a description or statement of a function that the system must perform or do, It is a feature or condition that a user seeks to have implemented in a system

A requirement is simply a statement of what the system must do or what characteristic it needs to have. Business requirements describe the “what” of the system, and system requirements describe “how” the system will be implemented. A functional requirement relates directly to a process the system has to perform or information it needs to contain. Nonfunctional requirements refer to behavioral properties that the system must have, such as performance and usability. The Methods used to collect the requirements were observation, interview, brainstorming and online search.

4.2.1 Functional requirement

are those that relate directly to the functioning of the system. These are the aspects of the system the client is most likely to recognize.

Ref #	Function description	Category
F1	System should allow user to create/publish new documents	Evident
F2	System should be able to allow user upload a relevant document	Evident
F3	System should be able to tack movement of document in each level of organization	evident
F4	System should be able to allow user to search documents docments available to him/her	evident
F5	System should able give notification when document received o dispatched as well as when maximum number of days to process it are exceeded.	evident
F6	System should allow Administrator to manage All users in the system	evident
F7	System should allow Administrator to delete and add new user	evident
F8	System should verify user using user name and password	Evident
F9	System should be able to grade users according to their level	hidden

4.2.2 Non functional requirements

They are constraints/restrictions imposed on the system –these may include the use of specific hardware and software and budget and time constraints.

Attributes	Constraints
Operational	The system should be able to work at any browser
performance	The system should be available for use full time i.e 24 hours
Efficiency	The system should be able to fulfill its purpose with the best possible utilization of all necessary resources, storage, transmission channels and peripherals
Usability	The system should be easy to use for all type of its users and reach the satisfaction level of usability

4.2.3 Identification of use case

In software and system engineering, a use case is a list of steps typically defining interaction between a role known as actor and a system to archive a specific goal. The actor can be human being or an external system which can interact with the system. The use cases and respective actors are identified in table below:-

Table : Identification of use case

Use case	**Actors**
Login	Student,Staff, administrator.
Check document status	Students, staff, Administrator
Search for document	Student, Staff, Administrator.
Add user	Administrator.
Delete user	Administrator.
Change password	Staff, students, administrator.
Report	Administrator
View document details	Student, Staff, Administrator.
Upload the document	Students, Staff, Administrator
Update document	Administrator.
Logout	Student, Staff , administrator.

5 Use case diagrams

Use case diagram is a representation of a user's interaction with the system and depicting the specifications of a use case. A use case diagram can portray the different types of users of a system and the various ways that they interact with the system. This type of diagram is typically used in conjunction with the textual use case and will often be accompanied by other types of diagrams as well

Use case diagrams are presented in figures:-

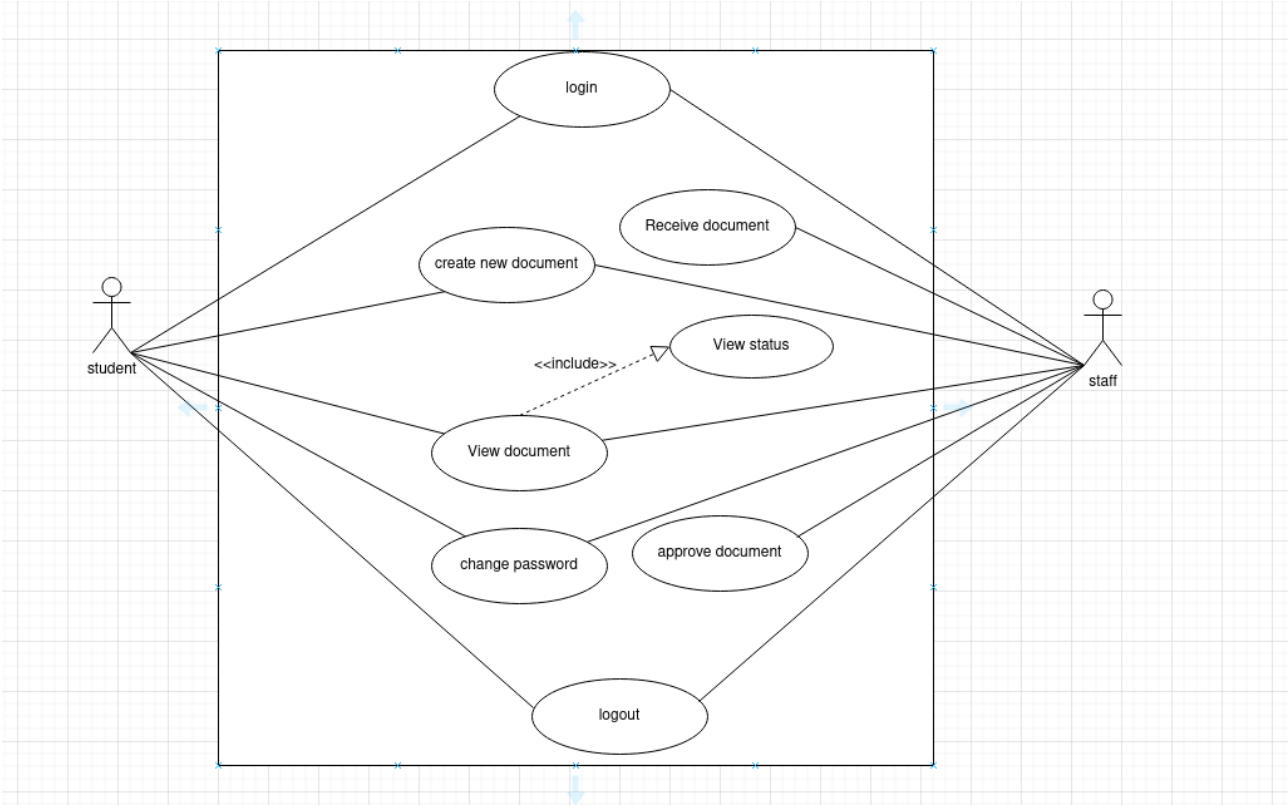


Fig 2: Use case diagram for student and staff

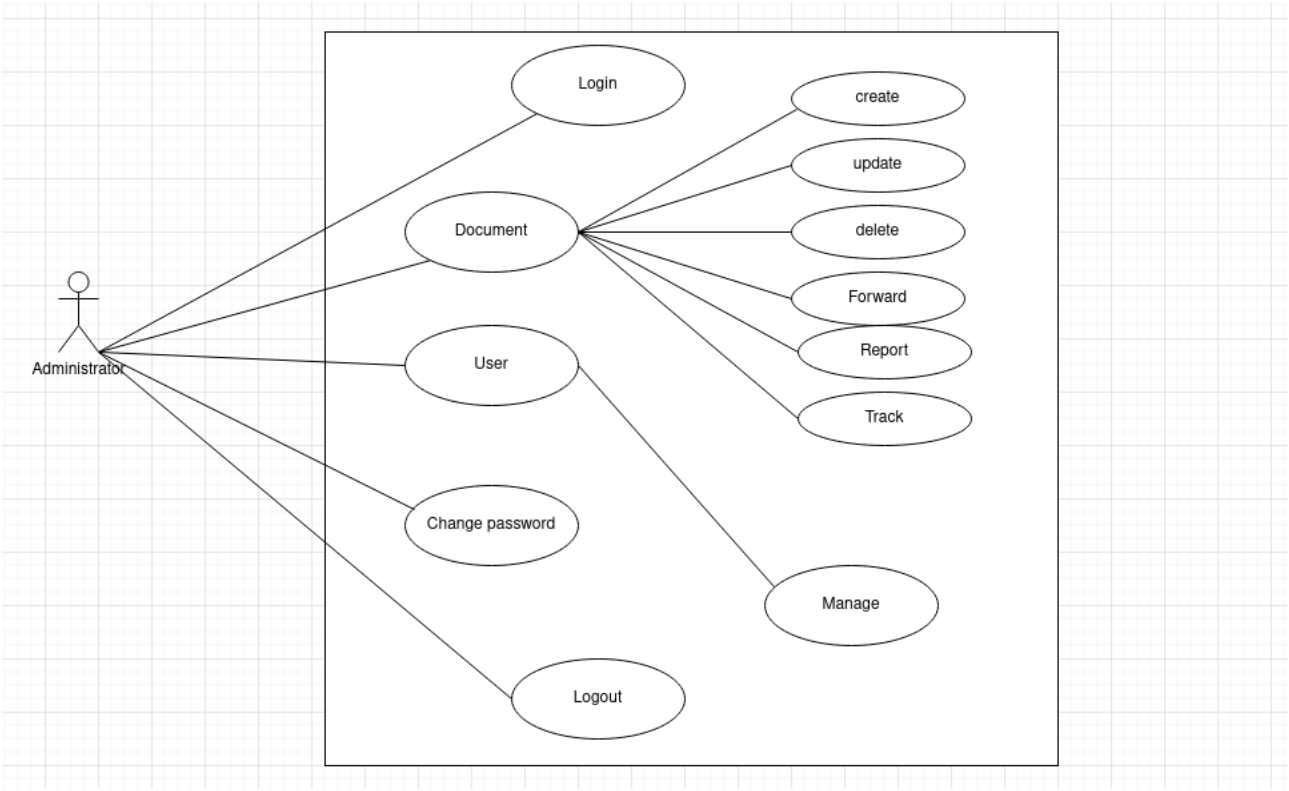
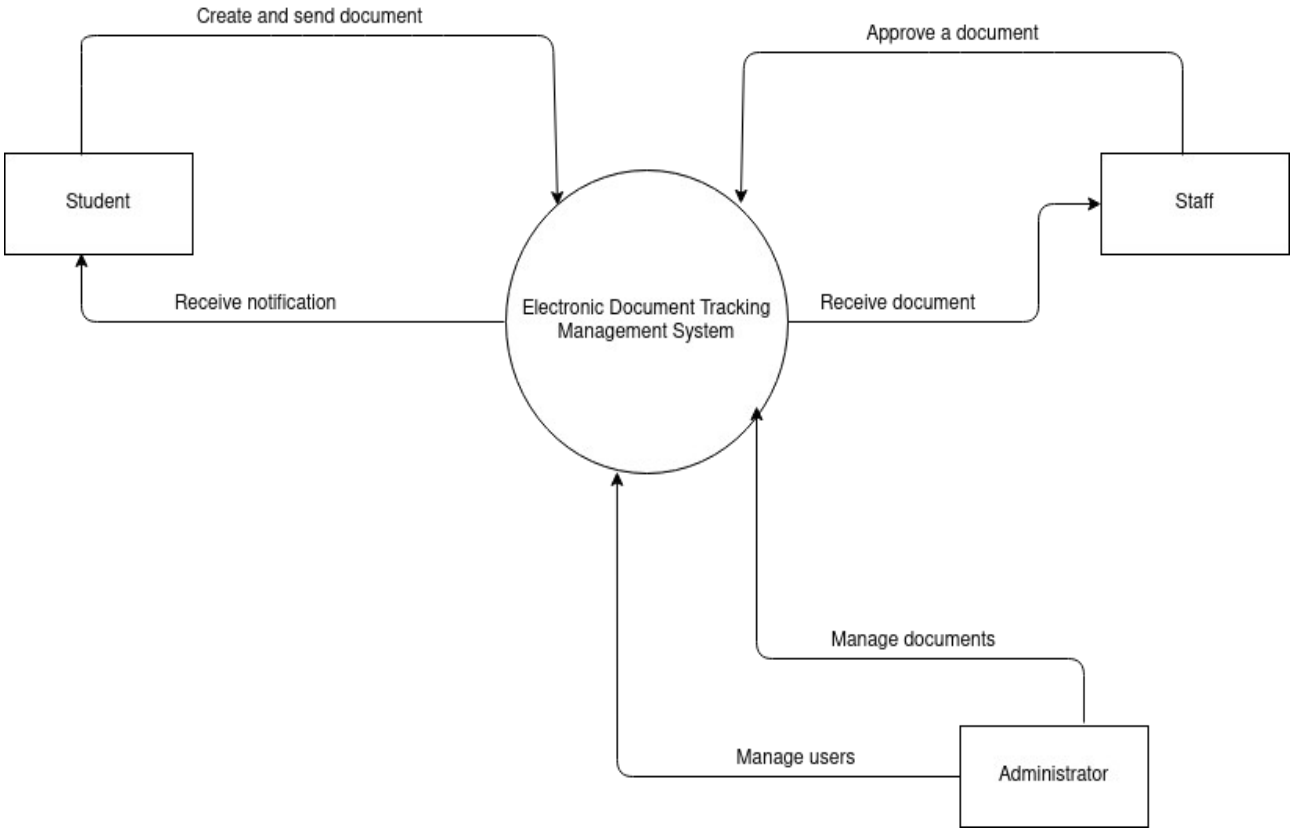


Fig 3: Use case diagram for admin

4.2.4 Data Flow Diagram (Context diagram)

A context diagram is a level 0 data-flow diagram that identifies the flow of information between

the system and external entities. Context diagram for the electronic document tracking management system is shown below:-



e-DTMS context diagram

Fig 4: e-DTMS context diagram

4.2.5 System sequence diagrams.

System sequence diagram is the sequence diagram that shows, for a particular scenario of the use case, the event that actor generates, their order and possible inter-system events. Sequence diagrams model the flow of logic within your system in a visual manner, enabling you both to document and validate your logic, and are commonly used for both analysis and design purposes.

Sequence diagrams for the electronic document tracking management system we are going to develop are
presented in figures:-

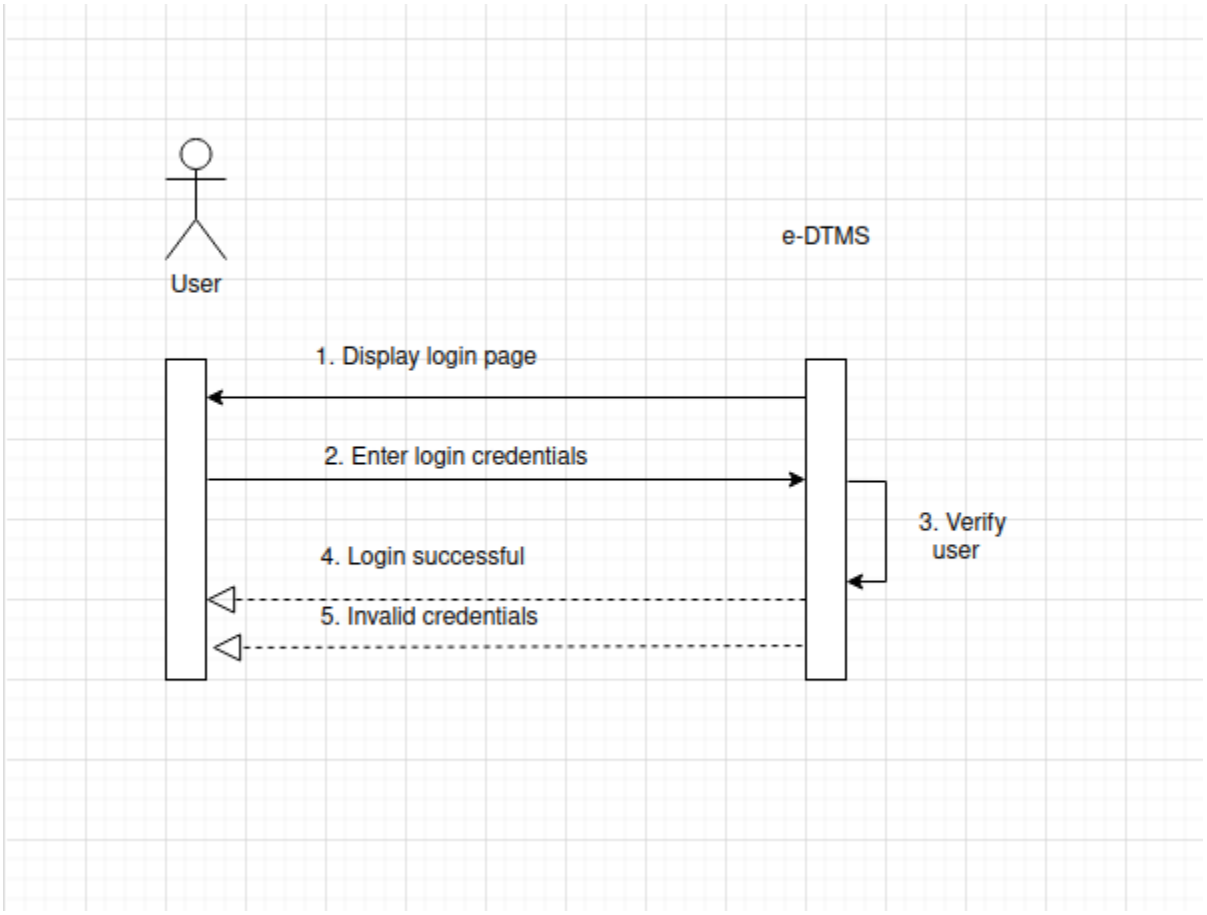


Fig 5: Sequence diagram for user login

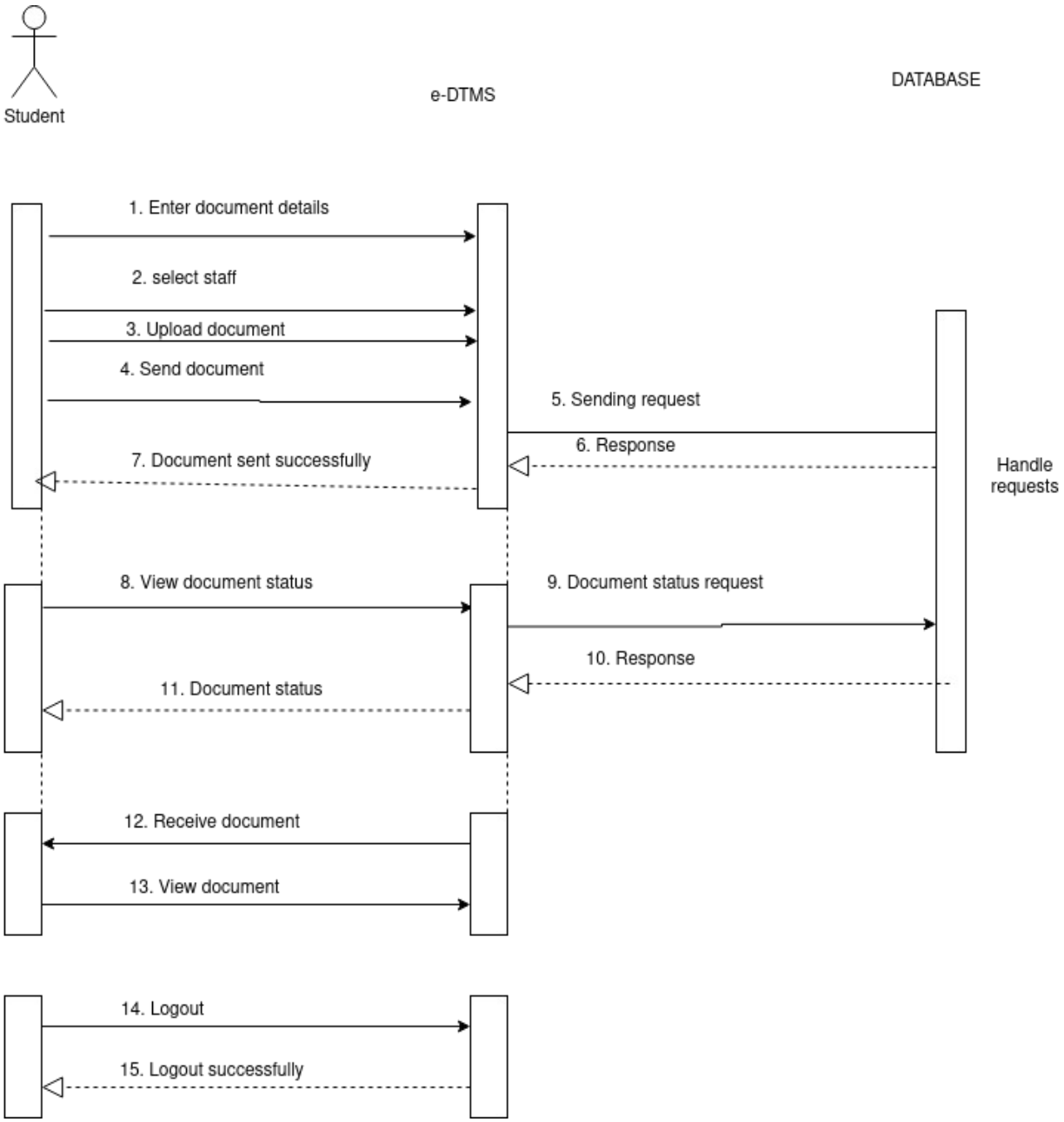


Fig 6 : Sequence diagram for student

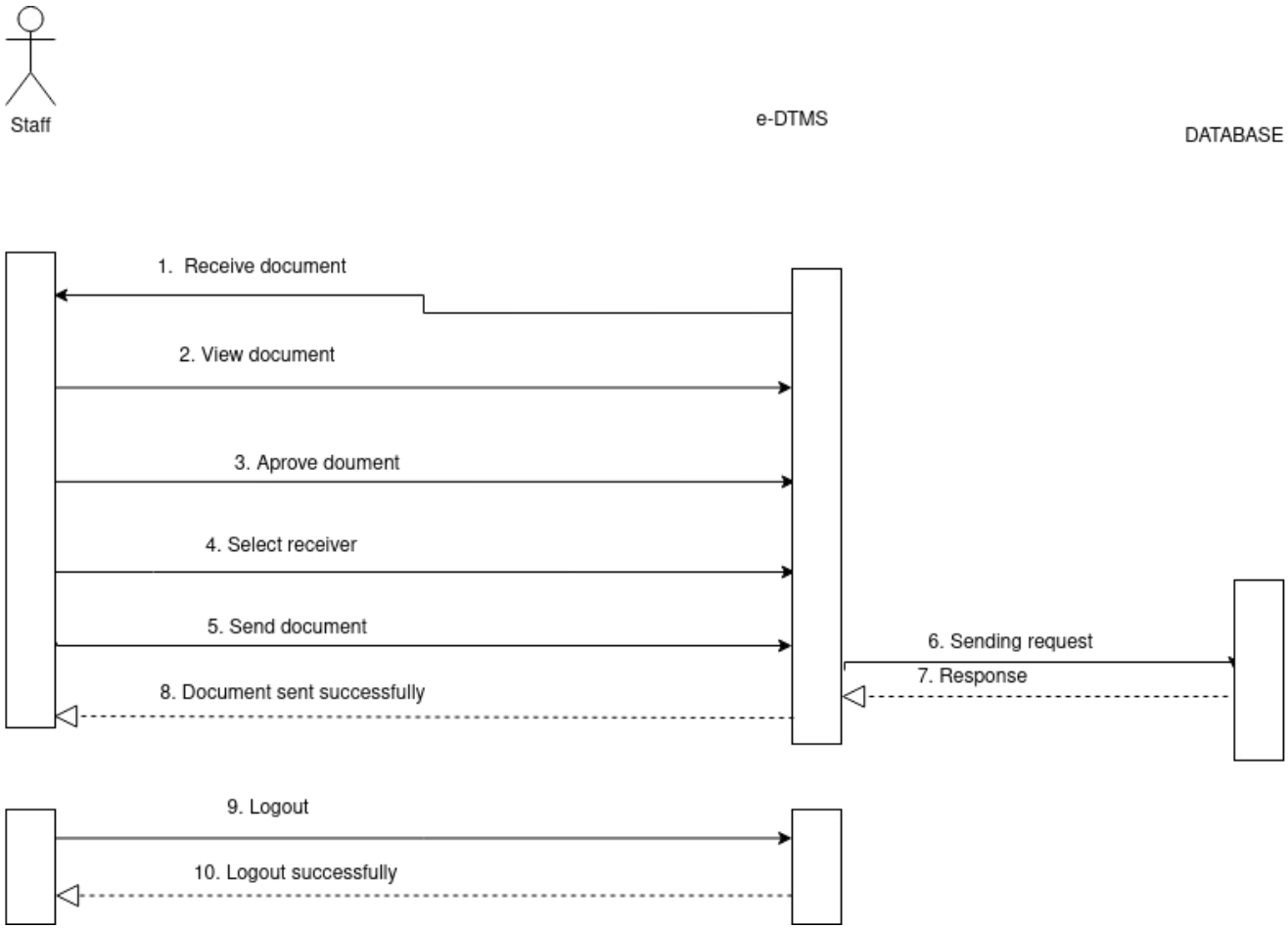


Fig 7 : Sequence diagram for Staff

4.2.6 Database design

Entity Relationship Diagram(ERD)

An ERD is a picture which shows the information that is created, stored, and used by a business

system. The basic steps in building an ERD are these identify the entities, add the appropriate attributes to each entity, and then draw relationships among entities to show how they are associated with one another

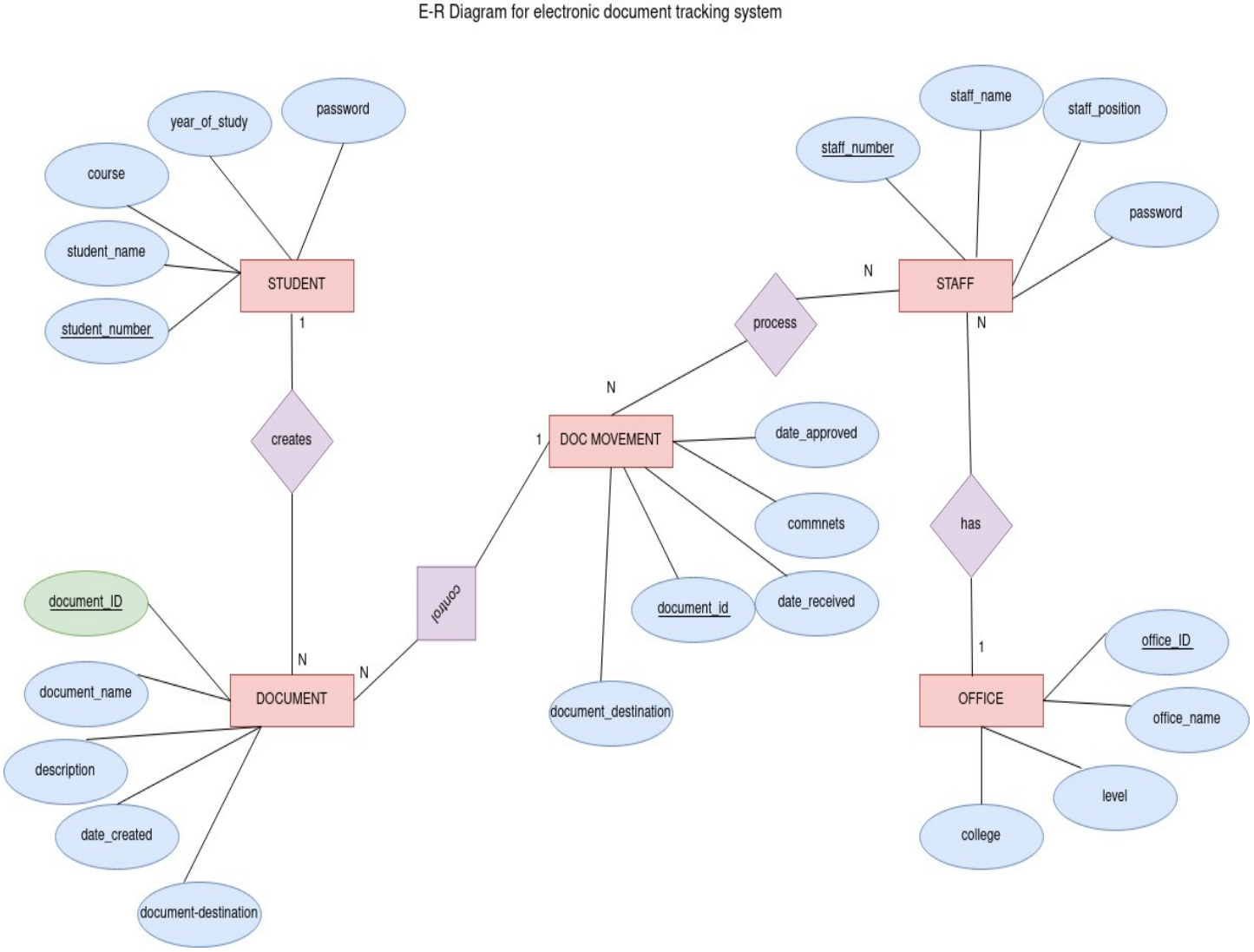


Fig 8 : E-R Diagram for e- DTMS

Chapter 5

Implementation

Section 5.1 software used.

During the development of this project, the following computer tools were used

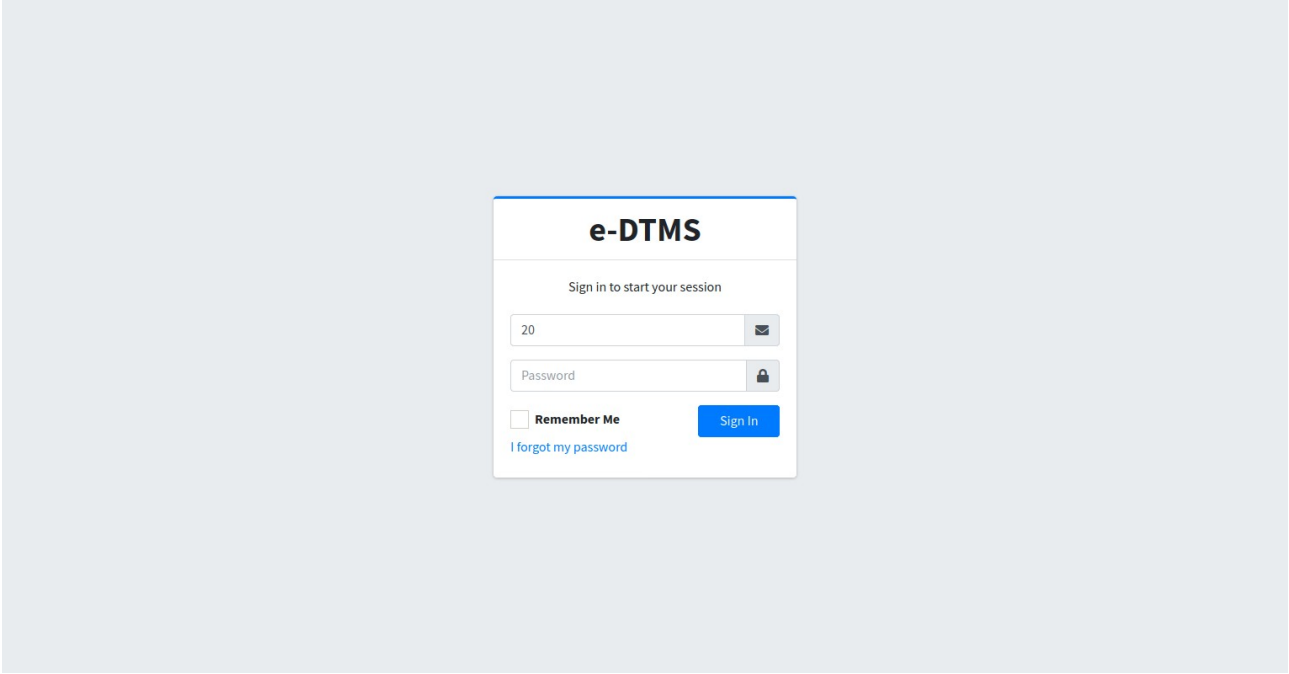
Software	Description	**Uses**
Visual studio code	Is an IDE used in computer programming, and is the most widely used javascript IDE, it contains a base workspace and an extensible plugin system for customizing the environment	To develop, execute and testing code
lamp server	Is a free and open source cross-platform web server solution stack package ,consisting mainly of the Apache HTTP server,MariaDB database and interpreters for scripts	Local web server for testing and deployment purpose of the database
Drawer.io	Graphic software which offers a wide variety of built-in shapes, objects, and stencils to work with.	Draw different diagram user cases, data flow diagram, process diagram
UML	is a standardized modeling language consisting of an integrated set of diagrams, developed to help system and software developers for specifying, visualizing, constructing, and documenting the artifacts of software systems, as well as for business modeling and other non-software systems	Draw class diagram and ERD diagram

Section 5.2 user interface implementation.

In our implementation of electronic document tracking management system, we have a number of interfaces which helps users to interact with the system in accomplish their tasks according to the functionalities provided by the system. According to the progress of our implementation here are some of the interfaces in our system.

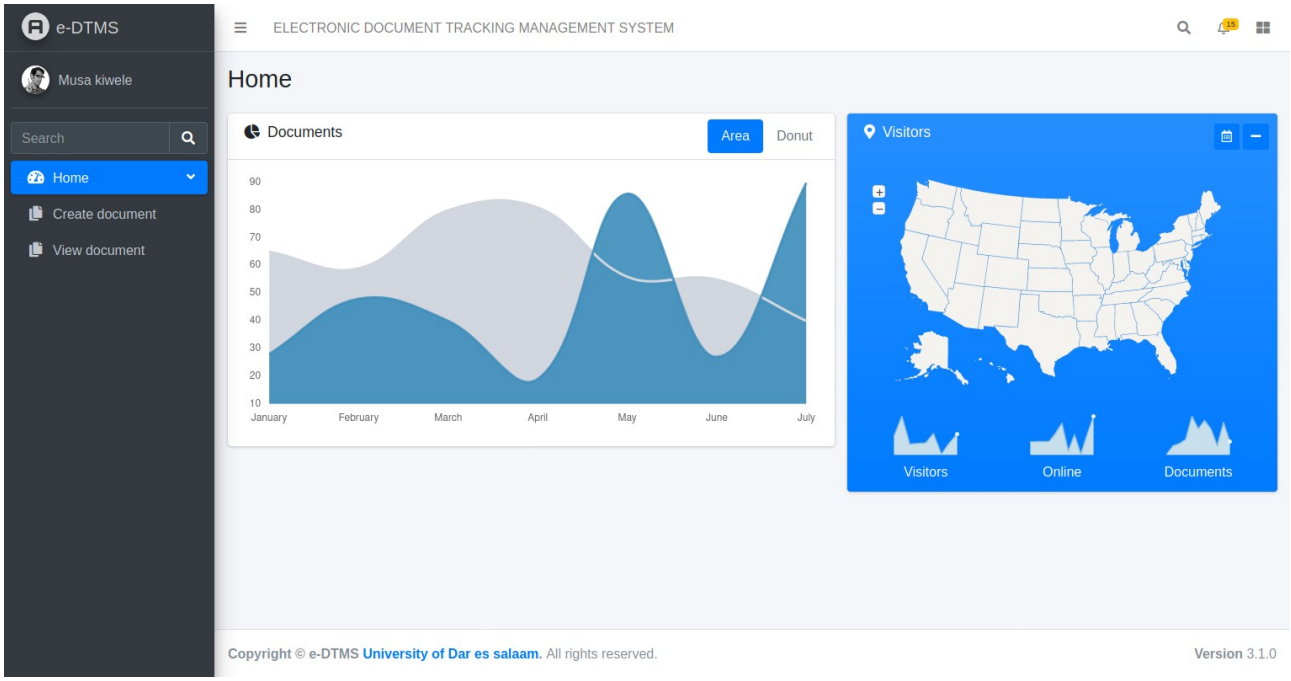
5.2.1 Login page.

This page has a field to accept username which is a registration number of the user and password. Also there is a link which direct user to the page that will help him/her to recover a forgotten password.



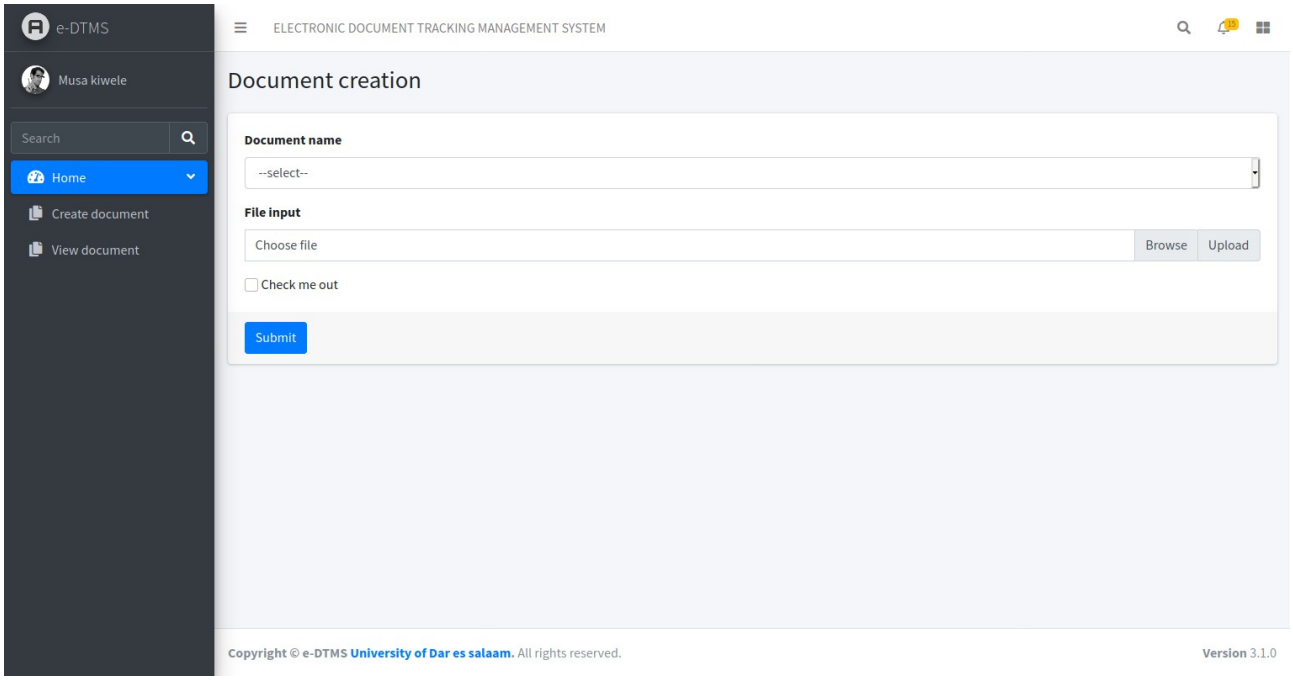
5.2.2 Home gape.

After a user has login into the system will be directed to the login page where some statistics of created documents and received documents will be displayed.



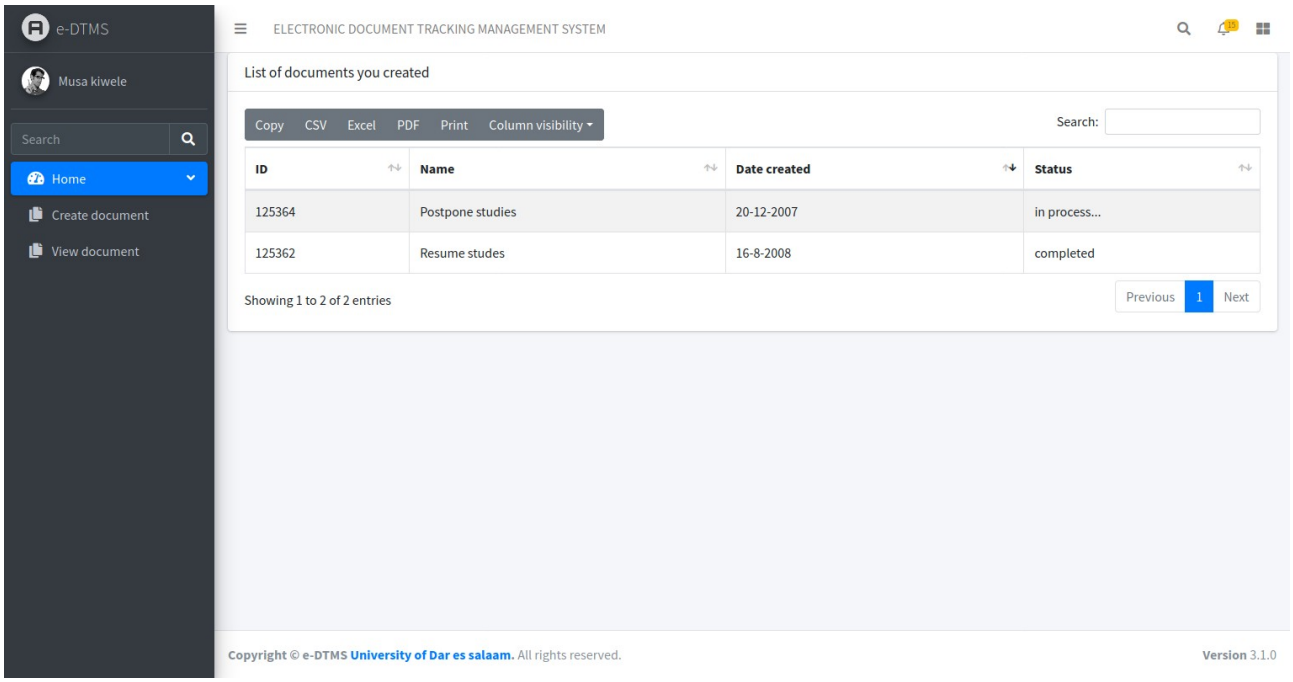
5.2.3 Document creation page.

This is the page especially for the student to create different documents and when the documents are submitted by student will be directly received by the secretary of respective department.



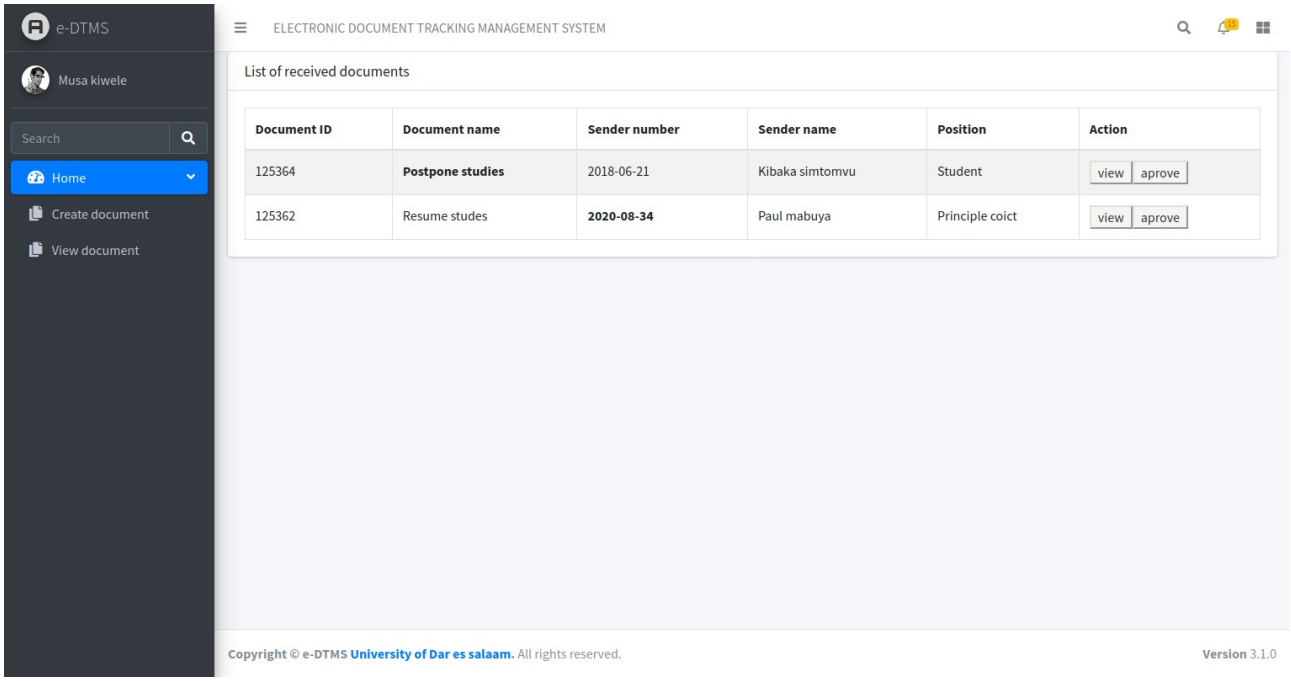
5.2.4 List of created document.

This page specifically display the list of documents created by the user including their status if are completely processed or are in process.



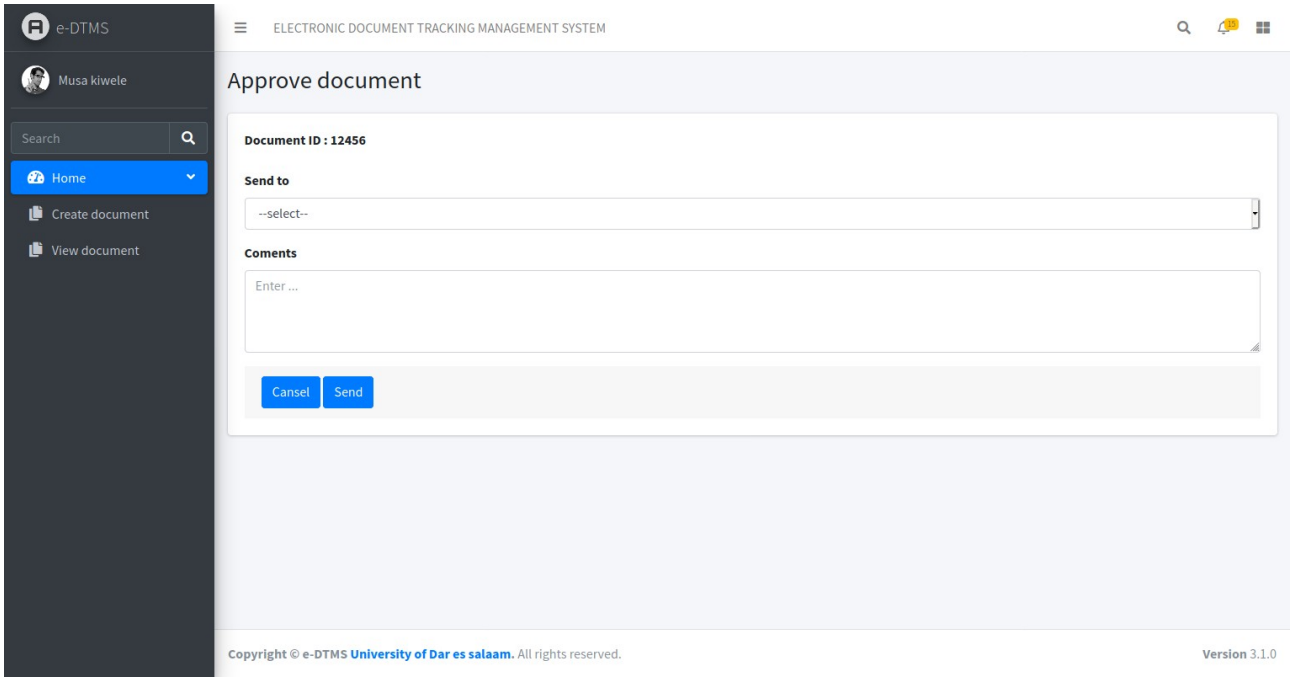
5.2.5 Received document page.

This page also display the list of received documents after the user has been notified from notification bar near the top corner of the page. It also has an action column which allow user to view and approve document.



5.2.6 Document approval page.

This page if for staff and secretary where after viewing a document they can approve to send a document to other offices or staff. And also the document can be cancelled to send back to the user if there is an error of incomplete of information



Chapter 6.

Conclusion and Recommendations

Section 6.1- Conclusion

Among the valuable programs designed to enhance student's learning and understanding is the practical training program. It exposes students to the experience and challenges existing in their careers. It is the best way to measure student's understanding and skills by testing the ability to put the theoretical study into practice and making the appropriate application of the gained knowledge in bringing about the development of the country and of the world at large.

In this project, we developed an automated system that facilitates the various activities taking organization for movement of the file and generate a different report about the file.

The system developed in this project consists of user side and data side. The user side of the system takes most of the activities. The prototype of the system has been tested with us and it has shown that the system effectively performs its activities example in user side the administrators are able to create, update and delete file, manage other users and also transfer the file and secretary able to see the file that is transferred to his/her office and also transfer it to another office.

Apart from developing the system, the team has gained various skills such as:

Working in a team (Team Work)

Working under pressure with or without supervision

Section 6.2- Recommendation

We recommended the institute to use the system in order to check the accountability of the user (staff members) at the working environment, to prove the process of transfer documents and performance of work as the system will provide the performance report for each office in delaying the movement of the document

Also should engage to different technology like uses of scanner to prove the performance of the system, minimize the human error and dependability of human performance.V

Nevertheless, the Institute should supply some of the devices that will help the student on the implementation and testing session or phase.

These devices can be such as switch, router and Ethernet cables in order to test the performance of the system either on the intranet or internet.

Finally, the Institute of Finance Management should emphasize more practices on the theory learnt on the subjects in order to gain more experience practically and theoretically. And also the Institute should foresees on what the market or industry really needs, so that they can supply the knowledge to the students of the certain field of study theoretically and practically (so that they can capture an experience).Therefore, the student can use the knowledge acquired to apply to their working environment or compete in employment market.

REFERENCES

Bandaya, M. T., Sheikha, S. A., & Ratherb, J. A. (2015). File Tracking System for University of Kashmir: Design Guidelines and Model Implementation.

Borrie, H. (2004). *The Firebird Book: A Reference for Database Developers*. Apress.

Crede, A., & Mansell, R. (1998). The Importance of Sustainable Development: ICTs in Developing Countries. *Booklets I&IV, E-Journal Research*.

Kelly, D. (2009). Methods for Evaluating Interactive Information Retrieval Systems with Users. *Foundations and Trends® in Information Retrieval*, *3*(1–2), 1–224. https://doi.org/10.1561/1500000012

KRASNIQI, H. (2013). FILE TRACKING SYSTEM.

LLP, E. & Y., McGee, J. V., Young, E. &, Prusak, L., & Pyburn, P. J. (1993). *Managing Information Strategically: Increase Your Company's Competitiveness and Efficiency by Using Information as a Strategic Tool*. John Wiley & Sons.