ADDIS ABABA SCIENCE AND TECHNOLOGY UNIVERSITY

COLLEGE OF ELECTRICAL AND MECHANICAL ENGINEERING

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

COMPUTER ENGINEERING STREAM

INTERNSHIP REPORT

Company Name: **AASTU ICT Directorate**

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Addis Ababa, Ethiopia

Declaration

We declare that the presented report of internship is uniquely prepared by us after the completion of three months of internship work at Addis Ababa Sciences and Technology University ICT directorate. We have been under guidance of our academic advisor, Mr. Netsanet Getnet and industry advisor Dr. Asrat Mulatu.

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Abstract

AASTU Data tracking system is mainly concerned on minimizing cost and time and also prevent the lost and delay of different types of application letters or requests. This platform is an easy way of applying different application letters like letter of leave and promotion from the lectures towards the department, and also letter of recruitment from the department towards the college.The user of this platform can see the pending of his request and he has also all the records of his requests.Totally this web site saves time and also enables the applicant to track his request from the begining to the end.

Executive Summary

Internship program is compulsory for the regular students and necessary for the completion of the degree. This is the internship report based on the three-month long internship program that we had successfully completed in AASTU ICT directorate as a requirement of our BSc program on Department of Computer Engineering at AASTU University.

This report describes the operations of the AASTU ICT Directorate, potential organizational divisions and work distributions, and how we participated in the design, development, testing, and research studies of numerous software applications and systems, both those that were already being developed, studied, and those that were specifically assigned. A brief history of the projects we worked on will be provided in the report, along with specifics on how the Initiatives, tasks, and studies were carried out.

We have acquired new technical skills throughout the work term. We have grasped new knowledge in the area of UI/UX designing and web development.
We have also been introduced to the real-world skill of time management, research methodologies and approaches and requirement specification. Most importantly, the work experience was very good which included good fellowship, cooperative teamwork and accepting responsibilities.

This report concludes with our overall impressions of the work experience as well as the opinion of the Industrial Internship Program in general.

Acknowledgment

First and foremost, our greatest and deepest gratitude goes to the almighty God for keeping us alive to finish our internship program vibrant and healthy. Next, we would like to express our deeply heartfelt gratitude and thank to our industry advisors Dr. Ashenafi Yadessa and Dr. Asrat Mulatu and our academic advisor Mr.Netsanet Getnet for following us up in every aspect of our work. Besides that, our appreciation goes to Human Resource staff members and Dr. Samson dean of collage of electrical and mechanical, for giving the necessary information about the current manual document management and tracking system. Finally, we would like to give our gratitude for our university, which gives us the internship program to acquire real life job experience, and we would like to thank AASTU ICT Directorate for accepting us to share their experience throughout the whole internship time.

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Chapter one: Introduction

1.1. Background of the company

Addis Ababa Science and Technology University is one of the new public universities of Ethiopia, which is mainly established in 2011GC to play as a forefront-changing actor in the technological transformation of the country by creating strong linkage with industries. In line with the given strategic direction of Ethiopian development, the university has a mission to be problem solver of the industry, leading in the nation research, recognized in continental and international community.

To achieve this mission, the university has given special attention to strength the university –industry linkage (UIL). Strong university- industry linkage is the core point to bring change in the national development. AASTU is commented to strengthen and work with industries to bring mutual benefit for both industries and the university.

AASTU aims at conducting demand-driven research in science and technology to address the challenging issues in the country's development plan. The outputs from the researches are to bring academic excellence and with an entrepreneurial spirit to transfer into the commercial domain, thus strengthening the links between the university and the local community, as well as benefiting the wider society. Therefore, AASTU has been working with industries and communities in the following collaborative areas: -Consultancy projects, Joint researches, technical training, Community services, and Competency exam services for new employees.

AASTU is a university-in-the-making, and a large portion of its near-term ambitions center on constructing academic infrastructure and facilities, hiring staff, and developing manpower. The institution has so far been successful in hiring 472 academic staff members and 391 administrative workers, per the data received from HR. Specifically the staff recruit, promotion and leave or termination is done by the involvements of the departments, colleges, academic vice president and human resource directorate.

AASTU has four colleges:

- College of Architecture and Civil Engineering
- College of Natural and Social Sciences
- College of Electrical and Mechanical Engineering
- College of Applied Science

There are numerous departments below each collage. Therefore, there are numerous tiresome steps involved in the hiring, promoting, and applying for leave processes. Even though AASTU presently is performing one comprehensive human resource management for both academic and administrative staff, no such specific system for document tracking was developed.

AASTU ICT Directorates is one of the giant directorates found in AASTU under Administration of Intuition development and business with respect to vice president to support the learning, research and community service at its premises. ICT Directorate is in charge of managing the central ICT infrastructure, the databases, interfaces, portals and websites. The University owns a campus LAN system with standardized data center, fiber backbone and horizontal cabling. Wi-Fi is also available to support mobility.

1.2. Missions of AASTU ICT Directorate

- To deploy and support innovative, quality and sustainable ICT infrastructure and service that meet the changing ICT needs of the University.
- To play a leading role in development of the ICT sector through the provision of research in AASTU.
- To help meet student's needs for personal career advancement in ICT is also available to support mobility.

1.3. Visions of AASTU ICT Directorate

- To become a center of excellence in utilizing the potential of ICT in learning, innovation and education environment for the benefit of AASTU and the nation's development as well.
- To be a center for advancement of ICT through research, innovation, transfer, adoption, adaptation, integration, and dissemination in AASTU as well as in Ethiopia.

1.4. Values and Principles of AASTU ICT Directorate

- **Quality**: company product should be of high quality and the company staff continuously strives for excellent in their technical and administrative endeavors.
- **Integrity**: In all our activities, we will act with the quality of being honest and with strong moral principle.
- **Transparency**: rule, regulation and decision making at all level to be transparent.
- **Accountability**: company staff performing duties in an accountable manner and taking full responsibility for action and decision they take thereof.
- **Rule of law**: company community believe in the rule of law and act accordingly.
- **Equality**: the company is an equal opportunity employer and working institution regardless of gender, status in society, ethnic background or religious affinity.

1.5. Objective of AASTU ICT Directorate

- Offering the best quality and uninterrupted service for AASTU community.
- Establish feedback mechanism from AASTU community to improve service quality.
- Enhance peoples' satisfaction through continual improvement and service delivery process.
- Expand its capability to academics, research, consultancy, and overall administrative tasks at AASTU with a broader range of ICT services.

1.6. Structure and workflow of AASTU ICT Directorate

The service deliver by AAST ICT directorate is organized into five categories and for efficient task execution, each part is discharged by specialized team infrastructure.

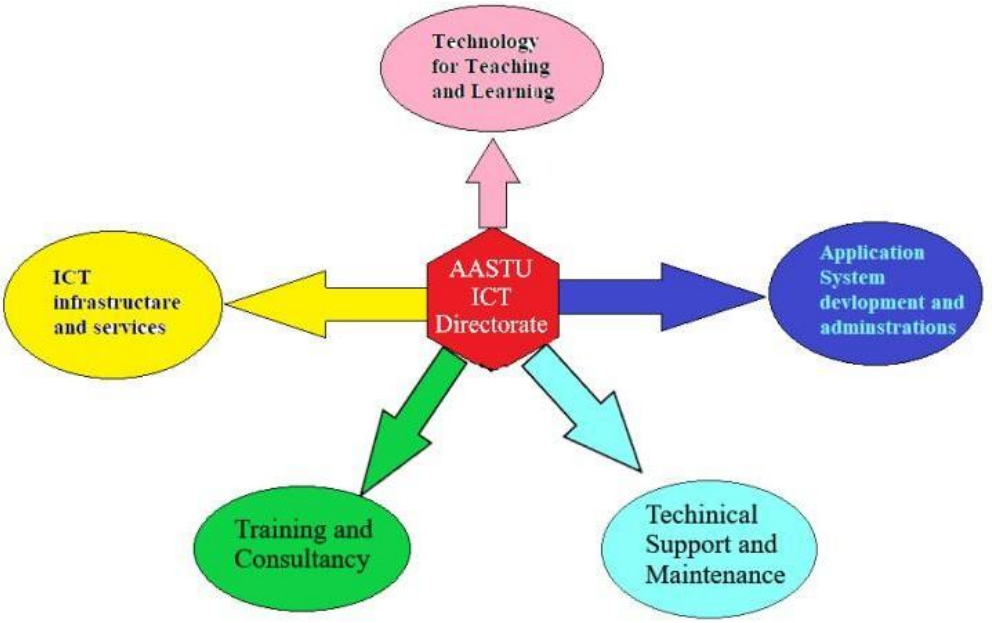


Figure 1.1 AASTU ICT Directorate Workflow

The services provided by these five categories are as follows:

a. Technology for Teaching and Learning: - in charge of designing and implementing integrated online learning management systems.

b. ICT infrastructure and services team: - provides services like network, connectivity, server and related issues.

c. Application system development and administration team: - dedicated to automate the processes of the host institution.

d. Training and consultancy team: - in-house and outsourced training usually managed by the training and consultancy team, consultation for clients and stakeholders run by this team.

e. Technical support and maintenance team: -users support, preventive and corrective maintenance handled by the technical support and maintenance team.

Chapter Two: About the internship

2.1 Objective

- The main objective of internship is to give real life work experience for those students who were staying on class like us.
- In addition, it helps to learn how to apply the theoretical knowledge that acquired from the class for the benefit of the company as well as for our self.
- To enable us to get hands-on real-life experience.
- To broaden our chance for handling a job and jump starting our careers.
- To create conducive atmosphere to assess professional qualification.
- To strengthen our professional skills and interpersonal communication.

2.2 Tasks

Within the whole internship time we have been assigned to work on many tasks that the company have been working on such as.

- Web development
- UI/UX designing
- Using database to store data

Chapter Three: Internship Experiences

3.1 Practical skill

One of the key motivations for interning at a company is to obtain practical experience. These abilities are developed by daily activity. We have acquired a variety of practical skills. As we spent our internship time on a software company the tasks we have mentioned before can be taken as a practical experience.

3.2 Communication skill

During our internship time it was necessary to communicate with each other and share information to accomplish the task as fast as we can. So, our communication skills have been improving from day to day, the changes were visible even to us, and that is a good thing. Communication skill is one of the good characteristics; we should have as an Engineer.

3.3 Work Ethics

When viewed via the ethical prism, there is a significant distinction between company life principles and those taught in schools. We must build various ethics within the firm in the workplace. Work ethics we acquired during our internship time in the company:

- Punctuality
- Obedience for manager
- Honesty
- Self confidence
- Trust worthy
- Politeness
- Respectfulness

Chapter Four: Project work

4.1 Project summary

The main concern of our project is to build electronic document tracking system.
A document tracking system **helps you automate accessing, searching, editing, and managing your electronic documents and files**. The tracking system lets you see who accessed the file and allows you to limit who can view and modify the content of said files.
The recruitment, promotion, and leave policies for academic personnel at AASTU are still criticized by most lecturers and stockholders as being inefficient. This is mostly due to the manual document management and tracking system that is still in use.

The best way to fix AASTU's inefficient working procedures is to implement a document tracking system.

The issues stated previously, such as the length of time it takes to hire new employees and the bureaucracy involved in employee promotion, will be resolved with the establishment of this system.

The system that will be created will include functions for automating document access and searching, as well as giving departments, colleges, human resources, and the vice president authority over notifications regarding employee hiring, promotion, and leave or termination.

Mainly it creates accountability and transparency of the working processes especially in the specified sectors like when there is promotion hire and termination of academic employees. In order to eliminate numerous bottlenecks during hiring, promotions, and termination requests, the project is therefore crucial. It spares the participants in the working process time and hassle. It offers a complete system that can incorporate every working procedure carried out at the moment with the greatest efficiency.

To build the web application we use web latest technologies (JavaScript frameworks) to build frontend and backend. We use React with redux to build frontend and NodeJs with mongoose to build backend. Mongodb is also used as the database management. Axios is also used to connect frontend and backend. An electronic document management system enable users to create, index, manage, store, retrieve and access

documents. This electronic way of managing documents enhances the productivity of university's communities and reduce the time in searching documents.

The system also can prevent loss of documents or damage from the effects of disasters; such as fire, flooding, animal like mouse or human errors.

4.2 Statement of the problems

As is well known, the world is transforming rapidly toward digital technology. because using a digital system is easier for users. There isn't an electronic document tracking system in place at Addis Ababa Science and Technology University at the moment. Employees must manually produce, store, retrieve, keep, and dispose of records; hence, they will encounter various difficulties.

The following are some of the concerns brought up in regard to manual document processes:

Performance:

- Poor time management: Often paperwork is slow, which results in delays on client's services and for the personnel processes of the University.

- Response time: Delay in the preparation and distribution of personnel action. For instance, preparation and distribution of personnel action for permanent employment takes about eight (8) days.

Information:

- Redundant information: Personnel information about employees stored in many places.
- Data is captured redundantly: Personnel information has to be captured again and again when activities related to a particular employee are performed.
- Data is not securely stored as the result; personal information of employees is exposed to unauthorized agents.
- Due to the large number of manual files, data organization is difficult and is not easy to meet new information needs from stored data.

Economy:

- Manual handling of data is expensive as compared to automated systems. Cost in terms of time is high.

Control (and security):

- too little security
- Difficulty in keeping track of hiring costs and activities.
- Decision making errors due to lack of credibility of reports.

Efficiency:

- Inefficiency due to poor time management.
- Effort and materials required for tasks is excessive.
- During the registration process and coordination of services, materials and supplies are often wasted because of redundant input of information or erroneous data. Besides, the personnel are not trained to make full use of computer resources.

Services:

- Recruitment activities are prolonged for many days since the existing system is manual.
- Poor recording of requisitions.
- Performance of work units is humped due to lack of programmed

4.3 Working business processes of AASTU academic staffs

4.3.1. Academic staff recruitment

AASTU recruits academic employees as stated in the rule of recruitment. Recruitment process of Bachelor, masters and philosophic degree is a little bit different. Recruitment process of master's applicant includes the following activities:

1. Each department makes a staff recruit request to their college preparing job description, number of employees required and person specification.
2. Then the college makes a decision on the request and shall prepare minutes and recommend for approval to the academic vice president.
3. Then the academic vice president shall receive requisition of academic employees from any departments of the university through their respective colleges. Then approves the requisition and sends it to human resource so that the hire to be conducted.
4. Human resources shall announce vacancies to the public through radio, television, newspapers etc.

5. Human resources shall register applicants and receive their educational and other relevant documents after checking against their originals.
6. If it is masters, Human resource and collage will do Short-listing and identifying the prospective employee with required characteristics and conduct an interview with the selected candidate.

   If it is Bachelor degree, the human resource and department will do so. If it is PHD, human resource and vice president will do Short-listing and identifying the prospective employee with required characteristics and conduct interview with the selected candidate.
7. The College makes decision on the selected candidates and shall prepare minutes and recommend for approval to the vice president.
8. The academic vice president orders the human resource to execute the hire.
9. Human resource ensures that the successful candidate is medically fit and free from any criminals and the final result will be posted on the organization notice board.
10. The human resource shall send recruit letters to college.
11. The selected candidates who are certified and fit for the job shall fill in application forms for employment.
12. Human resource prepares Personnel Action (PA) after collecting all documents necessary for the personal file of the employees. The PA shall describe Employee name, identification No, position/grade and salary, job code, cost center, location, work Unit/department, division, section, remarks and effective date.

4.3.2. Academic staffs promotion

AASTU Academic Staff Promotion will be held:

1. If there is a new vacancy and the employees fulfill the Vacancy criteria.
2. If the Employee updated his academic status(i,e from Bachelor Degree to masters or from masters to Assistant Professor.

There are Steps to be followed to Promote Employees.

Step 1: The employee shows the transcript of completion of the corresponding education level except from assistant professor to associate Professor to the Department. If it is for Associate professor the employee must have a document that fulfills the following criteria:

1. 4 years lecturer
2. Publication point greater than 3
3. Community service
4. Research grant

Step 2: The department assembly shall discuss the promotion of the employee and shall approve the Promotion of the Employee. Department assembly shall prepare minutes and recommend for approval to College.

Step 3: Then the college academic commission shall review his document.

Academic commission is composed of:

1. Department Heads
2. Associate Deans
3. Assistant Registrar
4. Staff representative
5. Student Representative

If the academic commission shall approve the Promotion of the Employee Department, assembly shall prepare minutes and recommend for approval to the Academic Vice President.

Step 4: The Academic Vice President shall review the Promotion of the Employee and If the academic president approves his promotion Academic Vice President prepare letter explaining the Promotion of the Employee and send it to a Human Resource

Step 5: Human resources manage the documents of approved letters. The human resource shall announce the promotion of the employee to Archive. The Archive prepares a letter that explains the employee is promoted and sends letters to all whom it may concern including finance.

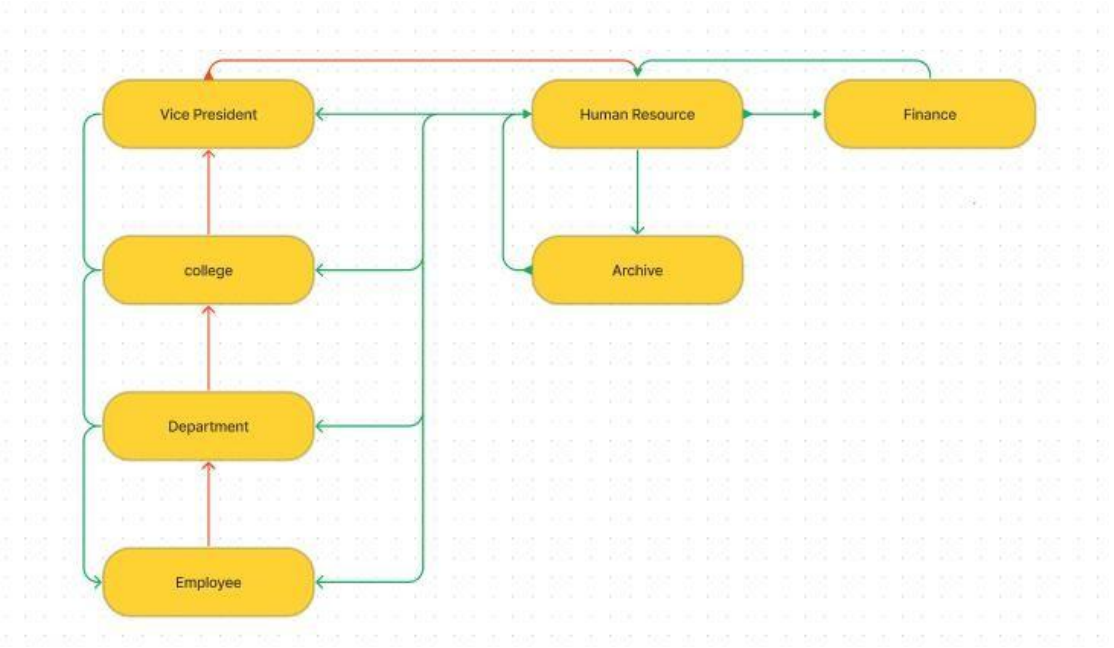


Figure 4.1: flow of letter with Red - letter from the employee, Green - letter from the Human resource

4.3.3. Academic staffs termination

- If the applicant is master level, submit the letter to collage.
- College has the right to delay the application for up to one month.
- College confirms the employees has not any problem with regard to university materials.
- If the applicant have not any problem, Collage will forward the request to HR.
- If the applicant in PhD level submit the leave application letter to vice president or department
- Department accept the application and confirms the applicant has not any problem with regard to the university materials.
- Department has the right to delay the application for up to one month.
- If the applicant hasn't any problem department forward to HR
- HR give the clearance paper to the applicant.

4.4. Situation analysis of the project

4.4.1. Description of alternatives

In this section, we will see two main possible alternative solutions to solve company's current problem regarding employee recruitment, promotion and leave (termination) processes as follows.

1. Stay with the current system

This alternative state that the company can stay operating on the current manual system to manage reports , decisions, requests for the new candidate , selecting best candidate, Provide vacancy information and generally to manage applicant's information and Recruitment, promotion and termination procedures.

2. Automate and manage the existing system(Build in house software)

The main goal is to automate and manage recruitment operations in order to increase Efficiency on managing reports, avoiding decision making under uncertainty, reducing delay in requesting for the new candidate, selecting best candidate, on current working-procedures and facilitating applicants on getting vacancy information.

Automation is required because time is very essential for stakeholders. Especially recruitment staff wants to automate all tedious jobs like Preparing the job description and person specification, Locating and developing the sources of required number and type of employees (Advertising etc.), Short-listing and identifying the prospective employee with required characteristics, arranging the interviews with the selected candidates, conducting the interview and decision-making etc. Automation also helps to reduce manual errors and increase accuracy. Basically automation of short listing candidates and selecting the best potential applicant that could help in achieving its goals are required. Management involves speeding up recruitment procedures and improves overall management of applicant's records.

4.4.1. Goal Analysis Criteria

The criterion used for analyzing the alternatives depicted as follows:

- Low cost :The decrease in cost of the working process is extremely valuable for the company since it allows spending the savings from the process to other activities.
- Accuracy: Accurate calculation is very much needed by the company to avoid unfair short listing and final evaluation of employment process.

- Availability of information: Company wants to avoid delay of information regarding recruitment promotion and termination management when requested.
- Time saving: Company wants to avoid wastage of time in hiring employees and processing of data. Thus this criterion is essential to analyze the proposed alternative solutions.

4.4.2. Feasibility Study

Feasibility study is a study that determines whether a proposed system is technically, financially, and operationally viable. The need of this study is to identify and demonstrate the best alternative. Cost benefit analysis and other feasibility studies such as ***technical, operational and schedule feasibility*** are applied for the identified alternatives.

1. Economic Feasibility:

Economic feasibility or cost benefit analysis helps the company to determine the benefit and savings that are expected from the proposed system and compare it with the cost the company incurs.

Alternative 1 - Staying with current System

Costs: This alternative uses different resources; mainly manual process requires more staff members and the operation is totally based on paper work. The company could go through different steps to perform the recruitment and selection process since the tasks are done manually, therefore it costs a lot.

Benefit: The Company does not gain any benefit from the current system instead it loses a lot of money due to inaccurate information; hire unqualified staff, loss of data, lack of ease of accessibility of data.

2. Technical Feasibility

Technical feasibility detects the technology and the resource required by the system is available or not. We check whether our alternatives are feasible in terms of the current technology and manpower needed for the company.

The first alternative is not technically feasible because it is a manual recruitment, promotion and termination of employee's management system in which there is no application of technology needs not to be a technical expert.

3 .Operational Feasibility

Operational Feasibility emphasize on the issues like whether the current system or the system to be developed will be used by the company staff members.

Alternative 1

The current system used by the company is time consuming and error prone and not effective as stated in the problem of the existing system.

Alternative2

Automating the system comes with the benefit from operation perspective in which it reduce cost of hiring, saves management time, gives accurate and fair selection of high qualified candidates.

4. Schedule Feasibility

Schedule Feasibility shows the estimated time to complete the project.

Alternative 1: Staying with the current system does not require any time.

Alternative 2: has a phase of requirement gathering, analysis and Design and implementation of the system so it takes up to 3-5 months to develop the system.

Recommendation

All possible alternatives for solving the problem of the company were analyzed to choose the better one. We conduct feasibility study for choosing the best alternative. Among the alternatives at hand, automating the current recruitment and selection process brought significant benefits while the others failed to do so. Some of the benefits are better time Management, reduce cost of hiring, selecting the best-qualified candidate and fast report generation etc. Thus, we recommend the company to choose Alternative 2 i.e. automating the system.

4.5. Goals and Objectives of the project

Our goal is to provide a considerable increase in the ease of document tracking for hire, leave and promotion furthermore, we would like to make the business easy to scale. Following is the objective we are trying to accomplish by the end of this project.

4.5.1. General objective

The major goal of the project is to design, develop and implement automated tracking system for organizational use.

4.5.2. Specific objective

In detail, this project have many specific objectives to fulfil:

- To create a system that will make document tracking easier and more automated.
- The system will make document exchange across different stockholders simple and efficient.
- The technology will enable authorized personnel to commit document revisions.
- To create a system for storing various papers electronically.
- To create a system that allows members of organizations to track essential papers electronically.

4.6. Scope of the project

The scope of this project focuses on providing Addis Ababa Science and Technology with an effective Electronic Document tracking System.

Its functionalities include:

- A Web-based interface to be used on different devices
- Sending and receiving features for files in different formats (jpg, jpeg, png, doc, docx, pdf).
- Provide a repository for data storage.
- Limitation on viewing documents based on the level of the users (Department Heads, are at lower levels than College Deans, which are at lower levels than the President of the University).

4.7 Implementation and data gathering

4.7.1. Data gathering techniques

It was agreed that the data gathered for this research would be qualitative and collected through observation. Staff in the Addis Ababa Science and Technology University's many offices are frequently required to handle, document, preserve, and even publish reminders on notice boards for others to read. As a result, we concluded that an Electronic Documentation tracking System is required.

4.7.2. The software development methodology

The design methodology employed in this project is the agile software design approach.
Software Development Life Cycle (SDLC) is a process of building or maintaining software systems.Typically, it includes various phases from preliminary development analysis to post-development software testing and evaluation. It also consists of the models and methodologies that development teams use to develop the software systems, which the methodologies form the framework for planning and controlling the entire development process.

A software application or an information system is designed to perform a particular set of tasks. Often, this set of tasks that the system will perform provides well-defined results, which involve complex computation and processing. It is therefore a harsh and tedious job to govern the entire development process to ensure that the end-product comprises of high degree of integrity and robustness, as well as user acceptance. Thus, a systematic development process, which is able to emphasize on the understanding of the scope and complexity of the total development process, is essential to achieve the said ¬characteristics of a successful system.

Currently, there are two SDLC methodologies, which are utilized by most system developers, namely the traditional development and agile development that explained in next session.

AGILE Software Development

Agile development is based on the idea of incremental and iterative development, in which the phases within a development life cycle are revisited over and over again. It iteratively improves software by using customer feedback to converge on solutions.

In agile development, rather than a single large process model that implemented in conventional SDLC, the development life cycle is divided into smaller parts, called “increments” or “iterations”, in which each of these increments touches on each of the conventional phases of development.

According to Agile Manifesto, the major factors of agile factors include the following four:

1. Early customer involvement

2. Iterative development
3. Self-organizing teams
4. Adaptation to change

There are currently six methods that are identified as agile development methods, which are Crystal methodologies, dynamic software development method, feature-driven development, lean software development, scrum, and extreme programming. lean software development, scrum, and extreme programming.

	AGILE	**TRADITIONAL**
User requirement	Iterative acquisition	Detailed user requirements are well defined before coding/implementation
Rework cost	low	high
Development direction	Readily changeable	Fixed
Testing	On every iteration	After coding phase completed
Customer involvement	high	low
Extra quality required for developers	Interpersonal skills & basic business knowledge	Nothing in particular
Suitable Project scale	low to medium-scaled	Large-scaled

Table: Comparison of Agile and Traditional Approaches

To successfully complete the assignment within the allotted time we have been employing an agile SDLC methodology to complete the project. The AASTU ICT center, one of our clients, was in constant communication (iterative). In addition, during every meeting, insightful criticism of the deliverables as well as suggestions for improving how we work were brought up on the status of the project.

In order to complete the job on time, successfully, and efficiently, we first created the following schedule:

ID	*Task name*	*Sub tasks*	*Duration*		
1	Initiation		Dec		
		Develop business case	7- 14		
		Feasibility study	14- 20		
		Assign project team			
	Planning		Dec	Jan	
		Insert project plan	21 - 29		
		As-Is BPD		1 -3	
		To-Be BPD		3 - 5	
		RAD		6 - 8	
		SDD		9 – 11	
	Execution				*Jan*
		Build deliverable			12 –27
		User Manual & Maintenance Document.			
		Monitoring and control			
	Closure				
		Project closure	End of semester from Feb 6 -17 as per academic colander		
		Review project closure			

We first obtained the requirements from our consumers in a superficial and deceptive way, and then we started carrying out the requests we believed to have come from them. Having the false belief, we visit several AASTU stakeholders, including human resources, departments, and colleges, to learn about the current hiring, promoting, and terminating procedures for academic staff. After generating the As-is, we presented it to our clients and solicited their feedback. After the AS-IS was authorized, we noticed several important issues and worked to identify processes that should not be automated as well as issues that could be. And designed our TO-BE using FIGMA UI/UX designing tool before beginning to carry out the project.

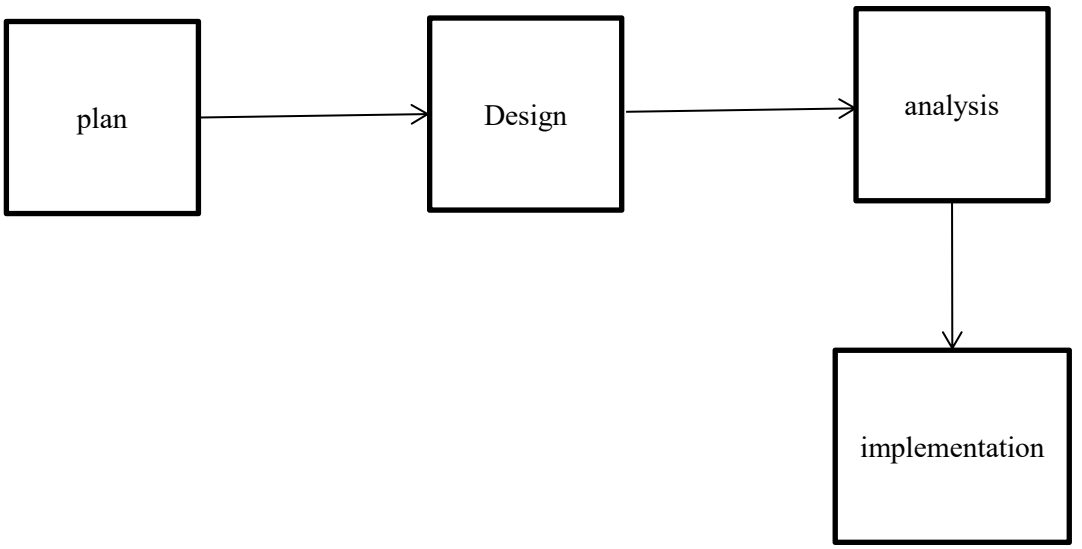
4.8. System design

Overview:

Refers to the systems development life cycle a set of processes or stages and all stages of the system where a number of steps and the main stage falls below.

All the steps and methodologies are:

- Plan
- Analysis
- Design
- Implementation



4.8.1. DTS Architecture

DTS which is an online intranet system will be used by four types of employees. These types who have different roles can be stated as; admin, collage/department, HR, user. Every user enters the main authentication page and after that, system will grant them authorization. After being authorized according to their permissions (role type) users will basically query and edit the database via DTS.

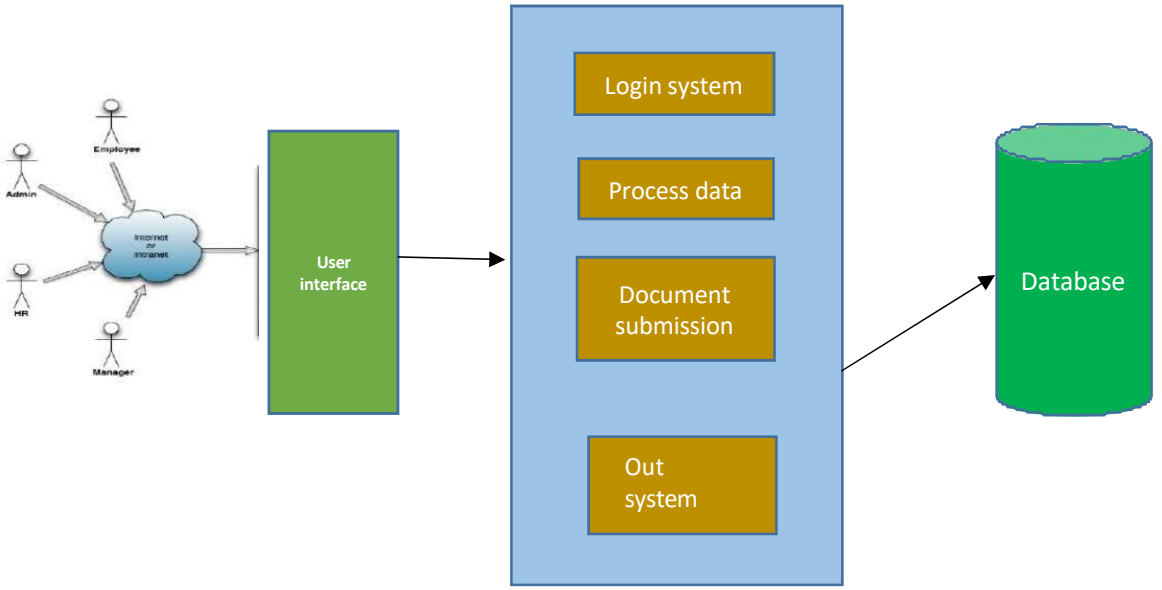


Figure: DTS Architecture

Description of procedures and functions:

This section will explain the major functions of DTS along with the data flow. So the major functionality of the project such as authentication mechanism, personal data processing, request or document submissions, and tracking explained step by step.

Authentication

- **Login user**: can login to the DTS system with his/her username and password.
- **Logout user:** can logout from the DTS system.

- **Login failure:** if the user does not exists in the database or the user did not get authorized
by the DTS admin yet.

Authorization

- **User role check:** after logging in, the user role will be checked from the database and the user interface will be created according to that role/roles.

Process data

- **Display:** user with defined roles can display the content of the database. Being more specific, employee can only view his/her personal information. Manager can see not only his/her personal information but also employees' information who are working under his/her coverage. Admin and hr can display their personal information and all employees' information.
- **Edit: a** user with employee role can edit his/her specific personal information. Manager can only edit employees' personal information that is under his/her coverage except user role type. HR can edit all employees' information except user role type. Admin can edit all information related to all employees' including their user role type.

- **Search:** user with manager role type can search the content of database for the employees who are under his/her coverage. HR and admin roles can search all the employees' information in the database. Search feature works on specific keywords showing employees' characteristics, peculiarities, skills, features, etc.

- **Report:** this feature is used to filter the contents of the search mechanism. For instance, as we mentioned in the above search feature. The HR wants to get a report of some specific employees who know "php". The list of employees obtained from the result of search feature he/she can get the specific report by selecting the corresponding checkbox available for each employee.
Or a manager role type can get a report of some or all employees' who are working under his/her coverage by selecting the checkbox. Except employee role type, all other role types such as admin, HR, and manager can use this feature.

Update authentication: this feature can be used only by admin role type. Admin can update the role type of a specific user. For example, an employee got promotion and his role type will be changed from employee role to manager role. Admin will be able to update this authentication mechanism.

4.9 Database design

This section describes the five tables that are linked to our project. These five tables is described in the following point

- User.
- Human resource
- Collage
- Vice president
- Department.

User

The user's data will be stored in the following format.

Field name	Data type	Key
id	objectId	Primary
name	sting	
email	string	
password	string	
last name	string	
department	string	
role	string	

College (Admin)

The admin table stores the information about admins profile. All the admins who will manage the system will be saved in this table.

Field name	Data type	Key
id	objectId	Primary
from	sting	

by	string	
Document Type	string	
purpose	string	
to	string	
Created by	objectId	
createdAt	date	
updatedAt	date	

Departments

The table department stores all departments requested through the system will issue. All of these department data will be in this table.

Field name	Data type	Key
id	objectId	Primary
from	sting	
by	string	
Document Type	string	
purpose	string	
to	string	
Created by	objectId	
createdAt	date	
updatedAt	date	

Vice President

The table Vice President stores all Vice President requested through the system will issue. All of these Vice President data will be in this table.

Field name	Data type	Key
id	objectId	Primary
from	sting	

by	string	
Document Type	string	
purpose	string	
to	string	
Created by	objectId	
createdAt	date	
updatedAt	date	

Human Resources

The table Human resources stores all Human Resources requested through the system will issue. All of these Human resources data will be in this table.

Field name	Data type	Key
id	objectId	Primary
from	sting	
by	string	
Document Type	string	
purpose	string	
to	string	
Created by	objectId	
createdAt	date	
updatedAt	date	

Hardware requirements:

• Disk space: 160 MB free (min) plus as much as you need to store materials. 5 GB is probably a realistic minimum.

• Backups: at least the same again (at a remote location preferably) as above to keep backups of the site

• Memory: 256 MB (min), 1GB or more is strongly recommended.

Software requirement:

The final phase of the lifecycle, which comprises all activities associated with the deployment of the application. These efforts include programming, testing, training and installation of the system in a production setting and transition of ownership of the application from the project team to the performing member.

Applications:

• Mongo dB: for database applications. [1]

• Figma: for designing the web site user interfaces. [2]

Programming languages, Libraries and Frameworks:

• HTML is the basic language in web programming and is the cornerstone of web programming.

• Mongo dB: open-source document-oriented database.

• JavaScript: JavaScript is a programming language used for interactive web periods - it works on your computer and does not bear the download from your website.

• CSS language: to design the style of the website.

Chapter Five: DTS Interfaces

5.1. Use Case Diagrams

A use case is a list of steps, typically defining interactions between a role (known in UML as an "actor") and a system, to achieve a goal. The actor can be a human or an external system. Use case diagram depicts functionalities of the system a given user can perform to accomplish a task and meet his/her goal. In other words the diagram shows the interaction between the system and the user of the system. The main tasks performed by recruitment unit are:

NB. Here applicant and candidate might be used interchangeably.

Use Case ID:	• **SUC-001**
UseCase Name:	**login**
Actors:	• **user**
Description:	This use case describes how a user logs into the document tracking System.
Trigger:	
Preconditions:	• The user must be registered.
Normal Flow:	This use case starts when an actor wishes to log into the document tracking System. 1. The system requests that the actor enter his/her email and password. 2. The actor enters his/her email and password. 3. The system validates the entered email and password and logs the actor into the system.
Post conditions:	If the use case was successful, the actor is now logged into the system. If not the system state is unchanged.
Alternative Flows:	If in the *Basic Flow* the actor enters an invalid email and/or password, the system displays an error message. The actor can choose to either return to the beginning of the *Basic Flow* or cancel the login, at which point the use case ends.
Exceptions:	• If any execution error happened due to database connection which is not happen frequently our system handle that in a common page.
Priority:	High
Frequency of Use:	Every time the system has to be logged in, the user must first log in.

Use Case ID:	**SUC-002**
Use Case Name:	**Forwarded document**
Actors:	• **User, Department, Collage, Vice president and/or HR**
Description:	This use case is used to see the Forwarded document to the appropriate concerned body.
Trigger:	•
Preconditions:	• User has been authenticated
Normal Flow:	1. The user selects forwarded option from mainpage. 2. The system displays the forwarded page. 3. The user enters the required information for watching/searching the forwarded documents. **4.** The system sorts the forwarded document according to the search criteria.
Post conditions:	Forwarded documents would be visible .
Alternative Flows:	2.5.1. The entry is not valid 2.5.1.1. The system displays error message and notifies the error sources. 2.5.1.2. The User corrects data entry. The process continues at step 4 of the normal flow
Exceptions:	• If any execution error happened due to database connection which is not happen frequently our system handle that in a common page.
Priority:	High
Frequency of Use:	Sometimes a user wants to know when and where a document was forwarded, as well as if it was forwarded.

Use Case ID:	**SUC-003**
Use Case Name:	**Awaiting documents**
Actors:	• **User**
Description:	In this use case the user can see a waiting documents or pending documents.
Trigger:	
Preconditions:	• User has been authenticated
Normal Flow:	1. The user selects pending option in the main page. 2. The system display list of documents that has been sent but awaiting response.
Post conditions:	List of pending documents will be displayed.
Alternative Flows:	
Exceptions:	• If any execution error happened due to database connection which is not happen frequently our system handle that in a common page.
Priority:	High
Frequency of Use:	User may occasionally check to see if his request has been answered.

Use Case ID:	**SUC-004**
Use Case Name:	➢ **Receiving new**
Actors:	• **Department, Collage, Vice president or HR or any concerned body/actor.**
Description:	This use case is used to notify concerned body that a request document has been sent.
Trigger:	
Preconditions:	• User has been authenticated
Normal Flow:	1. The user selects Receiving new option from main page. 2. The system displays the information of the sent documents in search form of receiving new page. 3. The concerned body selects a document from the list and can select approve/disprove, forward options. 4. The user who made the request receives notification from the system if the document was approved or disproved. 5. The system notifies the higher concerned body in the receiving new page and notifies the user who submitted the request in the forwarded page if the document was forwarded to a higher concerned body.
Post conditions:	Lists the sent request documents with the option to approve or reject them and to forward them.
Alternative Flows:	
Exceptions:	If any execution error happened due to database connection which is not happen frequently our system handle that in a common page.
Priority:	
Frequency of Use:	Sometimes, when there is recruitment, promotion and leave requests.

Use Case ID:	SUC-005
Use Case Name:	➢ profile
Actors:	• User
Description:	This use case is used to view final ranking of short listed candidates.
Trigger:	
Preconditions:	• User has been authenticated
Normal Flow:	1. The user selects profile option from main page. 2. The system displays profile page.
Post conditions:	Final ranking of candidates has been shown.
Alternative Flows:	
Exceptions:	• If any execution error happened due to database connection which is not happen frequently our system handle that in a common page.
Priority:	
Frequency of Use:	Sometimes, when the user makes his/her profile.

Use Case ID:	SUC-006
Use Case Name:	➢ Change profile
Actors:	• User
Description:	In this use case the user changes his or her own profile.
Trigger:	
Preconditions:	• User has been authenticated
Normal Flow:	1. The user selects profile option from main page. 2. The system displays profile page 3. The user fills the form and selects save changes option. 4. The system validates the entry. 5. The system saves the entry and displays a confirmation message
Post conditions:	The persons profile will be changed.
Alternative Flows:	Alternative flow1 1. The entry is not valid 2. The system displays error message 3. The user corrects the entry.

Exceptions:	• If any execution error happened due to database connection which is not happen frequently our system handle that in a common page.
Priority:	
Frequency of Use:	Sometimes

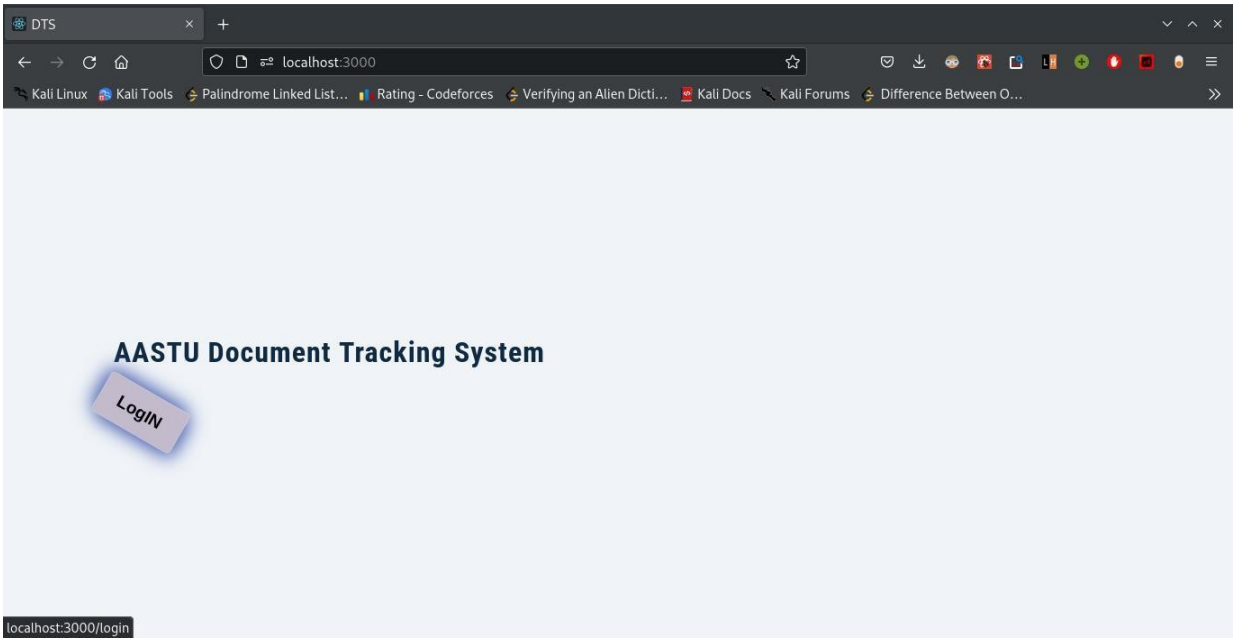
Use Case ID:	**SUC-007**
Use Case Name:	➢ **Forward document**
Actors:	• **The concerned body**
Description:	This use case is used to forward the requested document to the higher concerned body.
Trigger:	
Preconditions:	• User has been authenticated
Normal Flow:	1. The concerned body selects forward option in receiving new page. 2. The system shows the forwarding page 3. The user fills the form and selects forwardoption. 4. The system validates the entry. 5. The system saves the entry and forwards to the intended body.
Post conditions:	Job description has been made.
Alternative Flows:	**Alternative flow1** 1. The entry is not valid 2. The system displays error message 3. The user corrects the entry. The process continues at step 4 of the normal flow. .
Exceptions:	• If any execution error happened due to database connection which is not happen frequently our system handle that in a common page.
Priority:	
Frequency of Use:	Often

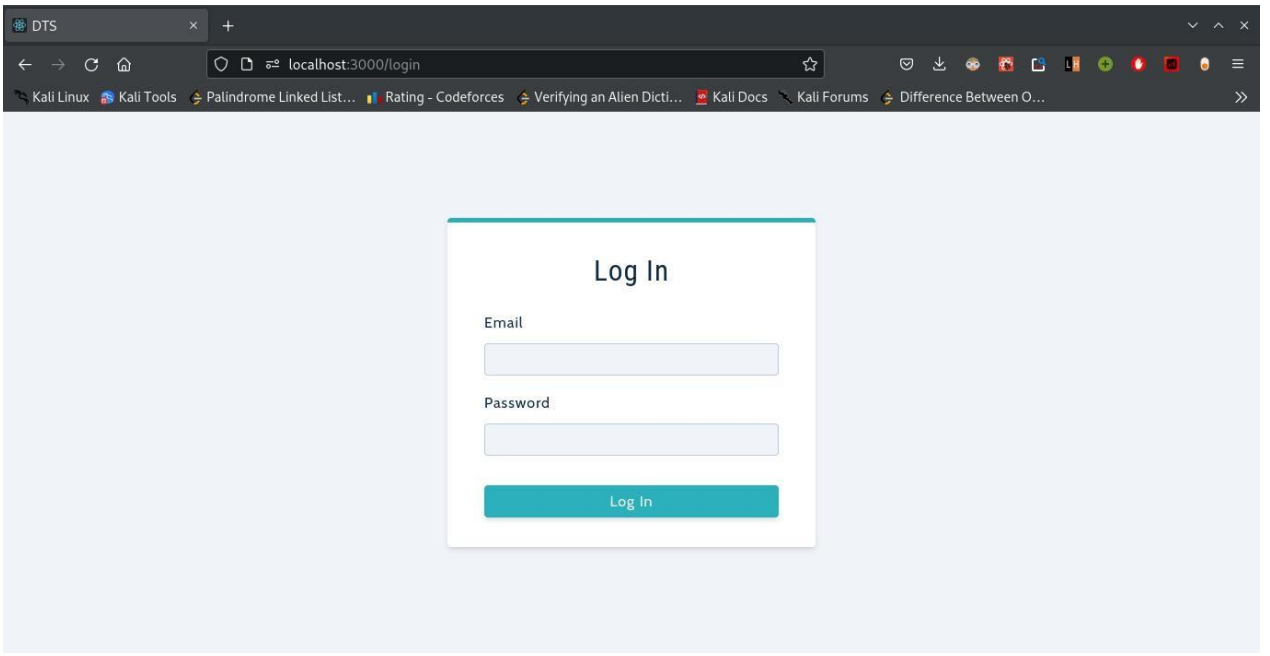
Use Case ID:	**SUC-008**
Use Case Name:	➢ **Logout**
Actors:	• **User**
Description:	This use case is used to logout the user from the system.
Trigger:	
Preconditions:	• User has been authenticated
Normal Flow:	1. The user selects logout option from main page. 2. The system redirects the user to the login page.
Post conditions:	User has been logout.
Alternative Flows:	
Exceptions:	• If any execution error happened due to database connection which is not happen frequently our system handle that in a common page.
Priority:	
Frequency of Use:	Sometimes

5.2. The architecture of The Work

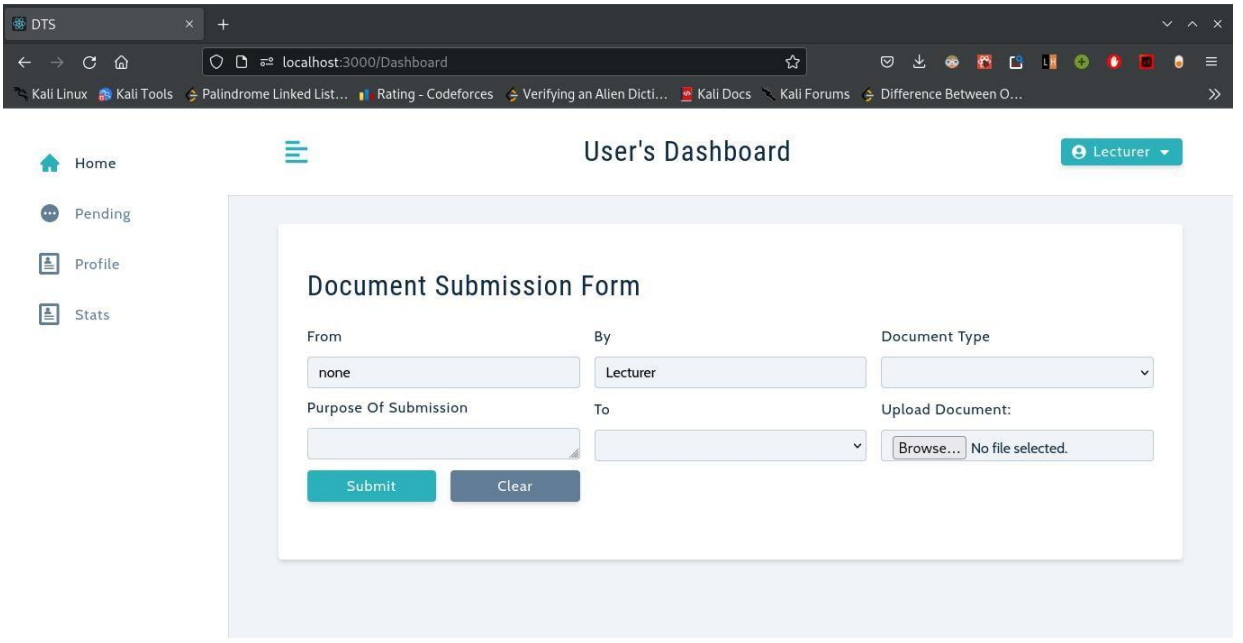
This work contains many interfaces each will be discussed in this thesis:

Login page:



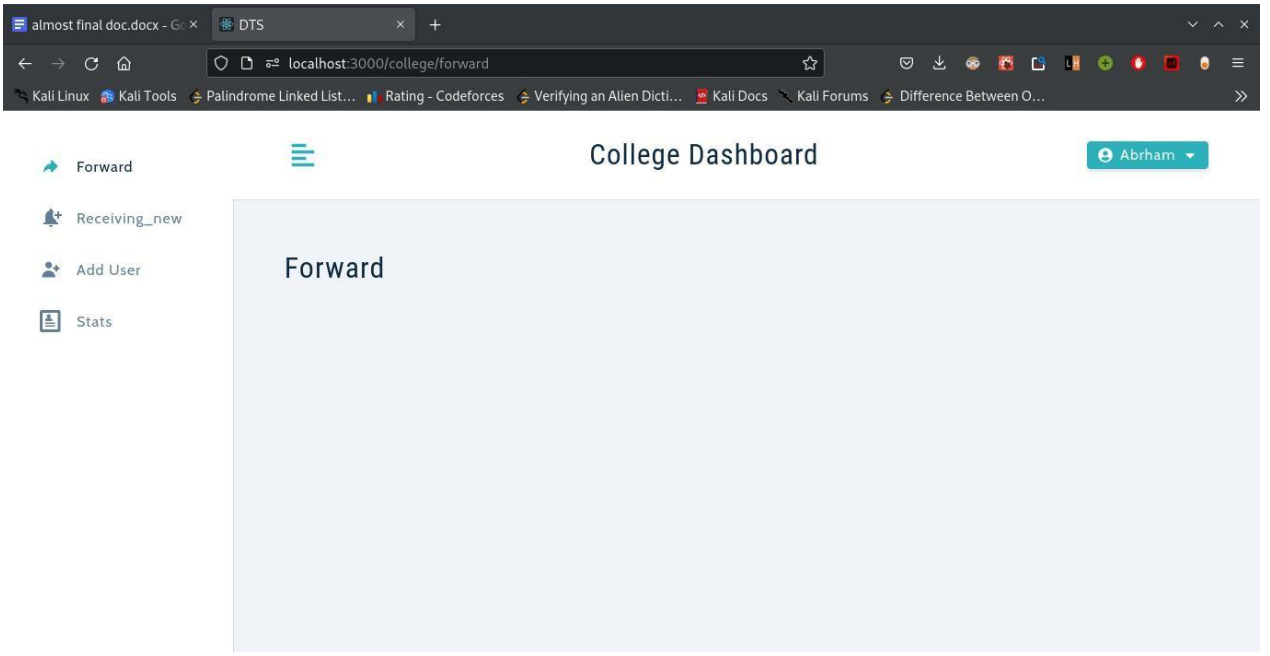

DTS
localhost:3000/login
Kali Linux
Kali Tools
Palindrome Linked List...
Rating - Codeforces
Verifying an Alien Dicti...
Kali Docs
Kali Forums
Difference Between O...
Log In
Email
Password
Log In

User's page:


DTS
localhost:3000/Dashboard
Kali Linux
Kali Tools
Palindrome Linked List...
Rating - Codeforces
Verifying an Alien Dicti...
Kali Docs
Kali Forums
Difference Between O...
Home
Pending
Profile
Stats
User's Dashboard
Lecturer
Document Submission Form
From
none
By
Lecturer
Document Type
Purpose Of Submission
To
Upload Document:
Browse...
No file selected.
Submit
Clear

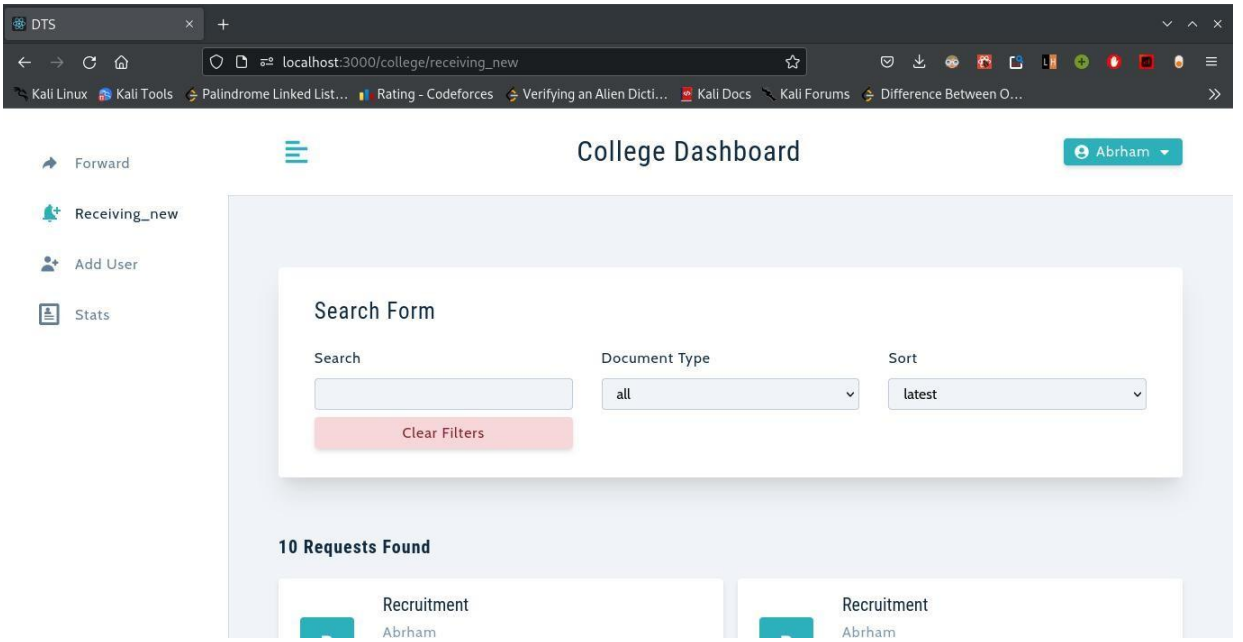
College pages:

College is also the admin, which controls the registration of users

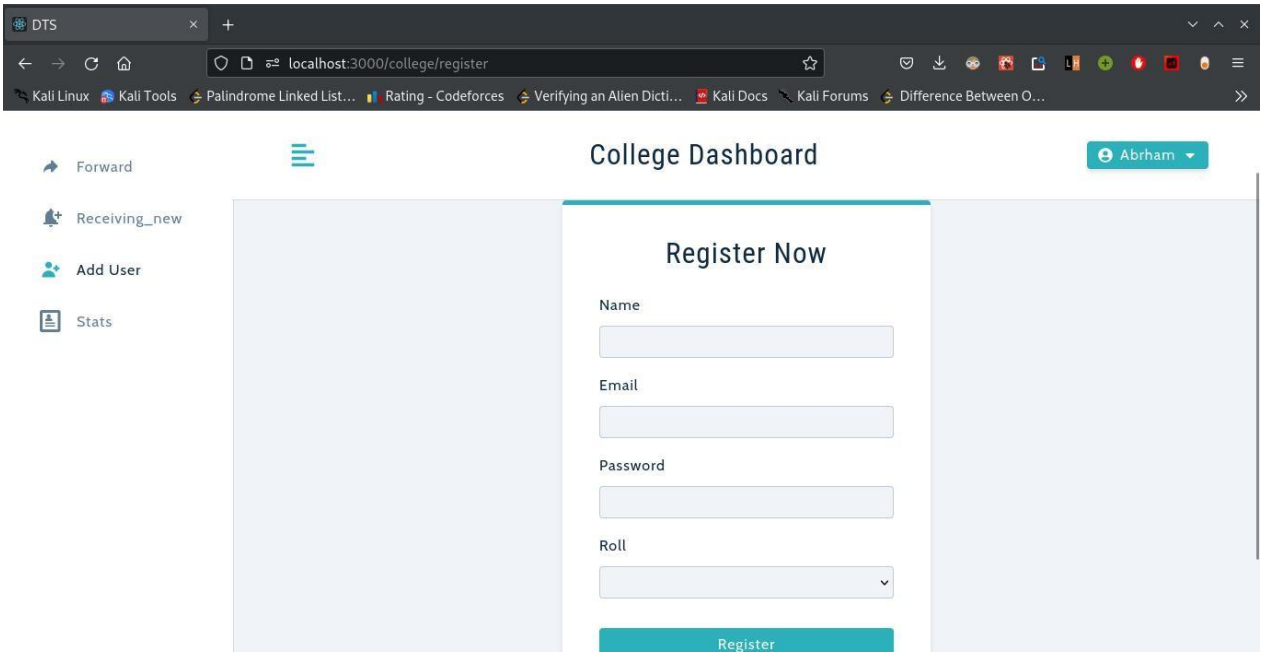


College receiving new Page:

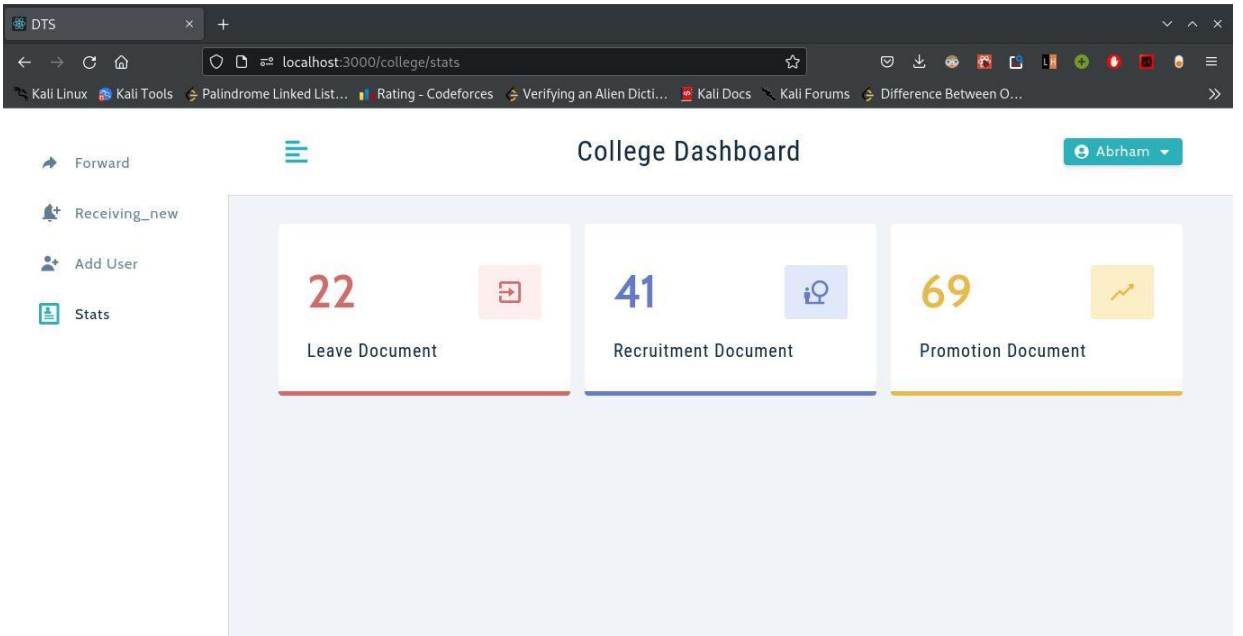
All messages sent to the college will be sent viewed here



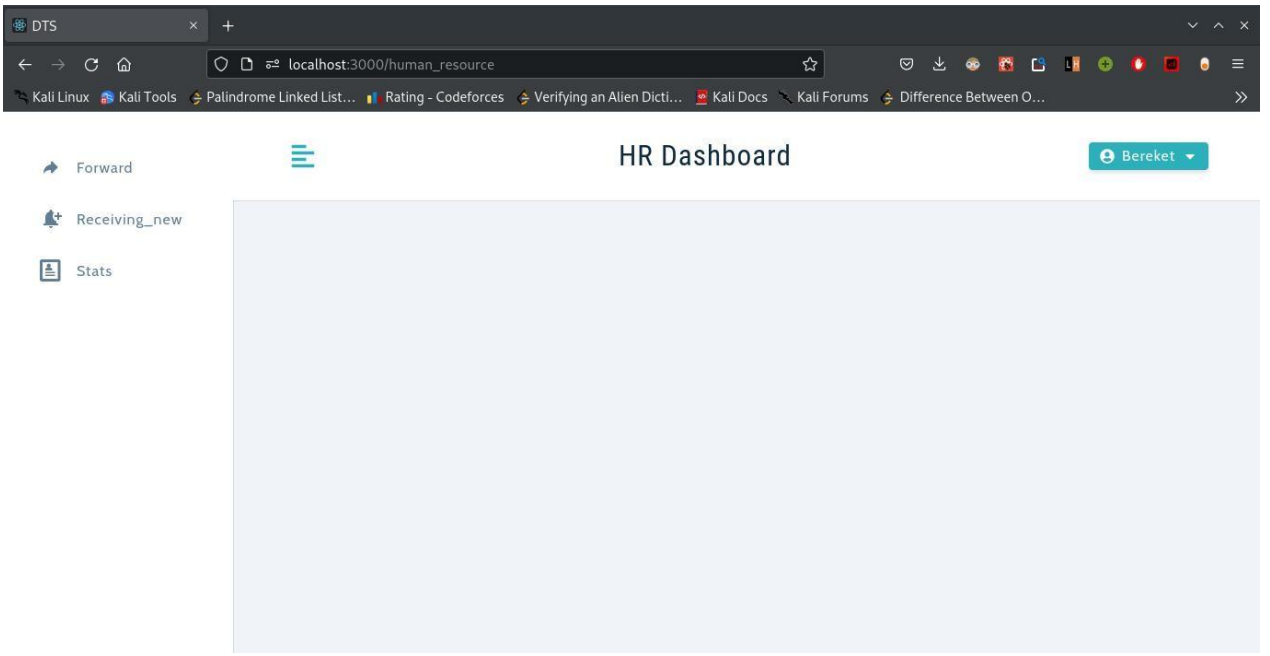
College Add user Page:



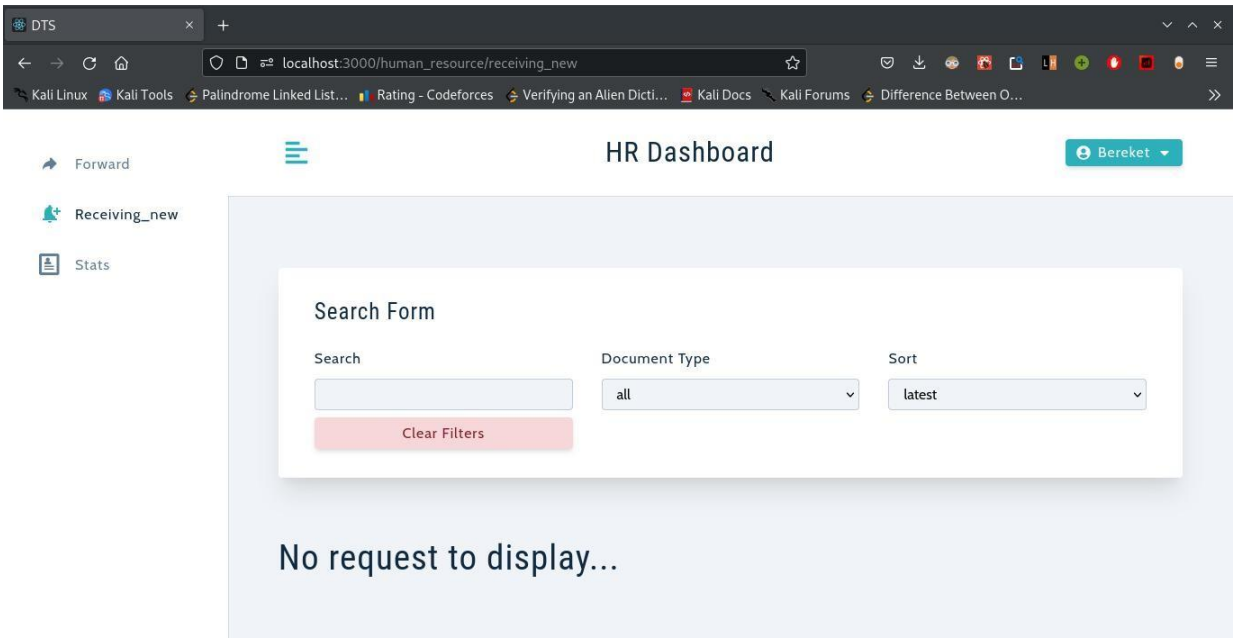
College status page:



Human resources dashboard



Human resources received new Page:



Chapter six: Conclusion and recommendations

6.1 Conclusion

A qualified Electrical and Computer Engineer is one whose career supported with a strong theory and mature experience. After four years of studying Electrical and Computer Engineering in school, one needs to experience the practical side of the industry to be whole in the profession. An internship experience is very vital for a computer-engineering student; it is like an introduction to future professional work in the field. Our internship program has enabled us to develop and showed us what an engineer resembles.This project or system is web based system to provide, for the recruitment, promotion, and leave policies for academic personnel at AASTU that automate the current manual system.It eliminate the manual, tedious and inefficient system. This firm offers a fantastic work culture, excellent ideas, and extremely high work quality. We had learned a lot about designing solutions to real-world problems and how to engage with higher-level people. Aside from our theoretical understanding, we are interested in world technology. Internship programs provide us with a wealth of knowledge and experiences in a variety of ways, including the spirit of collaboration and cooperation, communication and interaction with colleagues, the opportunity to transform theoretical knowledge into practical or real knowledge, the ability to make decisions and accept responsibility, the ability to solve specific problems, and the development of our self-confidence and professionalism.

6.2 Recommendation

Though teaching students engineering without setting many constraints can work well in developing students' creativity and exploring new ideas and techniques with freedom, making students well aware of the legal, client, and budget constraints that awaits them in their future career path also will enable engineers to become realistic who still can deliver quality work. We believe that we have accomplished our internship programs, but we also believe our internship experience would have given better fruits if the following were added:

For the intern students: before the internship, we strongly recommend a student should prepare a profound portfolio before looking for an internship hosting company either in soft skill or technical skill like web development , problem solving and others. Having a good portfolio is not only help full to introduce ourselves for a recruiting company but also having a concert portfolio could get us a paid internship with the additional benefit of getting involved on real projects.

For the company:
In general, the reception of students by industries is good. Their efforts from accepting students to training them for employment is highly commendable and should be continued. However, in the meantime, if industries introduce themselves to your students about the services they provide before the program starts, it will help students to apply according to their needs. Industries can also find the right student for them. This is our recommendation to the industry.

For university:

It is a worthy and encouraged activity for the university to provide this kind of opportunity to the students. Through this program, students will be able to apply the knowledge they have acquired during their time at university. Despite this, students work hard to get industry to accept them for the program. Therefore, it would be good if the university, as far as possible, provides a platform.

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