ADAMA SCIENCE AND TECHNOLOGY UNVERSITY

SCHOOL OF ELECTRICAL ENGINEERING AND COMPUTING

Department of Computer Science and Engineering

Hosting Organization: ASTU

Department Advisor: Mr. Desta Zerihun

Supervisor: Mr. Desta Zerihun

1. Ahmed Hibet……………….…..…………. A/UR13886/10
2. Nathanael Bogale……………..………… A/UR14674/10
3. Fuad Mohammed……………..……….. UGR/17131/11
4. Kinfe Masrie……………………………….UGR/17290/11
5. Mohammed Hassen……………...…………UGR/17471/11
6. Admasu Abera………………….…..A/UR14870/10

Submission Date: 21/10/2021

Executive Summary

As the core purpose of an internship is to create an opportunity for a student to gain practice in a real world of work under the guidance of an experienced supervisor we can say that was what we gained during this one month of internship period. Some of these real world practices include doing all the activities we were given by our supervisor, sharing responsibilities amongst each other, racing against time to get our tasks done, learning to work with and respect our co-interns, get an experience on our communication skills with some senior stuffs and our supervisors and also share ideas on how to effectively and efficiently get our tasks done. As a result of this internship we have gained some insights into the professional side of our field of study and got more motivated than ever.

This report is written to briefly explain what we have been doing for the past few weeks in the company we were assigned to and what challenges we faced during this time in the making of our project and resources we had to use and dig into to provide us with more knowledge and help us improve our work. We have also explored how our supervisor have helped us succeed in our assignments and how this whole program has helped us shape our career goal and evaluate our strengths and areas that need improving.

So in this report the following main points are involved

- ✓ General overview about the internship
- ✓ Brief history of the company
- ✓ Duties and tasks we were given to perform
- ✓ How our supervisors helped us succeed in our assignments
- ✓ What technical knowledge and skills we gained from the process and what resources we used
- ✓ What challenges we faced overall
- ✓ How this internship helped as and what career goals we made and how the ones that were already there changed
- ✓ Comments and personal opinions on the company and the internship

Acknowledgement

We are deeply grateful to our advisor Mr.Worku Kelem for his guidance, patience and support. We consider myself very fortunate for being able to work with a very considerate and encouraging advisor like him. Without his offering to accomplish this internship period, We would not be able to finish my practice at Adama Science and Technology ICT Center. Our team's enlightening suggestions and encouragements made us feel a good team spirit.

As there are many people we could and should thank for the success of this internship we will only mention few and leave the rest in our heart.

> ➢ First we would like to thank our teachers who have prepared us through courses they taught for this internship

> ➢ Secondly, we would like to thank our immediate supervisor Mr.Dawit Abate for making the working environment suitable for us and helping with the all the things we needed.

> ➢ We would also like to thank all the working staff there who supported us and helped us with the challenges we faced and gave us materials to work on.

List of Acronyms

DBMS	Database Management System
WMS	Work flow management system
SQL	Structured Query Language
ICT	Information Communication Technology
HTML	Hyper Text Markup Language
XML	Extensible Markup Language
JSON	JavaScript Object Notation)
RSS	Really Simple Syndication
MVC	Model — View — Controller
GUI	graphical user interface
URL	Uniform Resource Locator

Table of Contents

CHAPTER ONE

INTRODUCTION

1.1 General overview

Internship is an opportunity for a student to gain practice in a real world of work under the guidance of an experienced supervisor. It is an integral part of the curriculum and learning activity. Every student of School of Electrical Engineering and Computing at Adama Science and Technology University (ASTU) is required to complete a program of study that includes a compulsory internship to earn their academic degree in their field of specialization.

The objective of the internship is to produce qualified, motivated and practice oriented students. Internships should provide the students with valuable insights into the professional and industry-oriented side of their field of study. It should enable students to put into practice the skills, techniques, and knowledge acquired in University through lectures that are important for success in their future endeavor.

Some of the responsibilities of the hosting company were

➢ Providing the intern with job description, work place expectations and a variety of career-building work experiences (through appropriate tours, personal meetings, assigned readings, etc.),

➢ Providing the intern with necessary training on rules and regulations of the organization, rights and responsibilities of intern, and the safety precautions,

➢ Communicating with the intern to discuss on current performance of the organization, major technical problems related to the intern field of specialization, and the future work assignments and

➢ Evaluating, monitoring and submitting the intern evaluation at the end of the internship period.

Some of the works and office manners expected from the interns were

➢ To be on time for work and complete assignments and projects in the given time frame

➢ To take online courses and go through the materials given by the supervisor

- To respect office rules and silence
- To use office equipment and Wi-Fi appropriately and only for the intended purposes
- To communicate with supervisors and other staff members whenever necessary

Some of the outputs expected from this internship were

- To produce students that are qualified, motivated and practice oriented.
- To produce students that have the appropriate work ethics and office manners
- To produce students that have valuable insights into the professional and industry-oriented side of their field of study
- To produce students that have proper self-evaluation skills
- To produce students that have good career goals and that can improve those goals based on the experiences they gained from this internship.

1.2 Background of the organization

ICT Directorate of ASTU Organized half-day training on Smart Data Center Facilities Solutions in collaboration with Huawei Technologies Ethiopia PLC on October 27, 2020. The main objective of the training was to give an overview of the current data center formation.

1.3 Mission of the organization

- Creating a conducive teaching-learning, research, community service, management, and administration environment with ICT support.
- Providing reliable and adequate network infrastructure.
- Automating teaching-learning process.
- On-time user support.
- Delivering fast and reliable Internet and Intranet service on 24/7 for ASTU communities.
- Automating business process
- Securing ASTU network from any treats internal or external.
- Ensuring the quality of ASTU ICT equipments.
- ICT consultancy and training.
- Conducting research in ICT.
- Delivering ICT research outcomes, and professional application software's.

1.4 Products/services of the organization

➢ Exclusively managing, insuring quality, monitoring and maintenance of any ICT related equipments.
➢ Discarding any ICT equipments should be approved by ICT Directorate.
➢ Any application software's that are installed on ASTU ICT equipments should get the approval of ICT Directorate.
➢ Preparing ICT Policies, standards and guidelines.
➢ Request for any proprietary application software's and operating systems should be first approved by ICT before further processing.
➢ Managing, maintaining, upgrading and expanding of the network infrastructure, ICT Pools, SMART Rooms.

CHAPTER TWO

MANAGEMENT, TRAINING AND EMPLOYEE INFORMATION

2.1 Major duty you were given to perform

o ASTU's ICT Center is a collection professionals, creating a conducive teaching-learning, research, community service, management, and administration environment with ICT support, as well as providing reliable and adequate network infrastructure for the university community.

Some of their current projects involve

- A Store management system
- ASTU's ICT center file sharing platform
- Providing and managing the network infrastructure inside the campus.
- Providing ICT consultancy and training
- Delivering fast and reliable Internet and Intranet service on 24/7 for ASTU communities
- Automating business process
- Conducting research in ICT

As being inters in this company we were required to fulfill some basic requirements

1. **Attendance**

- Every intern is expected to attend to the work place.
- By the end of the month attendance is subject to calculation

2. **Task**

- We must take a task from the ICT Center projects and we were required to implement and submit appropriate results to our supervisor.

And to help us with our assigned project we had to take

Online courses

- Taking the courses from Coursera, YouTube were recommended to us by our supervisor and the courses were Python, Django , DBMS , & Git & Github

But our main project was to work on a web application that is a workflow management system.

A WMS is a software tool designed to help streamline routine business processes for optimal efficiency. Workflow management systems involve creating a form to hold data and automating a sequential path of tasks for the data to follow until it is fully processed.

Starting a new project in Django creates a folder structure that looks like this

```
$ django-admin startproject mysite

mysite/
    manage.py
    mysite/
        __init__.py
        settings.py
        urls.py
        asgi.py
        wsgi.py
```

These files are:

- The outer **mysite/** root directory is a container for your project. Its name doesn't matter to Django; you can rename it to anything you like.

- **manage.py**: A command-line utility that lets you interact with this Django project in various ways. You can read all the details about **manage.py** in django-admin and manage.py.

- The inner **mysite/** directory is the actual Python package for your project. Its name is the Python package name you'll need to use to import anything inside it (e.g. **mysite.urls**).

- **mysite/__init__.py**: An empty file that tells Python that this directory should be considered a Python package. If you're a Python beginner, read more about packages in the official Python docs.

- **mysite/settings.py**: Settings/configuration for this Django project. Django settings will tell you all about how settings work.

- **mysite/urls.py**: The URL declarations for this Django project; a "table of contents" of your Django-powered site. You can read more about URLs in URL dispatcher.

- **mysite/asgi.py**: An entry-point for ASGI-compatible web servers to serve your project. See How to deploy with ASGI for more details.

- **mysite/wsgi.py**: An entry-point for WSGI-compatible web servers to serve your project. See How to deploy with WSGI for more details.

2.2 How we became oriented with the responsibilities we were assigned

Being oriented in a new environment was challenging and not an easy task. But we were able to do it in a matter of days with the help of our supervisor and the staff. We first started digging into materials and watching tutorials on Web and other software development practices we were expected to take training on. Those courses were Python, Django, Software Development life cycles, Git & Github. But after a while we started focusing on our project on the Workflow management system for ICT Center.

➢ Installation and preparation on virtual machines

- Standalone Mode – run locally on a console (for development/test)

- Server Mode (for production)

➢ How to build a simple CRUD application

➢ How to run test in Django

2.3 How our supervisor helped us succeed in the given assignment

Having someone to guide you through tasks and assignment is critically important in an internship. That's what we had during our one month stay in ASTU. Our supervisors Mr. Desta Zerihun helped us in ways that were crucial like assigning us working places in the office, and also assigning us an immediate supervisor who played his own role in our success and some other staff members that were helpful in our daily activities. Our supervisor Mr. Desta Zerihun played his own crucial role in our success. As being our supervisor he gave us the assignments and projects we were working on and also helped us fetch materials that could help us in the making of the web application. He was also helpful giving us clues and suggestions on what is expected of the application we were building showing us different perspectives of how it can be helpful. But that was not all he did. As the purpose of the internship was not measures only by the success of the projects but also by how the interns have changed throughout the internship session and what kind of new working perspectives they have gained, Mr. Desta was able to provide us with these life and working advices so we can be better at our work and equipped us with the knowledge we'll be needing when going out for the real life of work.

2.4 Qualities we gained that helped us succeed in our daily duties

As mentioned in earlier topics having to settle in a new working environment and coping with it is challenging. In order to do that we had to develop some new skills and qualities that could help us create a good working environment of our own, do our project effectively and efficiently and also succeed in the internship in every way intended. Some of these qualities were just some basic working ethics and office manners such as

- Punctuality

- Respecting office manners and silence

- Using office materials appropriately

- Using the operating system that was suggested by the office (Ubuntu)

- Using the Wi-Fi to surf through the internet for materials

Developing these office ethics helped us make ourselves feel like part of the working force there and made our communications with the staff members easier.

But these weren't the only qualities we developed in our stay there. There were more like

- **Time management**: - which was a crucial quality. Being punctual helped us develop this other quality since being at work on time meant having more time to spend on gathering around and discussing on what our project should look like, how we should implement it, building drafts in our mind and actually working on those drafts, testing the outcome and evaluating if that was what we planned for it to look like in the beginning. So that's what time management was all about, dividing our time into these tasks so we would execute them in the given time frame.

- **Communication skills**: - these was also another crucial quality. As discussion was a part of our daily routine being able to communicate, explaining what we have in mind amongst each other was necessary so we had to develop this skill. We weren't only expected to communicate amongst each other but also we other members of the staff and with our supervisor about different things we needed help with.

- **Self-evaluation**: - meant evaluating ourselves through our daily routines, checking if what we did and how we did it was right, looking for better ways we can do those things and we can improve ourselves to do those things in the days to come. Also evaluating if we have successfully developed the other qualities mentioned.

- **Conflict resolution skills**: - as conflicts and misunderstanding are expected to occur while working together, conflict resolving skill was another quality was had to develop. This quality included being able to listen to other group member's points of views and trying to understand them as much as possible and also being able to explain one's point of view in a way that the other can understand why it is that one did that. It also meant compromising and laying a common ground for both parties of the conflict to work without leaving a whole for other conflicts to occur.

- **Helping and sharing with others**: - this was another skill which meant sharing all the available resources for common use and helping each other out with the necessary knowledge and skills needed.

These skills are skills that every working person should. As interns we have gained these fundamental qualities and more that helped us work on our project in an almost flawless way and respect each other while doing it. These qualities also helped us improve ourselves and become better and better in our daily routine.

CHAPTER THREE

SPECIFIC JOB INFORMATION

3.1 Daily technical duties and responsibilities we had during the internship

In the first two weeks after we were assigned the project we were gathering requirements from the ICT Center community and also from our supervisor, whilst doing that were also had to select what technology stack to use that would be suitable and we on the way would gain a new knowledge about. We eventually settled on Django as all of us were very familiar with Python and its development environments.

So it was necessary to for us to take some tutorials and read up daily on the following terms:

- Python

- Django

- MySQL

- Git and GitHub

- Software Engineering

Starting from the second week after finishing our requirements we immediately started working on our documentation. We brushed up on our software engineering fundamentals, we then started our project implementation alongside the writing of the documentation. These were some of the tasks we had to perform

- Getting ourselves familiar with software development lifecycles

- Looking up at some projects previously done using Django

- Reading and trying out methods on how we would be contributing on the same repository on GitHub

- Reading on materials from the internet and the documentations to get as much detail as possible about how we can create a new project and what the procedures are, these materials included

- Setting Coding standards

- Identifying Common beginner mistakes

- Installing and getting ready our machines for the project

- Identify and differentiate the apps to be created

- Map out the relations of the apps in contrast to the project

- Start implementing from the major functional requirement to the lower ones

- Have our works checked by our supervisor

- Finalize the project

After doing some of these activities for a few days we moved to the next part which was all about making the web application which we named ASTU ICT Center work flow management system. In the making of the project, every one of us took on a daily responsibility which included

➢ Gathering data on what a web app of this type should look like and what group of users it should focus on

➢ Collecting information from the ICT Center community on what way the will act on the project and what their responsibilities were

➢ Dividing the gathered data into different tasks to identify which should come first and which should follow.

➢ Checking whether the intended tasks were performed and what should be improved

➢ Committing what we did through each step and pushing it to a remote repository

All in all these were the technical duties and responsibilities we had during our stay in the company and in the making of our project.

3.2 Other responsibilities we had during our internship

Other than working on the project we were also given the responsibility of learning technology stacks our choice was Django which was one of Python's famous frameworks for web development.

We started reading up on Django and how it works. Reading and understanding its documentation was one of our tasks throughout the whole project journey. Since its documentation were very well structured it was not a problem to find most things. We were looking up tutorial videos, on some projects done using Django.

Django is a high-level Python web framework that enables rapid development of secure and maintainable websites. Built by experienced developers, Django takes care of much of the hassle of web development, so you can focus on writing your app without needing to reinvent the wheel. It is free and open source, has a thriving and active community, great documentation, and many options for free and paid-for support.

Django helps you write software that is:

Complete
> Django follows the "Batteries included" philosophy and provides almost everything developers might want to do "out of the box". Because everything you need is part of the one "product", it all works seamlessly together, follows consistent design principles, and has extensive and up-to-date documentation.

Versatile
> Django can be (and has been) used to build almost any type of website — from content management systems and wikis, through to social networks and news sites. It can work with any client-side framework, and can deliver content in almost any format (including HTML, RSS feeds, JSON, XML, etc).

Secure
> Django helps developers avoid many common security mistakes by providing a framework that has been engineered to "do the right things" to protect the website automatically. For example, Django provides a secure way to manage user accounts and passwords, avoiding common mistakes like putting session information in cookies where it is vulnerable (instead cookies just contain a key, and the actual data is stored in the database) or directly storing passwords rather than a password hash.
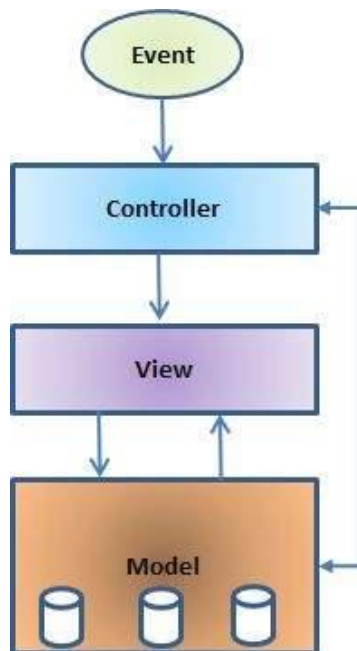
Scalable

Django uses a component-based "shared-nothing" architecture (each part of the architecture is independent of the others, and can hence be replaced or changed if needed). Having a clear separation between the different parts means that it can scale for increased traffic by adding hardware at any level: caching servers, database servers, or application servers. Some of the busiest sites have successfully scaled Django to meet their demands (e.g. Instagram and Disqus, to name just two).

Maintainable

Django code is written using design principles and patterns that encourage the creation of maintainable and reusable code. In particular, it makes use of the Don't Repeat Yourself (DRY) principle so there is no unnecessary duplication, reducing the amount of code. Django also promotes the grouping of related functionality into reusable "applications" and, at a lower level, groups related code into modules (along the lines of the Model View Controller (MVC) pattern).

Model **V**iew **C**ontroller or **MVC** as it is popularly called, is a software design pattern for developing web applications. A Model View Controller pattern is made up of the following three parts −

- **Model** − The lowest level of the pattern which is responsible for maintaining data.
- **View** − This is responsible for displaying all or a portion of the data to the user.
- **Controller** − Software Code that controls the interactions between the Model and View.

Portable

Django is written in Python, which runs on many platforms. That means that you are not tied to any particular server platform, and can run your applications on many flavours of Linux, Windows, and Mac OS X. Furthermore, Django is well-supported by many web hosting providers, who often provide specific infrastructure and documentation for hosting Django sites.

Django – Design Philosophies

Django comes with the following design philosophies −

- **Loosely Coupled** − Django aims to make each element of its stack independent of the others.

- **Less Coding** − Less code so in turn a quick development.

- **Don't Repeat Yourself (DRY)** − Everything should be developed only in exactly one place instead of repeating it again and again.

- **Fast Development** − Django's philosophy is to do all it can to facilitate hyper-fast development.

- **Clean Design** − Django strictly maintains a clean design throughout its own code and makes it easy to follow best web-development practices.

Advantages of Django

Here are few advantages of using Django which can be listed out here −
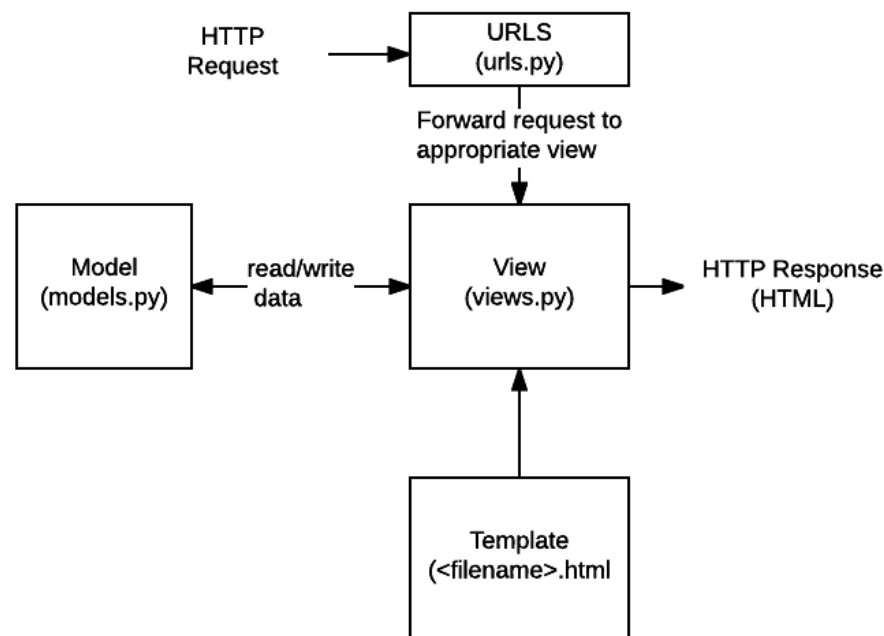
- **Object-Relational Mapping (ORM) Support** − Django provides a bridge between the data model and the database engine, and supports a large set of database systems including MySQL, Oracle, Postgres, etc. Django also supports NoSQL database through Django-nonrel fork. For now, the only NoSQL databases supported are MongoDB and google app engine.

- **Multilingual Support** − Django supports multilingual websites through its built-in internationalization system. So you can develop your website, which would support multiple languages.

- **Framework Support** − Django has built-in support for Ajax, RSS, Caching and various other frameworks.

- **Administration GUI** − Django provides a nice ready-to-use user interface for administrative activities.

- **Development Environment** − Django comes with a lightweight web server to facilitate end-to-end application development and testing.

In a traditional data-driven website, a web application waits for HTTP requests from the web browser (or other client). When a request is received the application works out what is needed based on the URL and possibly information in POST data or GET data. Depending on what is

required it may then read or write information from a database or perform other tasks required to satisfy the request. The application will then return a response to the web browser, often dynamically creating an HTML page for the browser to display by inserting the retrieved data into placeholders in an HTML template.

Django web applications typically group the code that handles each of these steps into separate files:

- **URLs:** While it is possible to process requests from every single URL via a single function, it is much more maintainable to write a separate view function to handle each resource. A URL mapper is used to redirect HTTP requests to the appropriate view based on the request URL. The URL mapper can also match particular patterns of strings or digits that appear in a URL and pass these to a view function as data.

- **View:** A view is a request handler function, which receives HTTP requests and returns HTTP responses. Views access the data needed to satisfy requests via *models*, and delegate the formatting of the response to *templates*.

- **Models:** Models are Python objects that define the structure of an application's data, and provide mechanisms to manage (add, modify, delete) and query records in the database.

- **Templates:** A template is a text file defining the structure or layout of a file (such as an HTML page), with placeholders used to represent actual content. A *view* can dynamically create an HTML page using an HTML template, populating it with data from a *model*. A template can be used to define the structure of any type of file; it doesn't have to be HTML!
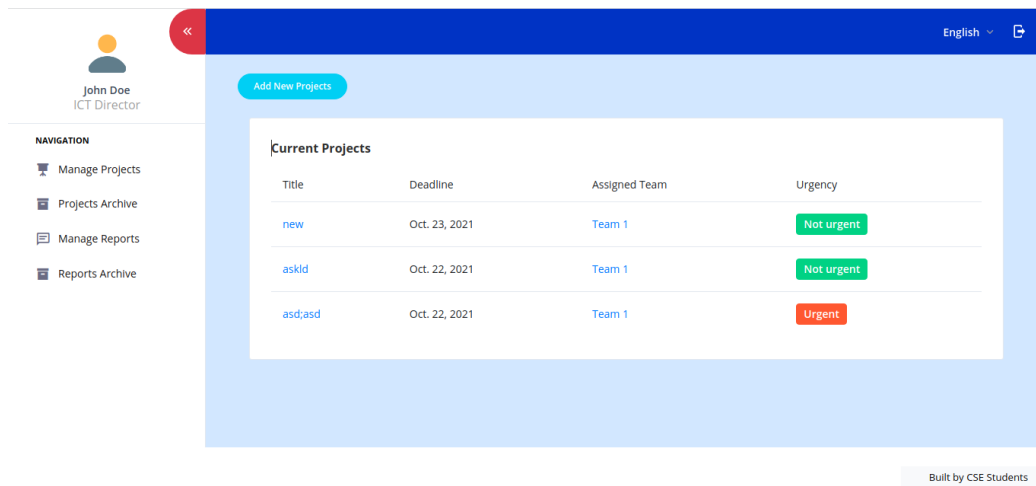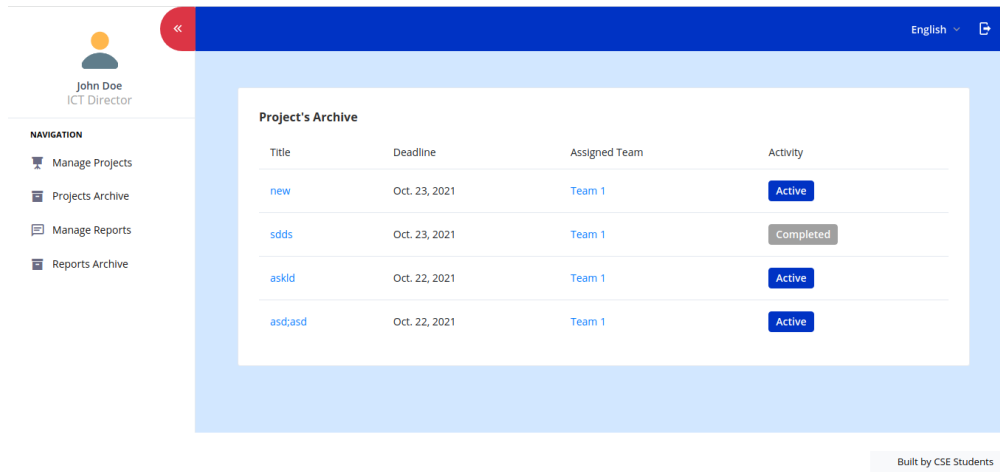

One of the things we were working on was using the Report Management Framework that would allow the employees of the ICT directorate to enhance their productivity by reducing the

paperwork that they would have to exchange through their works. This project was to help do their previous tasks digitally and making sure all records are stored archived and can be managed very quickly.

3.3 Technical knowledge and skills from our course work that were beneficial for our assignment

Since we were working with Django which is a web framework and we haven't taken any specific course on it but we have taken Python, Software Engineering, Web development we can definitely say that the technical knowledge and skills we got from our courses were really beneficial for our assignment on the web app. Also most of the skills we had from our python course were also helpful in some of our trainings. Some of the basic knowledge about Variables and Functions we gained from our Introduction to computing, Fundamentals of programming, Object oriented programming and other programming courses were also beneficial to some degree.

3.4 Relevant research projects we identified in our activities in the organization we stayed with

As mentioned before the main project we were tasked with was a web applications that can ease the way of report collection as well as project management and keep records of these processes. We found the materials we needed from the Django documentation and some GitHub repositories. So sadly there weren't any relevant research projects we found in the organization.

CHAPTER FOUR
REFLECTION AND CONCLUSION

In working this Internship often gave us the opportunity to connect and work with professionals. By interacting with professionals, we gained new connections and learn how to communicate in a professional environment. To be honest this internship has introduced us to a lot of useful resources and has given us the opportunity to meet a variety of professionals in our field. So, we can say that networking has helped us to acquire references and find new job opportunities.

As we all know, technological evolution is dramatically growing. This growth has a direct and indirect effect in one country's economic, social and political development. As we are computer science and engineering students we are the core part of this technological evolution. So, we are responsible to change our country's technology growth and put our fingerprint for the coming generation in this field of area.

This internship was a better way to understand our potential to take part in globalization and showed us what we can do after we graduate. So, we can say it gave us purpose and this will be the corner stone for us to have the better life in the future. And also, internship is the way to test jobs and explore different career options. It modifies our career goals in much better ways. As we have seen many things at the internship area for the last two months, we would not be new to the work area after we graduated.

This work experience gave us complements to our academic training and gave us an introduction to a specific career or field of interest. And this experiential education enables us to change our academic training to practical use and involves duties similar to those of an entry-level position.

This means it can offer us the opportunity to:
- Take responsibility for our own learning and create a more rewarding college experience.
- Develop knowledge, competencies, and experiences related to our major and career goals.

- Gain practical employment experience that employers look for after we graduate that how to solve complex problems, communicate effectively, function comfortably in teams, work productively with people from diverse backgrounds and etc.
- Explore and clarify our major and career goals with professionals in the field, so we'll know if the field is right for us.
- Achieve confidence and a smoother transition to permanent employment and develop professional work habits.
- Develop knowledge, competencies, and experiences related to our major and career goals.
- Explore and clarify our major and career goals with professionals in the field, so we'll know if the field is right for us.
  Gain practical employment experience that employers look for after we graduate that how to solve complex problems, communicate effectively, function comfortably in teams, work productively with people from diverse backgrounds and etc.
- Take responsibility for our own learning and create a more rewarding college experience.
- Achieve confidence and a smoother transition to permanent employment and develop professional work habits.

Now we're much more confident to say something, to suggest our opinion for every question or idea that is forwarded to us. It is due to the skill that we have been developed throughout the internship program. Getting experience is a great way to build confidence.

The following skills are the main benefits we've gained from the program & the work we have done
- Improving practical skills
- Applying Theoretical Knowledge
- Interpersonal communication skills
- Team playing Skill
- Develop Work ethics skills and etc.

Most educational programs are focused on theoretical part. We acquired a lot of theoretical knowledge in classes. And now even by trying to imitate the atmosphere of real working environment it is helpful for improving one's living standards and developing practical skills.

At the same time receiving practical skills might be helpful for enhancing the effectiveness of the working process and adapting challenges. The internship program was an excellent opportunity for us to gain experience in our field. Because of this internship we were able acquire new and improved behavioral skills like

- Responsibility
- Possessing a positive attitude
- Adaptability
- Honesty and integrity
- Motivation to work
- Willing to grow and learn
- Strong self-confidence
- Professionalism

We have improved team work skill by working with each other at the work place. We were able to understand that team work is important to strengthen the effort to accomplish any task. Ideas that are raised in team work helped us to see one thing in different angles and to be a multi directional thinker for elaborating our knowledge regarding the given issue. This team playing skills includes:

- Improving skills
- Progressing speaking ability
- Improving self-confidences
- Developing social interaction
- Understanding our potential relatively
- Upgrading oneself and individual member's potential
- Doing better work

Chapter 5

Recommendations

ASTU is one of the most influential educational institution in Ethiopia. It gives appropriate theoretical and practical education to students in concord environment. In this internship ASTU ICT has shown us a lot of things that we have never known before. It enabled us to build our healthy confidence as we understood the real work environment related to our field of area.

We recommend ASTU to keep accepting students for the internship as it is a very appropriate and suitable institution for applying theoretical knowledge during the internship. Because, it has no lack of materials and it hires well experienced professionals with whom the interns work as well.

We also recommend the future students to work in ASTU, ASTU ICT during their internship period since they will get the appropriate education and work experience.