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WOLKITE UNIVERSITY

COLLEGE OF COMPUTING AND INFORMATICS

DEPARTMENT OF SOFTWARE ENGINEERING

Report on the practical attachment in Software Engineering

Prepared by:
Betsegaw Abebe NSR/0322/12

In campus Advisor: Mr Aliazar Deneke
Organization supervisor: Ms. Elshaday Tesfaye

Report submitted to: Software Engineering Department

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Table of Contents

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Prepared by:
Betsegaw Abebe NSR/0322/12

Organization that hosted the student

Name: Addis software PLC
Region: Addis Ababa
Zone: Addis Ababa
District: Bole Sub-City
Town: AG Grace Plaza, Djibouti St, Addis Ababa
Telephone: +251-978-783525

The supervisor in the organization

Name: Elshaday Tesfaye
Profession: Software Development | UI/UX Design
Title: Ms.

Declaration

I therefore certify that all materials and data in this Practical attachment documentare obtained and within the Software Engineering Department. I also declare that this work is entirely original and has never been presented or used by any other departments.

Student Name : Betsegaw Abebe

Signature _____

Date _____

As an authorized Advisor, I have approved the submission of this Practical Attachment document.

Advisor Name _____

Signature _____

Date _____

Acknowledgment

I would like to extend my deepest gratitude and appreciation to the Wolkite University and Addis Software PLC for providing me with the opportunity to be a part of their internship program. This experience has been invaluable in shaping my professional growth and helping me gain practical knowledge in my field of interest.

First and foremost, I would like to express my thanks to my advisor Mr. Aliazar Deneke for his support through the internship and I also would like to express my sincere thanks to Ms. Elshaday Tesfaye for their guidance and mentorship throughout the internship. Their expertise, patience, and willingness to share their knowledge have been instrumental in my development. I am truly grateful for the time and effort they invested in my learning, providing me with valuable insights and constructive feedback that will undoubtedly shape my future career.

I would also like to extend my appreciation to the entire internship team. The support, encouragement, and collaborative spirit demonstrated by my colleagues have made this internship a truly enriching experience.

Furthermore, I would like to express my gratitude to the entire Addis Software PLC for providing a platform where I could apply my academic knowledge and gain hands-on experience. It has been a transformative experience that has not only enhanced my technical skills but also fostered personal and professional growth.

Abbreviations

CEO - Chief Executive Officer
JWT - JSON Web Token
SRS - Software Requirements Specification
UI - User Interface
UX- User experience

Abstract

This internship report provides a comprehensive overview of my experience and achievements during their internship at Addis Software PLC. The report highlights the objectives, methodology, and outcomes of the internship, along with key learnings and recommendations for future improvements.

The internship aimed to provide me with practical exposure to my field of interest and enhance my professional skills. The report outlines the specific tasks and responsibilities undertaken including project assignments and collaboration with team members.

The Statement Of Problem section describes the approach used to accomplish the internship objectives, including the tools, techniques, and resources utilized. The report also discusses the challenges faced during the internship.

Throughout the internship, I gained valuable knowledge and skills in software Engineering. The report emphasizes the key learnings, such as technical competencies, problem-solving abilities, and effective communication within a professional setting.

The outcomes of the internship are discussed, including the achievements, deliverables, and contributions made to the organization. The report highlights the positive impact of the my work on the projects undertaken and the overall success of the internship.

Based on the internship experience, the report provides recommendations for the organization to further improve their internship program. These recommendations focus on areas such as mentorship and training opportunities.

Overall, the internship report serves as a reflection of my professional development and the value gained from the internship experience. It provides insights into the practical application of academic knowledge, as well as the skills and competencies developed during the internship period.

CHAPTER ONE
Introduction

1.1 Background Of The Hosting Organization

Addis Software PLC is software development company based in Addis Ababa and was established in 2018. From its beginnings as a group of passionate software developers, Addis Software PLC has evolved into one of the best software development team in Ethiopia. Addis Software PLC fosters an environment of continuous learning, collaboration, and transparency, which has contributed to its exponential growth. They serve clients both within Ethiopia and internationally.The company was founded with the aim of providing opportunities for talented developers while contributing to significant advancements in Ethiopia's IT sector. Their projects focus on digitizing government and private sector services.
Addis Software PLC boasts a diverse range of services to cater to the evolving needs of its clients. These services include IT services, software solutions, website and application development, consultancy, and digital marketing.

1.2 Objective, Vision, Mission and Core values of the organization:

1.2.1 Mission

The mission of Addis Software PLC is to foster a digital well-being that benefits both the public and the developer community. They aim to achieve this by taking on large-scale, challenging projects that can drive positive change in Ethiopia's IT sector. Through their services and expertise, they strive to be a digital partner to businesses, helping them achieve success, market leadership, and reliability.

1.2.2Vision

The vision of Addis Software PLC is to be the premier software development team in Ethiopia, recognized for their exceptional services, contributions to the IT sector, and their role in creating an environment where programmers and tech enthusiasts can thrive. They envision a digital

landscape where talents are harnessed, collaborative learning is promoted, and clients can rely on their innovative solutions.

1.2.3 Core Values

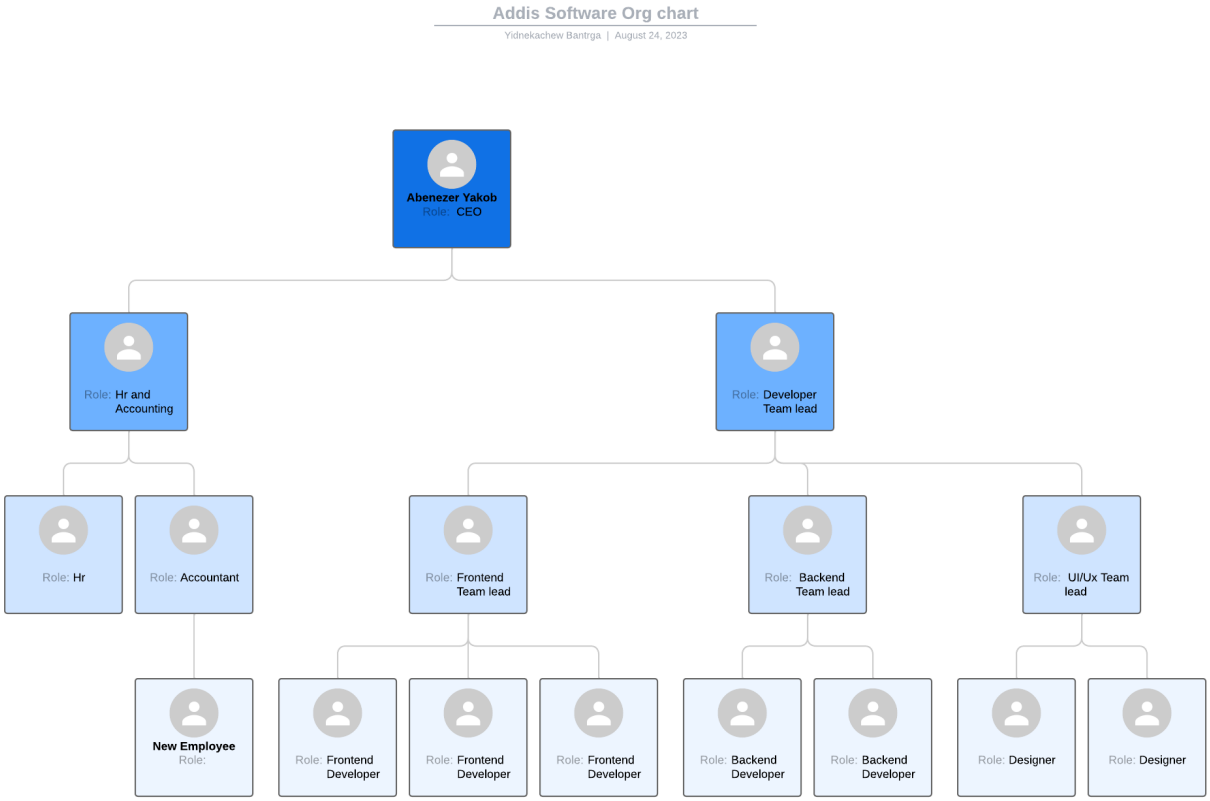
- Commitment: The organization is deeply committed to delivering quality advice, sales, support, and software solutions to clients, ensuring maximum returns on their investments.
- Innovation: Addis Software PLC values innovation and takes on challenging projects to drive advancements in the Ethiopian IT sector.
- Collaboration: The organization believes in creating an environment where everyone learns and grows together. Collaboration and mutual learning are integral to their culture.
- Transparency: Addis Software PLC promotes an open and transparent culture within their office, fostering trust and effective communication.
- Excellence: The organization prides itself on its elite staff and strives for excellence in providing services and expertise to both enterprise and startup companies.
- Digital Well-being: Addis Software PLC's core values include the concept of digital well-being, focusing on creating solutions that benefit the public and contribute positively to the developer community.
- Client Partnership: The organization aims to be a digital partner to businesses, helping them succeed and gain market leadership through their services.

1.3 Organizational Chart

Addis Software operates within a well-defined hierarchy, with the Chief Executive Officer (CEO) situated at the pinnacle. Directly reporting to the CEO are three pivotal roles: the Developer Team Lead, responsible for overseeing development efforts, the HR and Accounting department head, managing human resources and financial matters.

Beneath the Developer Team Lead, the hierarchy branches into distinct segments. These include the Backend Team Lead, the Frontend Team Lead, and the UI/UX Designer. Each of these roles plays an essential part in the software development process, with the Backend and Frontend Team Leads steering their respective technical teams, and the UI/UX Designer crafting intuitive and visually appealing user interfaces.

This well-structured framework facilitates streamlined communication, well-defined reporting pathways, and efficient administration throughout the organization



1.4 Statement Of Problem

Ethiopian diaspora around the world maintain strong connections to their homeland and often wish to invest in their country through purchasing property or other means. However, they face significant challenges in accessing financial services from Ethiopian banks. These challenges include a lack of comprehensive information about the banks and their services, difficulty

understanding and comparing different loan plans, and an inability to choose the best plan for their needs. This lack of access and understanding creates a barrier for the diaspora to contribute to their home country's economy and fulfill their personal financial goals.

The diaspora community plays a pivotal role in the development of their home countries. Their contributions are significant, with financial inflows being one of the most substantial. These inflows encompass remittances, investments, and trade activities. Another vital contribution from the diaspora community is the creation of employment opportunities. Owing to their access to capital, diaspora populations can invest in businesses in their home countries, stimulating job creation and fostering economic growth. This is particularly beneficial in scenarios where foreign currency sources are scarce. Therefore, there is a need for more effective and convenient ways to facilitate credit transactions between Ethiopian banks and their diaspora customers.

The objective of the system is to streamline the loan application process and provide a more accessible and transparent system for diasporas seeking loans from banks helping them make informed decisions and successfully secure loans for their financial needs by using our system. The purpose of the software is to provide a platform for diaspora communities to easily access loans from banks.
The system will act as an intermediary between these financial organizations and the diaspora community, offering a centralized source of information and guidance to help individuals make informed decisions about their financial needs.

The system will allow diasporas to easily submit loan requests and provide banks with relevant information. By utilizing phone operators to manually screen applicants for their eligibility, the owner of the system will ensure that each request is given sufficient attention and that each applicant meets the necessary requirements. The system will also enable banks to have access to these loan requests and send return offers and our system sends the return offers from the bank to the diasporas via email, making the process more efficient and less time-consuming for all parties involved.

Additionally, the system will provide assistance in the loan application process, helping individuals apply for loans and monitor their progress until they receive the offer they need.The system creates a streamlined, user-friendly platform that enables diasporas to easily submit their loan requests and view offers from partnering banks. The system will automate many of the routine tasks associated with loan processing, reducing the need for human intervention and making the application experience more efficient and transparent.

1.5 Tasks Assigned

1.5.1 Development of a CRUD Application

The objective of this task was to familiarize us with the company's technology stack and the work environment. This was achieved by developing a simple CRUD (Create, Read, Update, Delete) application that allowed users to manage data in a database.

We used Node.js for the backend and React with TypeScript for the frontend, as required by the company. We started by designing the database schema and planning out the necessary API endpoints. We then implemented these endpoints in Node.js. On the frontend, we created user interfaces using React that interacted with these endpoints, allowing users to create, read, update, and delete data in the database.

In addition to this, we also utilized Styled System for building our user interfaces on the frontend. Styled System is a collection of utility functions that add style props to your React components and allows you to control their layout and styling in a more efficient way.

During this process, we also learned about and utilized database aggregation. This is a process where the values of multiple rows are grouped together as input on certain criteria to form a single value of more significant meaning or measurement such as a set or a list.

To secure our application, we implemented JWT (JSON Web Tokens) authentication. This ensured that only authenticated users could perform CRUD operations.

We also learned about dockerizing applications. This involved creating a Dockerfile for our application, building a Docker image from it, and running our application inside a Docker container. This gave us a consistent and reproducible environment that made deployment easier.

The project was successful and helped us learn how to use these technologies and tools effectively and efficiently. It served as a valuable preparation for our main project. We not only developed a functional CRUD application but also gained hands-on experience with JWT authentication, Docker, Styled System, and database aggregation which are crucial skills in modern software development.

1.5.2 Preparation of Software Requirements Specification (SRS) Document Objective:

The objective of this task was to define and document the functional and non-functional requirements of a software system. This was done by analyzing the problem and the needs of the stakeholders.

We used the following steps to prepare the SRS document:

- We discussed the problem with our team and identified the main features and goals of the software system.
- We shared the document with various experts, including representatives from banks, software engineers, and diasporas, to gather insights from different business perspectives.
- We incorporated their feedback and suggestions into the document, ensuring that the requirements were clear, consistent, and complete.
- We validated the document by checking its quality, accuracy, and completeness.

The task was successful and helped us create a comprehensive SRS document that captured the essential requirements of the software system. It served as a valuable foundation for the design and development phases of the software project. We not only learned how to write an effective SRS document but also gained knowledge about the domain and the stakeholders of the software system.

1.5.3 Designing a Database Schema

The objective of this task was to structure and organize the data that your system will handle, using MongoDB as the database management system. MongoDB is a NoSQL database that offers flexibility, scalability, and high performance. It stores data in documents, which are JSON-like objects that can have different fields and values. This allows us to model complex and dynamic data without having to define a rigid schema beforehand.

We used the following steps to design the database schema for your project:

- We defined the requirements and features of your project, such as the types of data, the operations, and the queries that your system will support.
- We identified the main entities and attributes of your domain and mapped them to MongoDB documents. We also considered the relationships and references among them, as well as the indexes and validations that would improve the performance and quality of your data.

The task was successful and helped us create a database schema for your project that met your needs and expectations. It served as a foundation for storing and retrieving data in an effective way.

1.5.4 Creating Fundamental Components for the User Interface Objective:

The objective of this task was to create reusable and responsive components that would be utilized throughout the project. These components included buttons, select flex blocks, input fields, and others. I have used the Styled System for building these components, as it is a collection of utility functions that add style props to React components and allows me to control their layout and styling in a more efficient way.

I used the following steps to create the fundamental components for the user interface:

- identify the common elements and patterns that would appear in our user interface, such as forms, menus, cards, etc.
- followed the principles of atomic design, which is a methodology that breaks down the user interface into smaller and simpler components that can be combined and reused.
- implement the components using React with TypeScript. Used a Styled System to add style props to our components, such as color, space, typography, layout, etc. I also used Styled Components, a library that allows me to write CSS in JavaScript and attach styles to our components.

The task was successful and helped me to create fundamental components for the user interface that were reusable and responsive. It served as a basis for building more complex and dynamic user interfaces for our project.

1.5.5 Design and Implementation of a Role-Based Login Page using React Redux

The objective of this task was to enhance the user experience and ensure proper access control in our application by designing and implementing a login page that can accommodate users with varying roles.

- Designing the Login Page: I started by sketching out the design of the login page, which included input fields for the username and password, as well as other necessary elements such as a 'Remember Me' checkbox and 'Forgot Password' link.
- Implementing the Login Page: After finalizing the design, I implemented it using React. I managed the state of my components effectively using Redux.
- Role-Based Authentication: I implemented role-based authentication in our login process. This means that our system identifies the role of the user (e.g., admin, user, Phone Operator) upon login and directs them to the appropriate page or interface.
- Testing: After implementation, I thoroughly tested our login page to ensure it works as expected for all user roles.

By completing this task, I successfully developed a functional login page that can handle users with different roles, providing a tailored and efficient login process. This has not only enhanced the user experience but also ensured proper access control in our application.

1.5.6 Creation of Phone Operator Dashboard Components

The objective of this task was to enhance the functionality and user experience of our application by creating various pages and components for different user dashboards.

1. Phone Operator Dashboard Scheduled Diasporas Page: I was tasked with creating a scheduled diasporas page for the phone operator dashboard. This involved implementing a page where phone operators could view scheduled requests. This page was designed to be intuitive and user-friendly, allowing phone operators to easily navigate and manage their scheduled requests.
2. Request Detail Page: In addition to the dashboard, I also designed and implemented a request detail page. This page provided detailed information about each request, including information about diasporas and approve, reject or schedule requests . It also allowed phone operators to add necessary documents related to each request. This ensured that all relevant information and documents were easily accessible in one place.

By completing this task, I was able to significantly improve the functionality of our application. The detailed request page, in particular, has streamlined the process of viewing and managing request information, leading to improved productivity and user satisfaction.

1.5.7 Development of Dashboard component for Admin Pages

The objective of this task was to create various pages and components for the admin page/dashboard. This involved implementing features that allowed the admin to view diasporas/users, banks, and add different roles.

1. I designed and implemented a feature that allowed the admin to add different roles. This involved creating a user interface for adding roles and integrating it with the backend to update the database.
2. The request view allowed the admin to see detailed information about requests.
3. The diaspora view provided detailed information about diasporas.

The task was successfully completed, resulting in a functional admin dashboard with various features. This not only enhanced the usability of the application but also provided valuable experience in designing and implementing complex user interfaces.

1.5.1 Task completed

- ➔ Development of a CRUD Application.
- ➔ Design and Implementation of a Role-Based Login Page.
- ➔ Development of Dashboards component for Phone operators Pages.
- ➔ Phone Operator Dashboard Scheduled Diasporas Page.
- ➔ Request Detail Page for phone operator.
- ➔ Development of Dashboards component for Admin Pages.
- ➔ Designing and implementing a feature allowed the admin to add different roles.
- ➔ The request view allowed the admin to see detailed information about requests.

- ➔ The diaspora view provided detailed information about diasporas.

Overall, these tasks have not only allowed me to contribute significantly to the project but also provided me with valuable experience in component design and user interface development. I look forward to applying these skills in future projects.

1.5.2 Task is not completed

Designing and implementing a feature allowing the admin to add different roles is partly completely done due to ambiguity in the specification document .Despite the project not reaching completion within the internship period it is important to acknowledge the significant progress that was made. Throughout the duration of the internship period, I diligently worked on and successfully completed all tasks assigned to me. Although the project remains unfinished, the experience has provided a wealth of knowledge and skills that will undoubtedly be beneficial in future endeavors.

1.6Objective / aim of the task

1.6.1 General objective

The task's objective is to develop a system that serves as a bridge for diaspora communities to conveniently secure loans from banks, while simultaneously providing an opportunity to learn about industrial-level software development.

1.6.2 Specific objectives of the task are

- ➔ Familiarize you with the company's technology stack and work environment.
- ➔ Define and document the functional and non-functional requirements of a software system.
- ➔ Design a database schema using MongoDB for a project.
- ➔ Creating reusable and responsive components for the user interface using React with TypeScript and Styled System.
- ➔ Designing and implementing a role-based login page to enhance user experience and ensure proper access control.
- ➔ Creating various pages and components for the admin dashboard.
- ➔ Creating various pages and components for the phone operator dashboard.

CHAPTER TWO

2. Methodology for business process analyses or case study

2.1 Method of Data Collection

The data for the business process analysis was collected from the website published by Addis Software, which provided a platform for diaspora investors to register and access information about investment opportunities in Ethiopia. The website had a form that required the diaspora investors to fill in their personal and professional details, such as name, email, country of residence, sector of interest, amount of investment, etc. This method allowed us to obtain a large and diverse sample of potential investors and their preferences.

2.2 Method of problem analysis

We use a method used by a company to analyze problems, incorporating various methods to thoroughly understand and address challenges. These methods include:

Gathering User Stories: By directly collecting insights and feedback from users and stakeholders, the company gains valuable perspectives on issues and potential solutions.
Prototyping: Creating prototypes allows the company to visualize and test potential solutions, aiding in the identification of design flaws and user experience challenges.
Brainstorming: Leveraging group brainstorming sessions fosters creative thinking and generates diverse ideas to tackle identified problems.
Requirements Analysis: Through rigorous requirements analysis, the company defines the functional and non-functional aspects of the issues at hand, paving the way for effective solutions.
Interviews and Surveys: Engaging with stakeholders and users via interviews and surveys facilitates the gathering of comprehensive data on challenges and user needs.
By combining these methods, the company ensures a comprehensive understanding of problems and a well-informed basis for developing successful solutions.

2.3 Difficulty in internship

Internships are a valuable opportunity for learning and professional development, but they also come with their own set of challenges.

Team composition: One of the primary difficulties we face is that our group consists solely of interns. This can make it difficult to navigate through tasks and projects without the guidance

and expertise of seasoned professionals. We often find ourselves in situations where we have to rely on our own limited experience and knowledge, which can be intimidating and stressful.

Understanding the Codebase: As an intern, one of the first and most daunting tasks can be understanding a large, complex codebase. Discuss how you navigated this, any strategies you used, and how you sought help from your team.

Learning New Technologies: Often, you might have to learn new programming languages or technologies. Talk about these instances, how you approached learning, and how you applied your new knowledge.

Additionally, Transport-related difficulties can add to the overall stress of the internship, making it a challenging but ultimately rewarding experience.

2.4 Strength and weakness of the hosting organization

2.4.1 Strength

Learning Opportunities: The company provided numerous learning opportunities, one of which was access to various professional courses. These courses covered a wide range of topics, from programming languages to software development methodologies. This commitment to continuous learning not only helped me enhance my technical skills, but also allowed me to stay updated with the latest industry trends. The availability of these courses demonstrates the company's investment in employee growth and development, which I consider a significant strength.

Team Collaboration: The team held daily stand-up meetings where everyone shared their progress and any blockers they were facing. This open communication helped in resolving issues quickly and fostered a sense of camaraderie among team members.

Technology Stack: During my internship, I noticed that the company uses a modern technology stack including languages and tools like Docker. This not only made the development process smoother but also ensured that our applications were scalable and reliable.

Project Management: The use of project management tools Trello ensured that everyone was aware of their responsibilities, deadlines were clearly defined, and progress could be tracked effectively.

Workspace Environment: One of the strengths of the company was its vibrant and engaging workspace. The office was equipped with a variety of recreational facilities such as a game room with video games and a comfortable lounge area. This not only provided a much-needed break from work but also fostered a fun and relaxed atmosphere that boosted team morale and

productivity. It was clear that the company valued work-life balance and understood the importance of creating a positive work environment for its employees.

2.4.2 weakness

Lack of Documentation: Although I didn't have the opportunity to work directly with their team, I did have the chance to review some of the codebases. I noticed a significant lack of comprehensive documentation in some projects. This absence of documentation made it challenging for newcomers like me to understand the codebase effectively.

Team Composition: While the willingness of the team to help and mentor was commendable, one weakness I observed was that our team was primarily composed of interns. Although this provided us with a unique learning environment, it also presented challenges. The lack of experienced team members meant that it took us longer to collaborate effectively and navigate through complex tasks. Having a mix of experienced professionals in the team could have expedited our learning process and increased the efficiency of our projects. However, it's important to note that this experience taught us the value of peer learning and problem-solving as a team.

CHAPTER THREE

3.1 Result

During my software engineering internship, we initiated the creation of a software system designed to smoothly integrate with an existing company's website. This system was conceived as a channel for diaspora communities to secure loans from banks with ease. While the project is still in progress, we have successfully implemented its core functionality.

My responsibilities within the team included the development of a new feature for our software product, which encompassed a range of tasks from authentication processes to the design and development of various dashboard components. The project is currently in an active phase, with the team continually working on enhancements and improvements.

3.2 Discussion

The internship experience has been a significant learning journey. I have gained a comprehensive understanding of various aspects of software development, from database schema design and aggregation to frontend development with React and TypeScript. Working with a styled system has enhanced my aesthetic sensibility and user interface design skills.

My exposure to a large codebase has undoubtedly improved my ability to navigate and understand complex systems. Collaborating with a diverse team improved my communication and teamwork skills, which are crucial in any professional setting.

The practical skills I have acquired during this internship complement the theoretical knowledge from my Software Engineering course. This blend of theory and practice is essential for a well-rounded understanding of the field. It is encouraging to see that I have been able to apply my academic knowledge in a real-world context.

This internship has not only enriched my technical skills but also provided me with invaluable practical experience. These learnings will be beneficial in my future career as a software engineer.

3.3 Recommendation

3.3.1 For the hosting organization

Development Methodologies: Based on my observations during your internship, it appears that Addis Software PLC has already recognized the benefits of Agile-like methodologies in software development. However, the inconsistent application of these methodologies throughout projects can lead to inefficiencies and miscommunication within the team.

I recommend that Addis Software PLC consider adopting a more formalized and consistent Agile framework across all projects.By formalizing its approach to development, Addis Software PLC can ensure a standardized and efficient workflow.

3.3.2 For Wolkite University college computing and informatics, Department of Software Engineering.

Internship Opportunities: The college should actively communicate and collaborate with more companies to provide a wider range of internship opportunities for students. These internships should ideally involve projects that solve real-world problems, allowing students to apply their theoretical knowledge and gain practical skills.This would not only enhance the learning experience but also increase the employability of the students.

Curriculum Relevance: During my internship, I noticed that the theoretical knowledge I gained from the Software Engineering course was very useful. However, there was a lack of emphasis on new technologies and trends in our curriculum. I recommend incorporating more of the latest technologies and trends into the curriculum, as they are widely used in the industry and staying current is crucial in the rapidly evolving field of software engineering.

Practical Skills: The practical coding skills that I learned during my coursework were invaluable during my internship. However, I found myself lacking in knowledge about certain key areas which are widely used in the industry such as Continuous Integration/Continuous Deployment (CI/CD) , Cloud Services, Containers and Virtualization. I recommend introducing modules on these topics in the curriculum.

Conclusion

In conclusion, the software engineering internship has been an invaluable experience. I have had the opportunity to apply the theoretical knowledge gained from my coursework into practical use, gaining hands-on experience in software development and project management.

One of the significant aspects of this internship was the exposure to new technologies. This allowed me to broaden my technical skills and stay updated with the latest trends in software engineering. Working on these technologies has given me a deeper understanding of their application in solving real-world problems.

In addition to technical skills, the internship also provided an opportunity to understand and practice professional work ethics. Adhering to deadlines, maintaining confidentiality, and demonstrating integrity were some of the key work ethics I learned during this period.

Moreover, I have honed my soft skills, particularly in areas of communication, teamwork, and problem-solving. Interacting with diverse team members and participating in group projects has improved my ability to work collaboratively and effectively communicate my ideas.

The challenges faced during the internship have further developed my problem-solving skills and taught me the importance of resilience and adaptability in a dynamic work environment.

The exposure to real-world software development processes, including requirement gathering, design, coding, testing, and maintenance has significantly enhanced my understanding of the software lifecycle. The opportunity to work on actual projects and contribute to their success has boosted my confidence and affirmed my desire to pursue a career in software engineering.

I am grateful for the mentorship and guidance provided by the team which has enriched my learning experience. This internship has not only equipped me with essential skills for my future career but also provided a clear direction for my professional growth in the field of software engineering. I look forward to leveraging these experiences and insights as I embark on my next academic and professional journey.