INTERNSHIP REPORT CARRIED OUT AT ZENTRIX AFRICA TECHNOLOGY INSTITUTE FROM 30TH/JUNE 2025 TO 18TH /AUGUST/2025

BY

MUHWEZI ASAPH

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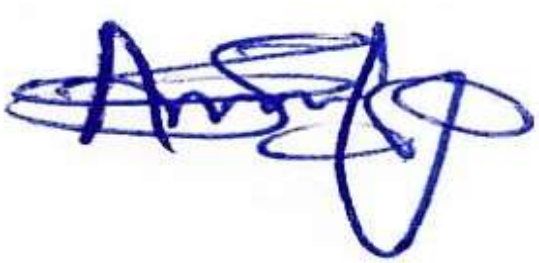
SUBMITTED TO THE SCHOOL OF COMPUTING AND ENGINEERING OF UGANDA TECHNOLOGY AND MANAGEMENT UNIVERSITY (UTAMU) IN PARTIAL FULFILMENT OF THE REQUIREMENTS LEADING TO THE AWARD OF BACHELOR OF SCIENCE IN COMPUTER SCIENCE AT UGANDA TECHNOLOGY AND MANAGEMENT UNIVERSITY (UTAMU)

SUBMITTED ON 10TH /SEP/2025

DECLARATION

I Muhwezi Asaph of RegNo: SEP23/BSC/3567U/F hereby declare that this report made in partial fulfilment of the requirements of the award of bachelor of science in computer science at Uganda Technology and Management University (UTAMU) is my very own work and it shows what I learnt and faced during my internship at Zentrix Africa Technology Institute (ZATI) conducted at National ICT innovation hub Nakawa and online, from 30th June 2025 to 18th August 2025.

This content is my original work as a result of my own efforts and experience i acquired from Zentrix Africa Technology Institute (ZATI) and has never been submitted to any institution.



Signature _____

Date: 18th /August/2025

APPROVAL

This is to certify that Muhwezi Asaph of RegNo: SEP23/BSC/3567U/F successfully carried out his internship at Zentrix Africa Technology Institute (ZATI) at National ICT innovation hub Nakawa and online, from 30th June 2025 to 18th August 2025 under the supervision of Mr Turwomwe Benjamin and is now ready for submission to the school of computing and engineering Uganda Technology and Management University (UTAMU).

Field supervisor

NAME: Mr Turwomwe Benjamin

Signature: _____

Date: 10/09/2025

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This is to certify that i supervised Muhwezi Asaph of RegNo: SEP23/BSC/3567U/F and he successfully carried out his internship at Zentrix Africa Technology Institute conducted at National ICT innovation hub Nakawa and online, from 30th June 2025 to 18th August 2025 under the supervision of Mr Turwomwe Benjamin and is now ready for submission to the school of computing and engineering Uganda Technology and Management University (UTAMU).

School supervisor

Name: Mr Allan Ninyesiga

Signature: .....

Date: .....

DEDICATION

I dedicate this internship report to the Almighty God for His grace, wisdom, and strength that enabled me to successfully complete this internship.

In another special way i want to also dedicate it to my beloved parents and family, whose prayers, encouragement, and sacrifices have always been my source of inspiration and i owe you endless gratitude.

Finally, i also dedicate this work to my supervisors, both school and field for their guidance, mentorship, and support that shaped my learning experience.

ACKNOWLEDGEMENT

I am deeply grateful to the Almighty God for His grace, wisdom, and strength that enabled me to successfully complete my internship.

My sincere appreciation goes also to my school supervisor Mr Allan Ninyesiga for his continuous guidance, advice, and encouragement throughout this internship period, i also extend my gratitude to my field supervisor, Mr. Turwomwe Benjamin at Zentrix Africa Technology Institute, whose mentorship, support, and constructive feedback greatly enriched my learning experience.

Special thanks also go to the CEO of Zentrix Africa Technology Institute (ZATI) Mr Sserunkuuma Ibrahim for offering me an opportunity and for creating a conducive environment that enhanced both my professional growth and personal development.

Lastly, i owe so much to my boss, workmates, family and friends for their encouragement, prayers, and moral support during the course of my internship.

Contents

LIST OF ABBREVIATION/ ACRONYMS

RegNO	Registration number
Tel	Telephone contact
Email	Electronic mail
UTAMU	Uganda Technology and Management University
Mr	Mister
ICT	Information and Communication Technology
SEP	September
BSC	Bachelor of science computer science
CEO	Chief Executive Officer
ZATI	Zentrix Africa Technology Institute
VS Code	Visual Studio Code
npm	node package manager
DevTools	Developer Tools
HTML	Hyper Text Markup Language
CSS	Cascading Styles Sheet
Js	JavaScript
DB	database
Repo	repository
UI	User interface
DOM	Document Object Model

ABSTRACT

This report is submitted in partial fulfilment of the requirements for the award of the Bachelor of Science in Computer Science at Uganda Technology and Management University (UTAMU). The internship was undertaken at Zentrix Africa Technology Institute, where i was attached to the Frontend and Backend development section.

The report highlights the background and purpose of the internship, including its objectives and benefits to both the intern, the host organization and the university. It further presents the major activities carried out, such as building and deploying a React-based To-Do web application on Netlify, developing and hosting a Books API backend on Render, and integrating a backend service for the To-Do application as a final project. These activities enhanced my skills in HTML, CSS, JavaScript, React.js, Node.js, Express, MongoDB, GitHub collaboration, and deployment technologies.

The report also discusses challenges encountered at personal, organizational, and institutional levels, as well as the strategies adopted to overcome them. Finally, it provides recommendations for improving the internship program for future internees, UTAMU, and Zentrix Africa Technology Institute, and concludes with key lessons and reflections from the entire experience.

Supporting documents, including letters, approvals, and evidence of executed tasks, are attached in the appendix.

CHAPTER ONE: BACKGROUND TO INTERNSHIP EXERCISE

1.0 INTRODUCTION.

This chapter presents the clear background of the internship, details about Zentrix Africa Technology Institute (where I did internship from), intern-supervisor relationship and scope of internship

Under background of internship, it defines what internship is, reason for or purpose of internship and its benefits, and on background of Zentrix Africa Technology Institute, it covers the profile, historical background and geographical location, its core values, governance structure, vision, mission, goals and its objectives.

1.1 BACKGROUND OF INTERNSHIP

The Internship training is an academic requirement for every student majoring in bachelor of science in computer science at UTAMU and it is done after the end of every year where the University offers opportunity to its students to be attached to different organizations which place them to work under senior personnels in their area of speciality who in this regard play the role of a trainer, mentor and supervisors. This exercise is a part of the university curriculum.

My end of year two internship was conducted at National ICT innovation hub Nakawa and online by Zentrix Africa Technology Institute where they offered me frontend/backend (full stack) internship opportunity.

1.1.1 WHAT'S INTERNSHIP?

It refers to the position within the company or organisation where individuals often students or recent graduates gain practical work experience in a specific field or industry

1.1.2 OBJECTIVES /PURPOSE FOR INTERNSHIP EXERCISE

The main objective of internship exercise is to give students an opportunity to apply their academic knowledge attained from the lecture room (mainly theories) in real world settings (practical application.) and also learn new skills while being supervised by an experienced professional.

The other objectives include;

- To enable students get familiarize with challenges related to their chosen field and

receive guidance from professionals on how to overcome them in all possible ways.

- To fulfil the requirements of the bachelor of science in computer science at Uganda Technology and Management University (UTAMU).
- To equip the intern with greater understanding about career options while more clearly defining personal career goals.
- To help student experience the activities and the functions of the field or industry he's majoring in
- To help student develop and refine oral and written communication skills**.**
- To help student identify areas for future knowledge and skill development.

1.1.3 TRAINING OBJECTIVE

My training objectives of conducting internships at Zentrix Africa Technology Institute were as follows

- Application of academic knowledge. I intended to apply theoretical concepts learned in the classroom to real-world situations to reinforce my understanding
- Software skill development. I needed to sharpen my software development skills as it will help me in my final year project.
- Mentorship. I intended to learn more from the professional mentors, and peers who can offer wise guidance and support in my course under study.
- Enhancing my employability. That's internship experience is considered a practical experience which can make my resume stand out before future employers.
- To fulfil my course requirements. I had to fulfil the course requirement needed for the award of bachelor of science in computer science at UTAMU.

1.1.4 BENEFITS OF INTERNSHIP

TO STUDENTS

Internships offer numerous benefits to students, both in terms of personal and professional development. Among them include;

- Real-world experience. It provides hands-on experience in a real working environment, allowing students to apply theoretical knowledge gained in the classroom

- Skill development. Students develop and enhance both technical and soft skills, including communication, teamwork, time management, and problem-solving.
- Networking opportunities. Internships allow students to interact with professionals in their field, leading to mentorship opportunities and future job connections prospects.
- Career exploration. Internships help students explore different career paths and industries, helping them decide what suit their interests and long-term goals.
- Improved employability. Having internship experience on a resume makes students more attractive to future employers as it demonstrates practical experience and commitment to the field.
- Building confidence. Gaining experience in a professional setting helps students build confidence in their abilities and prepares them for the future full-time job.
- Earning academic credit. Internships provide academic credit, helping students fulfil course requirements while gaining practical experience.

TO THE UNIVERSITY

Internships provide several benefits to universities, including:

- Enhanced reputation. Successful internships reflect positively on the university, showcasing its ability to prepare students for real-world jobs.
- Curriculum relevance. Feedback from students and supervisors helps the university keep academic programs relevant by aligning course works with industry demands and skills.
- Research and development. Internships can lead to partnerships for research, innovation, and new projects, benefiting academic departments.
- Data for performance metrics. Universities can use the success of internal internship programs and external internee supervisors' reports as evidence of high-quality student outcomes in accreditation processes and rankings.

TO THE EMPLOYER

Internships provide several benefits to the institution i did my internship from and among them include:

- Revenue support. Internship fees paid help ZATI sustain its operations and financial sustainability.

- Brand building and reputation. Every student who completes their internship becomes a brand ambassador.
- When interns share experiences, projects, or GitHub repositories, it increases the institute's visibility and credibility in Uganda's tech-education space.
- Talent pipeline. By training interns, ZATI identifies bright students who could later be volunteers, trainers, or staff.

1.2 BACKGROUND OF THE ORGANISATION WHERE INTERNSHIP TOOK PLACE (ZATI)

Zentrix Africa Technology Institute (ZATI) was founded in 2023 by Sserunkuuma Ibrahim, a software engineer and entrepreneur with a vision to revolutionize tech education across Africa. The journey began when he hired a team of twenty (20) fresh graduates from Uganda, Kenya, and Nigeria for his company, Zentrix Innovative Labs Limited and that despite of their academic qualifications, the team struggled with practical, hands-on skills, revealing a critical flaw in Africa's education system where students were leaving institutions with only theoretical knowledge and lacking real-world experience.

That experience nearly led to the collapse of the company and that situation birthed the idea in him to create ZATI to bridge the tech skills gap in Africa by offering affordable, practical, and accessible online education.

It has physical office space for administrative functions at Plot 19-22 Port Bell Road, Nakawa, Kampala, Uganda with almost all of its courses delivered 100% online however our community engagement was coupled by both online and physical being attended at National ICT innovation hub Nakawa.

1.2.1 CORE VALUES OF ZATI.

ZATI has its fundamental beliefs, guiding principles that shape how it behaves and makes decisions and among them include:

- Accessibility. ZATI believe in making high-quality education available to everyone, regardless of location or background.
- Innovation. It believes in constantly evolving and adapting to the latest technology and educational trends.

- Inclusivity. ZATI welcome diverse learners, ensuring equitable opportunities for all.
- Affordability. It Offers programs at a price that makes education reachable for all Africans.
- Excellence. ZATI believes in upholding high standards in education, delivering world-class learning experiences.
- Practical Learning. Believes in providing hands-on, real-world projects to ensure industry-relevant skills.
- Empowerment. Empowering students and professionals to thrive in the tech industry.
- Collaboration. believes in fostering partnerships with global tech companies and organizations to enhance opportunities.
- Sustainability. Committed to sustainable education models that contribute to Africa's long-term development.

1.2. 2 VISION, MISSION, GOALS AND OBJECTIVES OF ZATI

ZATI VISION.

ZATI vision is "To be the beacon of innovation and learning, lighting the way for individuals across Africa to embrace the vast opportunities of the digital era"

ZATI MISSION.

ZATI mission is "to bridge Africa's tech skills gap by delivering accessible, hands-on, and affordable online education.

ZATI GOALS AND OBJECTIVES

- To deliver high-quality education: Offer world-class, industry-relevant learning experiences to students and professionals.
- To bridge the skills gap: Equip learners with practical tech skills to meet the demands of Africa's growing tech sector.
- To ensure accessibility: Make education available to everyone across Africa through online platforms.
- To promote inclusivity: Provide equal learning opportunities, regardless of socio-economic background.

- To offer affordable programs: Keep tuition and fees within reach to support widespread education access.
- To empower learners: Foster student and professional growth through hands-on, real-world projects.
- To rive innovation: Stay at the forefront of educational and technological advancements.
- To collaborate globally: Partner with leading tech companies to enhance learning and career opportunities.
- To support sustainable development: Promote long-term growth by offering education that contributes to Africa's future prosperity.

1.2.3 SCOPE OF INTERNSHIP

The scope of internship contains the geographical scope, content and the time scope.

GEOGRAPHICAL SCOPE

The exercise was physically carried out at National ICT innovation hub Nakawa on Monday, Wednesday and Friday and online sessions on Tuesday, Thursday and Saturday

CONTENT SCOPE

During my internship, i worked on full-stack web development, covering both frontend and backend tasks. On the frontend, i built web pages using HTML, CSS, and JavaScript, and developed interactive interfaces with React.js, ensuring responsive layouts. On the backend, i implemented server-side logic with Node.js and Express.js, managed MongoDB databases, and integrated RESTful APIs to connect the frontend with dynamic data. I also collaborated on project version control using Git and GitHub, contributing to the development, testing, and deployment of complete web applications.

TIME SCOPE

It was meant to begin on 19th/ May/2025 and end on 18th /July /2025 but due to some unavoidable circumstances it was instead shifted and it began on 30th /June/2025 and ended on 18th/August/2025 attended to Monday to Saturday from 08:00am to 1:00pm physically and online.

1.3 INTERNEE-SUPERVISOR RELATIONSHIP

To me i observed good relationship and determination on the side of supervisor to ensure that i apply all the concepts of full stack development in the time available.

I was given enough time and tasks to practice what i have learned and i practiced enough using frontend and backend technologies. In summary, it was an exciting experience for me in that short time

1.4 GOVERNANCE STRUCTURE OF ZATI.

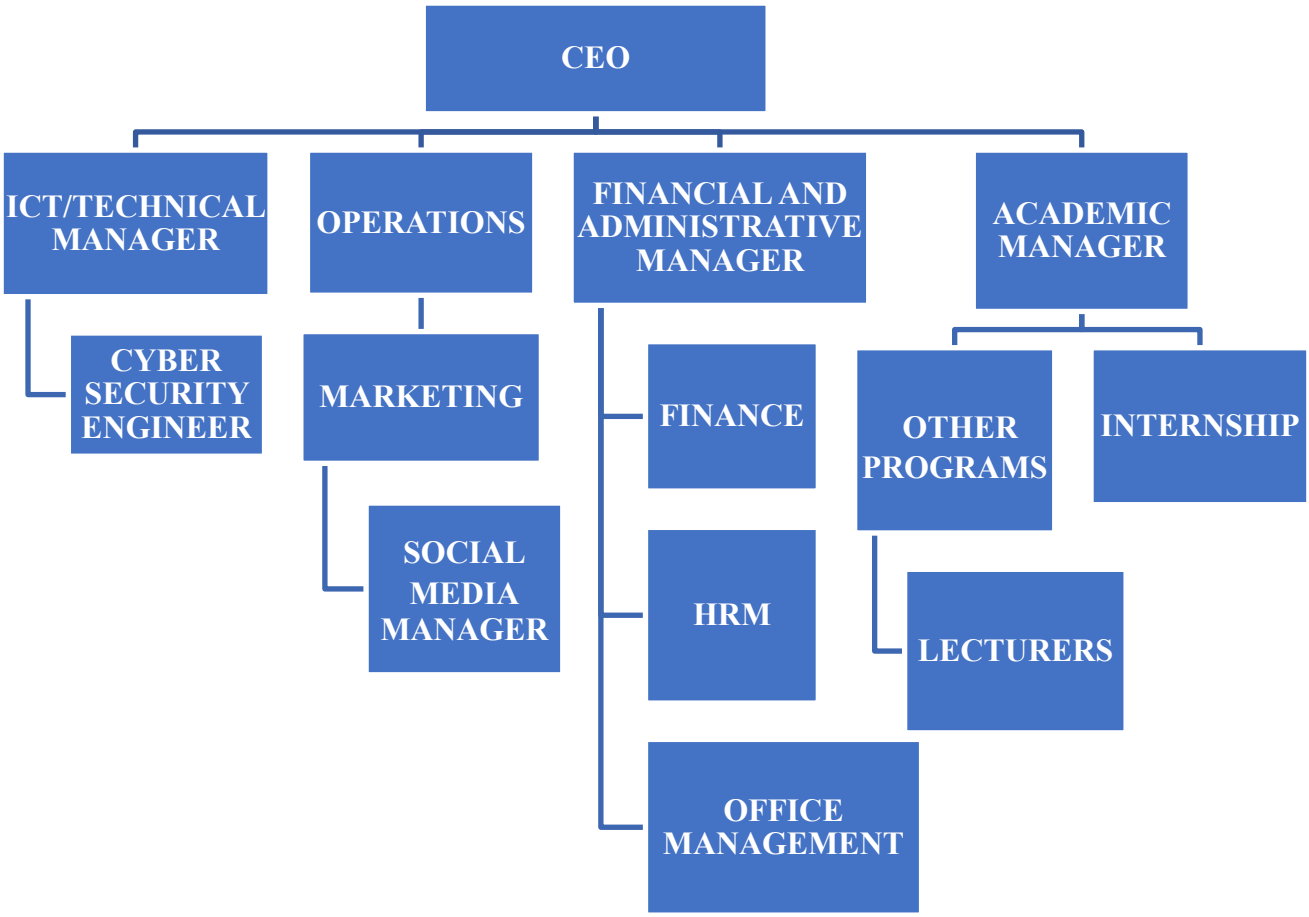

Figure 1 Shows the governance structure of ZATI

In conclusion, this internship provided me with a clear framework for understanding the purpose and value of field attachment, while the background of Zentrix Africa Technology Institute offered insight into the organization's mandate, vision, and operational structure. This foundation was essential in preparing me for the tasks and experiences i later encountered during the training.

CHAPTER TWO: INTERNSHIP ACTIVITIES, EXPERIENCES, SKILLS AND LESSONS LEARNED

2.0 INTRODUCTION

This chapter presents all the contents that ZATI allowed me to explore in full stack development internship and the lessons, skills and experience i learned from the internship experience. I detailed them in the table below

2.1 ACTIVITIES, EXPERIENCE AND LESSONS LEARNED

This part presents details of the activities, lessons learned and experience i learned from the internship experience at ZATI. I detailed them in the table below

Week / Day	Date	Activity (concise)	Technologies / Tools	Deployment / Live Links	Reflection (lessons, challenges, recommendations)
Week 1 – Day 1	30 Jun 2025	Orientation, program overview	—	—	Learned internship structure and expectations; Challenge: familiarizing with workflow; Recommendation: always avail orientation guide.
Week 1 – Day 2	1 Jul 2025	Tools installation and environment setup	VS Code, Node.js, npm, Git	—	Learned tool installation and Agile workflow; Challenge: Slow and high costs of internet; Recommendation:

					offline installers.
Week 1 – Day 3	2 Jul 2025	Continue setup, verify installations	VS Code, Node.js, Git	—	Practiced terminal commands; Challenge: setup errors; Recommendation: double-check versions.
Week 1 – Day 4	3 Jul 2025	Git and GitHub basics, push code	Git, GitHub	—	Learned version control; Challenge: git push errors; Recommendation: repeat practice.
Week 1 – Day 5	4 Jul 2025	HTML5 fundamentals, about me page	HTML5, VS Code	—	Learned page structure; Challenge: remembering tags; Recommendation: hands-on practice.
Week 1 – Day 6	5 Jul 2025	Continue HTML exercises	HTML5, VS Code	—	Strengthened HTML skills; Challenge: creating forms and tables; Recommendation: practice mini-

					projects.
Week 2 – Day 1	7 Jul 2025	CSS introduction	CSS3, Browser DevTools	—	Learned styling and selectors; Challenge: linking CSS files; Recommendation: verify paths.
Week 2 – Day 2	8 Jul 2025	Text styling, colors, Google Fonts	CSS3, Google Fonts	—	Learned typography and color usage; Challenge: font rendering; Recommendation: check contrast.
Week 2 – Day 3	9 Jul 2025	Box model and spacing	CSS3, Browser DevTools	—	Learned padding, margin, border; challenge: padding vs margin; recommendation: inspect boxes visually.
Week 2 – Day 4	10 Jul 2025	Positioning and floats	CSS3	—	Learned absolute/relative/fixed; Challenge: parent-relative reference; Recommendation: practice layouts.
Week 2 –	11 Jul	Flexbox	CSS3	—	Learned responsive

Day 5	2025	layout			layouts; Challenge: overflow; Recommendation: wrap items properly.
Week 3 – Day 1	14 Jul 2025	JavaScript basics, variables, alerts	JavaScript, Browser DevTools	—	Learned interactivity; Challenge: let vs const; Recommendation: practice small snippets.
Week 3 – Day 2	15 Jul 2025	Functions and operators	JavaScript	—	Learned reusable code; Challenge: return values; Recommendation: build mini function apps.
Week 3 – Day 3	16 Jul 2025	Conditionals and control flow	JavaScript	—	Learned decision-making in code; Challenge: nesting; Recommendation: use flowcharts.
Week 3 – Day 4	17 Jul 2025	Loops and arrays	JavaScript	—	Learned automation and data storage; Challenge: infinite loops; Recommendation: incremental testing.

Week 3 – Day 5	18 Jul 2025	DOM manipulation basics	JavaScript, HTML	—	Learned connecting JS to HTML; Challenge: selector errors; Recommendation: inspect elements.
Week 3 – Day 6	19 Jul 2025	DOM events and mini project	JavaScript	—	Learned event handling; Challenge: multiple listeners; Recommendation: test incrementally.
Week 4 – Day 1	21 Jul 2025	React.js intro, setup, JSX	React.js, Node.js, VS Code	—	Learned component-based dev; Challenge: JSX syntax; Recommendation: follow official docs.
Week 4 – Day 2	22 Jul 2025	Components and props; calculator app	React.js	—	Learned state and props; Challenge: managing multiple states; Recommendation: create reusable components.
Week 4 – Day 3	23 Jul 2025	State and event handling; counter app	React.js	—	Learned interactive UIs; Challenge: debugging handlers; Recommendation:

					use React dev tools.
Week 4 – Day 4	24 Jul 2025	Lists and conditional rendering; To-Do app	React.js, CSS	—	Learned dynamic UI; Challenge: key props; Recommendation: unique keys in maps.
Week 4 – Day 5	25 Jul 2025	Completed To-Do app; add/delete features	React.js, CSS	Frontend – Netlify: https://asaph-todo-list-app.netlify.app/	Learned integration of props, state, events; Challenge: app state management; Recommendation: break components into smaller units.
Week 4 – Day 6	26 Jul 2025	Documentation and prep for backend	Git/GitHub, Markdown	—	Learned documentation and version control; Challenge: presentation; Recommendation: maintain clean GitHub repo.
Week 5 – Day 1	28 Jul 2025	Node.js and Express intro	Node.js, Express	—	Learned backend concepts; Challenge: npm errors; Recommendation: verify versions.
Week 5 –	29 Jul	RESTful API	Node.js, Express,	—	Learned HTTP

Day 2	2025	endpoints	Postman		methods and CRUD; Challenge: request/response handling; Recommendation: test with Postman.
Week 5 – Day 3	30 Jul 2025	MongoDB intro and connection	MongoDB, Mongoose, Node.js	—	Learned NoSQL and DB integration; Challenge: connection strings; Recommendation: use Atlas if local fails.
Week 5 – Day 4	31 Jul 2025	Models and CRUD operations	MongoDB, Mongoose, Node.js	—	Learned schema design and async/await; Challenge: validation errors; Recommendation: validate before saving.
Week 5 – Day 5	1 Aug 2025	Finalize API and prepare deployment	Node.js, Express, Git	—	Learned API documentation; Challenge: Git conflicts; Recommendation: frequent commits

					and clear README.
Week 5 – Day 6	2 Aug 2025	Backend deployment and testing	Node.js, Express, MongoDB, Postman	Books API – Render: https://internship-week-5-backend-app.onrender.com/ https://internship-week-5-backend-app.onrender.com/api/books	Learned deployment and testing; Challenge: endpoint errors; Recommendation: test each route in Postman.
Week 6 Day 1	04 Aug 2025	Built backend API, connected React To-Do frontend with backend. Tested API data flow.	Node.js, Express, MongoDB, React.js, Axios	—	Learned how APIs serve React data and CORS handling. Challenge: faced cross-origin errors and. env issues. Recommendation: always test APIs on Postman first.
Week 6 – Day 2	05 Aug 2025	Created User model (name, email, password). Built register route. Added password hashing with bcrypt.js.	MongoDB, Express.js, bcrypt.js	—	Understood importance of password hashing. Challenge: faced duplicate email validation issues. Recommendation: use proper error handling with try/catch and HTTP

					codes.
Week 6 – Day 3	06 Aug 2025	Installed and configured MongoDB. Integrated with Node.js using Mongoose.	MongoDB, Mongoose, Node.js	—	Learned basics of NoSQL and benefits of Mongoose. Challenge: faced installation and connection string errors. Recommendation: use MongoDB Atlas if local install fails.
Week 6 – Day 4	07 Aug 2025	Implemented JWT middleware to protect routes. Tested secure routes with Postman.	Express.js, JWT, Postman	—	Learned middleware use in Express. Challenge: faced expired/invalid token issues. Recommendation: send clear error messages to frontend.
Week 6 – Day 5	08 Aug 2025	Built signup/login forms in React. Stored JWT tokens and fetched user-specific data.	React.js, React Router, JWT	—	Understood authentication flow in frontend. Challenge: redirecting unauthenticated users. Recommendation: use React Router for

					protected routes.
Week 6 – Day 6	09 Aug 2025	Finalized MERN full stack app (CRUD + Auth). Pushed to GitHub. Deployed the app on Render.	MERN Stack (MongoDB, Express, React, Node.js), GitHub, Render	live on Render: https://internship-week-6.onrender.com/	Learned integration of full MERN stack. Challenge: faced debugging issues across stack. Recommendation: maintain logs in both frontend & backend for easier debugging.

2.1 KEY SKILLS ACQUIRED

2.1.1 TECHNICAL SKILLS

During the internship, i acquired a solid foundation in modern web development technologies. I became proficient in HTML5 and CSS3 for structuring and styling web pages, gaining confidence in building responsive layouts using Flexbox and Grid. Through practical projects, I advanced my understanding of JavaScript (ES6), focusing on DOM manipulation, event handling, and debugging.

I also developed expertise in React.js, where i learned to design reusable components, manage state and props, and build dynamic user interfaces. This was applied in the To-Do App project, which I successfully deployed on Netlify. On the backend side, I mastered Node.js and Express.js, creating RESTful APIs and integrating them with MongoDB using Mongoose. A key achievement was building and deploying a Books API on Render, which strengthened my database management and API testing skills using Postman. The culmination of these skills came in Week 6, when I integrated the frontend and backend into a full-stack To-Do App deployed on Render.

2.1.2 SOFT SKILLS:

Beyond technical expertise, i developed crucial professional skills. Working in both physical and online sessions, i learned to manage time effectively, communicate with supervisors and peers, and troubleshoot problems independently.

2.1.3 DEPLOYMENT AND PROJECT MANAGEMENT SKILLS

A unique skill i gained was deploying live applications. I became familiar with platforms like Netlify for frontend hosting and Render for backend and full-stack deployment. This gave me real-world exposure to DevOps practices, including handling environment variables, debugging CORS issues, and ensuring app availability online. Additionally, i improved in documentation and reporting, maintaining clear records of code changes and project progress.

In summary, the activities carried out during the internship enabled me to apply classroom knowledge to real workplace scenarios, acquire new technical and interpersonal skills, and gain valuable exposure to professional work culture. The experiences and lessons learned have laid a solid foundation for my future career development.

CHAPTER THREE: CHALLENGES FACED DURING THE INTERNSHIP EXERCISE

3.0 INTRODUCTION

This chapter presents personal challenges, challenges faced at school of computing and engineering UTAMU (section I did my internship from), university challenges and how i mitigated them.

3.1 PERSONAL CHALLENGES

I faced several individual challenges and among them include;

- Time management. Balancing internship tasks with my job and personal commitments proved difficult in the early weeks. Adjusting to tight schedules and strict deliverables required self-discipline and planning.
- Another major challenge was the steep learning curve of new technologies. I had limited prior exposure to tools such as React.js, Node.js, MongoDB and deployment platforms like Netlify and Render.
- Also debugging errors, managing asynchronous operations in JavaScript, and handling version control conflicts were frequent obstacles that slowed progress.

Mitigation**:** I overcame these personal challenges by;

- Creating a structured timetable
- Dedicating extra hours for practice, and making self-study part of my routine. I also extensively used online documentation, tutorials to supplement what i learned from supervisors.
- Whenever i encountered persistent errors, i sought guidance from my senior developers' friends and mentors, which helped me gain confidence in handling complex problems.

3.2 CHALLENGES FACED AT ZATI (HOST ORGANIZATION).

Interning at ZATI was enriching, but it also came with institutional challenges and among them include;

- Online program of the institution increased pressure on data charges which was not catered by the organization.

Mitigation: To address this challenge, i installed all required tools on my personal laptop using institution WIFI so i could work independently when away and this tried to reduce on cost.

3.3 UNIVERSITY-RELATED CHALLENGES

The internship was not only a professional placement but also an academic requirement, which brought its own set of challenges. The most demanding aspect was preparing weekly reports and ensuring alignment with university guidelines was time-consuming and stressful.

Mitigation: I managed the above challenge by integrating report writing into my weekly workflow instead of postponing it until the end.

Finally, the overall challenges i faced during the internship taught me resilience, adaptability, and the value of continuous learning. I learned to plan and prioritize tasks, seek solutions proactively, and communicate effectively with peers and supervisors. I also developed habits of self-learning, which will remain valuable as technology continues to evolve.

By overcoming these obstacles, I not only strengthened my technical expertise but also matured professionally, preparing me for future roles in the tech industry.

CHAPTER FOUR: RECOMMENDATIONS CONCLUSIONS AND CLOSING REMARKS

4.0 INTRODUCTION

This section contains suggested recommendations and conclusion.

4.1 RECOMMENDATIONS.

Based on my internship experience at Zentrix African Technology Institute (ZATI), i make the following recommendations for improving the field attachment program. These are directed towards future interns, the host organization (ZATI), and my university (UTAMU).

4.1.1 RECOMMENDATION TO THE FUTURE INTERNS.

- Should adopt proactive self-learning: Interns should not only rely on what supervisors teach but also make use of online resources such as documentation and tutorials to reinforce technical skills.
- Should practice time management: Interns should create clear schedules that balance internship tasks, personal study, and reporting requirements to avoid last-minute pressure.
- Should embrace version control early: Familiarity with Git and GitHub should be prioritized from the start to prevent errors in collaboration and ensure professional project tracking.
- Document consistently: Weekly updates, progress tracking, and reflections should be done in real-time instead of postponing to the end of the internship.
- Be adaptable: Since some projects require learning new technologies quickly (React.js, Node.js, MongoDB, deployments), future interns should approach the program with flexibility and willingness to step out of their comfort zones.

4.1.2 RECOMMENDATION TO ZATI

- Should enhance coordination between sessions: Since the internship alternates between physical and online engagements, ZATI should use centralized platforms to improve communication, announcements, and task follow-up.

- Should extend practical exposure: More real-world projects should be assigned to interns beyond tutorials, especially projects that solve local problems, as this would strengthen creativity and innovation.

4.1.3 RECOMMENDATION TO THE UNIVERSITY (UTAMU).

- The University should always hold a pre-internship session with students and avail them with internship documents in order for the students to understand what internship is, before them going for internship.
- Improve reporting guidelines: A standardized internship report template (covering weekly reports, challenges, recommendations, and final reflections) should be provided to reduce confusion and ensure consistency.
- Strengthen supervision: Frequent follow-up from university supervisors would help ensure interns are progressing well and reduce disconnect between academic expectations and host institution practices.
- Support career development**:** UTAMU should link internships with employability skills, offering career guidance sessions alongside technical training to prepare students for post-internship opportunities.

In conclusion, if these recommendations will be implemented, it will improve the internship experience for future students, enhance the effectiveness of ZATI's training approach, and ensure UTAMU graduates are better prepared to meet the demands of the tech industry.

4.2 CONCLUSION.

The internship at Zentrix Africa Technology Institute has been a highly transformative experience that bridged the gap between academic knowledge and practical application. Through seven weeks of intensive training in both frontend and backend development, I was able to translate theoretical concepts into real projects, including the successful deployment of a To-Do application frontend on Netlify, a Books API backend on Render, and later integrating a backend for the To-Do application as a final project, also deployed on Render. These hands-on experiences equipped me with valuable technical competencies, problem-solving abilities, and professional exposure that will remain crucial throughout my career journey.

Beyond technical growth, the internship also sharpened my soft skills such as teamwork, communication, time management, adaptability, and self-discipline, which are equally vital in

today's dynamic work environment. Although there were challenges at the personal, institutional, and university levels, each was met with resilience and turned into a learning opportunity, further enriching the overall experience.

In conclusion, the internship provided me with not only the confidence to engage with real-world development projects but also the motivation to pursue continuous learning and professional excellence. It has strengthened my appreciation of field attachment as an essential component of academic training and has prepared me better for the demands of the software development industry.

4.3 CLOSING REMARK / PERSONAL REFLECTION

I am deeply grateful for the opportunity to undertake my internship at Zentrix Africa Technology Institute. The guidance of my supervisors, the collaborative spirit of my colleagues, and the structured learning environment allowed me to grow both professionally and personally. This experience has not only strengthened my technical skills but also instilled a sense of responsibility, perseverance, and confidence in my abilities. I leave this internship more prepared to contribute meaningfully to the tech industry and to pursue further learning with dedication and enthusiasm.

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APPENDIX

Figure 2 shows Appendix1 showing advertisement of community engagement offer.

UGANDA TECHNOLOGY AND MANAGEMENT UNIVERSITY

UTAMU

18th March 2025

To whom it may concern

Dear Sir/Madam

RE: STUDENT INTERNSHIP FOR MUHWEZI ASAPH

This is to introduce to you Muhwezi Asaph, REG NO. SEP23/BCS/3567U/F, a student of Uganda Technology and Management University pursuing a Bachelor of Science in Computer Science.

As part of the UTAMU Curriculum, the students are required to gain practical experience by working in an organization under the guidance of a supervisor at work (internship).

This is to request your organization to assist this student with an internship placement.

For any inquires please don't hesitate to send an email to info@utamu.ac.ug

Thank you so much for your cooperation.

Sincerely,

UTAMU

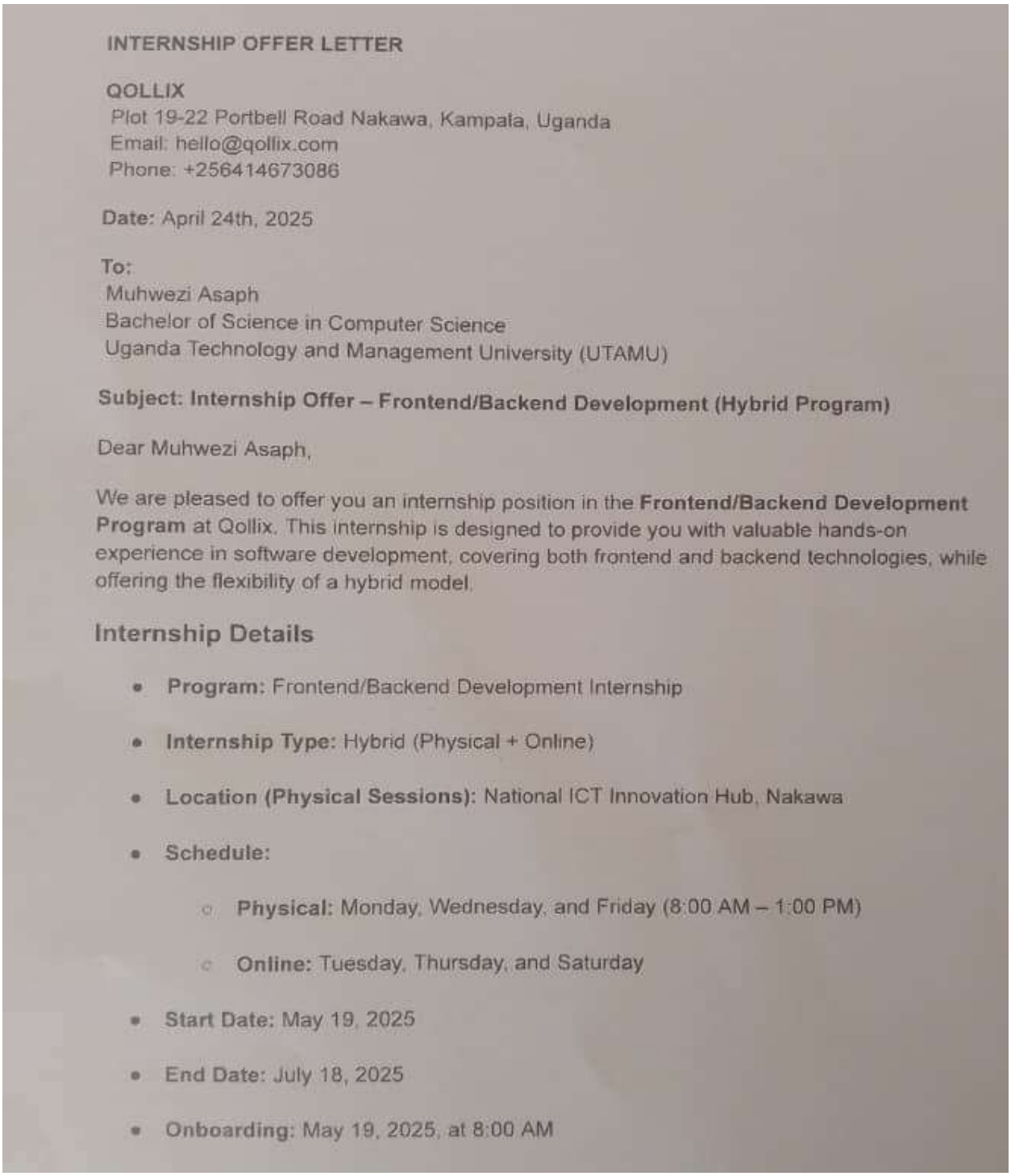
Dr. Philip Ouma Ayoo

Dean School of Technology, Computing & Engineering

Bugolobi Campus
Plot 2 Erisa Rd, Kiswa Bugolobi Kampala,
Kungu Campus
Plot 8374 Block 82 Kyadondo, Kungu, Gombe, Nansana, Wakiso

P.O Box 73307 Kampala Uganda
+256 790-914-427, +256 750-599-736
www.utamu.ac.ug
info@utamu.ac.ug

Figure 3 shows Appendix2 showing letter of recommendation from the university



INTERNSHIP OFFER LETTER

QOLLIX
Plot 19-22 Portbell Road Nakawa, Kampala, Uganda
Email: hello@qollix.com
Phone: +256414673086

Date: April 24th, 2025

To:
Muhwezi Asaph
Bachelor of Science in Computer Science
Uganda Technology and Management University (UTAMU)

Subject: Internship Offer – Frontend/Backend Development (Hybrid Program)

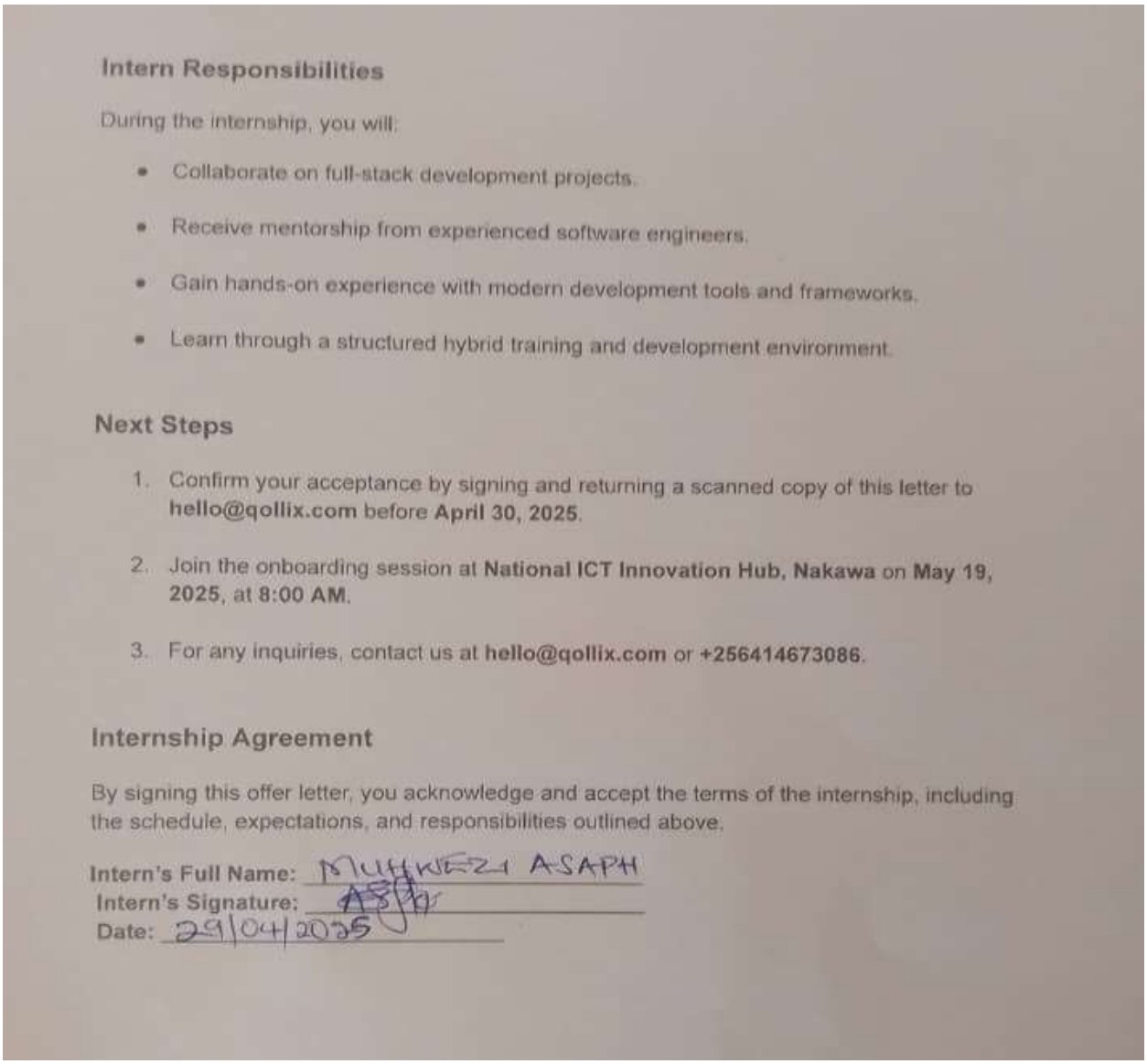
Dear Muhwezi Asaph,

We are pleased to offer you an internship position in the **Frontend/Backend Development Program** at Qollix. This internship is designed to provide you with valuable hands-on experience in software development, covering both frontend and backend technologies, while offering the flexibility of a hybrid model.

Internship Details

- **Program:** Frontend/Backend Development Internship
- **Internship Type:** Hybrid (Physical + Online)
- **Location (Physical Sessions):** National ICT Innovation Hub, Nakawa
- **Schedule:**
  - **Physical:** Monday, Wednesday, and Friday (8:00 AM – 1:00 PM)
  - **Online:** Tuesday, Thursday, and Saturday
- **Start Date:** May 19, 2025
- **End Date:** July 18, 2025
- **Onboarding:** May 19, 2025, at 8:00 AM

Figure 4 shows Appendix 3 showing letter from the internship placement organisation



Intern Responsibilities

During the internship, you will:

- Collaborate on full-stack development projects.
- Receive mentorship from experienced software engineers.
- Gain hands-on experience with modern development tools and frameworks.
- Learn through a structured hybrid training and development environment.

Next Steps

1. Confirm your acceptance by signing and returning a scanned copy of this letter to **hello@qollix.com** before **April 30, 2025**.
2. Join the onboarding session at **National ICT Innovation Hub, Nakawa** on **May 19, 2025**, at **8:00 AM**.
3. For any inquiries, contact us at **hello@qollix.com** or **+256414673086**.

Internship Agreement

By signing this offer letter, you acknowledge and accept the terms of the internship, including the schedule, expectations, and responsibilities outlined above.

Intern's Full Name: MUHWEZI ASAPH
Intern's Signature:
Date: 29/04/2025

shows continuation of letter from the internship placement organisation

DAILY RECORD OF PROGRESS

Week 1 internship at Zentrix Africa Technologies institute

Internship Duration: 30 June 2025 – 18th August 2025

Week covered: Week 1 (30th June – 06th July 2025)

Location: National ICT Innovation Hub, Nakawa (Physical) and Online

DAY BY DAY DETAILED BREAKDOWN

Day 1 – Monday, 30th June 2025 (Physical)

Activity: Internship orientation and program overview

Key concepts covered:

- **Overview of Zentrix Africa Technologies institute and its work in tech innovation.**
- **Structure and objectives of the internship**
- **Internship deliverables: Weekly reports, attendance, final project.**
- **Weekly schedule: Mon/Wed/Fri (Physical), Tue/Thu/Sat (Online)**
- **Expected technologies: HTML, CSS, JS, React, Node.js, Express, MongoDB, Git, GitHub**

Lessons learned:

- **Understood the structure and expectations of the internship.**
- **Learned about the technology to use and what will be covered in 8 weeks.**

Challenges faced:

- **Getting familiar with the internship workflow and expectations.**

Recommendations:

- **Provide a printed or digital orientation guide for interns.**
- **Have a questions and answer session to clarify doubts after orientation.**

I declare that all the information provided is true

Signed by trainee **Date** **Signed by field supervisor** **Date**

ZENTRIX AFRICA Technology Institute
30 JUN 2025
+256 414 673 [illegible]
info@zati.africa | www.zati.africa
Plot 9-22 Port Bell Rd, Nakawa, Kla, UG

Figure 5 shows appendix 4 activity log

For more about activity log, visit the RECORD_OF_SERVICE file shared alongside the report

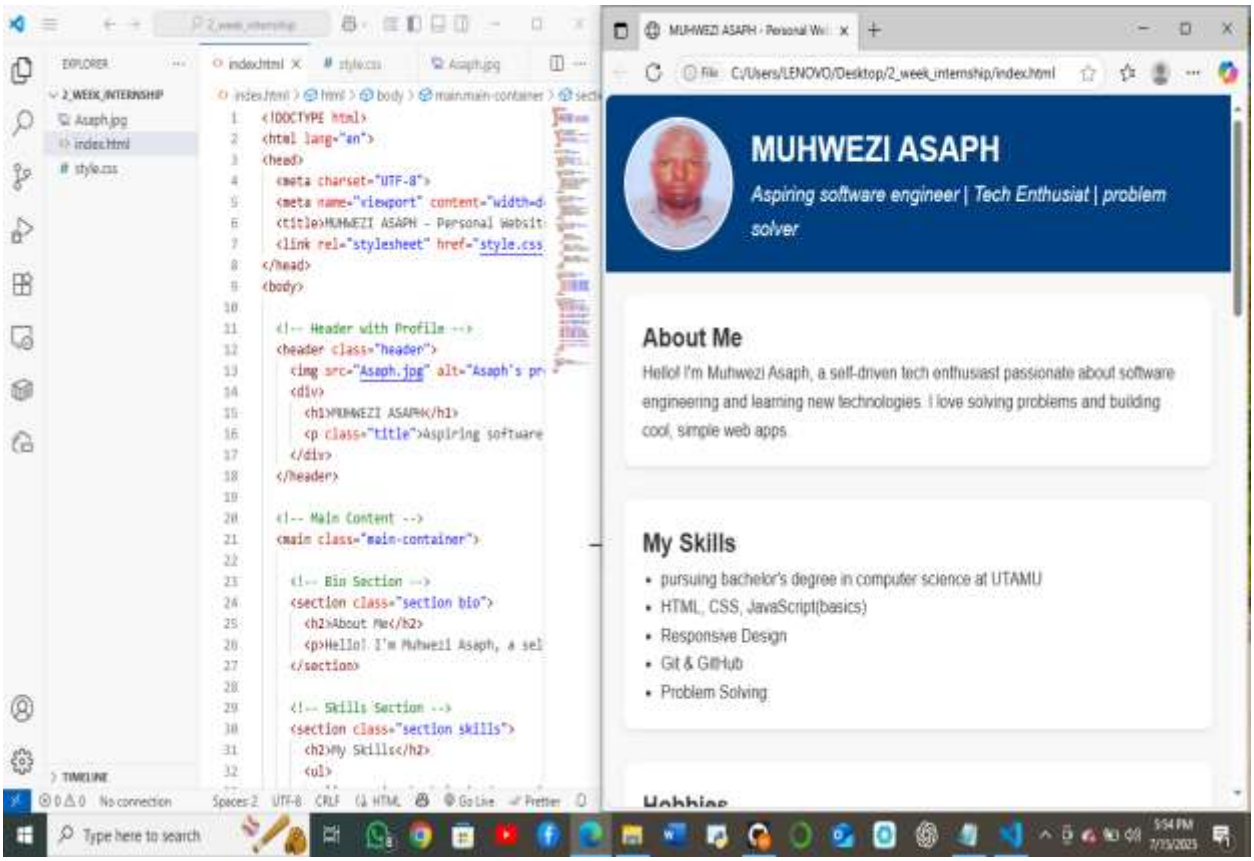


Figure 6 shows appendix 5 proof of doing assigned tasks

For more about proof of doing assigned tasks, visit the weekly_reports file shared alongside the report

For deployed live tasks,

https://asaph-todo-list-app.netlify.app/

https://internship-week-5-backend-app.onrender.com/

https://internship-week-5-backend-app.onrender.com/api/books

https://internship-week-6.onrender.com/

For the whole internship at ZATI visit https://github.com/muhweziasaph/zentrix-internship-2025.git

END