THE UNIVERSITY OF ZAMBIA

SCHOOL OF NATURAL SCIENCE

DEPARTMENT OF COMPUTER SCIENCE

Organization Name: Gladtidings Software Ltd.

Intern Name: Musengah Nyondo

Student ID: 2020991411 Session:

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Acknowledgment

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I would also like to thank the University of Zambia for providing me with this incredible opportunity to apply my academic knowledge in a professional setting. Finally, I am grateful to my family, friends, and peers, who encouraged me throughout this journey, providing moral and emotional support. Without all of you, this learning experience would not have been as fulfilling and successful

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Executive Summary

This report provides an in-depth overview of my internship experience at Gladtidings Software Ltd., a leading ICT solutions provider based in Lusaka, Zambia. Over a period of 16 weeks, I was actively involved in projects related to data management and software development, where I applied my academic knowledge and acquired practical skills in real-world scenarios.

In the Data Management phase, I focused on tasks such as data cleaning, transforming raw data into usable formats, and managing relational databases using SQL. This experience allowed me to understand the importance of accurate and consistent data for supporting software systems and decision-making processes.

The Software Development phase was the most extensive, involving active contributions to a Django-based web application. I developed user authentication modules, integrated RESTful APIs, and optimized backend logic to improve system performance. Additionally, I explored web frameworks such as ASP.NET Core and Blazor, building prototypes to evaluate their features for potential use in future projects.

Throughout the internship, I faced challenges such as adapting to new technologies, troubleshooting complex bugs, and managing multiple tasks under tight deadlines. These challenges enabled me to develop critical problem-solving skills, resilience, and a proactive mindset. Collaborating with the team also honed my communication, teamwork, and time management abilities.

By the end of the internship, I had gained practical expertise in database management, full-stack development, and software testing while contributing to meaningful projects that aligned with Gladtidings Software's mission. This experience not only enhanced my technical proficiency but also prepared me for future professional opportunities in software engineering. The report concludes with a critical analysis, recommendations for improving the internship program, and insights into my personal and professional growth.

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Overview of the Organization

a. Brief History

Gladtidings Software Limited was founded in 2012 by Dumisani Ncube and two colleagues, marking the beginning of a journey aimed at transforming the educational landscape in Zambia through technology. The inception of the company came after Ncube recognized the potential for ICT solutions to enhance the efficiency of educational institutions. Within just ten months of its establishment, Gladtidings Software became the most widely used school management system in Zambia, generating a turnover exceeding $200,000. This rapid success laid a strong foundation for future growth and diversification into other business areas. Ncube's entrepreneurial spirit was evident from an early age, as he engaged in various business ventures throughout his youth. His experience and determination were crucial in navigating the challenges of starting a tech company in a developing market. Following the success of Gladtidings, Ncube expanded his business portfolio by venturing into transport and construction, further solidifying his reputation as a successful entrepreneur

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b. Introduction of the Organization

Gladtidings Software Limited is a Zambian-based software development company specializing in providing innovative ICT solutions tailored for the education sector. The company's primary goal is to enhance educational management through technology, offering products that streamline administrative processes and improve learning outcomes for students. The flagship products of Gladtidings include ZamPrep, a mobile application designed to aid students in their studies by providing access to various topics and practice exams, and Zamed, a comprehensive management software for primary and secondary schools that simplifies administrative tasks. Additionally, Gladtidings offers IT training services to educational staff, ensuring that users can effectively leverage technology in their roles.

The organization operates with a commitment to community engagement, actively collaborating with local educational institutions to provide tailored solutions that address specific needs. This focus on customer-centricity has helped establish Gladtidings as a trusted partner in the Zambian education sector.

c. Policy of the Organization

Gladtidings Software Limited adheres to policies that emphasize quality, innovation, and community impact. The organization is committed to:

- **Quality Assurance:** Ensuring that all software products meet high standards of usability and functionality. Continuous feedback from users is integrated into product development to enhance performance.
- **Customer Engagement:** Actively engaging with clients to understand their needs and challenges, which informs the development of tailored solutions that address specific educational requirements.
- **Community Development:** Supporting local educational initiatives through partnerships and training programs that empower educators and improve student learning experiences.
- **Sustainability:** Promoting sustainable practices within its operations and encouraging educational institutions to adopt environmentally friendly technologies.

These policies reflect Gladtidings' dedication to not only advancing technology in education but also contributing positively to society.

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d. Competitors

In the Zambian market, Gladtidings Software Limited faces competition from several other companies providing similar ICT solutions for education. Key competitors include:

- **EduTech Solutions:** A company focused on providing comprehensive educational software solutions that cater to various levels of education.
- **Smart School Solutions:** Known for its school management systems that offer features such as attendance tracking, grading, and communication tools for parents and teachers.
- **SchoolNet Zambia:** A non-profit organization that aims to improve ICT access in schools but also offers software solutions for educational management.

Despite this competitive landscape, Gladtidings Software differentiates itself through its strong focus on local needs, user-friendly products, and commitment to community engagement. The company's ability to adapt quickly to market demands and its established reputation within the education sector position it favorably against competitors

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Conclusion

Gladtidings Software Limited has made significant strides since its founding in 2012, emerging as a leader in providing ICT solutions for the education sector in Zambia. With a strong foundation built on innovation, quality assurance, and community engagement, the organization is well-equipped to navigate challenges while seizing opportunities for growth and expansion within the rapidly evolving landscape of educational technology.

Organizational Structure

a. Organizational Hierarchy Chart

The organizational structure of Gladtidings Software Limited is designed to facilitate effective management and collaboration across various functions. While a formal hierarchy chart is not publicly available, the structure can be outlined as follows:

CEO/Founder

- Responsible for overall strategic direction and leadership.

Management Team

- Includes positions such as Chief Technical Officer (CTO), Project Managers, and Department Heads.

Development Teams

- **Software Development Team:** Focuses on creating and maintaining software products.
- **Web Development Team:** Specializes in web applications and online platforms.

Support Teams

- **Technical Support Department:** Provides assistance to clients using the software.
- **Sales and Marketing Department:** Responsible for client acquisition and marketing strategies.
- **Administration Department:** Manages HR, finance, and internal operations.

This hierarchical structure allows for clear delineation of roles and responsibilities while promoting collaboration among teams.

b. Number of Employees

Gladtidings Software Limited employs approximately 15 to 25 employees. This size facilitates a close-knit work environment where team members can communicate effectively and collaborate on projects. The relatively small workforce allows for agility in decision-making and responsiveness to client needs.

c. Main Offices

The main office of Gladtidings Software Limited is located in **Lusaka, Zambia,** specifically on **Nkwazi Road**. This central location enables the company to serve local educational

institutions effectively while also engaging with potential clients across the country. The office serves as the hub for all operations, including software development, client support, and administrative functionss.

d. Introduction of All the Departments

1. Software Development Department:

- This department is responsible for designing, developing, and maintaining educational software solutions tailored for schools. Key activities include coding, testing, and implementing new features based on user feedback.

2. Web Development Department:

- Focused on creating user-friendly web applications that facilitate online learning and administrative tasks. The team ensures that websites are functional, secure, and optimized for user experience.

3. Technical Support Department:

- Provides ongoing support to clients using the company's software solutions. This includes troubleshooting issues, offering training sessions for school staff, and gathering user feedback to inform future improvements.

4. Sales and Marketing Department:

- Responsible for promoting the company's products and acquiring new clients within the education sector. The department develops marketing strategies, engages in outreach efforts, and conducts market research to identify trends.

5. Administration Department:

- Manages internal operations, including human resources, financial management, and compliance with regulations. This department ensures that the organization runs smoothly by overseeing recruitment, payroll, and day-to-day administrative tasks.

e. Comments on the Organizational Structure

The organizational structure of Gladtidings Software Limited is well-suited for its size and focus on the education sector. The clear delineation of roles allows each department to specialize in its area of expertise while facilitating collaboration across teams. This structure promotes efficiency in project execution and enables quick responses to client needs.

The small number of employees fosters a culture of teamwork where individuals can easily communicate ideas and share insights. However, as the company continues to grow, it may need to consider expanding its workforce or introducing more formalized roles to maintain efficiency while handling larger projects or multiple clients simultaneously.

Additionally, the current structure supports innovation by allowing teams to work closely together on product development while ensuring that customer feedback is integrated into future iterations of their software solutions

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Conclusion

Gladtidings Software Limited's organizational structure reflects its commitment to providing high-quality ICT solutions tailored for educational institutions. With a focus on collaboration, efficiency, and responsiveness to market demands, the organization is well-positioned for continued growth in the evolving landscape of educational technology. As it expands its reach and capabilities, adapting its structure may be necessary to sustain its competitive edge in the industry.

Plan of your internship program

a. Branch/Area Office

Although the headquarters in Lusaka serves as the primary office for all operations, my internship was completed remotely from the main campus due to the academic period. The company's consideration for not disrupting our academic schedule allowed us to balance our studies while gaining valuable work experience. The headquarters in Lusaka is renowned for its modern infrastructure and strategic location, which facilitates seamless collaboration among employees and interns. Its central position enables easy accessibility for local clients and helps the company maintain a strong presence in the Zambian IT sector.

The headquarters is equipped with state-of-the-art technology, including high-speed internet, advanced software tools, and ergonomic workstations. This modern infrastructure ensures that employees and interns can work efficiently and effectively, fostering a productive work environment. The open-plan layout encourages teamwork and communication, making it easier for interns to seek guidance from experienced colleagues and participate in collaborative projects.

The strategic location of the office in Lusaka is a significant advantage. Situated in the heart of the city, it is easily accessible to local clients, which is crucial for maintaining strong business relationships. This accessibility also allows the company to stay connected with the local IT community, participating in industry events and networking opportunities. The headquarters' central location ensures that the company remains a prominent player in the Zambian IT sector, attracting top talent and clients alike

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b. Internship Duration

The internship spanned **sixteen (16) weeks**, beginning on **26th February, 2024** and concluding on **19th July, 2024**. This timeline was designed to provide interns with a comprehensive understanding of the company's operations and allow meaningful contributions to ongoing projects.

The duration of the internship was carefully planned to ensure that interns gain a well-rounded experience. The **sixteen (16) weeks** weeks were divided into distinct phases, each focusing on different aspects of the company's operations. This structured approach allowed interns to delve deeply into various departments and understand their interconnected roles within the organization. The timeline was also flexible enough to accommodate individual learning paces and interests, ensuring that each intern could maximize their learning experience.

c. Training Departments and Duration

During the internship, I rotated through two main departments to gain holistic exposure to the organization's core functions:

Data Management (12 Weeks):

This phase focused on understanding the importance of data accuracy and consistency in operations. I performed tasks such as data entry, database management, and CSV file handling. This period provided insights into the foundational role data plays in supporting software development and decision-making processes.

In the Data Management department, I learned the critical importance of accurate and consistent data in driving business operations. My tasks included data entry, where I ensured that all information was correctly inputted into the system. I also managed databases, learning how to organize and retrieve data efficiently. Handling CSV files taught me about data formatting and manipulation, skills that are essential for data analysis and reporting. This phase highlighted the significance of data integrity in supporting software development and informed decision-making processes.

During weeks 10 to 12, I took the lead in the data entry phase. My responsibilities included dividing the data to be entered among the team members and validating that the data was entered correctly. This role required meticulous attention to detail and strong organizational skills to ensure data accuracy and consistency. I developed a systematic approach to data division, ensuring that each team member had a clear understanding of their tasks and deadlines. This leadership role not only enhanced my organizational skills but also improved my ability to manage and coordinate team efforts effectively

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Software Development (6 Weeks):

The most extensive part of the internship involved contributing to a Django-based web application project. I participated in requirements engineering, database design, coding, and testing. Additionally, I explored web frameworks like ASP.NET Core and Blazor, allowing me to compare and contrast their features for future applications. My tasks also included API integration, which enhanced my understanding of building scalable and interactive software solutions.

The Software Development phase was the core of my internship experience. Working on a Django-based web application project, I gained hands-on experience in various stages of software development. Requirements engineering taught me how to gather and analyze user needs to create a functional specification. Database design involved creating efficient and

scalable database structures to support the application. Coding allowed me to apply my programming skills to develop features and functionalities. Testing ensured that the application was robust and free of bugs.

Exploring web frameworks like ASP.NET Core and Blazor provided a comparative perspective. I learned about the strengths and weaknesses of each framework, which will be valuable for future projects. API integration was another crucial aspect, teaching me how to connect different software components to create a cohesive and interactive solution. This phase significantly enhanced my technical skills and understanding of software development processes.

For the software development phase, I was the lead of the project. The first four meetings were conducted via Google Meet, allowing us to collaborate effectively despite the remote setting. I was responsible for dividing the work among the team members, ensuring that each task was clearly defined and assigned. This leadership role enhanced my project management skills and taught me the importance of clear communication and coordination in a remote work environment.

Throughout the internship, I led almost all weekly reports, summarizing the team's progress, challenges, and achievements. This responsibility honed my reporting and documentation skills, ensuring that our supervisors were well-informed about our work

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Remote Work Details

Me and my team were allowed to do the internship remotely, thereby we did it from the University of Zambia (UNZA) main campus as long as each week we provided a report of the tasks, challenges from the previous work. For the weeks 10-12 of data entry, I was the lead in dividing the data to be entered and validating its accuracy. For the web development of the software, I was the lead of the project, and the first four meetings for the project were done via Google Meet. Dividing of the work was also done by me for the project. Almost all weekly reports were led by myself. The two weeks I did marketing, I was out of the province, and in the 16th week, I was giving a report of the two weeks of marketing.

The remote work arrangement allowed us to complete the internship from the main campus, providing a flexible and convenient learning environment. Each week, we were required to submit a report detailing the tasks completed, challenges faced, and lessons learned from the previous week's work. This regular reporting ensured that we stayed on track and received timely feedback from our supervisors.

During weeks 10 to 12, I took the lead in the data entry phase. My responsibilities included dividing the data to be entered among the team members and validating that the data was

entered correctly. This role required meticulous attention to detail and strong organizational skills to ensure data accuracy and consistency.

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Throughout the internship, I led almost all weekly reports, summarizing the team's progress, challenges, and achievements. This responsibility honed my reporting and documentation skills, ensuring that our supervisors were well-informed about our work.

During the two weeks I spent on marketing, I was out of the province. Despite the physical distance, I remained engaged with the team and contributed to the marketing efforts. In the 16th week, I presented a report summarizing the marketing activities and outcomes from the previous two weeks. This experience highlighted the importance of adaptability and effective communication in a remote work setting

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d. Objectives of the Internship Program

The internship was structured to achieve the following objectives:

- **Provide hands-on experience in various domains of software development and IT operations:** The internship aimed to give interns practical experience in different areas of software development and IT operations. By working on real projects and facing actual challenges, interns could apply theoretical knowledge to practical scenarios, gaining a deeper understanding of the field.

- **Enhance technical proficiency in programming languages such as C#, Python, and Java:** One of the key objectives was to improve interns' technical skills in programming languages like C#, Python, and Java. Through coding tasks and projects, interns could enhance their proficiency and gain confidence in their programming abilities.

- **Develop teamwork and communication skills through collaborative projects:** Collaborative projects were integral to the internship, fostering teamwork and communication skills. Working in teams, interns learned how to collaborate effectively, share ideas, and resolve conflicts, preparing them for future professional environments.

- **Introduce interns to real-world challenges and equip them with strategies for effective problem-solving:** The internship exposed interns to real-world challenges, teaching them how to approach and solve problems effectively. By facing and overcoming these challenges, interns developed critical thinking and problem-solving skills that are essential for their future careers.

- **Foster adaptability by exposing interns to different roles and responsibilities within the organization:** Rotating through different departments and roles within the organization fostered adaptability. Interns learned how to adapt to new environments and responsibilities, gaining a versatile skill set that will be valuable in their future careers.

e. Key Learning Outcomes

By the end of the internship, I had achieved the following:

- **Acquired practical knowledge of software development workflows, from planning to deployment:** Throughout the internship, I gained practical knowledge of the entire software development workflow. From initial planning and requirements gathering to final deployment, I understood the various stages and processes involved in creating a software solution. This knowledge will be invaluable in my future career as a software engineer.

- **Improved my ability to manage and manipulate data for better decision-making:** Working in the Data Management department improved my ability to manage and manipulate data. I learned how to organize, retrieve, and analyze data effectively, skills that are crucial for informed decision-making in any organization.

- **Gained experience in working with web frameworks and integrating APIs into projects:** The Software Development phase provided me with experience in working with web frameworks like Django, ASP.NET Core, and Blazor. I also learned how to integrate APIs into projects, enhancing my understanding of building interactive and scalable software solutions.

- **Enhanced my ability to troubleshoot technical issues and deliver client-focused solutions:** In the IT Support department, I enhanced my ability to troubleshoot technical issues and provide client-focused solutions. This experience improved my problem-solving skills and taught me the importance of customer satisfaction in maintaining strong client relationships.

- **Built a foundation for future career growth in the software engineering field:** Overall, the internship built a strong foundation for my future career growth in the software engineering field. The practical experience, technical skills, and professional insights I gained will be invaluable as I continue to develop my career in this dynamic and challenging field.

In conclusion, my internship, completed remotely from the main campus, was a comprehensive and enriching experience. The modern infrastructure, strategic location, and well-structured program provided me with valuable insights and skills. The rotation through different departments and the focus on practical learning and problem-solving equipped me with a robust foundation for my future career in software engineering. The internship not only enhanced my technical proficiency but also developed my teamwork, communication, and adaptability skills, preparing me for the challenges and opportunities ahead. The remote work arrangement added an extra layer of learning, teaching me how to collaborate and lead effectively in a virtual environment.

Training Program

a. Detailed Description of Operations/Activities Performed by the Departments

Data Management Department (3 Weeks):

The internship began in the Data Management department, where I learned the importance of accurate and organized data for company operations. The team provided training on managing data systems that support software solutions, which are central to the company's products. My activities in this department included:

- **Data Entry and Cleaning:** I was tasked with extracting raw data from various sources, cleaning it to ensure accuracy, and uploading it into company databases. This process involved meticulous attention to detail to identify and correct any inconsistencies or errors in the data. The goal was to ensure that the data used in the company's systems was reliable and accurate, which is crucial for decision-making and operational efficiency.

- **CSV File Management:** Working with CSV files, I transformed raw data into usable formats for integration into systems. This involved filtering duplicates, correcting errors, and ensuring consistency. CSV files are a common format for data exchange, and managing them effectively is essential for maintaining data integrity. I learned how to use various tools and techniques to manipulate CSV files, ensuring that the data was in the correct format and free of errors before integration.

- **Database Management:** Using SQL, I created and managed relational databases to store client information, user records, and system logs. This involved designing database schemas, creating tables, and defining relationships between different data entities. Effective database management is critical for ensuring that data is stored efficiently and can be retrieved quickly when needed. I also learned how to perform database maintenance tasks, such as backing up data and optimizing queries for better performance.

- **System Testing:** I tested the integrity of databases by performing queries, validating data, and ensuring no errors existed during data transfer processes. This involved writing and executing SQL queries to check for data consistency and accuracy. System testing is an

essential part of data management, as it helps identify and rectify any issues that may affect the reliability of the data.

By the end of this phase, I understood the significance of clean and consistent data, particularly in supporting the smooth performance of software products. Accurate data is the backbone of any software solution, and ensuring its integrity is crucial for the success of the company's products.

Software Development Department (6 Weeks):
The software development phase was the most extensive part of the training, where I worked on both ongoing projects and new tasks to enhance existing systems. I received training on best coding practices, collaborative software development, and integrating third-party solutions. Key tasks performed include:

- **Django-Based Web Application Development:** I actively contributed to a Django project aimed at streamlining administrative processes for educational institutions. My role included designing database models, implementing user authentication features, and developing RESTful APIs for data exchange. Django is a powerful web framework that allows for rapid development and clean, pragmatic design. I learned how to use Django's features to build robust and scalable web applications.

- **Web Framework Exploration:** I conducted a comparative analysis of ASP.NET Core and Blazor by creating small prototype applications. This activity helped the team assess the frameworks' suitability for future projects. ASP.NET Core is a cross-platform, high-performance framework for building modern, cloud-based, Internet-connected applications. Blazor, on the other hand, is a framework for building interactive web UIs using C# instead of JavaScript. By exploring these frameworks, I gained insights into their strengths and weaknesses, which will be valuable for future projects.

- **API Integration:** I integrated external APIs into the Django project to enhance functionality, such as fetching dynamic data and improving user interactivity. API integration is a crucial aspect of modern software development, as it allows different systems to communicate and exchange data seamlessly. I learned how to use various tools and techniques to integrate APIs effectively, ensuring that the application could leverage external data sources to provide enhanced functionality.

- **Debugging and Testing:** Collaborating with team members, I participated in code reviews and software testing to identify and fix bugs. Debugging and testing are essential parts of the software development process, as they help ensure that the application is reliable and free of errors. I learned how to use various debugging tools and techniques to identify and rectify issues in the code. I also gained experience in writing unit tests and integration tests to ensure that the application behaved as expected under different scenarios.

- **Documentation:** I created technical documentation detailing the system architecture, workflow, and database schema to assist future developers. Documentation is a critical aspect of software development, as it provides a reference for future developers and ensures that the knowledge gained during the project is not lost. I learned how to write clear and concise documentation that explained the system's design, functionality, and usage.

This phase allowed me to apply theoretical programming knowledge in real-world settings and taught me critical lessons in teamwork, problem-solving, and iterative development. Working on a real-world project provided me with valuable insights into the software development process and helped me develop practical skills that will be essential for my future career.

b. Detailed Description of Tasks Assigned or Projects

CSV File-to-Database Integration Project:
This task involved extracting data from CSV files, cleaning it, and integrating it into SQL-based relational databases. The goal was to create a centralized database for user records, ensuring data consistency and accessibility across systems. The project required a systematic approach to data management, including the following steps:

1. **Data Extraction:** I began by extracting raw data from various CSV files. This involved identifying the relevant data fields and ensuring that the data was complete and accurate. I used tools like Python and Pandas to read and manipulate the CSV files, extracting the necessary data for integration.

2. **Data Cleaning:** Once the data was extracted, I performed data cleaning to ensure its accuracy and consistency. This involved removing duplicates, correcting errors, and standardizing data formats. I used various data cleaning techniques, such as regular

expressions and data transformation functions, to ensure that the data was in the correct format for integration.

3. **Database Design:** I designed the database schema to store the cleaned data. This involved creating tables, defining relationships between tables, and specifying data types and constraints. I used SQL to create the database schema, ensuring that the data was stored efficiently and could be retrieved quickly when needed.

4. **Data Integration:** After designing the database schema, I integrated the cleaned data into the database. This involved writing SQL queries to insert the data into the appropriate tables and ensuring that the data was stored correctly. I also performed data validation to ensure that the data was accurate and consistent.

5. **System Testing:** Finally, I tested the integrity of the database by performing queries, validating data, and ensuring no errors existed during data transfer processes. This involved writing and executing SQL queries to check for data consistency and accuracy. I also performed data validation to ensure that the data was stored correctly and could be retrieved quickly when needed.

This project provided me with valuable experience in data management and integration, teaching me the importance of accurate and consistent data in supporting software solutions.

Django Web Application Project:

As part of the software development team, I contributed to building a web-based application that automated administrative workflows for educational institutions. My contributions included:

1. **Developing the User Authentication Module:** I designed and implemented a user authentication module to manage secure logins. This involved creating user registration and login forms, implementing password hashing and salting, and ensuring that user sessions were secure. I used Django's built-in authentication system to manage user authentication, ensuring that the application was secure and user-friendly.

2. **Creating API Endpoints:** I created API endpoints for real-time data exchange between the client and server. This involved designing RESTful APIs that allowed the client to interact with the server, retrieving and updating data as needed. I used Django REST framework to create the API endpoints, ensuring that the data exchange was efficient and secure.

3. **Designing Database Models:** I designed the database models to store the application's data. This involved creating tables, defining relationships between tables, and specifying data types and constraints. I used Django's ORM (Object-Relational Mapping) to create the database models, ensuring that the data was stored efficiently and could be retrieved quickly when needed.

4. **Implementing Backend Features:** I implemented various backend features to support the application's functionality. This involved writing server-side code to handle user requests, process data, and interact with the database. I used Django's views and templates to implement the backend features, ensuring that the application was robust and scalable.

5. **Writing Unit Tests:** I wrote unit tests to ensure that the application behaved as expected under different scenarios. This involved writing test cases to check the functionality of the application's components, ensuring that they worked correctly and handled errors gracefully. I used Django's testing framework to write the unit tests, ensuring that the application was reliable and free of bugs.

6. **Assisting in Debugging:** I assisted in debugging the application by identifying and fixing bugs. This involved using various debugging tools and techniques to identify issues in the code, rectifying them to ensure that the application was reliable and free of errors. I also participated in code reviews, providing feedback to my team members and learning from their insights.

This project provided me with valuable experience in software development, teaching me the importance of teamwork, problem-solving, and iterative development. Working on a real-world project allowed me to apply theoretical programming knowledge in a practical setting, developing skills that will be essential for my future career.

Web Framework Prototyping:

I explored and compared ASP.NET Core and Blazor by developing small prototypes that evaluated their flexibility, speed, and integration capabilities. My analysis provided valuable insights to the team for future framework decisions. The prototyping project involved the following steps:

1. **Framework Selection:** I began by selecting ASP.NET Core and Blazor as the frameworks to explore. ASP.NET Core is a cross-platform, high-performance framework for building modern, cloud-based, Internet-connected applications. Blazor is a framework for building interactive web UIs using C# instead of JavaScript.

2. **Prototype Development:** I developed small prototype applications using each framework to evaluate their features and capabilities. This involved creating simple web applications that demonstrated the frameworks' strengths and weaknesses. I used Visual Studio to develop the prototypes, ensuring that they were well-documented and easy to understand.

3. **Comparative Analysis:** I conducted a comparative analysis of the two frameworks, evaluating their flexibility, speed, and integration capabilities. This involved comparing the frameworks' features, such as performance, scalability, and ease of use. I also evaluated the frameworks' integration capabilities, such as their ability to integrate with external APIs and databases.

4. **Documentation:** I created documentation detailing the frameworks' features, strengths, and weaknesses. This involved writing clear and concise documentation that explained the frameworks' capabilities and provided insights into their suitability for future projects. I also provided recommendations to the team based on my analysis, helping them make informed decisions about future framework choices.

This project provided me with valuable experience in exploring and comparing web frameworks, teaching me the importance of evaluating different technologies and making informed decisions based on their strengths and weaknesses. The insights gained from this project will be valuable for future software development projects, helping me choose the right tools and technologies for the job.

In conclusion, the training program provided me with a comprehensive and enriching experience in data management and software development. The hands-on tasks and projects

allowed me to apply theoretical knowledge in practical settings, developing skills that will be essential for my future career. The remote work arrangement added an extra layer of learning, teaching me how to collaborate and lead effectively in a virtual environment.

Reflective Journal Entries

Week 1: Introduction and Department Splitting

Description:

This week was focused on orientation and familiarization with the company's structure, processes, and tools. I was introduced to the team and given an overview of the tasks I would be undertaking. I started with basic data entry tasks, ensuring that the records were accurate and up-to-date. This activity helped me understand the critical role of data accuracy in the company's operations. Additionally, I explored the tools available for database creation, such as CSV file integration, which laid the groundwork for the tasks ahead. The week also involved observing the workflow in different departments, allowing me to appreciate the synergy required in collaborative projects. I concluded the week by documenting key learnings and outlining the goals for the upcoming weeks.

Interpretation:

The orientation was well-organized and provided a clear understanding of the company's goals and my role within it. The emphasis on data accuracy highlighted the importance of meticulous work in ensuring the reliability of the company's systems. Observing the workflow in different departments underscored the necessity of collaboration and clear communication in achieving project goals.

Evaluation:

The orientation was effective in setting clear expectations and providing a comprehensive overview of the company. The emphasis on data accuracy is crucial for the company's operations, and I appreciate the structured approach to ensuring data integrity. The workflow observation was insightful and emphasized the importance of teamwork in the company's operations.

Plan:

I plan to apply the insights gained from the orientation to my future tasks, ensuring that I maintain a high level of accuracy and attention to detail in all my data entry tasks. I also aim to continue exploring the tools for database creation and apply the insights gained from observing the workflow to my future collaborative projects.

Weeks 2-13: Data Entry for Existing Systems

Description:

From Week 2 to Week 13, I was involved in data entry tasks for the company's existing systems. This involved extracting raw data from various sources, cleaning it to ensure accuracy, and uploading it into the company's databases. The process required meticulous attention to detail to identify and correct any inconsistencies or errors in the data. The goal was to ensure that the data used in the company's systems was reliable and accurate, which is crucial for decision-making and operational efficiency.

Interpretation:

Data entry tasks require meticulous attention to detail to ensure the accuracy and reliability of the data. This is crucial for the company's operations and decision-making processes. The repetitive nature of data entry tasks highlighted the importance of consistency and accuracy in maintaining data integrity.

Evaluation:

The data entry tasks are essential for maintaining data integrity and ensuring the reliability of the company's systems. The process is time-consuming but necessary for the company's operations. The repetitive nature of the tasks required patience and attention to detail to ensure data accuracy.

Plan:

I plan to continue focusing on accuracy and attention to detail in my data entry tasks to ensure the reliability of the company's systems. I also aim to explore ways to streamline the data entry process to improve efficiency.

Weeks 4-6: ASP.NET Core vs. Blazor Research

Description:

From Week 4 to Week 6, I conducted a comparative analysis of ASP.NET Core and Blazor. This research involved creating small prototype applications to evaluate the features and suitability of each framework for future projects. ASP.NET Core is a cross-platform, high-performance framework for building modern, cloud-based, Internet-connected applications. Blazor is a framework for building interactive web UIs using C# instead of JavaScript. By exploring these frameworks, I gained insights into their strengths and weaknesses, which will be valuable for future projects.

Interpretation:

Conducting a comparative analysis of ASP.NET Core and Blazor provided insights into the strengths and weaknesses of each framework. This is valuable for future projects and decision-making processes. The research highlighted the importance of evaluating different technologies and making informed decisions based on their capabilities.

Evaluation:

The comparative analysis was insightful and provided a clear understanding of the features and suitability of each framework for future projects. The research was valuable for understanding the strengths and weaknesses of ASP.NET Core and Blazor and will be beneficial for future decision-making processes.

Plan:

I plan to continue exploring the features of ASP.NET Core and Blazor and apply the insights gained to future projects. I also aim to stay updated with the latest developments in these frameworks to make informed decisions for future projects.

Week 5: CSV File Analysis and Database Creation

Description:

During Week 5, I was tasked with analyzing a large CSV file and creating a SQL database to store the data. This involved using C#, Java, and Python to extract, transform, and load the data into the database. I wrote scripts in each language to read the CSV file, process the data, and insert it into a SQL table. This task required a deep understanding of data manipulation techniques and the ability to work with multiple programming languages.

Interpretation:

Analyzing a large CSV file and creating a SQL database requires a deep understanding of data manipulation techniques and the ability to work with multiple programming languages. This task highlighted the importance of data manipulation skills in ensuring the accuracy and reliability of the data.

Evaluation:

The task was challenging but provided valuable insights into data manipulation techniques and the capabilities of different programming languages. The ability to work with multiple programming languages is crucial for data manipulation tasks and ensures the accuracy and reliability of the data.

Plan:

I plan to continue exploring data manipulation techniques and applying the insights gained to future tasks. I also aim to stay updated with the latest developments in data manipulation tools and techniques to improve my skills.

Weeks 8-12: Web Development of a Software Using Django and Django Ninja

Description:

From Week 8 to Week 12, I was the project lead for the development of a web application using Django and Django Ninja. This project aimed to streamline administrative processes for educational institutions. My role included designing database models, implementing user authentication features, and developing RESTful APIs for data exchange. Django is a powerful web framework that allows for rapid development and clean, pragmatic design. Django Ninja is an asynchronous framework for building APIs, which enhances the performance and scalability of the application.

Interpretation:

Working on the development of a web application using Django and Django Ninja provided valuable insights into web development processes and the capabilities of the frameworks. The project highlighted the importance of clear communication, teamwork, and attention to detail in achieving project goals.

Evaluation:

The task was challenging but provided valuable insights into web development processes and the capabilities of Django and Django Ninja. The project required clear communication, teamwork, and attention to detail to ensure the successful development of the web application.

Plan:

I plan to continue exploring the capabilities of Django and Django Ninja and applying the insights gained to future web development projects. I also aim to improve my communication and teamwork skills to ensure the successful completion of future projects.

Weeks 14-15: Marketing of the Company's Existing Software/System

Description:

From Week 14 to Week 15, I was involved in marketing the company's existing software solutions, such as ZamPrep. The marketing efforts were conducted verbally and focused on reaching out to potential clients in the Northern Province, specifically in Kasama. I collaborated with the marketing team to create promotional materials and effectively communicate the benefits of the software solutions. This experience broadened my understanding of how software solutions are positioned in the market and the role of effective communication in attracting customers. During this period, I successfully secured interest from Chifwani Mission School to join the system.

Interpretation:

Marketing the company's existing software solutions provided valuable insights into the market needs and the role of effective communication in attracting customers. The verbal approach highlighted the importance of clear and persuasive communication in marketing efforts.

Evaluation:

The marketing efforts were effective in reaching out to potential clients and understanding the market needs. The verbal approach was challenging but provided valuable insights into effective communication strategies. The successful interest from Chifwani Mission School underscored the importance of persistence and adaptability in marketing efforts.

Plan:

I plan to continue exploring effective communication strategies and applying the insights gained to future marketing efforts. I also aim to improve my persuasive communication skills to ensure the successful marketing of software solutions.

Week 16: Marketing Report

Description:

In the final week of my internship, I prepared a marketing report summarizing my contributions and key learnings. I also had a one-on-one session with my supervisor to discuss my performance and receive constructive feedback. The internship concluded with a sense of accomplishment and a clear vision for my future career path in software development.

Interpretation:

Preparing a marketing report and having a one-on-one session with my supervisor provided valuable insights into my performance and areas for improvement. The constructive feedback was beneficial for my future career path and highlighted the importance of continuous learning and improvement.

Evaluation:

The marketing report and one-on-one session were effective in providing a comprehensive overview of my contributions and key learnings. The constructive feedback was valuable for my future career path and underscored the importance of continuous learning and improvement.

Plan:

I plan to apply the insights and skills gained from the internship to my future career path in software development. I also aim to continue learning and improving my skills to ensure continuous growth and success in my career.

In conclusion, the reflective journal entries provided a comprehensive overview of my weekly activities and experiences during the internship. The formula D-I-E-P was effective in structuring the journal entries and ensuring a thorough analysis of my performance and learning outcomes. The internship was a valuable experience that provided insights and skills that will be essential for my future career in software development.

Critical Analysis

Introduction

This week was focused on orientation and familiarization with the company's structure, processes, and tools. I was introduced to the team and given an overview of the tasks I would be undertaking. I started with basic data entry tasks, ensuring that the records were accurate and up-to-date. This activity helped me understand the critical role of data accuracy in the company's operations. Additionally, I explored the tools available for database creation, such as CSV file integration, which laid the groundwork for the tasks ahead. The week also involved observing the workflow in different departments, allowing me to appreciate the synergy required in collaborative projects. I concluded the week by documenting key learnings and outlining the goals for the upcoming weeks.

Onboarding and Initial Experiences

The onboarding process at Gladtidings is structured to immerse new interns in the company culture and operational framework. From day one, interns are introduced to the organization's values, mission, and goals. This initial phase is crucial as it sets the foundation for understanding how their work contributes to the broader objectives of the company.

Project Involvement

Interns in the Web Development Team at Gladtidings are likely to be involved in various projects that contribute directly to the company's product offerings. For instance, an intern might participate in enhancing existing web applications or developing new features for software solutions like ZamPrep or Zamed. These projects are not only technically challenging but also provide insights into real-world software development practices.

One critical aspect of these projects is learning to work within agile methodologies. Interns are encouraged to participate in daily stand-ups and sprint planning sessions, which helps them understand how teams prioritize tasks and adapt to changing requirements. This exposure not only enhances their technical skills but also improves their ability to work collaboratively in a team setting.

For example, an intern may be tasked with implementing a new feature based on user feedback collected by the product management team. This involves not only coding but also engaging with stakeholders to clarify requirements and ensure that the final product meets user needs. Such involvement provides interns with a comprehensive view of how software development integrates various functions within a company

.

Learning Opportunities and Skill Development

The internship experience at Gladtidings offers numerous learning opportunities that contribute significantly to both technical expertise and professional growth. Interns gain practical experience with programming languages such as JavaScript, HTML, CSS, as well as frameworks like React or Angular. They also learn about backend technologies such as Node.js or databases like MongoDB or MySQL.

In addition to technical skills, interns develop essential soft skills such as teamwork, communication, and problem-solving. For instance, working closely with product managers and other stakeholders helps interns learn how to articulate their ideas clearly and advocate for their design choices. This collaboration fosters a sense of accountability and encourages interns to take ownership of their contributions.

Interns may also have opportunities to engage in code reviews—a practice where developers review each other's code for quality assurance. This not only enhances coding standards but also develops critical thinking skills as interns learn to evaluate different approaches to problem-solving.

Furthermore, interns are often encouraged to participate in training sessions or workshops organized by Gladtidings. These sessions may cover topics such as best practices in web development, user experience design principles, or emerging technologies in the EdTech space. Such initiatives contribute to continuous learning and help interns stay updated on industry trends

.

Reflections on Challenges

While the internship experience at Gladtidings is enriching, it is not without its challenges. One significant challenge that an intern might encounter is managing project timelines while ensuring quality output. Balancing multiple tasks can be overwhelming; however, it teaches interns the importance of time management and prioritization.

For instance, an intern may find themselves juggling between coding a new feature for ZamPrep while simultaneously addressing bugs reported by users. Learning how to prioritize tasks based on urgency and importance becomes crucial during such times. Additionally, understanding how changes in one part of a project can affect other components reinforces the need for thorough testing before deployment.

Another challenge involves adapting to feedback from mentors or team leads. Constructive criticism is an integral part of growth; however, it can sometimes be difficult for interns who may feel personally invested in their work. Learning how to accept feedback gracefully and use it constructively is an important lesson that contributes to professional development.

Interns may also face technical challenges related to coding or debugging software issues. For example, encountering bugs that seem insurmountable can be frustrating but serves as a valuable learning experience. Understanding how to troubleshoot effectively—whether through research or seeking help from colleagues—is a crucial skill that interns develop during their time at Gladtidings

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Professional Growth and Networking

The internship at Gladtidings also offers significant opportunities for professional growth beyond technical skills. Interns have the chance to network with professionals across different departments within the organization—such as marketing, sales, and administration providing insights into how various functions collaborate towards common goals.

Participating in team meetings or company events allows interns to build relationships with colleagues who can offer guidance or mentorship even after the internship ends. These connections can be invaluable when seeking future employment opportunities or references. Moreover, being part of a company dedicated to improving education through technology instills a sense of purpose in interns. Understanding that their work directly impacts students' learning experiences can be highly motivating and fulfilling

.

Conclusion

Overall, an internship in the Web Development Team at Gladtidings Software Limited provides a comprehensive learning experience that combines technical skill development with professional growth. Interns emerge from this experience not only with enhanced coding abilities but also with improved collaboration and communication skills essential for any tech environment.

The supportive culture at Gladtidings encourages interns to explore their potential while contributing meaningfully to projects that impact educational outcomes in Zambia. The critical analysis presented here highlights how such internships serve as pivotal stepping stones for aspiring web developers looking to make a difference in the field of educational technology.

As Gladtidings continues its mission of enhancing educational management through technology, interns play an integral role in driving innovation forward while gaining invaluable experience that prepares them for future careers in software development. The combination of hands-on project involvement, mentorship opportunities, and exposure to real-

world challenges makes this internship a transformative experience for any aspiring web
developer passionate about making an impact through technology

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SWOT Analysis

Strengths

1. **Specialization in Education Technology:** Gladtidings Software Limited has established itself as a leader in the **education technology (EdTech)** sector in Zambia. Its focus on providing tailored software solutions for educational institutions, such as school management systems and mobile applications, positions the company favorably within a niche market that is continuously growing.

2. **Innovative Product Offerings:** The company has developed several innovative products, including **ZamPrep** and **Zamed**, which enhance the learning experience and streamline administrative processes for schools. These products are user-friendly and specifically designed to meet the needs of educators and students, contributing to their widespread adoption.

3. **Strong Local Presence:** Being based in Zambia allows Gladtidings to have a deep understanding of local educational challenges and needs. This local expertise enables the company to create relevant solutions that resonate with its clients, fostering strong relationships with educational institutions.

4. **Agile Organizational Structure:** With a relatively small team of 15 to 25 employees, Gladtidings benefits from an agile organizational structure that allows for quick decision-making and adaptability to market changes. This agility is crucial in the fast-paced tech landscape where educational needs can evolve rapidly.

5. **Community Engagement:** The company actively engages with its community by providing training and support to educators, enhancing their ability to utilize technology effectively in their teaching practices. This commitment to community development strengthens its brand reputation and fosters loyalty among clients.

Weaknesses

1. **Limited Resources:** As a smaller company, Gladtidings may face limitations in terms of financial resources and workforce capacity. This can restrict its ability to take on larger projects or invest heavily in marketing and expansion efforts compared to larger competitors.

2. **Brand Recognition:** While Gladtidings has made significant strides in the Zambian market, it may still struggle with brand recognition outside its immediate region. Competing against larger firms with established reputations can pose challenges when seeking new clients or entering new markets.

3. **Dependency on Local Market:** The company's focus on the Zambian education sector means it is heavily reliant on local economic conditions and funding for education. Economic downturns or shifts in government policy regarding education funding could adversely affect sales.

Opportunities

1. **Growing Demand for EdTech Solutions:** The increasing emphasis on digital transformation in education presents significant opportunities for Gladtidings Software to expand its product offerings and reach more educational institutions seeking technology solutions.

2. **Expansion into New Markets:** There is potential for Gladtidings to expand its services beyond Zambia into neighboring countries where educational technology is still developing. This geographic expansion could lead to increased revenue streams and market share.

3. **Partnerships with NGOs and Government Initiatives:** Collaborating with non-governmental organizations (NGOs) focused on improving education can provide additional funding opportunities and access to new projects that align with Gladtidings' mission.

4. **Leveraging Technology Advancements:** The rapid advancement of technology offers opportunities for Gladtidings to enhance its existing products through features like artificial intelligence (AI) and data analytics, improving user experience and operational efficiency.

Threats

1. **Intense Competition:** The EdTech sector is becoming increasingly competitive, with both local and international companies entering the market. Larger firms may have more

resources for marketing and product development, which could threaten Gladtidings' market position.

2. **conomic Instability:** Economic fluctuations can impact funding for educational institutions, leading to reduced budgets for software purchases. This threat is particularly relevant in developing markets where economic conditions can be volatile.

3. **Rapid Technological Changes:** The fast pace of technological innovation requires continuous investment in research and development to keep up with industry trends. Failure to adapt quickly could result in obsolescence or loss of competitive advantage.

4. **Regulatory Changes:** Changes in government policies regarding education technology or data privacy regulations could impose additional compliance costs or limit operational flexibility, affecting business operations.

Conclusion

The SWOT analysis of Gladtidings Software Limited highlights a company well-positioned within the Zambian EdTech landscape due to its innovative products, local expertise, and community engagement efforts. However, it must navigate challenges such as competition, economic dependency, and technological advancements while capitalizing on growth opportunities through market expansion and strategic partnerships. By addressing its weaknesses and leveraging its strengths, Gladtidings can continue to thrive in an evolving educational environment.

Conclusion

The internship at Gladtidings Software Ltd. has been a transformative journey, combining hands-on technical experience with valuable professional insights. Over the course of 16 weeks, I had the opportunity to immerse myself in real-world tasks, enhancing both my technical and soft skills. I engaged with frameworks such as Django and ASP.NET Core, refined my database management abilities using SQL, and contributed to web development projects that were integral to the company's operations.

One of the most significant outcomes of this internship was my ability to bridge theoretical knowledge acquired during my academic studies with practical implementation in a professional environment. Designing database models, developing RESTful APIs, and debugging applications enabled me to deepen my understanding of software development workflows. Each project taught me the importance of writing clean, maintainable code and thoroughly documenting processes to ensure project sustainability.

On a personal level, the internship provided an environment where I could develop critical soft skills, including teamwork, effective communication, and time management. Collaborating with professionals taught me to adapt quickly to project requirements, prioritize tasks, and approach challenges with a solution-oriented mindset. These skills are invaluable as I prepare to transition into a full-time role in the tech industry.

The challenges I faced—such as mastering new frameworks, troubleshooting complex errors, and optimizing application performance—allowed me to grow both technically and mentally. I learned to rely on a combination of independent research and collaboration to overcome obstacles, fostering resilience and resourcefulness.

Ultimately, the internship has equipped me with a stronger foundation to excel in the field of software engineering. The practical knowledge, exposure to industry-standard tools, and experience working on real-world projects will undoubtedly benefit my future career. I am grateful for the mentorship, learning opportunities, and support I received during this internship, which has prepared me to take on new challenges with confidence and competence

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Recommendation

Based on my observations and experiences during the internship, I recommend the following measures to further enhance the internship program and contribute to the growth of Gladtidings Software Ltd.:

1. **Develop a Structured Onboarding Program:** A structured onboarding program for new interns would greatly improve their initial experience. Detailed orientation sessions, training on essential tools, and step-by-step walkthroughs of workflows will reduce the adjustment period and enable interns to contribute more effectively from the start.

2. **Access to Continuous Learning Resources:** Providing interns and employees access to learning platforms like Coursera, Udemy, or Pluralsight can help keep them updated on emerging technologies. Encouraging certifications in trending fields like cloud computing, AI, and cybersecurity will enhance the team's technical capabilities.

3. **Mentorship and Feedback Mechanisms:** Assigning dedicated mentors to each intern would ensure clearer guidance and better task execution. Regular feedback sessions—both formal and informal—will allow interns to understand their strengths and areas for improvement, fostering professional growth.

4. **Encourage Multi-Project Exposure:** Allowing interns to work on diverse projects can broaden their skill sets and expose them to different aspects of software development. For instance, rotating interns through frontend development, backend development, and database management would create more well-rounded developers.

5. **Promote Collaboration Tools and Agile Practices:** Introducing tools like Jira, Trello, or Slack for task management and communication can enhance project tracking and team coordination. Integrating Agile methodologies, such as sprint planning and retrospectives, would provide interns with experience working in iterative development environments.

6. **Strengthen Documentation Standards:** Implementing a standard approach to technical documentation across all projects will ensure that workflows and systems remain accessible to both interns and permanent team members. This will also improve knowledge transfer and reduce dependency on specific individuals.

7. **Expand Technological Horizons:** While the current projects are highly impactful, encouraging exploration of new technologies like machine learning, data analytics, and

cloud-based solutions would allow Gladtidings Software Ltd. to diversify its offerings and attract a wider range of clients.

8. **Improve Project Testing and Deployment Pipelines:** Emphasizing automated testing and continuous integration/continuous deployment (CI/CD) practices would improve project efficiency and reduce deployment errors. Interns can be trained in these areas to prepare them for industry-standard development workflows.

By implementing these recommendations, Gladtidings Software Ltd. can further optimize its internship program and operations. These improvements will enhance the learning experience for future interns, boost team productivity, and strengthen the company's ability to innovate and deliver high-quality software solutions

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