Adventist University of Central Africa

QURAN LEARN HUB

CASE STUDY: RWANDA MUSLIM COMMUNITY

A final year project presented in partial fulfillment of the requirement for the degree BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY

Majoring in

Networking and Communication System

By

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ABSTRACT

Research project for the Bachelor's Degree in Information Technology

Adventist University of Central Africa

Topic: QURAN LEARN HUB

Name of the researcher: **HAKIZIMANA Bahati**

Name and the degree of the faculty advisor: **NSHUNGUYE Justin**

Date of completion: 26th June 2024

The Rwanda Muslim Community has been a vital part of Rwanda since the late 19th century. They aim to promote education, social welfare, and unity among Muslims, fostering national development. However, traditional Quranic education faces challenges such as limited access to qualified teachers, linguistic barriers, high costs, and time constraints.

Quran Learn Hub addresses these issues by offering a technology-integrated platform for Quranic education. The platform provides online access to Quranic texts, translations, and Tafsir, with interactive tools like quizzes, forums, and multimedia resources. Personalized learning paths and multilingual support make education accessible to all. The platform also supports teachers in managing courses, exams, and grades.

Developed using the Spiral model, the system utilizes Object-Oriented Analysis and Design (OOAD), UML, PostgreSQL, Laravel, React JS, and Tailwind CSS. The comprehensive integration and testing of system components ensure a reliable, secure, and efficient educational platform.

DECLARATION

I, Bahati HAKIZIMANA with 23990 confirm that I am the only one who wrote this project report, and it has never been submitted before for any degree application, either in full or in part. The work presented here is entirely my own, except when I mention or give credit to other sources.

Signature: _____

Name: HAKIZIMANA Bahati

Date: May 2024

APPROVAL

I, NSHUNGUYE Justin, hereby confirm that I have given my consent for this project report to be completed and submitted under my supervision.

Signature…….

Date……

DEDICATION

To the Divine Creator, the Almighty God,

To my beloved family, particularly my parents and siblings,

I will forever be grateful for everything that lecturers have done,

To all my friends,

You all have been my greatest supporters.

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LIST OF ABBREVIATIONS

AUCA Adventist University of Central Africa

UML Unified Modeling Language

PDF Portable Document Format

RAM Random Access Memory

ID Identification

OS Operating System

GB Gigabyte

HTTP Hypertext Transfer Protocol

DNS Domain Name System

UI User Interface

ACKNOWLEGMENT

To God, the source of all grace and strength, I want to express my deep gratitude for guiding and supporting me throughout my higher education journey. Your light has illuminated me in dark moments, and your grace has given me the strength to overcome challenges. At every step of this journey, I have felt your comforting presence and infinite love, instilling in me the confidence and hope needed to move forward.

I want to express my sincere gratitude to the Adventist University of Central Africa through academic staff of the Faculty of Information Technology, Department of Network and communication system and the whole Administration at large Your commitment to academic excellence and unwavering support have been essential pillars of my success. I extend my heartfelt appreciation for all that you have provided me.

My gratitude and unreserved recognition are addressed to **Mr. Justin NSHUNGUYE**, who, despite multitudes of his daily tasks and multiple responsibilities, accepted to supervise this work. His guidance, insight, patience, and support played important roles in the fulfillment of this work.

To my family, especially my beloved parents and my sister, I am infinitely grateful for your unwavering support and unconditional love. Your constant encouragement and sacrifices have been the foundation upon which I could build my path to success. Every day, I am inspired by your management and example of perseverance.

Together, you have all contributed to shaping my journey and turning my dreams into reality.

Bahati HAKIZIMANA

CHAPTER 1
GENERAL INTRODUCTION

Introduction

The Quran, considered the holy book of Islam, serves as a guide and source of inspiration for Muslims worldwide. Learning and understanding the Quran are essential aspects of a Muslim's life, fostering spiritual growth and a deeper connection with Allah. Traditionally, this learning process has involved attending classes at mosques or centers, where qualified teachers provide instruction on Quranic recitation, interpretation, and memorization.

However, with the advent of digital technology, online learning platforms have emerged as a convenient and effective alternative. These platforms offer greater flexibility, allowing learners to access Quranic education at their own pace and on their own schedule. This is particularly beneficial for individuals with busy lifestyles, those living in remote areas with limited access to educational resources, and those who prefer a more personalized learning experience.

Quran Learn Hub is an online platform designed to facilitate Quranic learning for Muslims of all ages and backgrounds. The platform aims to provide a comprehensive learning experience, combining traditional teaching methods with modern technology to create an engaging and interactive learning environment. Quran Learn Hub offers a variety of features, including structured courses, interactive lessons, and tools for tracking progress, all designed to enhance the learning experience and ensure that students gain a deep and thorough understanding of the Quran.

Furthermore, Quran Learn Hub addresses several challenges faced by traditional Quranic education. For instance, it eliminates geographical barriers, enabling learners from different parts of the world to access high-quality Quranic education. It also incorporates multimedia resources, such as video lectures, audio recitations, and interactive exercises, to make learning more engaging and effective. Additionally, the platform provides opportunities for learners to interact with teachers and fellow students through online forums and live sessions, fostering a sense of community and collaboration.

By leveraging digital technology, Quran Learn Hub not only makes Quranic education more accessible but also enhances the overall learning experience. The platform is designed to cater to the diverse needs of the global Muslim community, ensuring that learners of all levels can benefit

from its resources and achieve their educational goals. Through Quran Learn Hub, Muslims can deepen their understanding of the Quran, strengthen their faith, and build a stronger connection with Allah.

Background of the study

The emergence of digital technology has revolutionized the field of education, making it possible to deliver high-quality educational content to a global audience. Online learning platforms offer a viable solution to the challenges posed by traditional methods, providing learners with the flexibility to study at their own pace and convenience. Platforms such as Quran Learn Hub seek to leverage this technology to provide a comprehensive and interactive learning experience for Muslims seeking to deepen their understanding of the Quran. This approach not only makes Quranic education more accessible but also allows for a more personalized learning experience that can cater to the diverse needs of Muslims around the world.

In Rwanda, the Muslim community has experienced similar challenges with traditional Quranic education. Factors such as limited access to qualified teachers, geographical constraints, and the demands of daily life have made it difficult for many Rwandan Muslims to engage in regular Quranic study. The introduction of online learning platforms in Rwanda could address these issues by providing an alternative means of accessing Quranic education that is not bound by the limitations of physical classes.

The Rwanda Muslim community, like many others globally, stands to benefit significantly from the adoption of digital learning platforms. By offering structured courses, interactive content, and flexible scheduling, these platforms can enhance the Quranic learning experience and promote greater engagement among learners.

In response to these challenges, I am developing a system called Quran Learn Hub, which aims to provide an accessible and effective means of teaching the Quran among Rwandans. This system leverages digital technology to deliver a comprehensive and interactive learning experience. The platform will offer a variety of features, including structured courses, interactive content, and flexible learning schedules, to cater to the diverse needs of learners. By doing so, Quran Learn Hub will make Quranic education more accessible to the Rwandan Muslim community, helping to overcome the limitations of traditional learning methods and promoting greater engagement and understanding of the Quran.

Statement of Problems

Despite the availability of traditional methods for Quranic education, there is a need for more accessible and flexible learning options that can cater to the diverse needs of Muslims worldwide. Traditional methods often require physical presence at specific locations and times, which can be challenging for individuals with busy schedules or limited access to educational resources. Additionally, traditional methods may not always provide the level of interactivity and engagement desired by learners, leading to difficulties in understanding and retention of the material. In fact, traditional methods present several challenges for Muslims, including:

- Limited Access to Qualified Teachers: Many Muslims face difficulties in finding qualified Quranic teachers within their locality.
- Geographical Constraints: Physical distance from educational centers makes it hard for many individuals to attend regular Quranic sessions.
- Time Constraints: Busy schedules and other commitments prevent individuals from attending classes at fixed times.

Short summary

Much money is spent to buy the papers and pens for registering learners, which make an insecurity of data.It takes a long time for Muslims to arrive to the mosque and other center, which makes them also to spend much money for ticket.

Preparing and correcting exams takes much time where it takes at least two weeks are spent.

After completing learning, it cost much time for learners to get their certificate.

Online learning platforms offer a solution to these challenges by providing a more flexible an interactive learning experience that can be accessed from anywhere, at any time.

However, the effectiveness of online learning in the context of Quranic studies has not been extensively studied. There is a need to evaluate the effectiveness of online learning platforms in facilitating Quranic education and to identify ways to enhance learning experience for users.

Motivation

The motivation behind Quran Learn Hub system from a desire to address the limitations of traditional methods of Quranic education and to harness the potential of online learning to provide a more accessible and engaging learning experience.

The project is driven by commitment to promoting knowledge and values and empowering Muslims to connect more deeply with their faith. Here's the key motivators for this work:

- To allow Muslims to register wherever there at any time.
- To allow Muslims to take courses online any time anywhere.
- To allow Muslims to gate certificate once course completed.
- To secure Muslim's data.
- To allow Time management.
- To avoid money, spend for ticket.

Objectives of the study

General objective

The primary objective of this study is to design and develop a comprehensive online platform, Quran Learn Hub that enhances the accessibility, engagement, and efficiency of Quranic education for learners worldwide.

Specific objectives

- To Develop an Accessible Learning Platform: Create a user-friendly and intuitive interface for Quran Learn Hub that caters to users of all ages and technical abilities. The platform should facilitate easy navigation and provide seamless access to Quranic texts, translations, and Tafsir. To provide a structured learning curriculum that covers various aspects of Quranic studies, including recitation, interpretation, and memorization.
- To Implement Comprehensive Educational Resources: Integrate a wide range of educational resources, including digital Quranic texts, translations, Tafsir, and multimedia content. This will provide learners with a rich and diverse learning experience. To provide certification upon completion of courses, recognizing the achievements of learners and motivating them to continue their studies.
- To Provide Interactive Learning Tools: Develop interactive tools such as quizzes, forums, and multimedia resources to enhance the educational experience. These tools will engage learners and support their understanding and retention of Quranic knowledge.

- To Enable Remote Access: Ensure that the platform is accessible from anywhere in the world, allowing learners to study the Quran regardless of their geographic location. This includes optimizing the platform for various devices and internet speeds.
- To Ensure Security and Data Privacy: Implement robust security measures to protect user data and ensure privacy. This includes secure login, encrypted data storage, and regular security audits to safeguard the platform and its users.
- To Enhance Community Engagement: Foster a sense of community among learners through forums, discussion boards, and social features. This will enable learners to share insights, ask questions, and support each other in their educational journeys.
- To Facilitate Qualified Instruction: Provide features that allow qualified instructors to offer guidance and support. This includes tools for online classes, video lectures, and real-time interaction with learners to create a supportive learning environment akin to traditional Halaqas.

Scope of the Study

The study will focus on the design, development, and implementation of Quran Learn Hub, with an emphasis on creating a user friendly and engaging platform for Quranic education.

The study will also explore the effectiveness of online learning in the context of Quranic studies, comparing it to traditional methods of learning.

Methodology and Techniques

The study will employ a mixed-methods approach, combining qualitative and quantitative research methods. Qualitative methods, such as interviews and surveys, will be used to gather data on user preferences, learning styles, and the effectiveness of online learning in Quranic studies. Quantitative methods, such as data analysis and statistical modeling, will be used to analyze the data and draw conclusions.

The development of Quran Learn Hub will follow an iterative design process, involving multiple stages of design, implementation, and evaluation.

User feedback will be solicited at each stage to ensure that the platform meets the needs and expectations of its users.

Observation

Throughout the study, careful observation of user interactions with the platform will be conducted. This will involve monitoring how users navigate the platform, engage with the learning materials, and interact with each other in the community forums.

Observations will be used to identify usability issues, areas for improvement, and user preferences, which will inform the iterative design process of Quran Learn Hub.

Documentation

Documentation refers to a set of written, graphic, audiovisual, or electronic documents, resources, or materials used to provide information, instructions, explanations, or evidence on a particular topic.

In the context of the topic on the Quran Learn Hub, I have employed a comprehensive documentary approach. This involves gathering and organizing relevant information about existing systems, the specific requirements of the university, and best practices in Quran learn hub. I have also documented the process of designing, developing, and implementing the Quran Learn Hub, detailing the decisions made, steps taken, and challenges encountered.

Interview

The interview method is a systematic way to collect data or information from a respondent by asking questions and facilitating understanding (Holstein, 2001).

Interviews conducted at Rwanda Muslim community with administrators, and students aimed to gather insights on Quran learn hub. Administrators highlighted challenges in traditional methods, administrators provided input on logistical considerations, and students shared their experiences and preferences. Feedback from stakeholders guided the design and implementation of the QLH system, ensuring alignment with Rwanda Muslim Community's specific needs and expectations.

I, Hakizimana Bahati, conducted these interviews to gather the necessary insights:

Question 1: What are the main challenges you face with traditional Quranic education methods?

"Muslim Traditional methods require physical presence at specific locations and times, which can be difficult for individuals with busy schedules or limited access to educational resources."
Said Bali Ismael

Question 2: How do you think online learning platforms can address the challenges of traditional Quranic education?

Answer: "*Enabling access to qualified teachers and educational content regardless of geographical location."* Said Ramathan NTAKIRUTIMANA

Question 3: In your opinion, what motivates individuals to choose online Quranic learning platforms over traditional methods?

Answer: "*Easier access to qualified teachers and educational content"* said Ashraf BYIRINGIRO

Question 4: What features do you believe are essential for an effective online Quranic learning platform?

Answer: "*Interactive elements like quizzes and discussion forums are essential as they engage students and facilitate better understanding*" said Amina Mukarugwiza.

Question 5: How important is multilingual support in an online Quranic learning platform for the Rwanda Muslim community?

Answer: "*Very important, as it ensures that non-Arabic speakers can fully understand and engage with the Quranic content*" said Abdul Karim.

Question 6: What are your thoughts on personalized learning paths in online education platforms?

Answer: "*Personalized learning paths are crucial as they allow students to learn at their own pace and focus on areas they find challenging*" said Fatima Nyiramaso.

Question 7: How can community features, such as forums and discussion boards, enhance the online learning experience?

Answer: "*Community features foster a sense of belonging and allow students to support and learn from each other*" said Mohamed Habimana

Question 8: What measures should be taken to ensure the security and privacy of users on the platform?

Answer: "*Implementing robust security protocols, including secure logins and encrypted data storage, is essential to protect user information*" said Youssouf Mutabazi.

Expected result.

The expected results of the study include:

- Identification of key features and functionalities that are essential for an effective online platform for Quranic education.
- Comparison of the effectiveness of online learning in Quranic studies to traditional methods of learning, highlighting the strengths and weaknesses of each approach.
- Identification of challenges and opportunities associated with implementing an online platform for addressing these challenges.
- Development of Quran Learn Hub as a user-friendly and engaging platform for Quranic education, based on user feedback and iterative design process.

Organization of the report

This research study consists of five chapters which include the following:

Chapter 1: Offers a comprehensive introduction to the project, outlining its objectives and presenting the envisioned functionalities of the new system.

Chapter 2: Conducts an in-depth analysis of the existing system, evaluating its operational aspects, strengths, weaknesses, and proposing effective solutions.

Chapter 3: Introduces the conceptual framework for the proposed solutions, employing UML diagrams to visually represent processes and workflows.

Chapter 4: Details the design and implementation phases of the new system, providing insights into its features, technologies, testing procedures, and deployment strategies.

Chapter 5: Concludes the research endeavor by offering valuable recommendations and insights, consolidating references and sources for further exploration. This structured approach ensures a coherent and systematic exploration of the project's facets, covering introduction, analysis, design, implementation, and conclusion.

CHAPTER TWO

ANALYSIS OF THE EXISTING SYSTEM

This chapter is based on looking together how these Muslims usually study the Qur'an, the obstacles in the usual way of using the web, and the solution to these obstacles that lead specifically to the creation of an automated system that will help everyone who wants to study the Quran online from different regions either in Rwanda or/and elsewhere in the world.

Historical background

Islam was introduced to Rwanda in the late 19th century by traders and missionaries from the East African coast and the Democratic Republic of the Congo. The initial contact with Islam in Rwanda is believed to have occurred through trade routes that connected the Rwandan kingdom with the coastal regions of East Africa. Muslim traders, primarily Swahili-speaking, brought with them not only goods but also their religious beliefs and practices. These traders played a crucial role in spreading Islam as they interacted with local communities.

The spread of Islam in Rwanda was gradual and faced several challenges. The early Muslim communities were small and scattered, primarily composed of traders and their families. These early Muslims often faced resistance from the local population, which was predominantly composed of followers of indigenous religions and, later, Christianity introduced by European missionaries. Despite these challenges, the Muslim community persevered and continued to grow.

In the early 20th century, more structured efforts to propagate Islam were undertaken by missionaries from the Democratic Republic of the Congo. These missionaries established Quranic schools and mosques, which became centers for religious education and community activities. The establishment of these institutions provided a more organized framework for the practice and teaching of Islam in Rwanda. As a result, the Muslim population began to increase steadily.

Over time, the Muslim community in Rwanda established itself as an integral part of the country's cultural and religious diversity. The construction of mosques in various regions of Rwanda facilitated the practice of Islam and provided a sense of community and identity for Muslims. These mosques not only served as places of worship but also as centers for social and educational activities. The teaching of the Quran and Islamic principles became more structured and accessible to the growing Muslim population.

The Muslim community in Rwanda has made significant contributions to the country's social, cultural, and economic development. Muslims have been involved in various sectors, including trade, education, and healthcare, playing a vital role in the overall development of Rwandan society. The community's contributions have helped to foster greater understanding and tolerance among different religious and ethnic groups in Rwanda.

In recent years, the Rwandan Muslim community has continued to grow and evolve. The younger generation of Muslims is increasingly seeking ways to balance their religious obligations with the demands of modern life. This has led to a growing interest in using digital technology to access Quranic education and other religious resources. The introduction of online learning platforms offers a solution to many of the challenges faced by traditional methods of Quranic education, providing greater flexibility and accessibility for learners.

Mission:

The Rwanda Muslim Community aims to promote values, education, and social welfare, fostering unity and cooperation among Muslims while contributing to national development and harmony in Rwanda**.**

Vision:

The Rwanda Muslim Community envisions a society where Muslims actively participate in all aspects of national life, embodying principles of peace, tolerance, and mutual respect, contributing to Rwanda's progress and cohesion.

Description of the existing system

The process of becoming a Muslim in Rwanda typically involves several steps, emphasizing education, community support, and personal conviction. Interested individuals often start by learning about through informal discussions with Muslim friends or family members. They may attend local mosques, where imams and community leaders provide guidance and answer questions about the faith.

Formal learning often includes attending classes or study sessions at centers or madrasas, where learners are taught the fundamental beliefs and practices of, including the Five Pillars, history, and the Qur'an. This educational phase is crucial as it helps individuals understand the core tenets of the religion.

The decision to convert is a deeply personal one, made after careful consideration and a period of reflection. When someone decides to embrace, they publicly declare their faith by reciting the Shahada, the declaration of faith, in the presence of witnesses at a mosque.

Following the declaration, new Muslims often receive ongoing support from the community, including mentorship and access to further religious education. They are encouraged to integrate practices into their daily lives, such as praying, fasting during Ramadan, and participating in community events, thus becoming fully integrated members of the Rwandan Muslim community.

Analysis of the current system

The traditional system of Quranic study, while rich in history and deeply rooted in culture, faces several challenges in the modern world. Accessibility remains a significant issue, with many Muslims in remote or rural areas lacking access to qualified teachers and educational institutions. The linguistic barriers posed by classical Arabic make it difficult for non-Arabic speakers to fully grasp the Quran without substantial effort and resources. Resource limitations, such as the scarcity and cost of written materials, further hinder widespread Quranic education. Additionally, the time commitment required for traditional methods of study often conflicts with the daily responsibilities of modern life. Despite these challenges, the traditional systems personalized and community-based approach provides a strong foundation for Quran Learn Hub, which aims to address these limitations through the integration of digital technology and modern educational tools.

Design of activities of the current system

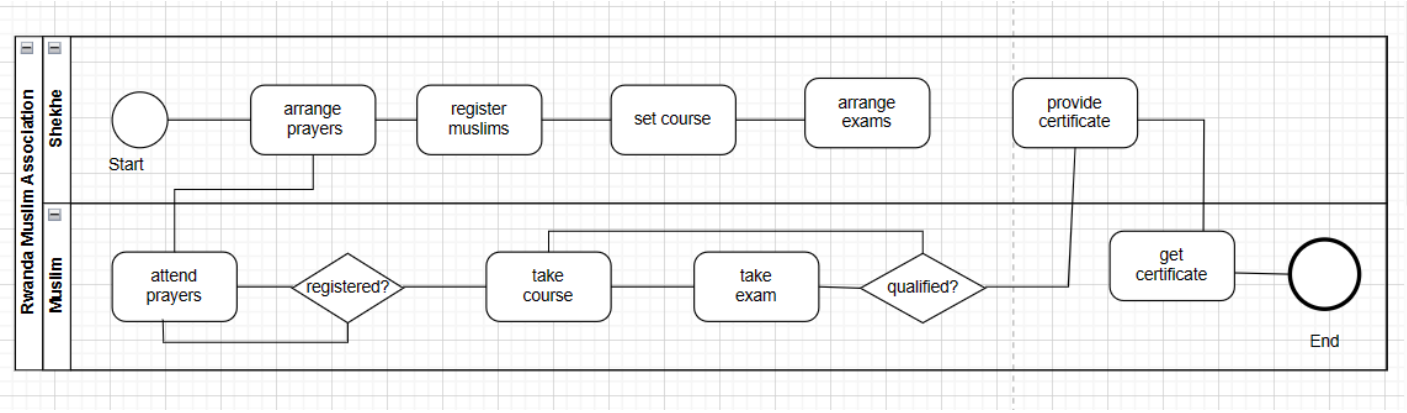


Figure 1 Sketch of the existing system

Problems of the current system

The traditional system of Quranic study, despite its historical richness, faces several challenges:

- Accessibility: Many Muslims in remote or rural areas lack access to qualified teachers and educational institutions.
- Linguistic Barriers: The classical Arabic of the Quran poses difficulties for non-Arabic speakers, requiring significant effort and resources to learn and understand.
- Resource Limitations: Scarcity and high cost of written materials limit the availability of comprehensive Quranic education.
- Time Constraints: Traditional methods demand considerable time commitment, often conflicting with modern daily responsibilities.
- Limited Technology Integration: The traditional system does not leverage modern technology, which could enhance the learning experience and make it more accessible to a global audience.

Proposed solution

To address the challenges faced by the traditional system of Quranic study, Quran Learn Hub proposes a modern, technology-integrated solution.

- The platform leverages digital technology to make Quranic education more accessible and efficient.
- By providing online access to Quranic texts, translations, and Tafsir, Quran Learn Hub ensures that Students worldwide can study the Quran regardless of their geographic location.
- Interactive learning tools such as quizzes, forums, and multimedia resources enhance the educational experience, making it more engaging and effective.
- Personalized learning paths allow users to tailor their studies to their individual interests and proficiency levels.
- Multilingual support caters to a diverse global audience, breaking down linguistic barriers.

- Qualified instructors and community engagement features foster a supportive learning environment, similar to traditional Halaqas but with the added benefits of modern connectivity.
- Through these innovations, Quran Learn Hub aims to overcome the limitations of the traditional system and provide a comprehensive, accessible, and enriching Quranic education experience.

System requirements

Functional requirements are those demands that are more readily identifiable at the outset, whereas non-functional requirements, often referred to as quality requirements, outline the characteristics and limitations of the system.

Functional requirements

- ✓ User Registration and Authentication: The system should allow users to register, log in, and manage their profiles securely.
- ✓ Course Management: Admins and teachers should be able to create, update, and delete courses, including adding course materials such as videos, documents, and quizzes.
- ✓ Interactive Learning Tools: The system should provide quizzes, forums, and multimedia resources to enhance the learning experience.
- ✓ Personalized Learning Paths: Users should be able to create and follow personalized learning paths based on their interests and proficiency levels.
- ✓ Multilingual Support: The system should support multiple languages to cater to a diverse global audience.
- ✓ Live Classes and Webinars: The platform should facilitate live classes and webinars, allowing real-time interaction between teachers and Students.
- ✓ Progress Tracking: Users should be able to track their progress, view completed courses, and receive certificates for course completion.
- ✓ Notifications and Announcements: The system should send notifications and announcements regarding new courses, upcoming events, and important updates.
- ✓ Community Engagement: The platform should include discussion forums and group study sessions to foster community interaction and support.

Non-functional requirements

- ✓ Scalability: The system should be able to handle a large number of users and data without performance degradation.
- ✓ Reliability: The platform should be reliable, with minimal downtime and quick recovery from any failures.
- ✓ Security: User data and course content must be protected through strong security measures, including encryption and secure authentication protocols.
- ✓ Usability: The system should have an intuitive and user-friendly interface to ensure a positive user experience.
- ✓ Performance: The platform should load quickly and respond promptly to user interactions, providing a seamless experience.
- ✓ Maintainability: The system should be designed for easy maintenance, with clear documentation and modular components to facilitate updates and troubleshooting.
- ✓ Compatibility: The platform should be compatible with various devices and browsers, ensuring accessibility for all users.
- ✓ Accessibility: The system should adhere to accessibility standards to accommodate users with disabilities, providing features such as screen reader support and keyboard navigation.

CHAPTER THREE

REQUIREMENTS ANALYSIS AND DESIGN OF THE NEWSYSTEM

Introduction

This chapter delves into the detailed requirements analysis and design of the new system, Quran Learn Hub. Building on the understanding of the traditional methods and the challenges identified in the previous chapter, this section aims to outline the specific requirements needed to develop an effective and comprehensive digital platform for Quranic education. The requirements analysis will cover both functional and non-functional aspects, ensuring that the system is not only feature-rich but also reliable, secure, and user-friendly. Following the requirements analysis, the design phase will be discussed, detailing the architecture, components, and user interface of the new system. This structured approach ensures that the Quran Learn Hub platform is meticulously planned and capable of delivering a high-quality educational experience that meets the needs of its diverse user base.

Unified Modeling Language (UML)

The Unified Modeling Language (UML), utilized in software development, serves as a comprehensive modeling language with the aim of providing a unified framework for defining a system's architecture. It stands as a prevalent form of documentation particularly suited for 12 Object-oriented systems. Functioning as a visual language, UML facilitates the depiction, construction, and documentation of system artifacts (Booch, 2006).

UML amalgamates principles from various modeling approaches including object modeling, component modeling, business modeling, and data modeling such as entity-relationship diagrams. Its versatility allows for utilization within any phase of the software development life cycle, employing diverse implementation technologies. It serves as a standardized notation across various object-oriented methodologies, encompassing the most effective aspects of prior notations.

The progression of UML diagrams commences with conceptual and abstract representations before gradually incorporating specifics that ultimately guide code generation and system development. These diagrams delineate both the "what" and the "how" as they evolve.

UML seamlessly merges the Booch method, Object-Modeling Technique (OMT), and Object-Oriented Software Engineering (OOSE) notations into a singular, widely adopted modeling

language. UML's overarching goal is to transform into a universal modeling language capable of representing systems that are concurrent and distributed.

Design of the new system- Diagrams

The initial phase of the system development life cycle is system design, during which the programmer and the user collaboratively establish a thorough understanding of the system's operational mechanisms.

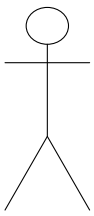
Use Case Diagram

Use case diagrams are visual representations within the realm of UML diagrams, illustrating the interactions between a system and its environment, as well as the requisite business requirements for the system's operation (Dennis, 2012). These diagrams depict a business entity or software system, its external stakeholders (referred to as actors), and a compilation of tasks (known as use cases) that the system users are either expected or authorized to perform when engaging with the system. Use case diagrams find application in delineating the operational aspects of a system as perceived from the perspective of external users.

These diagrams utilize the following symbols:

Actor

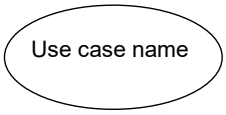
When directly interacting with a system, an external entity takes on a designated role defined by an actor. This role might represent a user's function or a role fulfilled by another system that engages with the given system



Actor Name

Use Case

The use case entails detailing the sequence of actions that a system can undertake while interacting with external actors. It encompasses tasks that the system should perform in response to an actor's request and is visually depicted as follows:

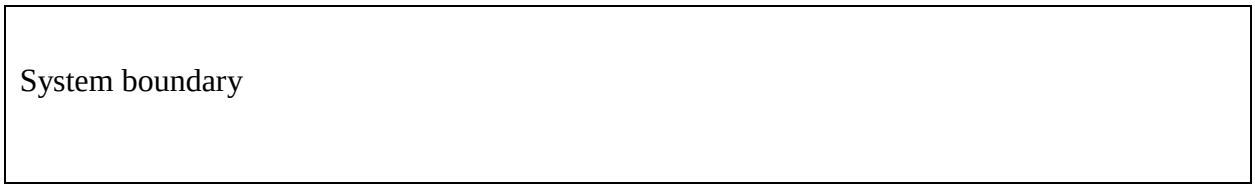


Relation ship

Genuine associations linking actors and use cases, depicted through the UML association symbol.

System boundary

To visually represent the boundary or scope of the modeled system, a box is drawn around the use case.



A box is employed to visually delineate the boundary or extent of the modeled system around the use case.

Use Case Diagram

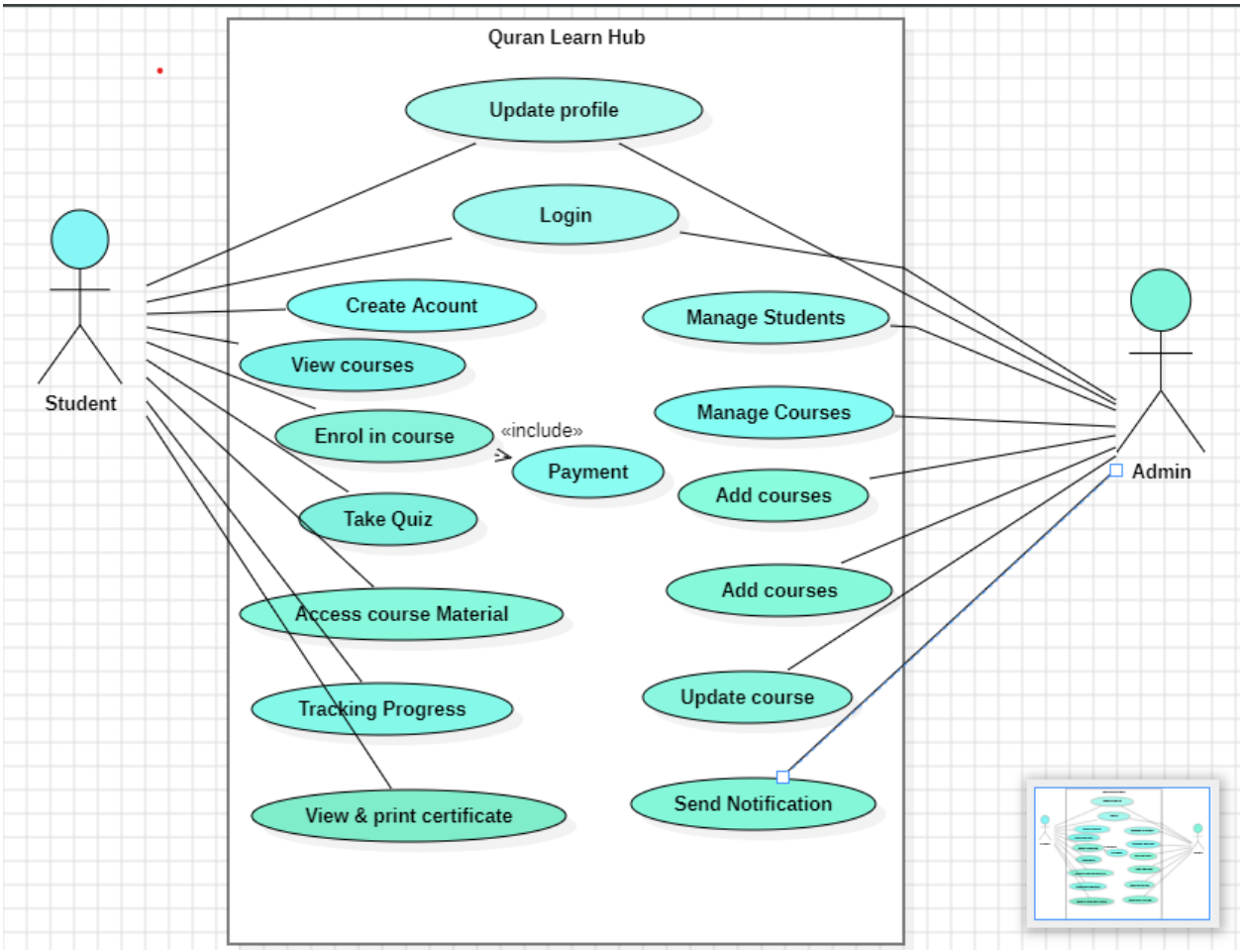


Figure 2 Use Case diagram

Use-case description

Use Case description specifies what a use case accomplishes, and what it requires to be properly performed. Each use case looks like this:

- **Name:** A name of a use case
- **Description:** What a system aims to accomplish
- **Actor:** The participant in the use case
- **Pre-condition:** The system state is required before the use case may start.
- **Post-condition:** When the use case is finished, the system states it.
- **Normal flow:** The use case's real steps
- **Alternative flow:** Steps that could be taken if a regular flow were to fail.

Use case description for creating accounts

Use case Number	UC-01
Use Case Name	Create Account
Actor	Student
Description	Creating of account for Students and to access the system
Pre-condition	Both parties must provide valid information while registering
Post-condition	The system should display a message that an account is created
Normal Flow	1. Student runs the system 2. Student access the registration form 3. System displays the form to fill 4. Student fills the requested inputs and submits the form 5. System validates the input of the fields. 6. System saves data in the database 7. System displays a confirmation message
Alternative flow	a) If the data inserted in the inputs is not valid, the system will show an error b) A student refill and submit the form again. c) If there is a failure in saving the data or the data already exists in the database, the system will display an error message.

Table 3 1 Create Account Use Case Table

Use case Number	UC-02
Use Case Name	Manage Quran Learn Hub
Actor	Admin
Description	Deleting, Updating Courses with all related to it.
Pre-condition	Admin must login to access with valid credentials
Post-condition	The system should display a message if the different functionalities of adding, deleting and updated are successful.
Normal Flow	• System displays course registration form • System saves data and display confirmation message. • Admin views different courses and can update and delete a particular detail about course.
Alternative flow	• If the data inserted in the inputs is not valid, the system will show an error • The admin refills and submits the form. • If there is a failure in saving the data or the data already exists in the database, the system will display an error message.

Table 3 2 Manage Quran Learn Hub Use Case Table

Use case description for managing users

Use case Number	UC-04
Use Case Name	Manage users

Actor	Admin
Description	Managing the users of the system
Pre-condition	Admin provide valid credentials for logging in
Post-condition	Admin should view all users of the system
Normal Flow	• Admin runs the system • Admin access the login form • System displays the form to fill • Admin provides the credentials and submit the form. • System validates the input of the fields. • System logs the admin and redirect to the dashboard • Admin views the users of the system
Alternative flow	If the data inserted in the login inputs is invalid, the system will show an error message. The admin refills and submits the form again. If there is a failure in logging in, the system will display an error message.

Table 3 3 Managing Users Use Case Table

Use case description for managing Muslims

Use case Number	UC-05
Use Case Name	Manage Quran Learn Hub
Actor	Admin
Description	Managing Quran Learn Hub

Pre-condition	Admin provide valid credentials for logging in
Post-condition	Admin observe all system activities.
Normal Flow	1. Admin runs the system
	2. Admin access the login form 3. System displays the form to fill 4. Admin provides the credentials and submit the form. 5. System logs the admin and redirect to the dashboard 6. Admin views all the clothes in the system
Alternative flow	a. If the data inserted in the login inputs is invalid, the system will show an error message. b. The admin refills and submits the form again. c. If there is a failure in logging in, the system will display an error message.

Table 3 4 Managing Quran Learn Hub Use Case Table

Use case description for Enroll in the Course

Use case Number	UC-05
Use Case Name	Enroll in the Course
Actor	Student
Description	Student makes an enrollment in the course to attend.
Pre-condition	1. Student must have an account 2. Student must be logged in

Post-condition	Success message will be displayed
Normal Flow	1. Student will be able to view all courses with their details 2. Student will be able to visit course and study 3. Student will be able to checkout
Alternative flow	a. If there is a failure, the system will display an error message.

Table 3 5 Making Enrollment Use Case Table

Use case description for Payment

Use case Number	UC-08
Use Case Name	Payment
Actor	Student
Description	Student make payment to take in the courses
Pre-condition	1. Student must have an account and be logged in 2. Student must have made enrollment 3. Student must be aware of the total to be paid
Post-condition	Success message will be displayed
Normal Flow	1. Student makes an enrollment 2. System shows the total cost to be paid 3. Student makes the payment 4. System checks the payment method 5. System displays a success message

Alternative Flow	1. If the information is invalid, an error message is displayed

Table 3 6 Make Payment Use Case Table

Class Diagram

A class diagram is a structural diagram that depicts the classes, their properties, functions, and connections between classes to indicate how a system is organized.

A class describes the methods and variables in an object, which is a specific item in a program or the unit of code representing that thing. In the context of the Unified Modeling Language (UML), a class diagram is a depiction of the relationships and source code dependencies among classes. All types of object-oriented programming can benefit from class diagrams (OOP). The classes are grouped in groups based on shared traits in a class diagram.

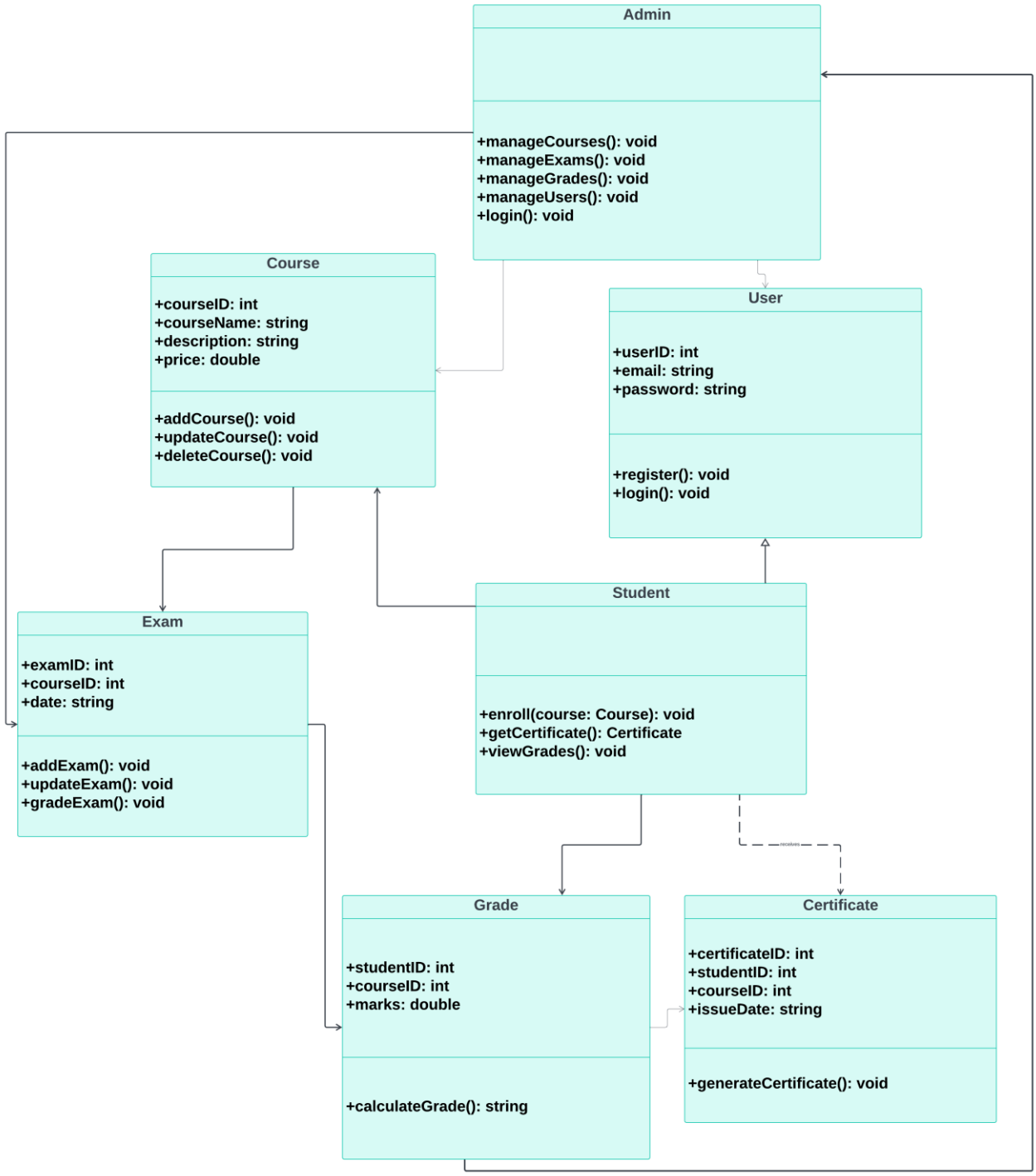
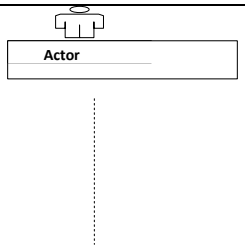
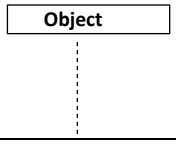
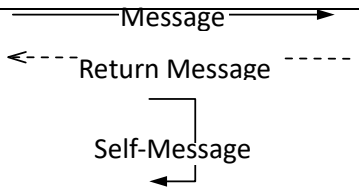


Figure 3 Class Diagram

Sequence Diagram

A sequence diagram is a type of interaction chart that depicts objects as lifelines running down the page, with messages rendered as bolts from the source lifeline to the target lifeline, representing their interactions through time. Object interactions are arranged in temporal sequence in a sequence diagram.

Sequence in UML, the stages required to perform an operation are described in diagrams, which are interaction diagrams. They show how things interact when operating within a cooperative system. Sequence Diagrams are time-focused and use the vertical axis of the diagram to indicate time, what messages are received, and how the interaction is organized graphically.

Term and definition	Symbol
An actor: • It could be a person or a system that is not a part of the system yet benefits from it. • In a chain, it participates by sending and/or receiving messages. • It is positioned at the top of the diagram.	
An object lifeline: • It partakes in a sequence by transferring and/or obtaining messages. • It is placed at the upmost of the schema.	
An activation: • It is a lengthy narrow rectangle positioned at top of a • It shows the transfer and Acquisition of messages	
Message: • It bears information from one object to Another. • When an operation call is made, a message is marked With a solid arrow, but a return is marked with the value returned and shown as a dashed arrow.	

The notations and their definitions that are used in sequence diagram:

Sequence diagram

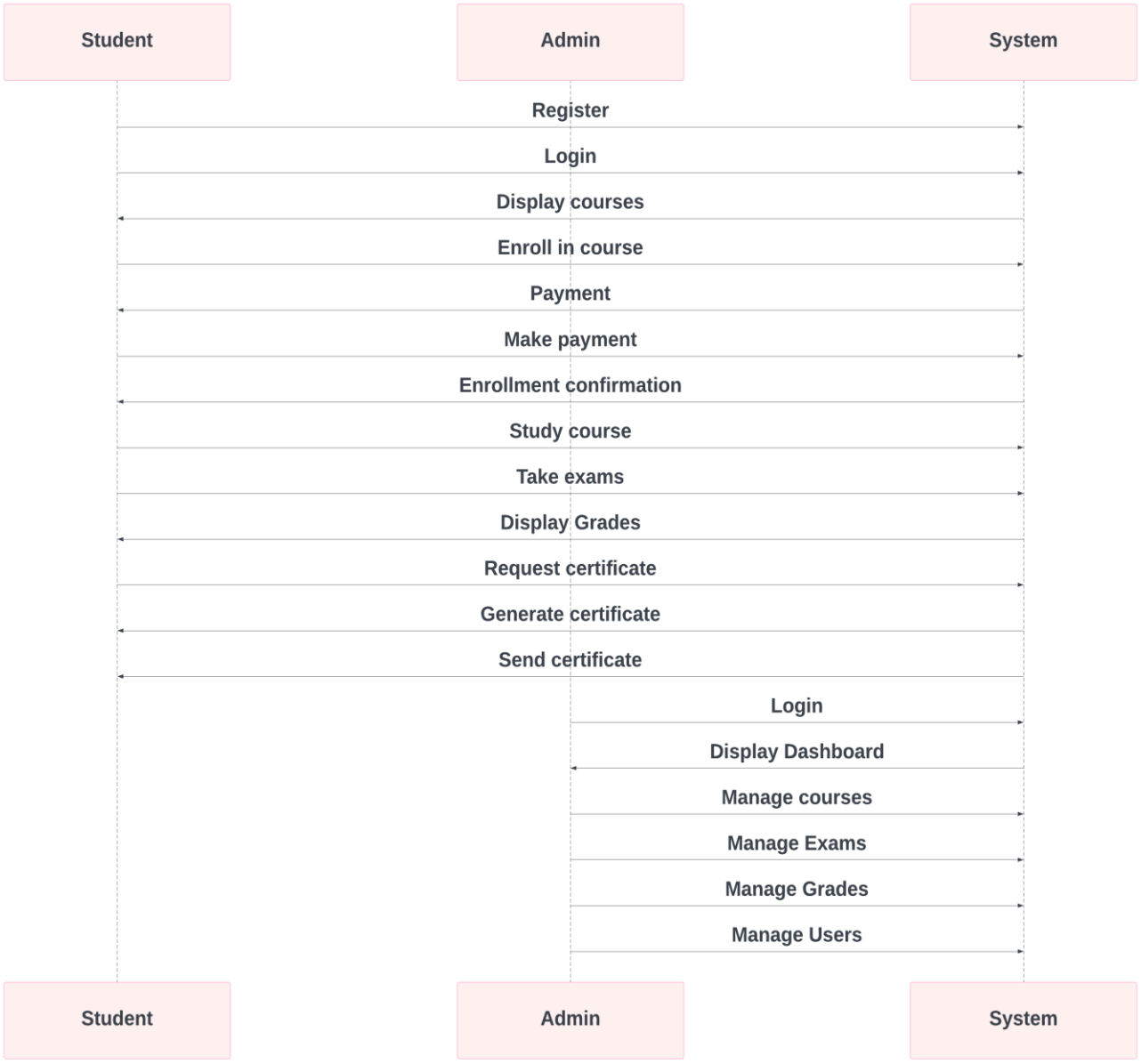


Figure 4 Sequence Diagram

Database schema diagram

A database schema diagram describes how data is organized to create a blueprint for how a database will be constructed and is the database management system's supporting formal language used to define the structure of a database system (DBMS). Formally speaking, a database schema is a set of rules (sentences referred to as integrity constraints) applied to a database. The compatibility of the schema's components is ensured by these integrity requirements.

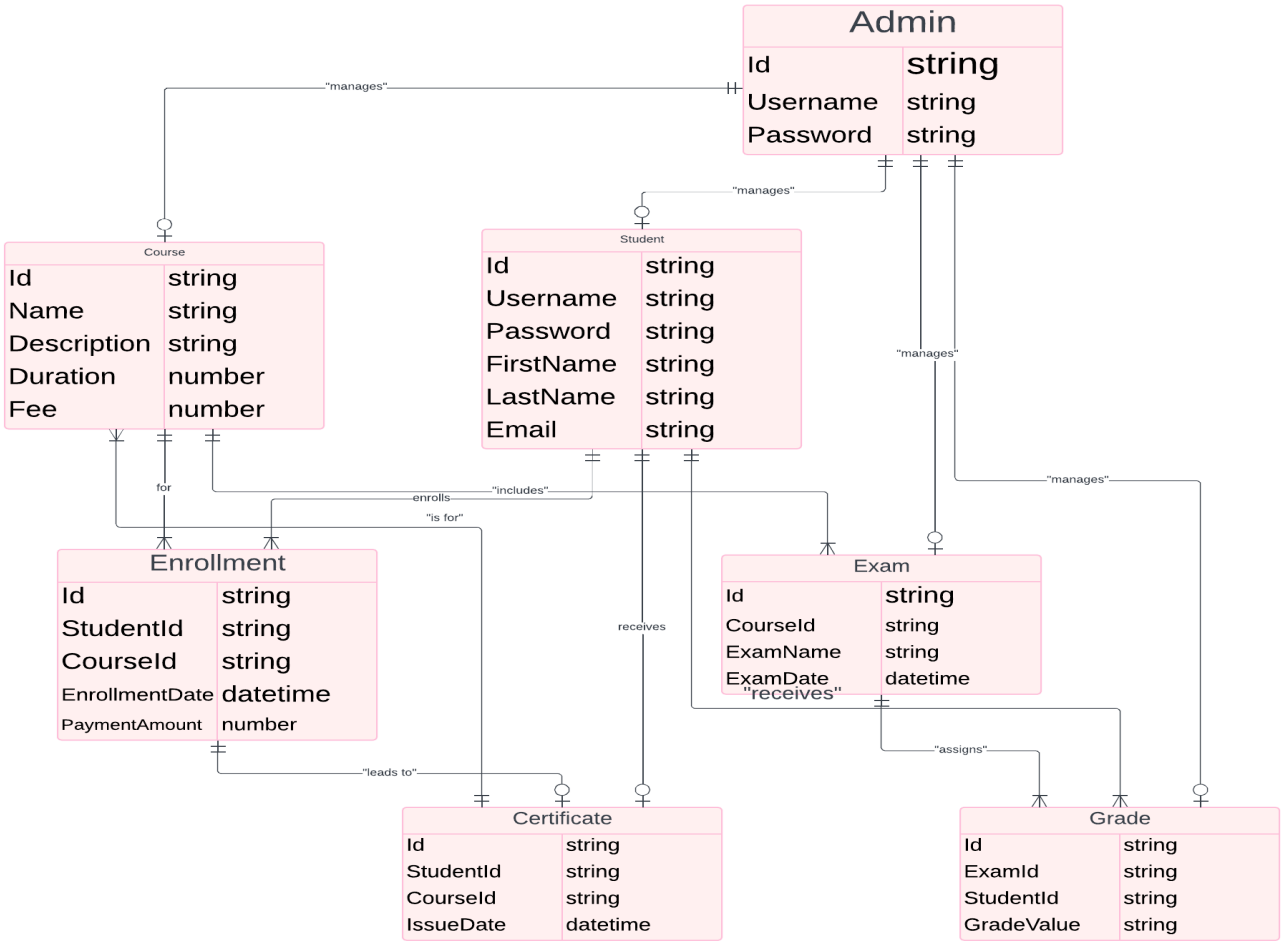


Figure 5 Database schema

Activities diagram

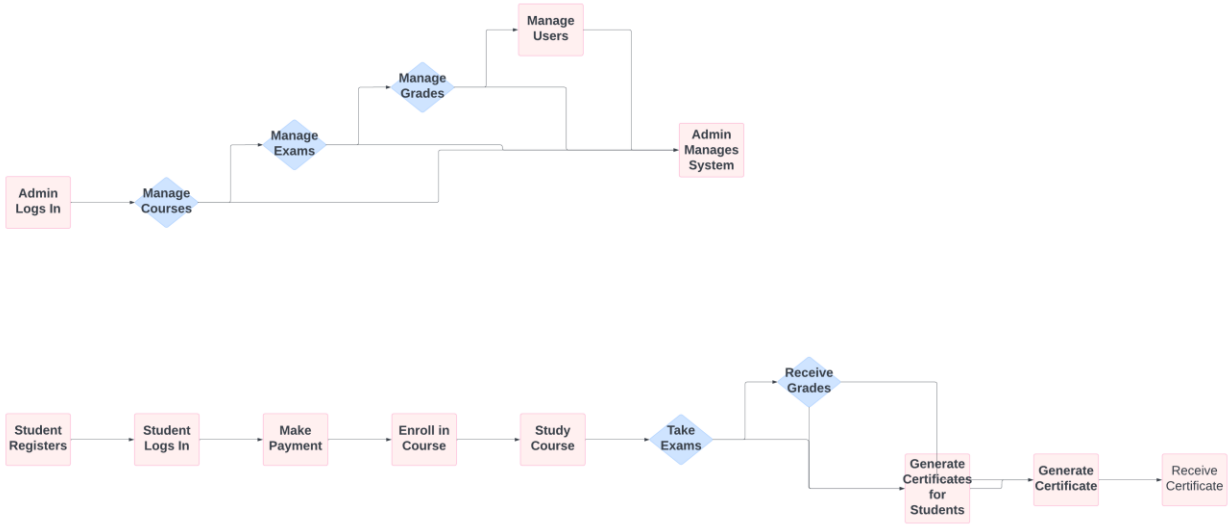


Figure 6 Activity diagram

Data definition

Data definition involves specifying the structure, types, and relationships of data within a database, ensuring consistency, integrity, and clarity for effective data management and retrieval.

1. User Table

Field	Type	Attributes
user_id	UUID	Primary Key
username	String	Unique, Required
email	String	Unique, Required
password_hash	String	Required
role	Enum	'student', 'teacher', 'admin', Required
created_at	Timestamp	Default: current_timestamp
updated_at	Timestamp	Default: current_timestamp

Table 3 7 User definition table

Field	Type	Attributes
course_id	UUID	Primary Key
title	String	Required
description	Text	
language	String	Required
teacher_id	UUID	Foreign Key -> User.user_id, Required
created_at	Timestamp	Default: current_timestamp
updated_at	Timestamp	Default: current_timestamp

Table 3 8 Course definition table

Field	Type	Attributes
quiz_id	UUID	Primary Key
course_id	UUID	Foreign Key -> Course.course_id, Required
title	String	Required
description	Text	
created_at	Timestamp	Default: current_timestamp
updated_at	Timestamp	Default: current_timestamp

Table 3 9 Quiz definition table

Field	Type	Attributes
question_id	UUID	Primary Key
quiz_id	UUID	Foreign Key -> Quiz.quiz_id, Required
question_text	Text	Required
question_type	Enum	'multiple_choice', 'true_false', 'short_answer', Required

Table 3 10 Question definition table

8. QuizAnswer Table

Field	Type	Attributes
answer_id	UUID	Primary Key
question_id	UUID	Foreign Key -> QuizQuestion.question_id, Required
answer_text	Text	Required
is_correct	Boolean	Required

Table 3 11 Answer definition table

System Architecture Design

Connected by lines that indicate the connections between the blocks, where the main parts or functions are shown.

The sample system architecture of the new application is depicted in the image below.

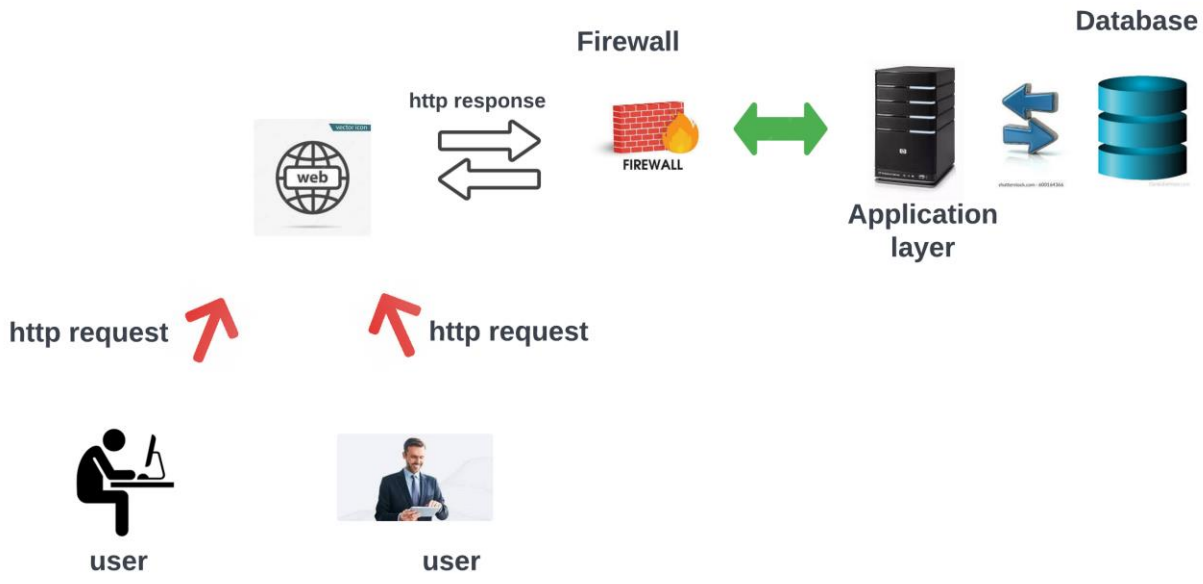


Figure 7 System architecture

CHAPTER FOUR

IMPREMENTATION OF THE NEW SYSTEM

Introduction

This chapter describes the development of "Quran Learn Hub". It includes a brief overview of the technologies used to make the application, operational, the presentation of screenshots for the new system, tests that have been applied. Last but not least, software and hardware compatibility requirements

Tools and technologies used

In order to create this web application (Quran Learn Hub), I used a variety of tools and technologies, including:

ReactsJS: React, often referred to as **React.js** or **ReactJS**, is a JavaScript library known for its flexibility and efficiency in creating interactive user interfaces (UIs) for both web and native applications. With its **component-based architecture**, developers can create UI elements like buttons or search bars, which can then be reused throughout an application. This not only streamlines the development process but also enhances maintainability.

PostgreSQL: is open-source object-relational database system

StarUML: aims to promote agile and clear modeling with a smart software modeler.

Visual Code Studio: is a code editor that has been redesigned and optimized for creating and fixing contemporary cloud and online apps

Golang: is a programming language by Google known for efficiency, simplicity, and concurrency support

Python: It is the third-most-starred project on GitHub, with more than 131,000 stars, behind only freeCodeCamp(almost 300,000 stars) and marginally behind Vue.js framework According to Alexa Rank, Bootstrap getbootstrap.com is in the top-2000 in US while vuejs.org is in top-7000 in US. (Kavanagh, 2021).

Presentation of the New System

The outcomes of the application of this system are shown in this section. These are the web pages or user interfaces that are produced as a result of running the programs. The screenshots in this section show the user interface:

Homepage

Welcome to Quran Learn Hub – a modern platform for accessible and engaging Quranic education. Explore our courses, connect with instructors, and join a community of learners.

Dashboard

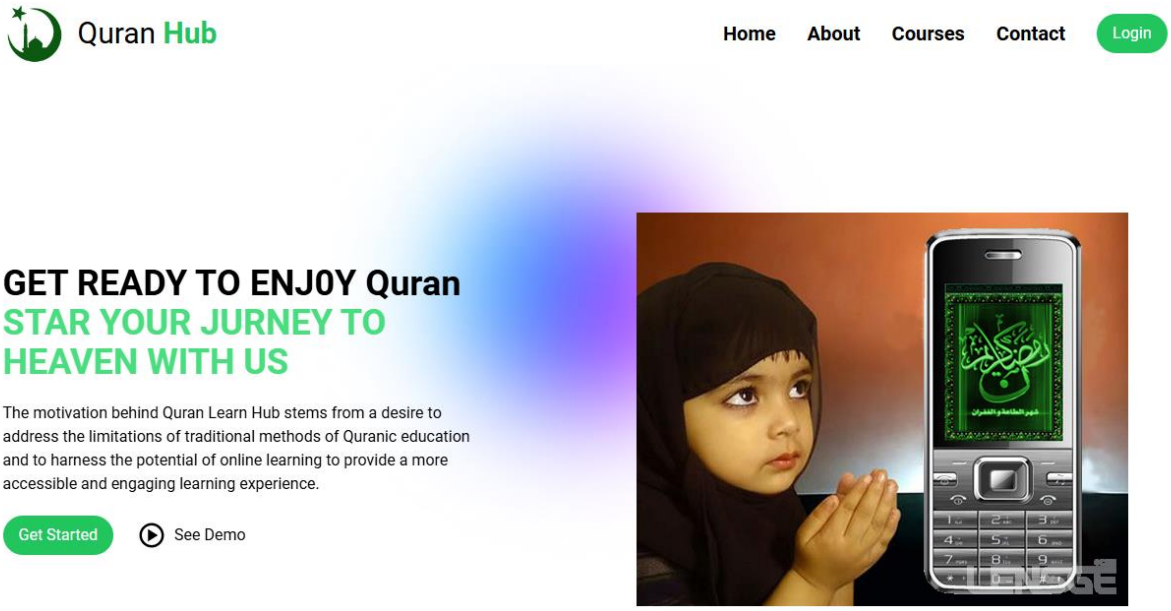


Figure 8 Homepage

Admin Dashboard

Manage Quran Learn Hub efficiently. Admins can oversee users, courses, exams, and certifications. Easily create, update, and monitor educational content and user activity.

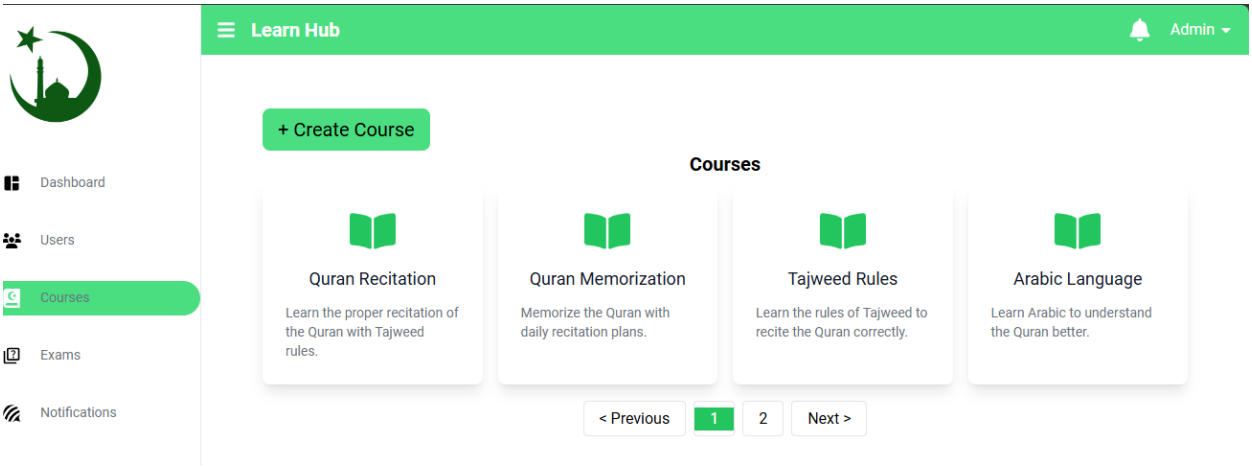


Figure 9 Admin Course Management

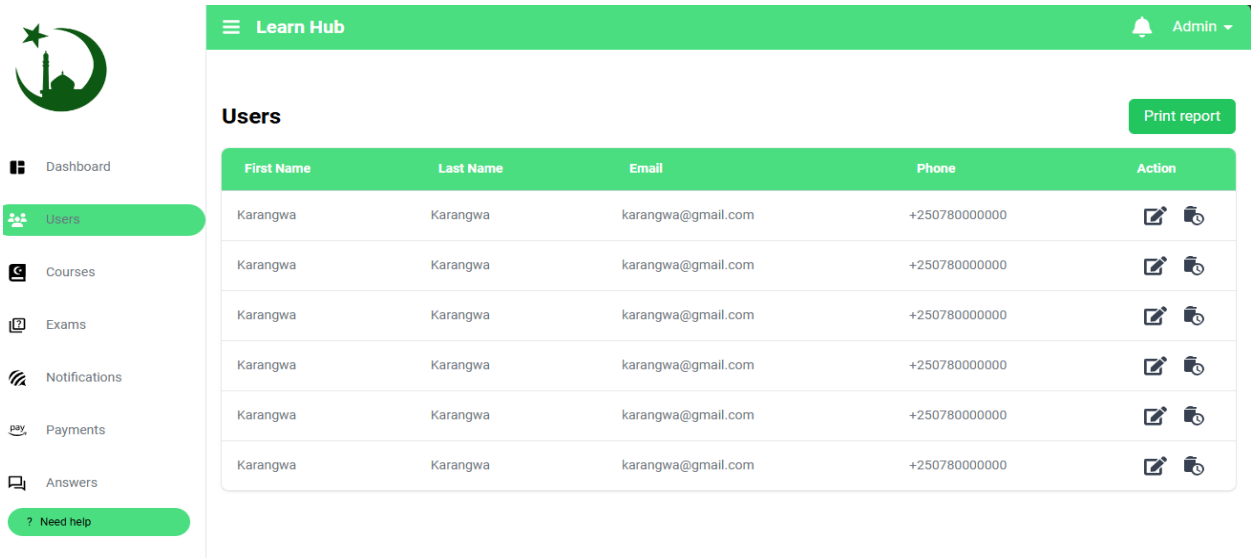


Figure 10 Users Management

Login

Log in to Quran Learn Hub to continue your studies, manage your courses, and connect with the community. Access your personalized dashboard and resources.

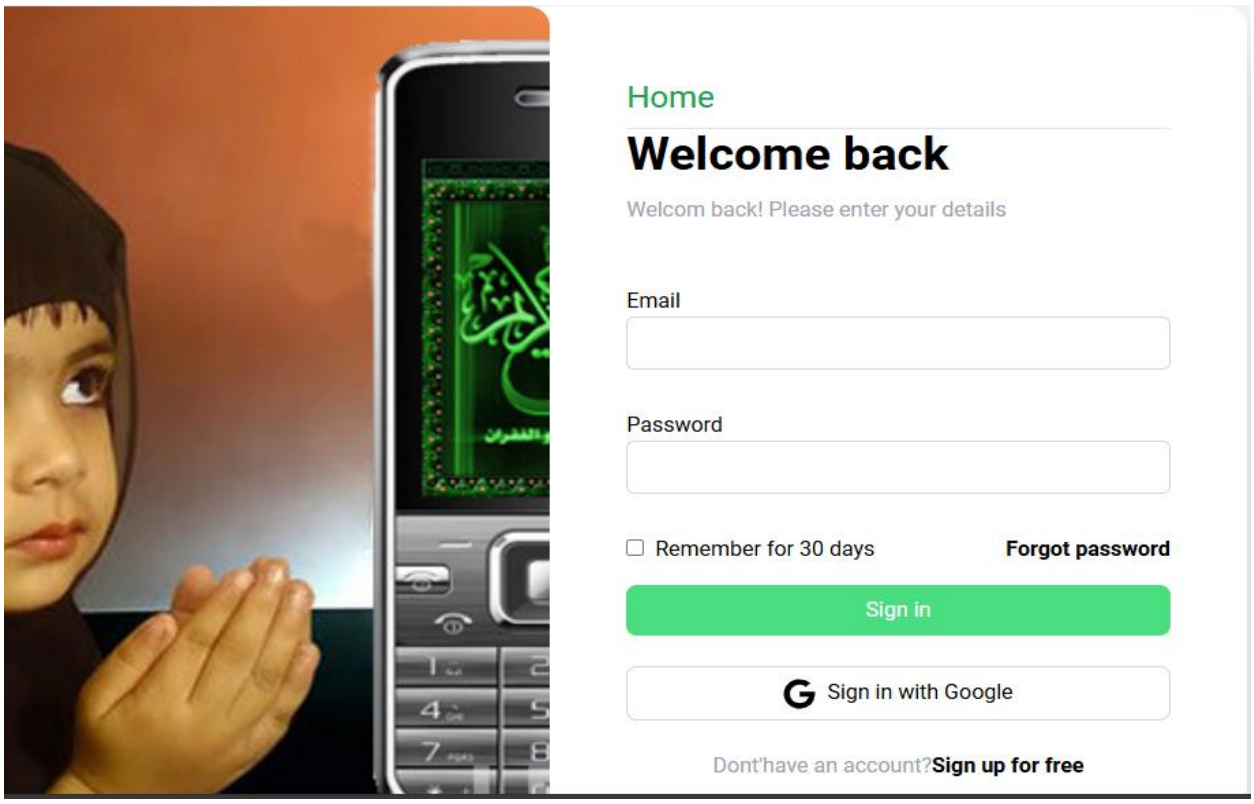


Figure 11 Login Page

Signup

Join Quran Learn Hub to start your Quranic learning journey. Create an account to access courses, track your progress, and receive personalized learning paths.

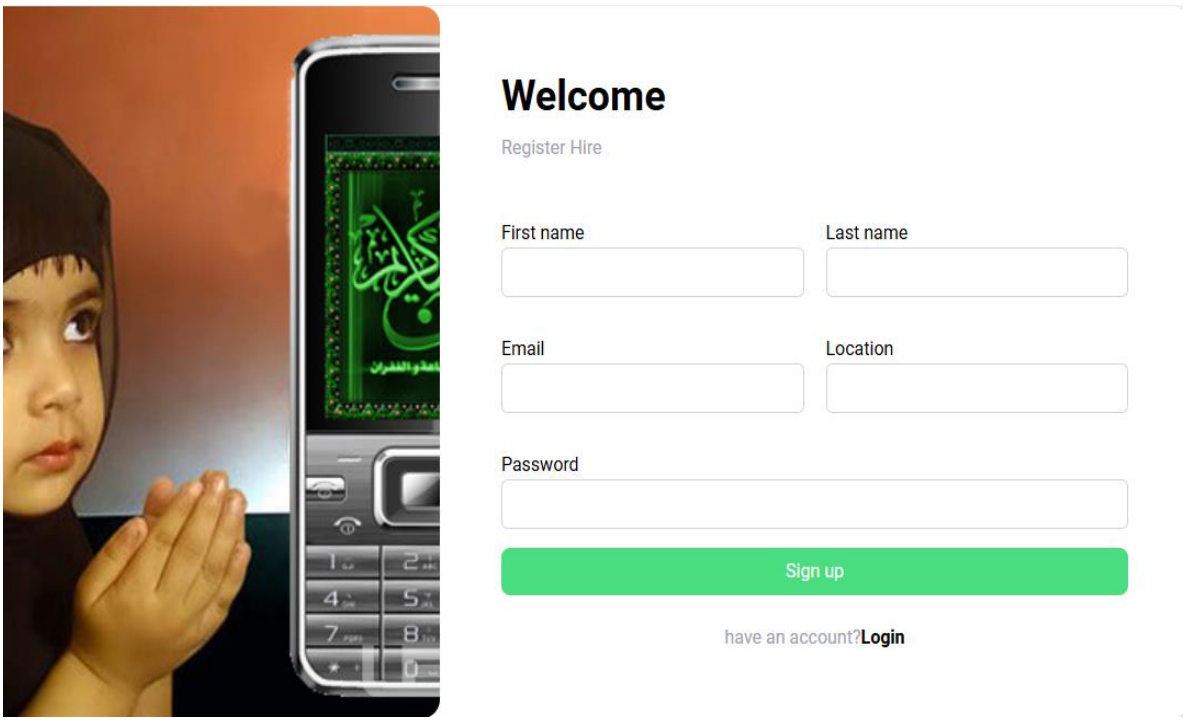


Figure 12 Registration Page

Software Testing

The design of software benefits from the use of software tests. They aid in determining whether the software genuinely accomplishes the task it was designed to tackle.

When undertaking software testing, it's vital to keep the following things in mind:

- Is the application compliant with the standards that guided its design and development?
- Is the application functioning as it should?
- Is it possible to implement the application in the same way and satisfy the needs of the stakeholders?

The following are some software testing:

The Unit Test: Unit testing is a technique for ensuring the correct operation of a particular piece of software or a program. It is a method of evaluating the acceptability for use of individual pieces of source code, sets of one or more computer program modules, related control data, usage processes, and operating procedures. In other words, every little component that can be assembled with the aim of verifying that each part is in accordance with its specifications and checking for logical errors Unit testing is a powerful tool that allows for the most thorough error detection. At every point where code has been created, a unit test has been run on the application.

The Integration test: is the stage of software testing where many software components are combined and tested together. This test is crucial for confirming the correct assembly of the software's numerous components. As more tests are run, the hardware and software components are gathered and tested, and eventually the full system is tested. The application modules were thoroughly tested one after another until they were finished to guarantee that the assembled software components met all of the necessary functional and technical requirements.

The Validation test: The software is validated in its external context during the final test step. To guarantee that it fully satisfies the requirements established in the beginning phase, the product has been tested in its final configuration. The validation test is essential to make sure that the setup of the application corresponds to the needs stated. For instance, the national ID must contain 16 digits, and the email address must conclude with gmail.com. The application was thoroughly tested, and it was during this process that we discovered that the operations' progress matched the functional requirements.

Hardware and Software compatibility requirements

Student-side requirements:

- A web browser (Google Chrome, Mozilla Firefox, Opera, Torch, etc.) ➢ Operating System (Windows 7, 8, 8.1 10; Linux, Mac OS).
- A RAM of 1024 Megabyte (minimum)
- A hard disk of 8 Gigabyte of free space

Server-side requirements:

- Operating System: Windows Server 2008 R2.
- Postgres;
- Network cark: 1GB/Second;
- RAM: 1GB minimum;
- 2GB or Freer hard disk space.

CHAPTER FIVE
CONCLUSION AND RECOMMENDATIONS

Conclusion

The main objective of this project is to develop and deploy a web application that allows users who desire to learn Quran to browse and register and learn online and after learning they get certificate.

To achieve this objective effectively, as illustrated in the preceding chapter's diagram, a practical solution was employed. Several methods, including observation, interviews, and documentation, were employed to pinpoint the shortcomings of the current Quran Learn Hub acquisition system.

After identifying the existing issues, UML analysis was carried out to determine the most suitable approach for crafting a new system using appropriate programming languages. A series of tests were performed to validate whether the newly developed system effectively addresses the problems of the previous system. The results of these tests were found to be positive.

Once fully established, this project will empower users to easily access a wide range of Quran Courses. The system will present a user-friendly interface that facilitates seamless interaction, and it will ensure the security and accessibility of Learning -related data.

Furthermore, this solution will also be advantageous to courses management. By establishing an online presence, these management will be more effectively. This initiative enhances operational efficiency and reduces the need for manual data entry.

To sum up, I can confidently affirm that the Quran Learn Hub has been successfully designed and implemented in alignment with the expectations outlined in the earlier sections.

Recommendation

I'd like to advise people to start using this system in place of the current method if they want to learn Quran and pay online everywhere in the world. They should research the benefits of this new system and learn how it works and what it does so that it can assist them in carrying out their tasks effectively and efficiently.

Future updates to the program will feature additional integration of different languages. To conclude this effort, I would want to encourage anyone who is interested to add other features to enhance my work.

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APPENDICES

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Kigali, RWANDA

SKILLS

- Front-End: React.js, Vue.js, JavaScript, HTML, CSS, Tailwind CSS, Docker
- Back-End: Laravel, Nodejs, Nestjs PHP, MySQL, PostgreSQL, MongoDB RESTful APIs, Golang, Java Programing, JavaScript, Postman, Python
- computer-skills: Ms-Office, computer maintenance,

CERTIFACTIONS

- Cybersecurity essential
- NDG-Linux essential
- Network essential

REFERENCE

- Shema Fred Managing Director at Quarks Group
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  shema01@gmail.com

- Niyobuhungiro Yves Software developer and team leader at KudiBooks

CURCURRUM VITAE

Experienced full-stack developer with a proven track record of developing and deploying web applications. Skilled in both front-end and back-end development, with expertise in technologies such as Laravel, React.js, Nestjs, NodeJs, Vue.js, Golang, Google-maps, Figma and more. Experienced in developing payment systems, ecommerce platforms, car rental applications, and other projects.

EDUCATION

Adventist University of Central Africa **2020-2024**

Bachelor of Information Technology, Majoring in Networks and Communication Systems

- Relevant Coursework: Includes extensive study in computer networking, programming languages Java. And web technologies, preparing for a career in IT support and development.

WORKING EXPERIENCE

Reactjs, Laravel, full-stack developer Empower Africa Now Ltd — Dec 2022- May 2024

- Developed and deployed multiple projects, including payment systems, ecommerce platforms, car rental applications, and others.

Reactjs frontend developer Quarks Group — Sep 2021 - Dec 2022

- Building and implementing user interfaces for web applications using React.js and related technologies.
- Creating reusable UI components that can be used across different parts of the application. Managing application state using tools like React's

React.js, Golang full-stack intern Ishema Hub Ltd — Jan 2011 - August

- Developing user interfaces for web applications using React.js.
- Implementing new features and functionalities based on project requirements.