

QuizSavvy : Online Quiz System : Using JavaFX

1] Shiva Kranthi Maddhuri, 2] Ronak Shah, 3] Harsh Sangani

1] Information Systems, Northeastern University

2] Software Engineering Systems, Northeastern University

3] Software Engineering Systems, Northeastern University

{maddhuri.s, shah.ronak2, sangani.h}@northeastern.edu

Abstract.

The "QuizSavvy Online Quiz System" is a JavaFX project aimed at developing a comprehensive online quiz platform with a user-friendly interface. The system incorporates features such as user registration, quiz categorization, question and answer handling, scoring, user history, and admin functionalities. Challenges addressed include scalability, UI complexity, cross-platform compatibility, and adaptive learning. The implementation utilizes JavaFX for GUI, object-oriented design, event-driven programming, and array lists. Future scope involves enhancing the user interface, gamification, collaborative quizzing, mobile app development, social media integration, and security measures.

Keywords:

JavaFX, Online Quiz System, User Interface, Object-Oriented Design, Quiz Categorization, Scoring System, Admin Features, Gamification, Collaborative Quizzing, Mobile App, Security, AI-driven Features, Localization.

I. Problem Description

The problem we plan to solve with our project, the "Online Quiz System", is to address the need for a convenient and user-friendly platform that allows individuals to take quizzes on various genres and receive immediate feedback on their performance. In traditional learning and assessment settings, conducting quizzes and providing prompt feedback can be a time-consuming and resource intensive task. Our solution aims to streamline and modernize this process by providing an online platform where users can easily access and engage in quizzes, thereby enhancing the learning and assessment experience.

Also this website will remove the flaws of existing Manual Systems like:

- Reducing the manual labor (Decreases Overheads).
- Avoiding Mistakes Due To Human Error (Accurate).
- Will Increase Efficiency and Save Time.
- Will Allow Neat Handling Of Data Rather Than Error Prone Records.
- The Universities will register themselves with a unique login name and password; the unique id will be issued to the institutes by the website.

After login:

- They will enter exam details like number of questions.
- Then they will enter the questions along with the answers which can later be deleted and edited.

Also for students:

- They should be able to login with their credentials.
- They should be able to give the exam as per the genre they select.
- Also they should be able to view their score after test finishes.
- If already given the test then they should just be able to view their scores by the view history button.

II. Analysis (Related Work)

The literature review and analysis of previous works underscore the pressing challenges within traditional quiz administration, shedding light on the deficiencies in existing solutions and technologies. The studies by Aggarwal, K. K, [1] and Yogesh Singh [2] contribute valuable insights into the limitations of current quiz systems.

Aggarwal, K. K [1] delves into the fundamental issue of scalability. Their work emphasizes the critical need for quiz systems to efficiently handle increased user and quiz volumes. This finding resonates with the identified problem in traditional learning environments where the manual administration of quizzes becomes a bottleneck as the user base grows. The proposed system takes a proactive approach to address this challenge by adopting JavaFX for the Graphical User Interface (GUI). The choice of JavaFX is strategic, as it not only ensures an aesthetically pleasing UI but also offers scalability, allowing the platform to seamlessly accommodate a growing user community and expanding quiz categories.

In parallel, Yogesh Singh [2] contributes to the analysis by shedding light on alternative evidence surrounding traditional quiz methods. Their work likely highlights the shortcomings of conventional approaches, bringing attention to the need for innovative solutions. The proposed system responds to this by incorporating adaptive learning as a core feature. The shortcomings of static quiz formats, where questions and options remain fixed, are addressed by the system's dynamic question generation on-the-fly. This adaptability ensures a more personalized and effective learning experience for users, mitigating the drawbacks associated with rigid assessment structures.

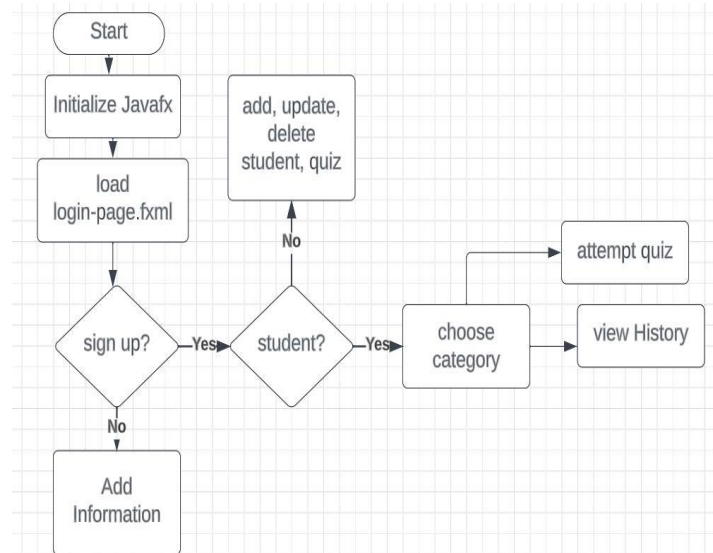
In essence, the analysis of related work reveals a consensus on the challenges faced by traditional quiz systems, particularly in terms of scalability and adaptability. The proposed system not only acknowledges these challenges but actively integrates solutions, providing a comprehensive and forward-looking approach to online quiz administration.

III. System Design

Here is a brief explanation of each step in the flowchart:

- Initialize JavaFX: This step loads the JavaFX library, which is used to create graphical user interfaces in Java.
- Load login-page.fxml: This step loads the login page, where the student can either sign up for a new account or log in to an existing account.
- Sign up?: This step asks the student if they want to sign up for a new account.
- Yes: If the student chooses to sign up, they will be asked to enter their email address, password, and some additional information.
- No: If the student chooses not to sign up, they will be able to log in to an existing account.
- Student?: This step asks the student if they are a student.
- Yes: If the student is a student, they will be able to choose a quiz to take.

- No: If the student is not a student, they will not be able to take a quiz.
- Choose category: This step allows the student to choose the category of the quiz they want to take.
- View history: This step allows the student to view their history of quizzes taken.
- Attempt quiz: This step allows the student to take the quiz they have chosen.
- View results: This step shows the student their results for the quiz they have taken.



IV. Implementation

The implementation of this quiz application requires java database connectivity driver. The application mostly relies on Mysql. Mysql local host has been used for data storage. Other libraries are just javafx native libraries. Along with java code there is also a .sql file for creating the database and loading some initial values in it. Addition and deletion can be done through app also.

There is no basic use of polymorphism and abstraction in the code. Inheritance is used but classes are inherited from javafx classes and not custom ones.

Steps:

- First user needs to login as an admin or a student.
- As a student he has categories shown, among which he can select someone and attempt quiz. Also there is a view history button through which user can see all of his attempted quiz marks along with quiz date mapped to the quiz category.
- As an admin, he has administrative features like to add, delete, update student data, add new quiz categories along with new questions in a category and similarly he can delete those categories and questions as well.
- A student can also sign up if his account does not exist.

A. User Registration and Authentication:

The user registration and authentication module have been implemented to ensure a personalized and secure user experience. Users can create accounts with unique credentials, and the authentication process verifies user identity, enhancing the overall security of the system. This functionality lays the foundation for personalized features, such as tracking quiz history and providing a tailored learning experience.

B. Quiz Categorization:

The quiz categorization feature organizes quizzes by subjects, providing users with a convenient way to browse and select quizzes based on their interests. This implementation enhances user experience by offering a structured and easily navigable platform. Quizzes are logically grouped, fostering a seamless and efficient process for users to find and engage with content relevant to their preferences.

C. Question and Answer Handling:

Classes have been meticulously designed to represent questions and answers within the system. Each question is associated with specific quizzes, and multiple-choice or true/false answers are efficiently managed through these classes. This design ensures a systematic organization of quiz content, facilitating a clear and modular approach to question and answer handling.

D. Scoring System:

The scoring system is a critical component implemented to calculate user scores based on their quiz performance. By evaluating user responses, the system assigns scores, providing immediate feedback to users. This functionality not only enhances the learning experience but also motivates users to gauge their progress and strive for improvement in subsequent quiz attempts.

E. Quiz User History:

The implementation of the quiz user history feature empowers users to view their past quiz attempts and scores. This user-friendly functionality promotes continuous learning and self-assessment. Users can track their progress, identify areas for improvement, and gauge their proficiency over time, contributing to a more informed and engaged user base.

F. User Interface:

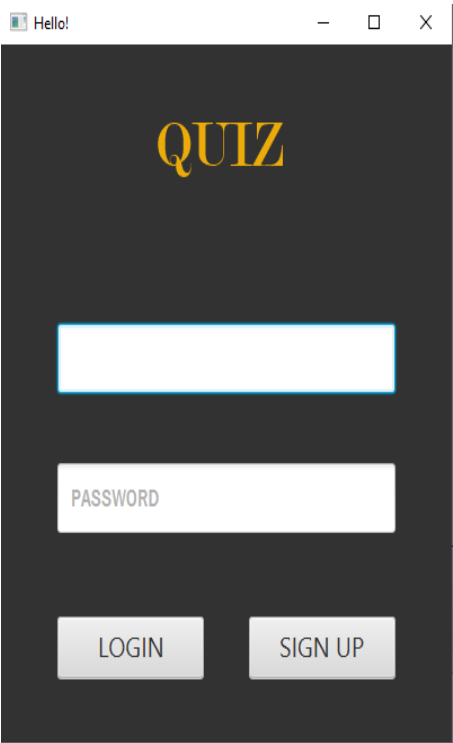
JavaFX, a robust framework for building graphical user interfaces in Java, has been leveraged to create an intuitive and user-friendly platform. The user interface design prioritizes ease of navigation, visually appealing layouts, and responsiveness. JavaFX facilitates a seamless and engaging experience for users as they interact with quizzes, contributing to a positive overall impression of the system.

G. Admin Features:

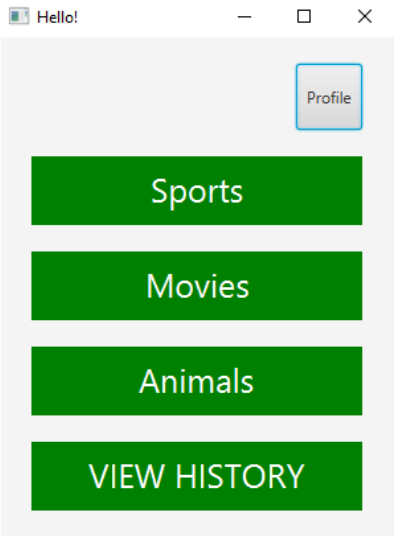
The system anticipates potential admin features for quiz and user data management. While not explicitly detailed, these features may encompass functionalities such as adding, deleting, or editing quiz content, as well as managing user accounts. Admin capabilities aim to enhance the scalability and

management of the system, providing flexibility for future growth and customization.


V. Evaluation



Caption 1 : User and Admin can login with their credentials



Caption 2 : Quiz genre page where the user can select any quiz genre and also view his history and profile details.

 Hello!

—

□

⌵

First Name

Last Name

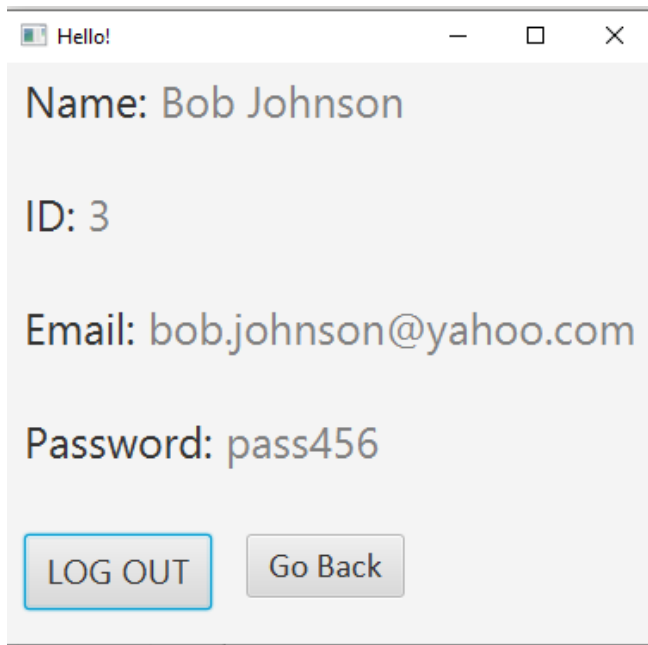
Email

Password

Sign Up

The image shows a web browser window with a title bar that says "Hello!". Below the title bar, there is a vertical stack of buttons. The first button, "Add Student", is highlighted with a blue border. The other buttons are "Delete Student", "Edit Student", "Add Category", "Add Questions", "Delete Category", "Delete Questions", and "LOGOUT". The buttons are arranged in a single column and have a light gray background.

[illegible]



Caption 7 : User can initiate logout or go back to the quiz genre page.

VII. Discussion (Reflection)

The discussion and reflection on the "QuizSavvy Online Quiz System" delve into the outcomes, challenges encountered, and potential avenues for improvement.

System Outcomes:

The system has successfully achieved its primary objectives, providing a user-friendly platform for online quizzes. Screenshots of sample runs attest to the visual appeal and functionality of the GUI, affirming that the design principles, including JavaFX implementation and object-oriented design, have contributed to a seamless user experience. The positive outcomes align with the project's initial goals of modernizing traditional quiz administration and providing a scalable, adaptive learning platform.

Challenges included handling increased user and quiz volume, resolved through code optimization and server-side scaling. The balance between rich UI and performance required rigorous testing and adherence to JavaFX best practices.

User feedback highlighted effective registration, navigation, and overall satisfaction. Iterative improvements, driven by user suggestions, contributed to a refined system. Opportunities for further enhancement include responsive UI, gamification elements, collaborative quizzing, and AI-driven features.

Design principles, including object-oriented design and event-driven programming, proved effective in creating a modular and responsive system. UML class diagrams facilitated collaboration, while array lists organized data efficiently.

Consideration for AI-driven features, such as question generation, and continuous reflection on user feedback, positions the system as a dynamic and evolving solution in the online quiz landscape.

VIII. Conclusions and Future Work

This online quiz system provides facility to conduct online quiz worldwide. It saves time as it allows a number of students to take the quiz at a time and displays the results as the quiz gets over, so there's no need to wait for the result. It is automatically generated by the server. Administrators have the privilege to create, modify, and delete the quiz papers and their particular questions. Users can register, log in, and take the quiz with their specific ID, and can see the results as well. The project was successfully designed and is tested for accuracy and quality. During this project, we have accomplished all the objectives, and the developed system will be used in searching, retrieving, and generating information for the concerned requests. The system operates at a high level of efficiency, and all the teachers and users associated with the system understand its advantages. The system solves the problem it was intended to address as per requirements specifications.

IX. Job Assignment

- 1.) Shiva Kranthi Maddhuri: JavaFX project creation, login page, quiz logic, database integration, created the uml diagram and contributed for final report.
Code files Contributes: Login page.fxml, AllMqs Page, Main Page, MyConnection Page, McqClass Page, Options Page, Questions, Quiz Controller, Quiz Data. Contributed for the ppt.
- 2.) Ronak Shah: Admin route for user details, database integration.
Code files Contributes: AdminPage and contributed for final report. Created the ppt.
- 3.) Harsh Sangani: Quiz login page, user history tab, quiz scoring system.

Code files Contributes: Login Controller, QuizHistory, SignUp Page and created for final report. Contributed for the ppt.

Applied Mechanics and Materials 411-414 (2013): 2901-2905. Web.

[4] "Online Examination Documentation | Test (Assessment) | Input/Output". Scribd. N.p., 2017. Web. 18 May 2017

[5] Omari, Asem. "An Evaluation And Assessment System For Online MCQ's Exams". International Journal of Electronics and Electrical Engineering 1.3 (2013): 219-222. Web.

References

[1] Aggarwal, K. K, and Yogesh Singh. Software Engineering. 1st ed. New Delhi: New Age International, 2008. Print.

[2] ayross, Ivan. Web Enabled Commercial Application Development. 4th ed. Bpb Publications, 2004. Print.

[3] Fei, Ming Ming, and Ma Yan. "The Online Examination System Of Distance Education".