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Online Examination System with Timer & Leaderboard

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ABSTRACT

In the digital era, traditional paper-based examinations are gradually being replaced by online examination platforms that offer greater flexibility, security, and efficiency. This project focuses on developing an Online Examination System with Timer and Leaderboard to ensure fairness and enhance student engagement. The main objective is to provide a secure and transparent examination process where exams are automatically submitted when the timer ends, and participants can view real-time rankings. The system uses Flask (Python) for the backend, MongoDB for database management, and HTML, CSS, and JavaScript for the frontend interface. The proposed solution reduces manual work, maintains exam integrity, and motivates learners through a competitive environment.

Keywords: Online Examination, Timer, Leaderboard, Flask, MongoDB, E-learning and Web application.

INTRODUCTION

Traditional paper-based exams have given way to online testing systems that provide efficiency, scalability, and flexibility in the digital age. A web-based framework called the Online Examination System with Timer and Leaderboard was created to safely administer text-based and objective assessments online. With the help of this system, students can sign up, log in, and take tests within a predetermined window of time. Once the timer goes off, submissions are automatically managed. By ranking participants according to their scores and submission times, the incorporation of a leaderboard offers a transparent and competitive perspective of

their performance. Constructed with Flask (Python) for backend functionality, MongoDB for data storage, and responsive HTML/CSS/JavaScript for the front-end interface, the system gives students an easy-to-use interface while streamlining test creation, administration, and evaluation for HODs. Secure authentication for administrators and students is one of the main advantages. Textual tests with manual evaluation and objective tests with automatic grading. To guarantee fairness, submissions are made automatically using a timer. Dynamic leaderboards that are sorted by time and score. This system's accuracy, real-time feedback, and lower administrative overhead help to close the gap between traditional exams and contemporary digital requirements.

LITERATURE REVIEW

In recent years, many studies have focused on improving student engagement and fairness in online examinations. According to several studies, leaderboards foster a sense of rivalry among students, which boosts their motivation and engagement (Domínguez et al., 2013; Hanus & Fox, 2015). According to a different set of studies, timed tests provide fairness in digital evaluations by ensuring that each participant has the same amount of time and

reducing the possibility of malpractice (Bennett, 2015; Clariana & Wallace, 2002). Similarly, by providing immediate feedback and a controlled testing environment, real-time systems have been shown to enhance focus and learning results (Saqr et al., 2020). Additionally, studies have demonstrated that incorporating gamification aspects like ranking elements, badges, and prizes improves students' motivation and long-term memory retention (Dicheva et al., 2015; Hamari et al., 2014). In order to ensure fair evaluation and engagement, the system integrates time-based submission and ranking features.

RELATED WORK

In this project, Flask (Python) is used for backend development in this project because of its lightweight design, deployment simplicity, and effective handling of web requests. It manages user identification, exam logic, and real-time data processing while enabling smooth client-server communication. A responsive and user-friendly user interface that is accessible on a variety of devices and browsers is created using HTML, CSS, and JavaScript. Flexible document-based storage is provided by MongoDB, which allows for scalability and fast retrieval for

huge student and exam populations. To ensure participant fairness, a server-controlled timer is incorporated to automatically submit responses when the designated time has passed. In addition, points and rankings are continuously updated on a real-time leaderboard, which encourages healthy rivalry among users.

EXISTING METHOD

While digital assessments are the main emphasis of the current online exam systems, real-time monitoring and competitive elements are not included. Traditional technologies like PHP and MySQL, which manage questions and generate results but do not facilitate real-time data synchronisation, are used in the development of the majority of these systems. Timers in these systems are frequently client-side, which leaves them open to manipulation or user time differences. Additionally, a lot of these sites need manual submission, which may provide some users unfair benefits if they take longer than permitted. All things considered, current systems digitise exams effectively, but they fall short in terms of scalability, real-time interaction, and fairness. These drawbacks underscore the need for a more sophisticated platform that upholds stringent time constraints, offers

real-time rating updates, and improves the user experience in general—a need that the suggested solution fills.

PROPOSED METHOD

To improve fairness and participation during tests, the suggested approach focusses on creating an effective online testing platform that has a dynamic scoreboard and synchronised timer. The system uses a client-server architecture, with the server handling authentication, question delivery, and result calculation while users access tests via a web interface. Every participant has the same amount of time thanks to a countdown timer that is managed by the server and that, when it expires, initiates automatic submission. Rankings based on scores and completion time are shown on the leaderboard, which is updated in real time via event-driven communication. To preserve data integrity and stop unwanted access, the system uses encryption methods, database indexing, and secure APIs. Even when several users are contributing at once, this method guarantees scalability, transparency, and seamless operation.

SYSTEM ARCHITECTURE

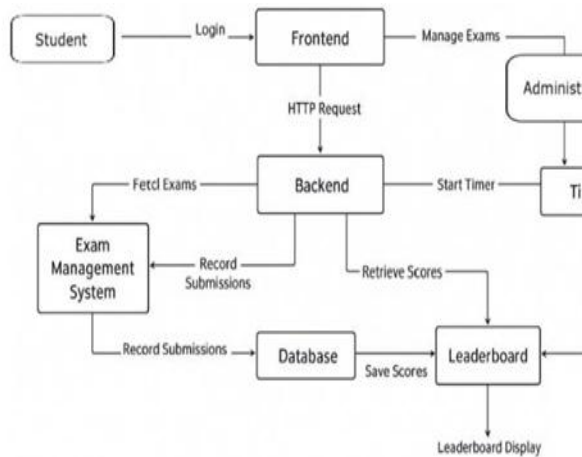


Fig1: Architecture of Online Examination System with Timer and Leaderboard

METHODOLOGY

Student: Registers on the platform, participates in assigned examinations, and submits responses within the specified time limit.

Frontend: Serves as the interactive layer that allows both students and administrators to seamlessly access and operate various system features.

Administrator: Responsible for creating, scheduling, and supervising exams while tracking student participation and performance.

Timer: Manages the countdown for each test, ensuring synchronization and automatic submission once the allotted duration expires.

Backend: Acts as the central processing unit that manages all system operations, executes exam-related logic, and facilitates smooth data communication among modules.

Exam Management System: Organizes the complete examination workflow, including question setup, scheduling, and collection of student submissions.

Database: Securely stores essential data such as user credentials, exam details, results, and leaderboard statistics for quick retrieval and reliability.

Leaderboard: Dynamically updates and displays student rankings and scores, providing real-time insight into performance and competition.

RESULTS AND DISCUSSION

Homepage: Shows the navigation menu, a welcome message, and choices for registering or logging in.

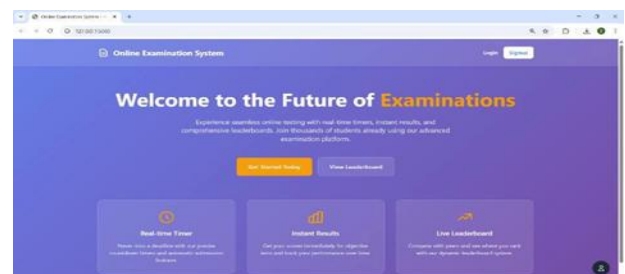


Fig 2. Homepage

Admin Login: A safe login process that requires a username and password for the

administrator or Head of Department (HOD).

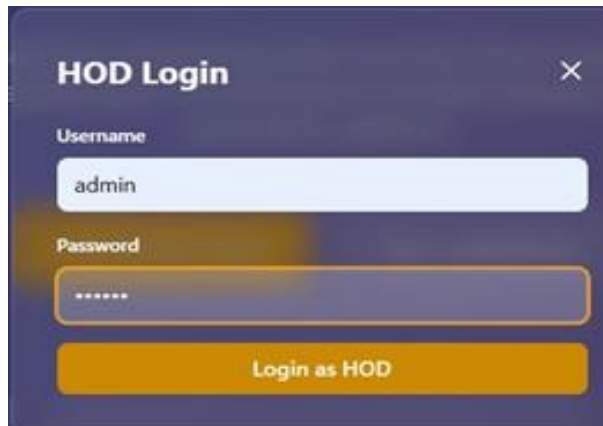


Fig 3. Admin Login

Admin Dashboard: Shows the user profile, available tests, and navigation links in an organised manner. Additionally, it gives a summary of all students, submissions, and assessments that are still pending.

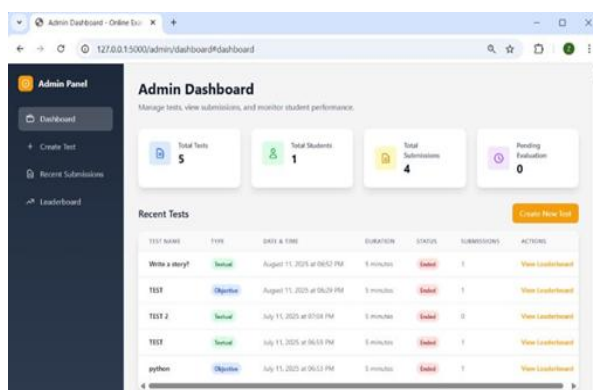


Fig 4. Admin Dashboard

Student Login: New users fill out a form with their name, email address, and password to create an account.

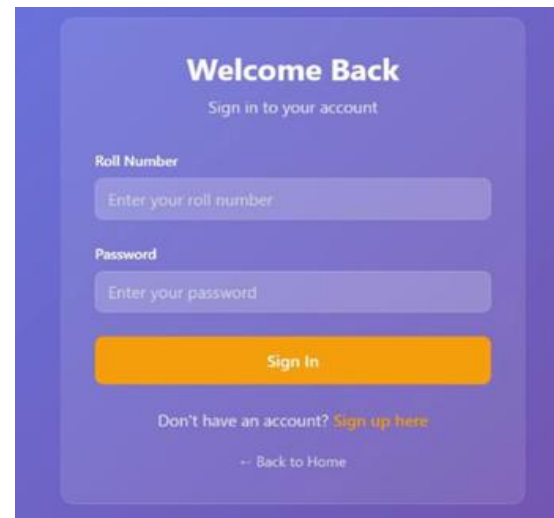


Fig 5. Student Login

Student Dashboard: A customised interface where students can see their performance data overall, recent submissions, and upcoming assessments.

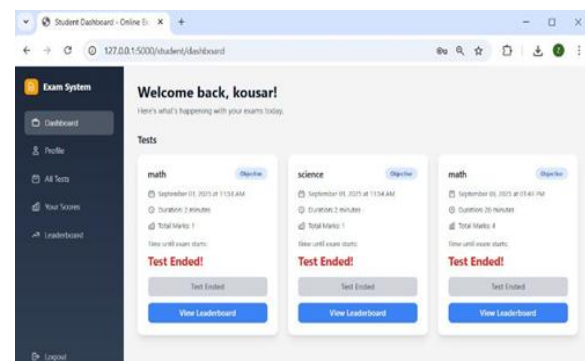
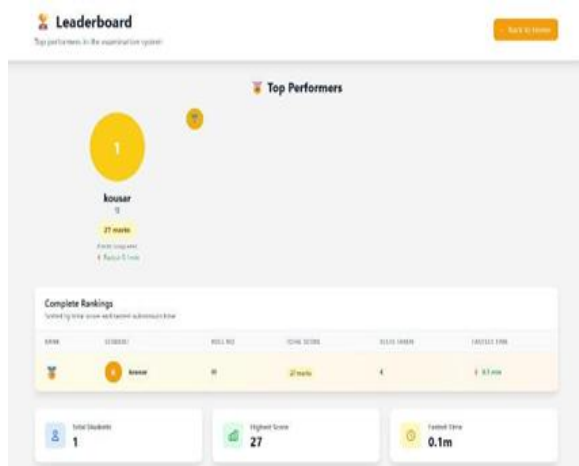


Fig 6. Student Dashboard

Leaderboard: shows participant rankings, scores, and usernames in a comprehensive table for all students as well as a podium view for the top three performers. It is dynamically updated upon each contribution.

**Fig 7. Leaderboard**

CONCLUSION

The Online Examination System with Timer and Leaderboard offers a secure, efficient, and fully digital platform for managing examinations while ensuring fairness and transparency. With features like automated timing, real-time leaderboards, and an intuitive interface, it streamlines the assessment process and reduces manual effort. The system effectively leverages modern web technologies to handle large-scale exams with reliability and accuracy. Looking ahead, it can be enhanced with AI-based proctoring for monitoring, adaptive question generation, and multilingual support.

FUTURE SCOPE

Future updates may also include a dedicated mobile app, real-time analytics

dashboards, and stronger security through two-factor authentication and encrypted data handling, making the platform more accessible, scalable, and intelligent.

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