

Web-Based Online Code Compiler for Internal Hackathons and Student Evaluation

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Abstract—A web-based code compiler enables real-time coding, execution, and evaluation for internal hackathons and student projects. It supports multiple languages, auto-grading, and secure isolation to handle competitions efficiently. This approach reduces setup time and ensures fair assessments.

Keywords—compiler, coding, hackathon, evaluation, web-based

I. INTRODUCTION

Programming skills have become an essential requirement for students in computer science and related fields. Educational institutions and organizations frequently conduct coding competitions, hackathons, and programming assessments to evaluate students' problem-solving abilities. Traditionally, these activities require participants to install compilers and development environments on their local systems, which may lead to issues such as software compatibility problems, configuration errors, and time-consuming setup processes. These challenges can affect the smooth execution of internal hackathons and student evaluation processes.

To overcome these limitations, this study proposes a Web-Based Online Code Compiler for Internal Hackathons and Student Evaluation. The proposed system aims to provide a centralized and user-friendly platform where students can write, compile, execute and submit code in multiple programming languages while allowing faculty or admins to efficiently monitor submissions and scores and evaluate student performance. By integrating a browser-based coding interface with server-side compilation, the system intends to improve accessibility, reduce setup complexity, and support fair and efficient programming assessments within academic environments.

II. LITERATURE REVIEW

Several studies have explored the use of web-based programming environments and online code editors to improve coding practice and accessibility. These platforms allow users to write, compile, and execute programs directly through a web browser without installing software.

Park et al. (2025) developed CodeDive, a web-based IDE that monitors students' coding activities in real time. The system helps instructors track programming progress but mainly focuses on learning analytics instead of hackathon management or automated result generation. [1]

Dalimunthe et al. (2023) proposed an online compiler-based programming training system that allows users to write and run code through a web browser, removing the need for local installation. However, the system mainly focuses on programming practice rather than hackathon organization or automated evaluation. [2]

Verma and Bahad (2023) proposed a real-time collaborative web code editor that allows multiple users to work on the same code simultaneously using technologies like WebSocket. However, the system mainly focuses on collaboration rather than coding event management or evaluation. [3]

Pande et al. (2023) designed a cloud-based compiler web application that supports languages such as C, C++, and Python and allows code execution through a browser. However, the system does not provide features for hackathon management or automated assessment. [4]

Raj, Deep, and Chopra (2023) reviewed various online live code editors and analyzed their features and technologies. Their study highlights advantages of web-based coding platforms but does not provide a dedicated system for hackathons or student evaluation. [5]

III. METHODOLOGY

A. System Design

This study presents the design and development of a web-based online code compiler system for conducting internal hackathons and student coding evaluations in colleges. The system enables students or users to write, compile, execute and submit programs directly through a web browser while allowing faculty members to manage coding events, monitor submissions, and finalize results. For internal hackathons, students can see the problem statement in the problem statement section which will be provided by the host and host can generate certificates for students. The methodology explains the development process so that other researchers or developers can understand and evaluate the effectiveness of the proposed system.

B. System Architecture

The system follows a system design and implementation approach. It consists of modules such as user registration, problem statement display, an online code editor, code compilation, submission management, result finalization and certificate generation. The main users of the system are

students and faculty members, where students participate in coding activities and faculty members manage hackathons or coding evaluations.

manage results. This approach reduces manual effort, which is often time-consuming for faculty members and hackathon judges.

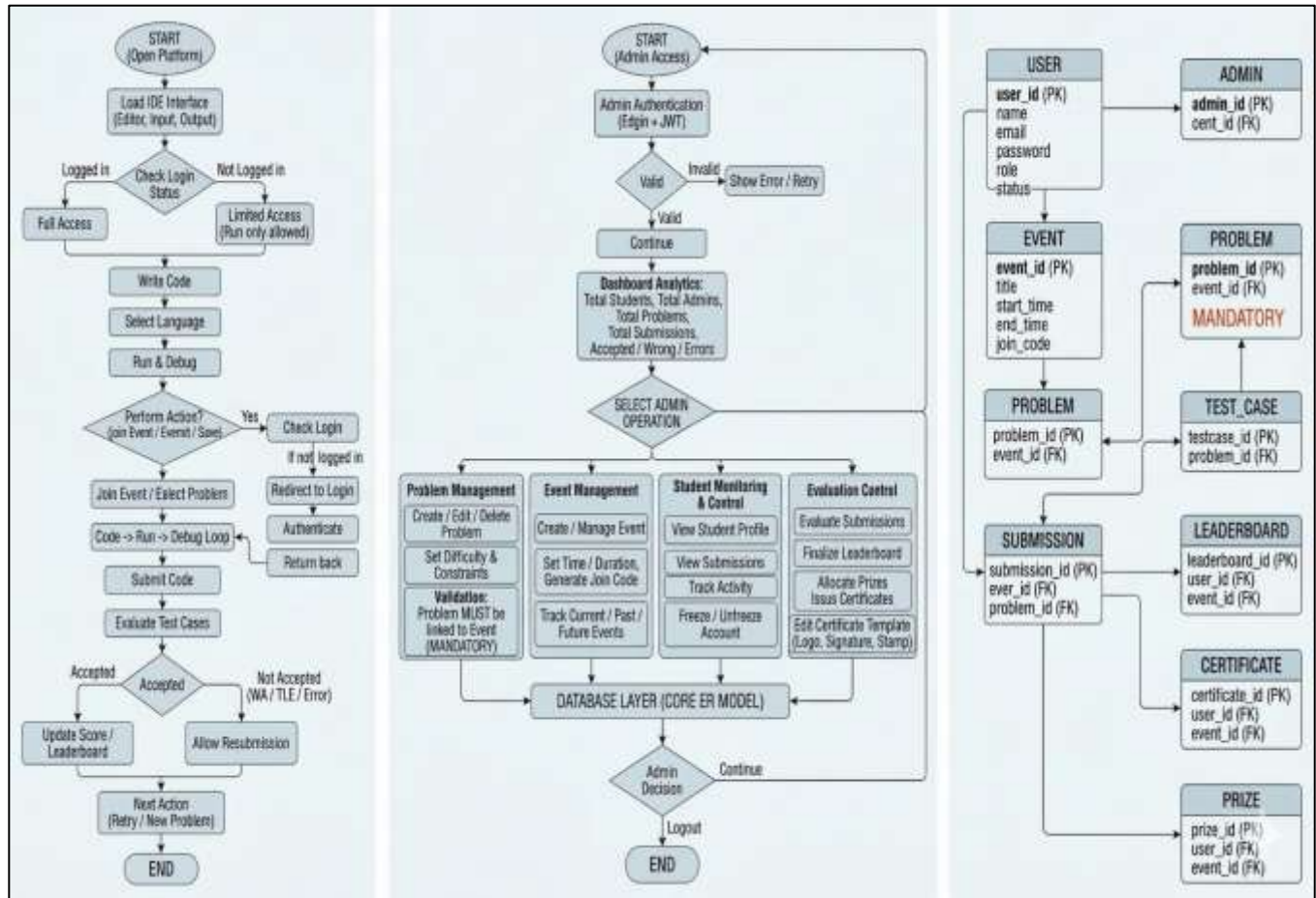


Fig. 1. Student Flow

Fig. 2. Admin Flow

Fig. 3. Entity-Relationship Diagram

C. Implementation

The system is developed using HTML, CSS, JavaScript and MERN stack for the frontend interface, while a backend server and database handle user information, coding problems, and submission records. Users log into the system, access coding problems, write and execute programs in the online editor, and submit their solutions. The backend server processes the code using a compiler or execution environment and returns the output to the user

D. System Evaluation

The system is evaluated by testing code execution, submission management, result finalization and certificate generation to ensure efficient operation for internal hackathons and student evaluations. The clearly defined design, tools, and procedures make the system reproducible and allow other developers or researchers to implement a similar platform.

IV. RESULT

Web-based online code compilers have gained significant adoption for various tasks such as coding during hackathons, student evaluation, result finalization, certificate generation, and monitoring student performance. These systems allow students to write, compile, and execute code directly through a web browser without requiring local installations, while faculty or organizers can efficiently monitor progress and

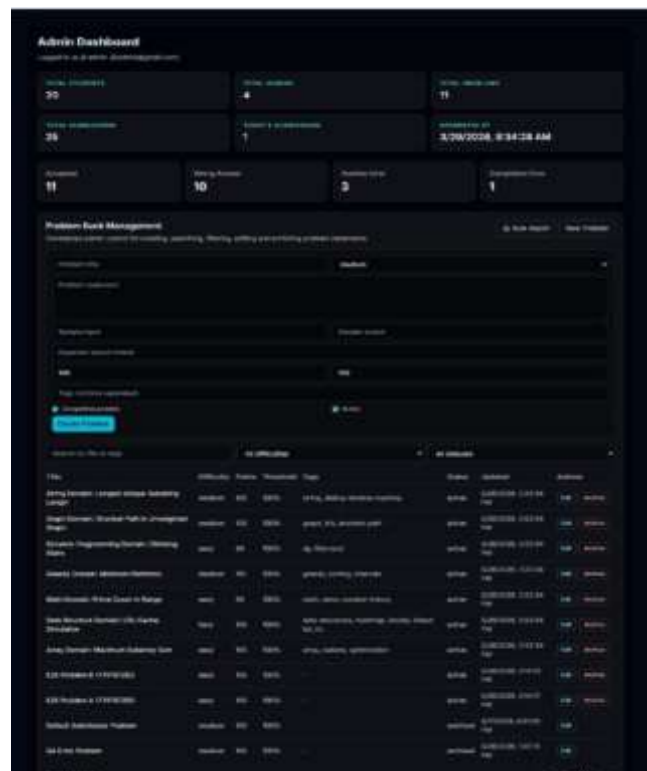


Figure 1. Administrative Interface for Managing Programming Problems and Submissions

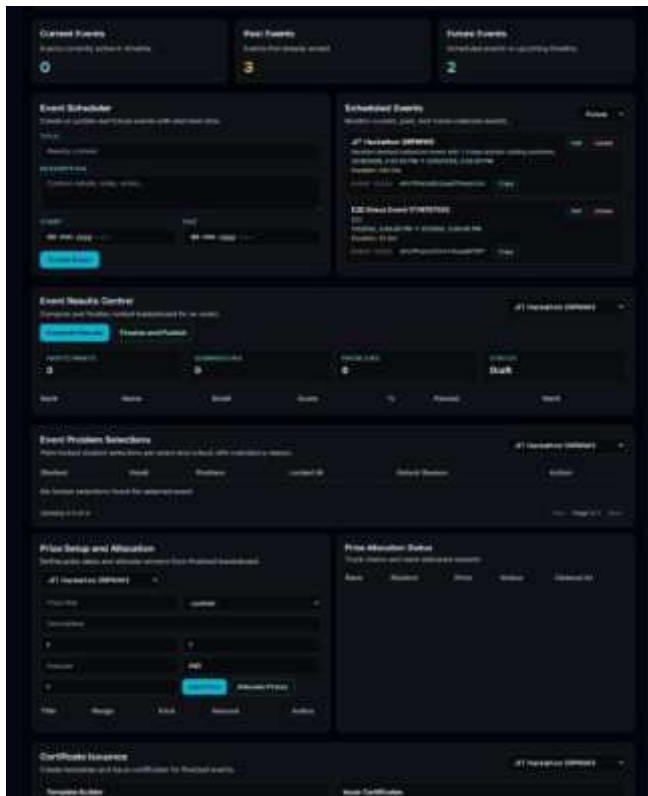


Figure 2. Admin Dashboard for Event Management

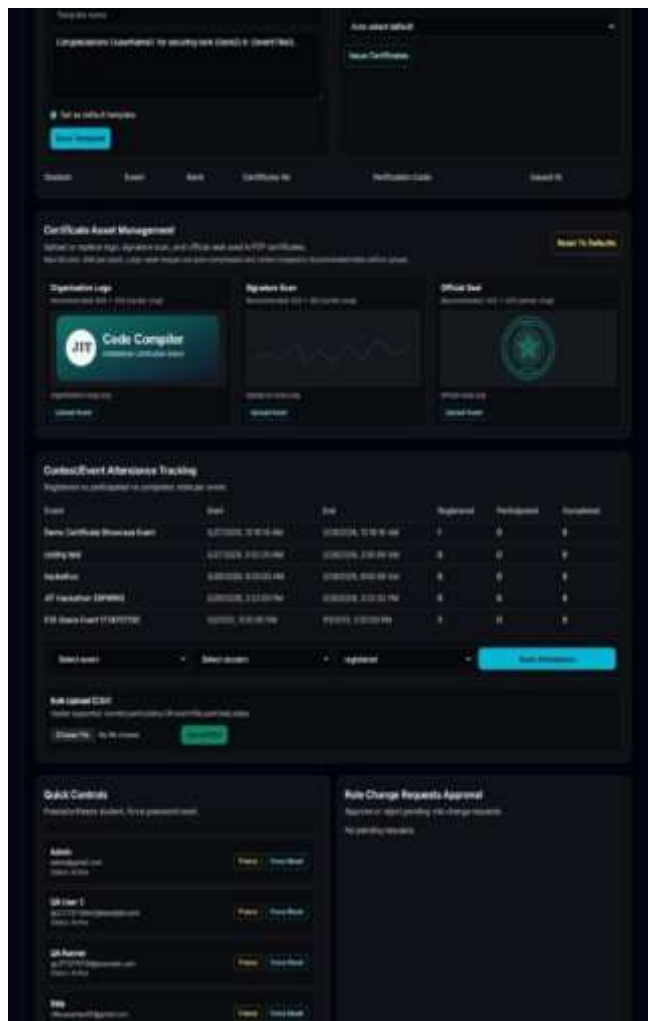


Figure 3. Admin Dashboard for Certificates Management



Figure 4. Web-Based Online Code Compiler Interface for Coding with Execution and Submission Features

V. CONCLUSION

This study introduced the design and development of a web-based online code compiler system for conducting internal hackathons and student coding evaluations. The proposed system enables users to write, compile, and execute programs efficiently through a web browser, while providing faculty with tools to manage events, monitor submissions, and generate results and certifications. The system reduces manual effort, improves evaluation efficiency, and ensures a streamlined process for both students and organizers. Overall, the developed platform demonstrates a practical and scalable solution for academic institutions. Future advancement may include support for real-time collaboration, advanced analytics, and improved security features.

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