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Test Genius

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ABSTRACT

*With the growing demand for digitized education and efficient assessment methods, the need for robust online examination portals has become critical. This project, titled "**Test Genius**", aims to create a comprehensive, secure, and user-friendly online exam platform that addresses the limitations of current systems. Developed using Spring Boot for the backend and Angular for the frontend, the system supports timer-based assessments, real-time feedback, and secure, role-based access. It accommodates exams across various domains and enables both administrators and users to manage and participate in tests efficiently. By automating grading and enhancing usability, "Test Genius" provides an advanced solution for modern education and skills evaluation. Future enhancements may include AI-based proctoring and detailed performance analytics to further improve the examination process.*

1. INTRODUCTION

With the rapid digitization of education and assessments, online examination portals have become a necessity in modern education and skill development, offering scalable and efficient assessment methods. "Test Genius" aims to address these gaps by providing a feature-rich, scalable, and secure platform for conducting online exams. This project focuses on developing a web-based online exam portal. It will permit students to take and give online examinations , test their skills and maintain master information and generate various reports of test.

Existing System

Currently, several online exam portals are available, but they come with significant limitations. Many existing platforms do not cover tests across all domains, restricting their usability to specific subjects or industries. Additionally, these portals often lack essential features such as timer-based assessments, making it difficult to enforce time constraints during exams. Furthermore, most systems do not provide real-time feedback, preventing students from instantly learning from their mistakes. The lack of these critical functionalities results in an inefficient examination process that does not fully utilize the potential of digital assessments.

Proposed System

The proposed Exam Portal, Test Genius, aims to overcome the limitations of existing online examination systems by offering a feature-rich, automated, and secure platform. This system will support tests across multiple domains, ensuring that exams are not restricted to specific subjects. A timer-based assessment feature will be implemented to enforce time constraints, ensuring that users complete exams within the allotted duration. Additionally, the platform will provide real- time feedback, allowing users to receive immediate responses on their performance, thus enhancing the learning process. The system will also incorporate role-based authentication, ensuring secure access for both administrators and users.

2-DESIGN

Design includes the process of designing and deploying the solution. It begins with problem and objective definition through careful planning of data acquisition and retention. Feature engineering process and suitable model design are also parts of this process-it is about discovering features relevant to the performance of the model and also the apt algorithms chosen along with their architecture.

A strategy of training and evaluation also needs to be established for the model in order to assess its performance based on the right metrics. The system should have friendly user interfaces, but deployment planning will ensure that integration into the current systems is seamless. The full design process helps address this complexity and, therefore, ensures the success of the project.

Architecture

Project architecture represents number of components we are using as a part of our project and design tools that can identify flaws, you will have the ability to analyse the fundamental software design, assess the chance of an attack, figure out potential threat elements, and identify any weaknesses or gaps in existing security. When using the flow of request processing i.e. what components in processing the request and in which order. An architecture description is a formal description and representation of a system organized in a way that supports reasoning about the structure of the system. Architecture is of two types. They are:

- Software Architecture
- Technical Architecture

Software Architecture

Software architecture design tools help to build software that doesn't have security issues. This is key because there are software risks in all areas of the software development process. When teams avoid software flaws or bugs, they are able to move forward with confidence. However, since this isn't always possible, software architecture design tools also need to have the ability to find flaws during the creation of software and correct them efficiently. When using software architecture

software architecture design tools that can identify flaws, you will have the ability to analyse the fundamental software design, assess the chance of an attack, figure out potential threat elements, and identify any weaknesses or gaps in existing security.

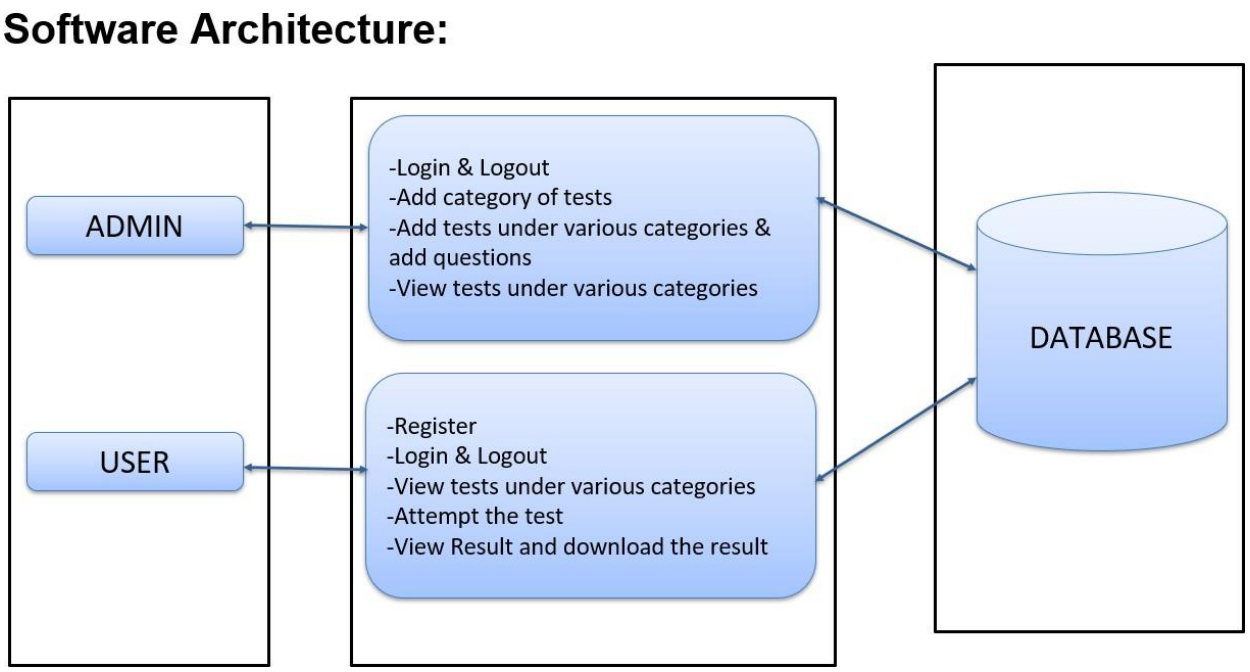


Fig.1 Software Architecture

Technical Architecture

Technical Architecture is a form of IT architecture that is used to design computer systems. It involves the development of a technical blueprint with regard to the arrangement, interaction, and interdependence of all elements so that system- relevant requirements are met.

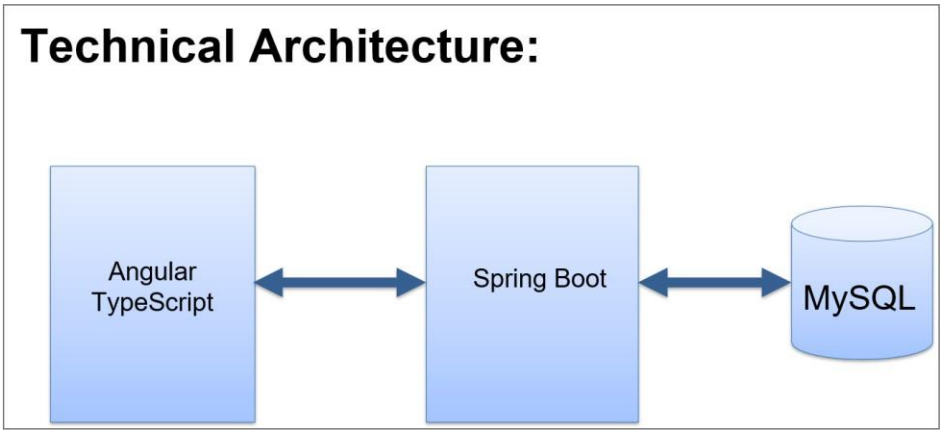


Fig.3.1.2 Technical Architecture

3-**IMPLEMENTATION**

Technologies

This system is developed using Angular and Spring Boot frameworks.

Fronted

- **Angular:** Provides a comprehensive framework for building dynamic and modular user interfaces with features like components, routing, and services.
- **TypeScript:** Used as the primary language for

developing frontend logic, offering type safety and better tooling.

- **HTML:** Structures the content of the web pages and interfaces.
- **CSS:** Responsible for styling and layout, ensuring the application is visually appealing and user-friendly.

Backend

- **Java:** Used as the core programming language for implementing the server-side logic and APIs.
- **Spring Boot:** Provides a robust framework for building RESTful web services, handling dependency injection, application configuration, and simplifying backend development.
- **Spring Security:** Manages authentication and authorization for the application, ensuring secure access to protected resources.
- **JWT** (JSON Web Tokens): Implements stateless authentication, allowing secure communication between the frontend and backend by transmitting signed tokens.
- **BCrypt:** Ensures secure password hashing and storage for user credentials.
- **MySQL:** Serves as the relational database for storing persistent data, including users, quizzes, questions, and results.

4-TESTING

Unit Testing

During This first round of testing, the program is submitted to assessments that focus on specific units or components of the software to determine whether each one is fully functional. In this phase, a unit can refer to a function, individual program or even a procedure, and White box testing method is usually used to get the job done.

One of the biggest benefits of this testing phase is that it can be run every time a piece of code is changed, allowing issues to be resolved as quickly as possible. It quite common for software developers to perform unit tests before delivering software to testers for formal testing.

Integration Testing

Integration testing allows individuals the opportunity to combine all of the units within a program and test them as a group. This testing level is designed to find interface defects between the modules/functions. This is particularly beneficial because it determines how efficiently the units are running together. Keep in mind that no matter how efficiently each unit is running, if they properly integrated, it will affect the functionality of the software program. In order to run these types of tests, individuals can make use of various testing methods, but the specific method that will be used to get the job done will depend greatly on the way in which the units are defined.

System Testing

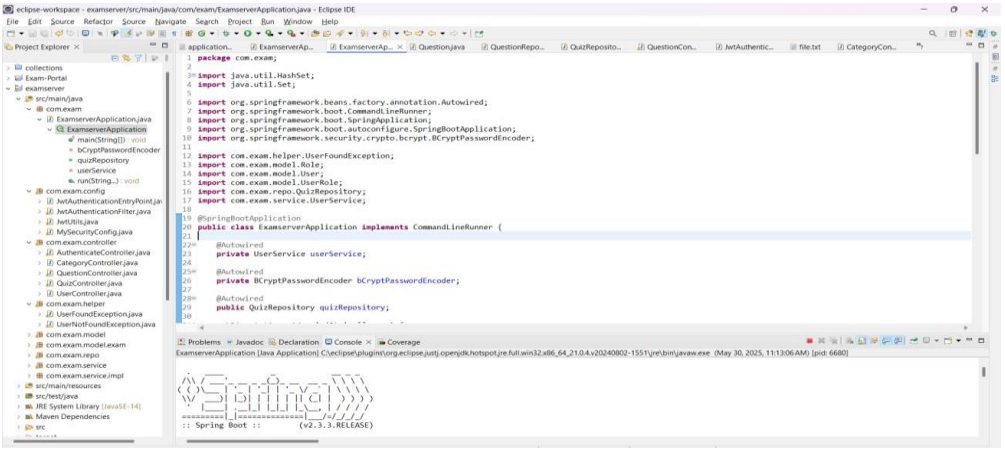
System testing is the first level in which the complete application is tested as a whole. The goal at this level is to evaluate whether the system has complied with all of the outlined requirements and to see that it meets Quality Standards. System testing is undertaken by independent testers who haven't played a role in developing the program. This testing is performed in an environment that closely mirrors production. System Testing is very important because it verifies that the application meets the technical, functional, and business requirements that were set by the customer.

Acceptance Testing

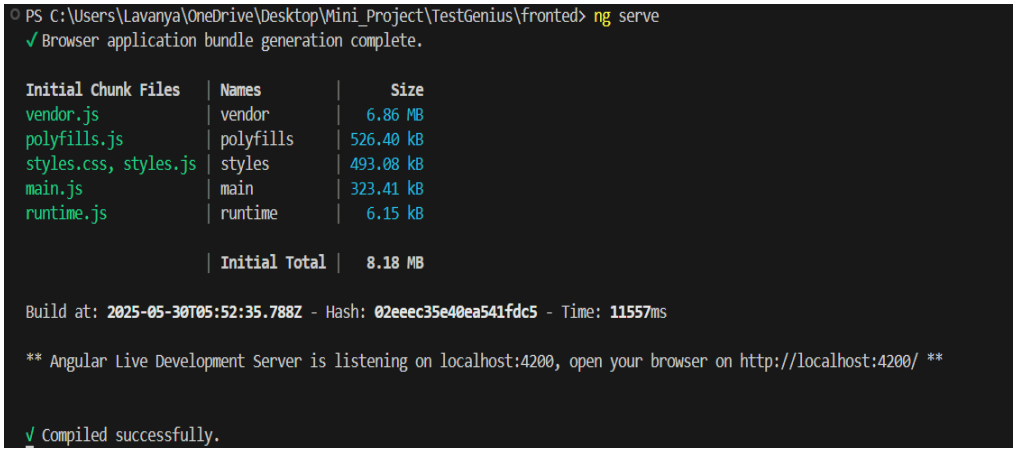
The final level, Acceptance testing (or User Acceptance Testing), is conducted to determine whether the system is ready for release. During the Software development life cycle, requirements changes can sometimes be misinterpreted in a fashion that does not meet the intended needs of the users. During this final phase, the user will test the system

to find out whether the application meets their business needs. Once this process has been completed and the software has passed, the program will then be delivered to production. The extensiveness of these tests is just another reason why bringing software testers in early is important. When a program is more thoroughly tested, a greater number of bugs will be detected; this ultimately results in higher quality software.

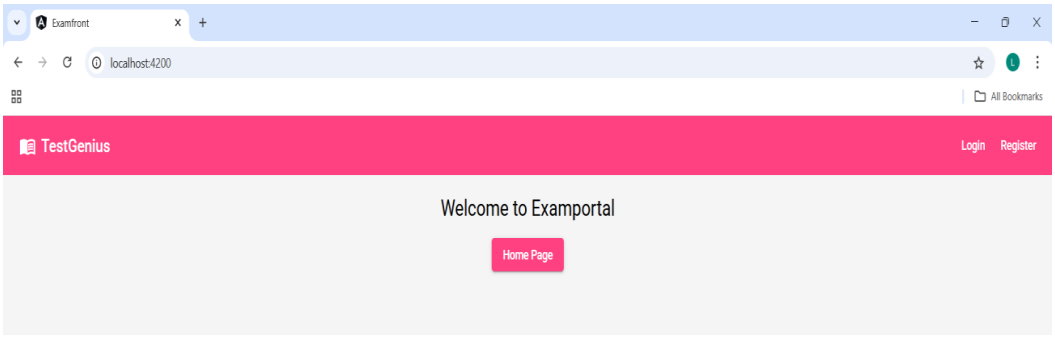
5-SCREENSHOTS



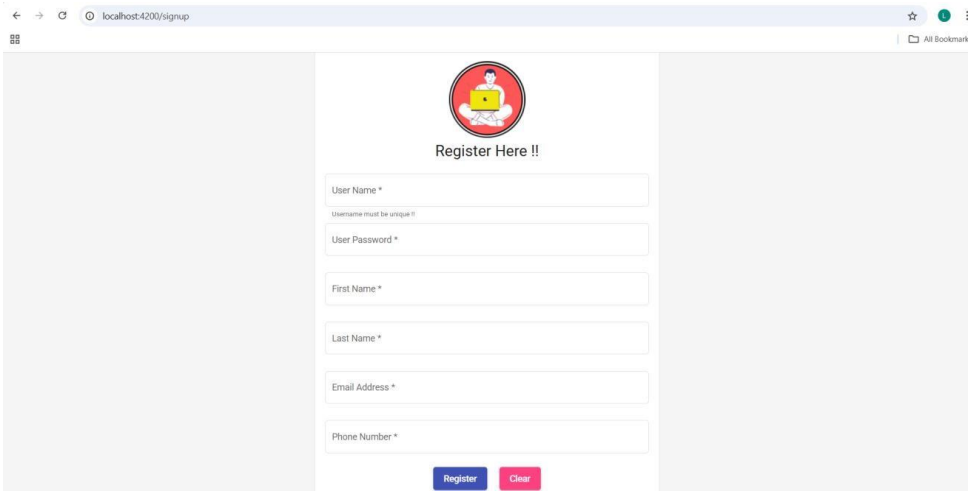
Screenshot 1 Starting the server



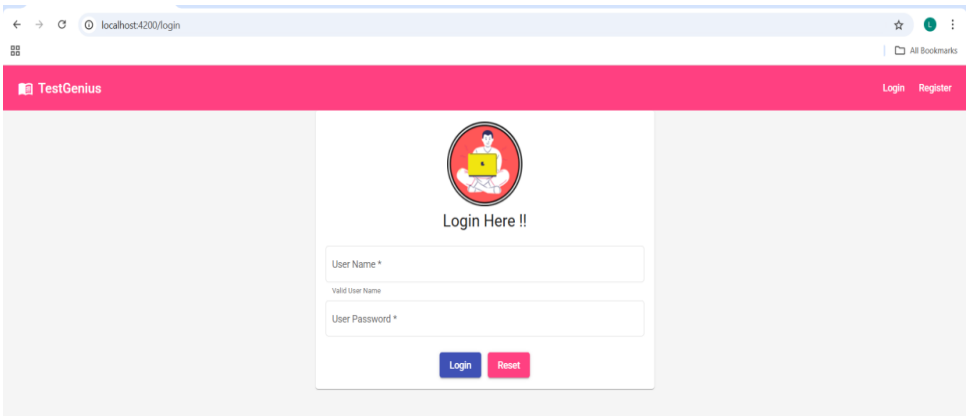
Screenshot 2 Generating link for the web page



Screenshot 3 Home page



Screenshot 4 Registration page



Screenshot 5 Login Page

6-CONCLUSION

Test Genius supports the tests across multiple domains allowing the individuals attempt the tests so that they can improve their skills.

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