Project Name: Pariksha Portal

Project Members:

PRN No.	Name
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Introduction of Project:

The Pariksha Portal is an innovative examination management system designed to streamline the process of conducting and managing exams efficiently. This project encompasses a comprehensive High-Level Design (HLD) incorporating React for the frontend, Spring Boot for the backend, and MySQL for the database management system. The system caters to both administrators and students, offering a seamless experience tailored to their respective needs.

Admin Panel:
The Admin Panel provides functionalities for administrators to manage exams, upload question papers, add student details, and monitor live exam participation. Administrators can create exams, view created exams, and access detailed analytics of student performance.

Student Panel:
The Student Panel offers students access to exams, allowing them to log in, attempt exams. It includes features such as warning alerts for tab switching, noise detection, and unauthorized camera use to maintain exam integrity.

Backend (Spring Boot):
The backend system handles authentication and authorization, exam management, result management, and real-time monitoring. It enables secure login for both admins and students, facilitates exam creation and management, stores student results, and monitors exam activities in real-time.

Database (MySQL):
The MySQL database stores crucial data such as admin credentials, exam details, questions, student information, exam participation records, and results. It ensures data integrity, reliability, and scalability for the entire system.

Workflow:
The workflow involves distinct processes for administrators and students. Administrators can create exams, manage student details, and monitor live exams. On the other hand, students can log in, access exams, attempt questions, and receive real-time warnings during exams.

Integration Points:
The integration between frontend and backend is achieved through REST APIs, enabling seamless communication between React frontend and Spring Boot backend. Additionally, the system integrates with external libraries/tools for webcam and microphone access, tab-switching detection, and noise detection to ensure exam integrity.

Technologies:
The system utilizes ReactJS for the frontend, Spring Boot for the backend, and MySQL for database management. Real-time monitoring using Face-Api.js. Security measures include HTTPS and JWT for secure authentication and exam proctoring.

Conclusion:
The Pariksha Portal offers a robust, user-friendly platform for conducting exams efficiently while ensuring exam integrity and security. Its comprehensive features cater to the needs of both administrators and students, making it a valuable tool for educational institutions seeking a modernized examination management system.

Objective of the Project:

The primary objective of the Pariksha Portal project is to develop an innovative examination management system that streamlines the process of conducting and managing exams efficiently. The project aims to provide a comprehensive solution that caters to the needs of both administrators and students, offering a seamless experience tailored to their respective requirements. Key objectives of the project include:

Efficient Exam Management: Develop a system that allows administrators to easily create exams, upload question papers, manage student details, and monitor live exam participation.

Enhanced User Experience: Provide a user-friendly interface for both administrators and students, ensuring ease of navigation and interaction with the system.

Exam Integrity and Security: Implement advanced security measures, including real-time monitoring, webcam access, noise detection, and tab-switching detection, to maintain exam integrity and prevent cheating.

Real-time Monitoring: Enable real-time monitoring of exam activities for administrators to track student participation and detect any irregularities during exams.

Data Management: Develop a robust database management system using MySQL to store crucial data such as exam details, questions, student information, participation records, and results securely.

Integration of Technologies: Integrate frontend technologies like ReactJS, backend technologies like Spring Boot, and external libraries/tools for webcam and microphone access to ensure seamless communication and functionality.

Scalability and Flexibility: Design the system with scalability in mind to accommodate growing user bases and increasing demand for online assessments. Ensure flexibility to adapt to evolving educational needs and technological advancements.

Scope of the Project:

The scope of the Pariksha Portal project encompasses various aspects of examination management, including system architecture, functionalities, technologies used, and future enhancements. The key scopes of the project include:

Administrator Panel: The administrator panel allows administrators to create exams, upload question papers, manage student details, monitor live exam participation, view exam analytics, and generate reports.

Student Panel: The student panel provides students with access to exams, allowing them to log in, attempt exams, receive real-time warnings for exam integrity, and view their results.

Backend Development: The backend development involves implementing authentication and authorization mechanisms, exam management functionalities, result management, and **real-time monitoring using Spring Boot.**

Database Management: Designing and implementing the MySQL database to store essential data such as admin credentials, exam details, questions, student information, exam participation records, and results securely.

Integration of Technologies: Integrating frontend and backend technologies through REST APIs, integrating external libraries/tools for exam proctoring, and ensuring seamless communication between different components of the systems.

Future Enhancements: The project outlines future enhancements, including improved user experience, mobile accessibility, integration of AI and machine learning, advanced data analytics, enhanced security measures, continuous updates, and scalability considerations to meet evolving educational needs and technological trends.

Overall, the Pariksha Portal project aims to develop a robust, user-friendly examination management system that ensures exam integrity, enhances user experience, and addresses the evolving needs of educational institutions.

Modification and improvement over the existing Implementation:

Present State:

The current implementation of the Pariksha Portal project includes functionalities for administrators to manage exams, upload question papers, add student details, and monitor live exam participation.

It offers features such as warning alerts for tab switching, noise detection, and unauthorized camera use to maintain exam integrity.

The backend system handles authentication and authorization, exam management, result management, and real-time monitoring using Spring Boot.

MySQL database stores crucial data such as admin credentials, exam details, questions, student information, exam participation records, and results.

Integration between frontend and backend is achieved through REST APIs, enabling seamless communication between React frontend and Spring Boot backend.

The system utilizes technologies like ReactJS for the frontend, Spring Boot for the backend, and external libraries/tools for exam proctoring.

After Implementation of Project (Improvements and Modifications):

Enhanced Exam Management Functionality:

Implement a feature for administrators to schedule exams in advance, allowing them to set start and end times for exams.

Introduce the option for administrators to set different exam durations for each exam, providing flexibility in exam scheduling.

Develop a feature for administrators to add instructions and guidelines for each exam, ensuring clarity for students.

Improved User Experience and Accessibility:

Enhance the user interface of the student panel to make it more intuitive and user-friendly.

Develop mobile applications for Android and iOS platforms, providing students with access to exams on smartphones and tablets.

Implement responsive design principles to ensure compatibility with a wide range of devices and screen sizes.

Integration of AI and Machine Learning:

Introduce AI algorithms to analyze student performance data and provide personalized recommendations for improvement.

Utilize machine learning for adaptive testing, where the difficulty level of questions adjusts based on the student's previous responses, enhancing the accuracy of assessments.

Advanced Security Measures:

Enhance security measures by implementing secure encryption protocols for data transmission between clients and servers.

Introduce additional anti-cheating mechanisms, such as biometric authentication or facial recognition, to further ensure exam integrity.

Implement SSL/TLS for secure communication between clients and servers, enhancing data security during transmission.

Data Analytics and Insights:

Develop advanced data analytics techniques to extract valuable insights from exam data, such as identifying trends, strengths, and weaknesses in student performance.

Generate comprehensive reports and analytics dashboards for administrators and students, enabling them to track progress and make data-driven decisions.

Continuous Updates and Maintenance:

Establish a system for regular updates and maintenance to keep the exam portal up-to-date with new features, security patches, and performance enhancements.

Provide responsive customer support and gather feedback from users to identify areas for improvement and address any issues promptly.

Scalability and Flexibility:

Design the exam portal with scalability in mind to accommodate growing user bases and increasing demand for online assessments.

Ensure flexibility to adapt to evolving educational needs and technological advancements, allowing for seamless integration of new technologies and features.

Overall, these modifications and improvements aim to enhance the functionality, usability, security, and scalability of the Pariksha Portal, providing users with a more robust and comprehensive examination management system.

Project Plan:

Number of Users and Their Roles:

Admin:

Responsible for managing exams, uploading question papers, adding student details, and monitoring live exam participation.

Can create exams, view created exams, access detailed analytics of student performance, and manage student records.

Student:

Responsible for accessing exams, attempting questions, and adhering to exam guidelines.

Can log in, access exams, attempt questions, and receive real-time warnings during exams for maintaining integrity.

Modules:

Admin Panel Management:

Functionality: This module allows administrators to manage exams, question papers, and student details.

Features:

Create new exams with options for specifying exam details and uploading question papers.

View scheduled exams, active exams, and exam analytics.

Add students manually or in bulk and view student records.

View and manage student results.

Student Panel Access:

Functionality: This module provides students with access to exams and ensures exam integrity.

Features:

Student login with PRN (Personal Registration Number) and password.

Access exams, read instructions, and attempt questions within the specified exam duration.

Receive real-time warnings for actions violating exam rules, such as tab switching or unauthorized camera use.

Backend Management:

Functionality: This module handles authentication, authorization, exam management, and result management.

Features:

Authentication and authorization of users (admins and students).

Creation and scheduling of exams.

Storage and retrieval of exam-related data.

Real-time monitoring of exam activities.

Storage and management of student results.

Database Management:

Functionality: This module deals with the storage and retrieval of data related to admins, students, exams, questions, and results.

Features:

Creation and management of database tables for storing admin credentials, student details, exam information, question papers, and results.

Ensuring data integrity, reliability, and scalability of the database.

Retrieval and manipulation of data as per application requirements.

Frontend Integration:

Functionality: This module integrates the frontend (ReactJS) with the backend (Spring Boot) through REST APIs.

Features:

Development of user interfaces for both admin and student panels using ReactJS.

Integration of frontend components with backend functionalities using REST APIs for seamless communication.

Ensuring compatibility and responsiveness of the user interface across different devices and screen sizes.

Security and Integrity Measures:

Functionality: This module focuses on implementing security measures to ensure the integrity of exams and protect user data.

Features:

Implementation of HTTPS and JWT for secure authentication.

Integration of external libraries/tools for webcam and microphone access, tab-switching detection, and noise detection to prevent cheating.

Encryption of sensitive data and secure transmission between clients and servers.

This project plan outlines the key users, their roles, and the modules involved in the Pariksha Portal project. Each module contributes to the overall functionality and effectiveness of the examination management system, catering to the needs of administrators and students while ensuring exam integrity and security.

Technology:

Frontend- React,javascript,HTML,Css,Bootstrap

Backend- Spring,SpringBoot,Spring Security ,JPA,REST API

Database- My SQL

Frontend Technology:

ReactJS:

Utilized for building the user interfaces of the admin and student panels. ReactJS is a popular JavaScript library for creating reusable UI components and managing the state of the application efficiently. It follows a component-based architecture and uses a virtual DOM for optimized rendering.

Backend Technology:

Spring Boot:

Employed for developing the backend of the examination management system. Spring Boot is a Java-based framework known for its ease of use and rapid application development capabilities. It provides auto-configuration, embedded servers, and seamless integration with the broader Spring ecosystem, making it suitable for building production-ready applications with minimal configuration.

Database Management System:

MySQL:

Chosen as the database management system for storing crucial data such as admin credentials, exam details, questions, student information, exam participation records, and results. MySQL is an open-source relational database management system widely used for its reliability, scalability, and ease of use. It offers features such as data encryption, access control, and user authentication for enhanced security.

Real-time Monitoring Technology:

Face-Api.js: Utilized for real-time monitoring during exams. Face-Api.js is a JavaScript library that provides face detection and recognition capabilities in the browser. It allows for monitoring actions such as unauthorized camera use during exams to ensure exam integrity and prevent cheating.

Security Measures:

HTTPS: Implemented to ensure secure communication between clients and servers. HTTPS encrypts data transmission over the network, providing confidentiality and integrity of the exchanged data.

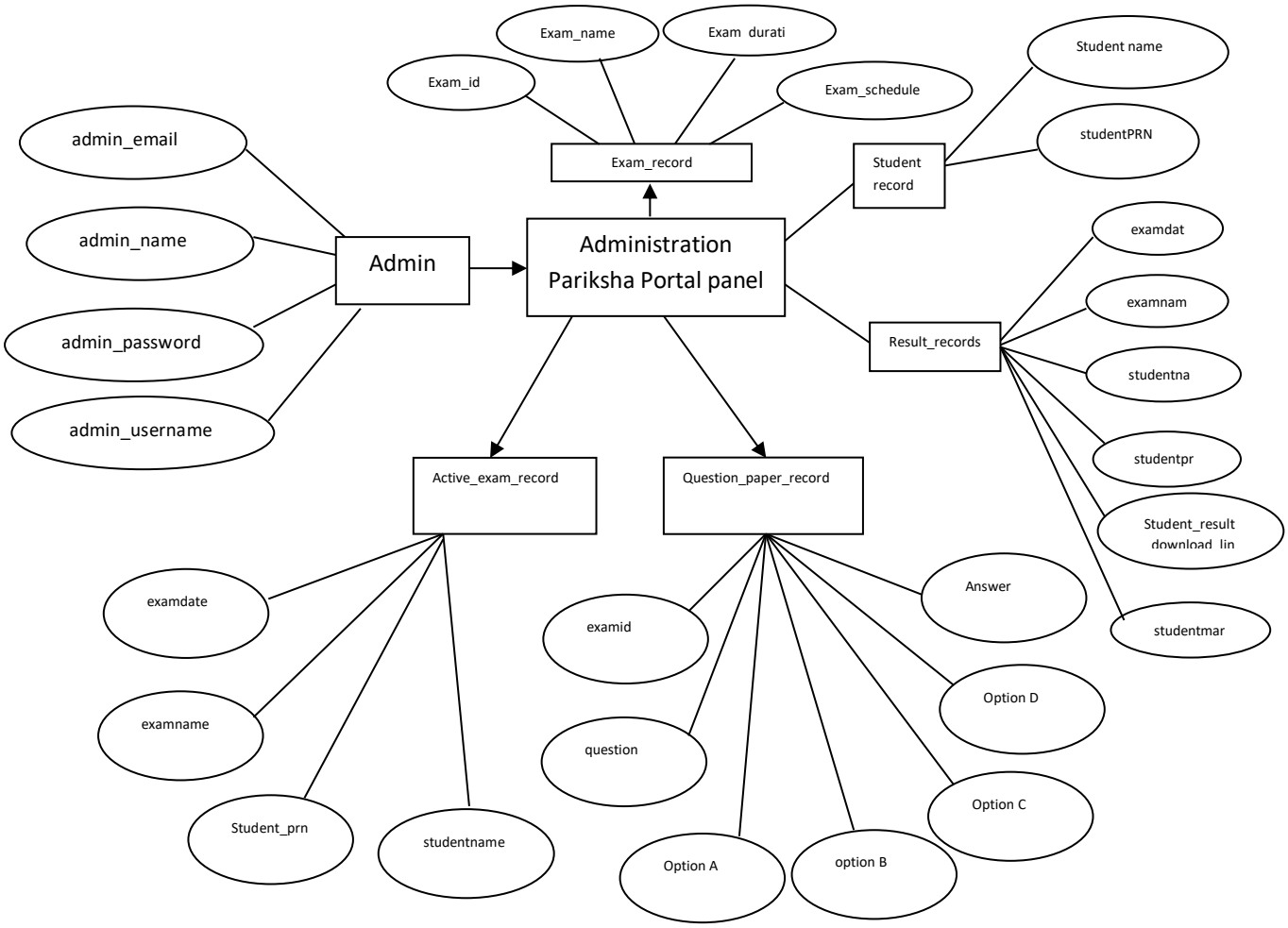
JWT (JSON Web Tokens): Utilized for secure authentication and authorization of users. JWT is a compact, URL-safe means of representing claims to be transferred between two parties. It is commonly used in web applications for stateless authentication.

These technologies collectively form the foundation of the Pariksha Portal project, enabling the development of a robust, user-friendly examination management system with advanced security measures and real-time monitoring capabilities.

Roles and Responsibilities:

Roles And Responsibilities		
1	Role	Spring Boot REST API
	Member Name	Dwarkesh Sanjay Virkhare
	PRN No	230943120027
	Description	designing, developing, and maintaining RESTful APIs ensures the reliability, security, and performance of the overall system, contributing to the success of the project.
2	Role	Spring Boot REST API
	Member Name	Shubham Chandrashekhar Pokale
	PRN No	230943120080
	Description	designing, developing, and maintaining RESTful APIs ensures the reliability, security, and performance of the overall system, contributing to the success of the project.
3	Role	Spring Boot REST API
	Member Name	Sujata Rajaram Natave
	PRN No	230943120089
	Description	designing, developing, and maintaining RESTful APIs ensures the reliability, security, and performance of the overall system, contributing to the success of the project.
4	Role	Spring Boot REST API
	Member Name	Syed Mohammad Mehdi
	PRN No	230943120092
	Description	designing, developing, and maintaining RESTful APIs ensures the reliability, security, and performance of the overall system, contributing to the success of the project.

Data Flow Diagram (DFD)



ERD / Database Tables:

Table Structures:

1. **Table name: active_exam_records**

Field	Type	Null	Key	Default	Extra
id	bigint	NO	PRI		auto_increment
exam_date	varchar(255)	YES			
exam_name	varchar(255)	YES			
student_name	varchar(255)	YES			
student_prn	varchar(255)	YES			

2. Table name: **adminsrecord**

Field	Type	Null	Key	Default	Extra
id	bigint	NO	PRI		auto_increment
exam_date	varchar(255)	YES			
exam_name	varchar(255)	YES			
student_name	varchar(255)	YES			
student_prn	varchar(255)	YES			

3. Table name: **examsrecord**

Field	Type	Null	Key	Default	Extra
id	bigint	NO	PRI		auto_increment
exam_date	varchar(255)	YES			
exam_duration	int	NO			
exam_name	varchar(255)	YES			
exam_id	varchar(255)	YES			

4. Table name: **question_paper_records**

Field	Type	Null	Key	Default	Extra
id	bigint	NO	PRI		auto_increment
question_paper_id	varchar(255)	YES			
question_paper_name	varchar(255)	YES			
answer	varchar(255)	YES			
exam_id	varchar(255)	YES			
optiona	varchar(255)	YES			
optionb	varchar(255)	YES			
optionc	varchar(255)	YES			
optiond	varchar(255)	YES			
question	varchar(255)	YES			

5. Table name: **result_records**

Field	Type	Null	Key	Default	Extra
id	bigint	NO	PRI		auto_increment
exam_date	varchar(255)	YES			
exam_name	varchar(255)	YES			
student_name	varchar(255)	YES			
student_prn	varchar(255)	YES			
student_marks	int	NO			
student_result_download_link	varchar(255)	YES			

6. Table name: **studentsrecord**

Field	Type	Null	Key	Default	Extra
id	bigint	NO	PRI		auto_increment
student_name	varchar(255)	YES			
student_prn	varchar(255)	YES			

Future Scope:

Enhanced User Experience:

Continuously improving the user interface and experience to make the platform more intuitive and user-friendly.

Implementing personalized dashboards for students, teachers, and administrators to cater to their specific needs and preferences.

Mobile Accessibility:

Developing mobile applications for Android and iOS platforms to provide access to the exam portal on smartphones and tablets, ensuring accessibility anytime, anywhere.

AI and Machine Learning Integration:

Incorporating AI algorithms to analyze student performance data and provide personalized recommendations for improvement.

Utilizing machine learning for adaptive testing, where the difficulty level of questions adjusts based on the student's previous responses, providing a more accurate assessment of their knowledge.

Data Analytics and Insights:

Employing advanced data analytics techniques to extract valuable insights from exam data, such as identifying trends, strengths, and weaknesses in student performance.

Generating comprehensive reports and analytics dashboards for administrators and students to track progress and make data-driven decisions.

Security and Integrity:

Implementing robust security measures to ensure the integrity of the exam process, including features such as secure encryption protocols, and anti-cheating mechanisms.

Continuous Updates and Maintenance:

Regularly updating the exam portal with new features, security patches, and performance enhancements to keep pace with technological advancements and user requirements.

Providing responsive customer support and soliciting feedback from users to identify areas for improvement and address any issues promptly.

Scalability and Flexibility:

Designing the exam portal with scalability in mind to accommodate growing user bases and increasing demand for online assessments.

Overall, the future scope of an exam portal application revolves around leveraging emerging technologies, enhancing user experience, ensuring security and integrity, and fostering engagement and inclusivity in the assessment process. By continuously innovating and adapting to evolving educational needs and technological trends, exam portals can play a pivotal role in transforming the way assessments are conducted and learning outcomes are measured.