Product Requirement Document

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Executive Summary

AI EXAMS is a digital examination application designed to conduct secure online exams, assessments, and tests. Our features include exam creation, automated and manual grading, detailed reporting, user management, and real-time notifications. The platform supports access from multiple devices and was built with scalability, security, and user experience in mind. It aims to provide a reliable and flexible solution for educational institutions, certification bodies, and organizations.

The primary users will be able to create an account, log in, and manage their profiles. They can only access scheduled or on-demand exams, and the exams can be taken on various devices (PC, tablet, mobile) with support for accessibility features.

After an exam, automated systems grade objective questions and provide an instantaneous receipt of exam results.

The Problem

The traditional paper-based exams or in-person assessments presented several challenges, that limited an easy and smooth examination experience for both the examinee and examiner.

However, in our increasingly digital and globalized world, there is a growing demand for a more adaptable, scalable, and efficient assessment technique further accelerated by the COVID-19 pandemic, highlighting the importance of a modern solution that can provide efficient, secure, user-friendly, and accessible exams with immediate results and feedback.

Goals and Objectives

- **Improve Efficiency and Scalability**: Enable small schools to large universities and organizations to conduct large-scale examinations with ease, accommodating a large number of candidates simultaneously, without compromising on quality or security.
- **Automate and Streamline Processes**: Enable automated grading with instant feedback for objective questions to reduce manual effort and minimize errors.
- **Environmental Sustainability:** Minimize the need for paper and physical resources, contributing to a more sustainable and eco-friendly examination process.
- **Customization and Flexibility**: Provide administrators with the ability to customize exam settings, such as time limits, question randomization, and grading schemes, to meet specific requirements.

Product Use Cases

Use Case 1: User Taking an Exam

1. Actors: Students
2. Preconditions:

   2.1. The student is registered and logged into the AI EXAMS platform.

   2.2. The student has an active exam assigned and scheduled.

   2.3. The student's device is compatible with the application’s requirements (internet connection).

3. Main Flows:

   3.1. The student logs into the AI EXAMS platform using their credentials.

   3.2. The student navigates to the "My Exams" section and selects the scheduled exam.

   3.3. The system displays exam rules, such as the subject description, timeframe etc.

   3.4. The system conducts a pre-exam check, verifying the student's Identity, compatible device, and internet connection.

4. Start Exam:

   4.1. Once verification is complete, the student clicks "Start Exam" to begin.

5. During the Exam:

   5.1. The student can see a timer showing the remaining time.

   5.2. The student will not be allowed to leave the browser on which the exam is being conducted.

   5.3. The student answers the questions, with the option to click “Next” if satisfied with the chosen answer or “Back” if not satisfied and wishes to change.

   5.4. The system monitors the student’s behavior for potential cheating (screenshots).

6. Submit Exam:

   6.1. Upon completion, the student submits the exam.

7. Post Exam Review:

   7.1. The system confirms submission and logs the student out of the exam environment.

   7.2. The student receives a confirmation message that the exam has been successfully submitted.

   7.3. The student views their result immediately after submission.

Use Case 2: Creating and Publishing an Exam

1. Actors: Teacher, Content creator.
2. Preconditions:

   2.1. The teacher has an active account on the AI EXAMS platform and has been granted permission to create and manage exams.

   2.2. The course or subject for the exam has been set up in the system.

3. Main Flow:

   3.1. The teacher logs into the platform using their credentials.

   3.2. The teacher navigates to the "Create Exam" section from the dashboard.

   3.3. The teacher defines the exam’s structure including exam title, description, start/end time, time per section, and number of questions.

4. Question Bank Management:

   4.1. The teacher selects questions from an existing question bank or creates new questions.

4.2. The teacher can categorize questions by multiple choice, short answer, essay, coding exercises, etc.

5. Customize Exam Flow:

   5.1. The teacher applies settings such as randomization of questions, negative marking, or grading rubrics.

6. Review and publish:

   6.1. Once all settings and questions are finalized, the teacher publishes the exam, making it available to the students enrolled in the subject.

7. Grading:

   7.1. After the student submits, the teacher can manually grade subjective questions and review the automated grading of objective questions.

Use Case 3: Managing Users and System Settings

1. Actor: Administrator
2. Precondition:

   2.1. The administrator has superuser or admin-level access to the AI EXAMS platform.

   2.2. The administrator has full permissions to manage users, system settings, and exam configurations.

3. Main Flow:

   3.1. The administrator logs into the AI EXAMS platform using their credentials.

   3.2. The administrator selects the "User Management" option from the admin dashboard.

   3.3. The administrator creates, edits, or deletes user accounts for students, teachers, and other admins.

   3.4. The administrator assigns roles and permissions to users based on their responsibilities.

   3.5. The administrator can search for and select an existing user to update their information, change their role, or deactivate their account.

4. System Configuration:

   4.1. The administrator accesses the "System Settings" panel to configure global settings like security protocols, and data retention policies.

   4.2. The administrator manages integrations with third-party tools and configures API access if needed.

5. Monitoring System Health:

   5.1. The administrator monitors the system’s performance, including server uptime, load balancing, and data backups.

   5.2. The administrator sets up alerts for system anomalies or security breaches.

6. Support and Maintainance:

   6.1. The administrator provides technical support to users and resolves any issues reported by students, and teachers.

   6.2. Once all updates are made, the administrator saves the changes.

   6.3. The system will send notifications to users about any changes made to their accounts, depending on the administrator's settings.

Use Case 4: Overseeing the Entire System

1. Actor: Super admin
2. Precondition:

   2.1. The Super Admin has been granted the highest level of access, overseeing the entire AI EXAMS platform.

3. Main Flow:

   3.1. The Super Admin logs into the AI EXAMS platform with their credentials.

   3.2. The Super Admin accesses a dashboard providing an overview of all activities across the platform, including active exams, user activity, and system health.

   3.3. The Super Admin can create, modify, or delete any user, including administrators.

   3.4. The Super Admin oversees role management, ensuring proper access controls across all users.

3.5. The Super Admin generates comprehensive reports on system usage, performance, and security. These reports are used to make strategic decisions regarding system upgrades, scaling, and future development.

3.6. The Super Admin makes high-level decisions regarding the platform's future, including planning for new features, scaling the infrastructure, and setting long-term goals.

Requirements

Functional Requirements

1. User Management

1.1. User Registration and Authentication:

- The system must allow users (students, teachers, administrators, super administrators) to create accounts and log in.
- The system must support authentication via username/password, and optionally, two-factor authentication.
- Users must be able to reset passwords via email or SMS.

1.2. Role-Based Access Control:

- The system must assign roles (e.g., student, teacher, administrator) to users, with each role having specific access permissions.
- The system must allow administrators to manage user roles and permissions.

1.3. User Profile Management:

- Users must be able to view and update their profiles, including personal information and preferences.
- The system must support uploading and managing user profile pictures.

2. Exam Creation and Management

2.1. Exam Creation:

- Teachers must be able to create exams by selecting or creating questions from a question bank.
- The system must support multiple question types (e.g., multiple-choice, essay, true/false, short answer).
- Teachers must be able to set exam parameters, including time limits, randomization of questions, and grading criteria.

2.2. Question Bank Management:

- Teachers must be able to create, edit, and organize questions in a question bank.
- The system must allow for tagging, categorization, and searching of questions within the question bank.

2.3. Exam Scheduling:

- Examiners must be able to schedule exams for specific dates and times, including recurring exams.

3. Exam Delivery

3.1. Device Compatibility:

- The system must support exam access on various devices (e.g., desktops, laptops, tablets, smartphones).
- The system must ensure compatibility with common operating systems (Windows, macOS, iOS, Android).

3.2. Accessibility Features:

- The system must include accessibility features such as screen readers, text-to-speech, adjustable font sizes, and color contrast options.
- The system must comply with WCAG (Web Content Accessibility Guidelines) standards.

3.3. Secure Exam Environment:

- The system must enforce a secure exam environment by locking down the app and preventing access to other applications during the exam.
- The system must enforce a NO screenshot rule on the application during the exam.

3.4 Network Reconnection:

- The system should provide a mechanism for students to reconnect to the same spot they lost connection during an exam.

4. Grading and Feedback

4.1. Automated Grading:

- The system must automatically grade objective questions (e.g., multiple-choice, true/false) upon submission.
- The system must allow for customizable grading rules and rubrics.

4.2. Manual Grading:

- Examiners must be able to manually grade subjective responses (e.g., essays, short answers) and provide feedback.

4.3. Grade Publication:

- The system must instantaneously show exam results upon submission.
- Students must be able to view their grades and feedback through their dashboard.

5. Reporting and Analytics

5.1. Exam Performance Reports:

- The system must generate detailed reports on exam performance, including individual and aggregate statistics.
- Teachers must be able to export reports in various formats (e.g., PDF, Excel).

5.2. User Activity Logs:

- Administrators must have access to logs showing user activity, including logins, exam access, and system changes.

5.3 Dashboard Analytics:

- The system must provide a dashboard with key metrics and visualizations for quick insights into exam and user performance.

6. Notifications and Alerts

6.1. Exam Reminders:

- The system must send automated reminders to students about upcoming exams, including dates, times, and requirements.

6.2. Real-Time Alerts:

- The system must notify administrators of any suspicious activities or incidents during an exam.

6.3. Result Notifications:

- The system sends a confirmation message that the exam has been successfully submitted and results are viewed immediately after submission.

7. Integration and API

7.1. API Access:

- The system must provide APIs for third-party integrations, allowing external systems to interact with AI EXAMS functionalities.

7.2. Pin access with censor management:

- A pin will be sent to the students before the exam starts and will only be valid within the sessions of the exam.

8. Data Security and Compliance

8.1. Data Encryption:

- The system must encrypt data at rest and in transit using industry-standard encryption protocols.

8.2. GDPR Compliance:

- The system must comply with GDPR (General Data Protection Regulation) for handling personal data, including user consent and data deletion requests.

8.3. Audit Trails:

- The system must maintain audit trails for all critical actions (e.g., exam creation, grading, user management) to ensure accountability.

9. Support and Maintenance

9.1. Helpdesk and Support:

- The system must provide a helpdesk feature where users can submit support tickets and access FAQs or troubleshooting guides.

9.2. System Maintenance:

- The system must offer tools for administrators to manage updates, backups, and system health checks.

Non-Functional Requirements

- **Performance:** The system should support up to 10,000 concurrent users with a response time of less than 2 seconds.
- **Reliability:** The system should have 99.9% uptime with a disaster recovery plan in place.
- **Security:** The system should comply with GDPR, CCPA, and other relevant data protection regulations.
- **Usability:** The interface should be intuitive and accessible, with clear navigation and help features.
- **Scalability:** The system should be able to scale horizontally to handle increasing loads.

- **Maintainability:** The system codebase should be modular and well-documented for easy updates and bug fixes.

Technical Requirements

- **Server hosting platform**: We would be using Railway or Render
- **Backend**: Use of robust backend technologies. We would be using Node.js
- **Frontend**: Modern frontend frameworks. We would be using React
- **Database**: Scalable database solutions. We would be using PostgreSQL.
- **API**: Restful API for integration with external services.

User Stories and Acceptance Criteria

1. Students User Stories

User Story 1: As a student, I want to register and create an account so that I can access exams.

Acceptance Criteria

- User registration requires a valid email and password.
- A confirmation email is sent to verify the email address.
- User should be able to reset their password via a "Forgot Password" link.

User Story 2: As a student, I want to log in to the AI EXAMS platform securely so that I can access my exams.

Scenario: Successful login

- Given I am a registered student
- And I am on the login page
- When I enter my valid username and password

- And I click on the "Login" button
- Then I should be redirected to the dashboard
- And I should see a list of my upcoming exams

Scenario: Unsuccessful login due to incorrect password

- Given I am a registered student
- And I am on the login page
- When I enter my valid username and an incorrect password
- And I click on the "Login" button
- Then I should see an error message "Incorrect username or password".

Acceptance Criteria:

- The system should allow the student to log in using a username and password.
- The login process should support two-factor authentication (2FA).
- The system should display an error message if the login fails due to incorrect credentials.
- Upon successful login, the student should be redirected to their dashboard.

User Story 3: As a student, I want to receive my exam results and feedback so that I can understand my performance.

Scenario: View results for a completed exam

- Given I am logged into the AI EXAMS platform
- And I have completed an exam
- When I navigate to "My Results"
- And I select the exam
- I should see my score and feedback
- And I should see a breakdown of my performance by section or question type.

Acceptance Criteria:

- The system should notify the student when results are available.
- The system should display the student’s score and any feedback the teacher provides.

- The student should be able to view detailed performance reports, including a breakdown by section or question type.

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2. Teacher User Stories

User Story 1: As a Teacher, I want to create a new exam, So that I can assess students' knowledge and skills.

Scenario: Create a new exam

- Given I am logged into the AI EXAMS platform as an examiner
- And I have access to the "Create Exam" section
- When I click on "Create New Exam"
- And I enter the exam title, description, and instructions
- And I add questions from the question bank or create new questions
- And I configure the exam settings (time limit, randomization, etc.)
- And I assign the exam to a group of students
- When I click on the "Publish Exam" button
- Then the exam should be saved
- And it should be available for the assigned students on the scheduled date.

Acceptance Criteria:

- The system should allow the teacher to create exams with various question types (MCQs, essays, coding, etc.).
- The teacher should be able to set time limits, randomization, and grading rubrics for the exam.
- The system should allow the teacher to select questions from a question bank or create new ones.
- The system should enable the teacher to assign the exam to specific students or groups.

User Story 2: As a Teacher, I want to grade subjective exam responses so that I can provide accurate assessments.

Scenario: Grade a subjective question

- Given I am logged into the AI EXAMS platform as a teacher
- And I have access to the "Grade Exams" section
- When I select an exam that requires grading
- And I navigate to the subjective questions
- Then I should see the students' responses
- And I should be able to assign a score and provide feedback
- When I submit the grades
- Then the scores and feedback should be saved
- And students should be notified of their results

Acceptance Criteria:

- The system should allow teachers to manually grade subjective responses like essays or coding questions.
- The teacher should be able to provide feedback on each response.
- The system should enable the teacher to save progress and return to grading later.
- The teacher should be able to release grades and feedback to students once grading is complete.

User Story 4: As a Teacher, I want to generate reports on exam performance so that I can analyze student outcomes.

Scenario: Generate a performance report

- Given I am logged into the AI EXAMS platform as an examiner
- And I have access to the "Reports" section
- When I select an exam and specify the report criteria (e.g., date range, group)
- And I click on "Generate Report"
- Then I should see a detailed report on exam performance
- And I should be able to export the report in various formats (PDF, Excel, etc.)

Acceptance Criteria:

- The system should provide a report generation tool that allows the teacher to view aggregate performance data.
- The reports should include metrics such as average score, pass rate, and performance by question type.
- The teacher should be able to export reports in multiple formats (PDF, Excel).
- The system should allow the teacher to filter reports by date, group, or other criteria.

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3. Administrator User Stories

User Story 1: As an Administrator, I want to manage user accounts so that I can control access to the platform.

Scenario: Create a new user account

- Given I am logged into the AI EXAMS platform as an administrator
- And I have access to the "User Management" section
- When I click on "Create New User"
- And I enter the user’s details (name, email, role, etc.)
- And I assign the appropriate role (student, teacher)
- And I click on "Save"
- Then the user account should be created And the user should receive a welcome email with login instructions

Acceptance Criteria:

- The system should allow the administrator to create, modify, or delete user accounts.
- The administrator should be able to assign roles and permissions to each user.
- The system should send email notifications to users upon account creation or role changes.
- The administrator should be able to reset user passwords and handle account recovery requests.

User Story 2: As an Administrator, I want to configure system settings so that the platform operates according to organizational policies.

Scenario: System Configuration

- Given I am logged into the AI EXAMS platform as an administrator
- And I have access to the "System Settings" section
- When I navigate to the security settings
- And I configure settings like password policies, two-factor authentication, and data retention
- And I click on "Save Changes"
- Then the system settings should be updated
- And users should be notified of any relevant changes (e.g., password policy updates)

Acceptance Criteria:

- The system should allow the administrator to set global settings like security protocols, and data retention policies.
- The administrator should be able to configure integrations with third-party tools.
- The system should provide options for setting up two-factor authentication (2FA) and other security measures.
- The administrator should be able to schedule and manage system backups.

User Story 3: As an Administrator, I want to monitor system performance so that I can ensure the platform runs smoothly.

Scenario: Monitor system performance

- Given I am logged into the AI EXAMS platform as an administrator
- And I have access to the "System Health" dashboard
- When I view the dashboard
- Then I should see metrics such as server uptime, load, and error rates
- And I should receive alerts for any critical issues (e.g., server downtime)
- When an issue is detected
- Then I should be able to trigger a system diagnosis or escalate the issue to IT support.

Acceptance Criteria:

- The system should provide real-time dashboards showing server performance, user activity, and system health.
- The administrator should receive alerts for any anomalies, such as high server load or security breaches.
- The system should log all system activities for auditing purposes.
- The administrator should be able to generate and export performance reports.

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4. Super Admin User Stories

User Story 1: As a Super Admin, I want to oversee the entire platform so that I can ensure everything runs smoothly.

Scenario: View the global activity dashboard

- Given I am logged into the AI EXAMS platform as a Super Admin
- When I navigate to the global activity dashboard
- Then I should see a comprehensive overview of all user activities, ongoing exams, and system status
- And I should be able to drill down into specific areas (e.g., user activity logs, exam performance)

Acceptance Criteria:

- The system should provide a global dashboard displaying an overview of all activities across the platform.
- The Super Admin should have access to all system settings, user accounts, and security protocols.
- The Super Admin should be able to monitor and respond to security incidents and system alerts.
- The system should allow the Super Admin to generate comprehensive reports on system usage, performance, and security.

User Story 2: As a Super Admin, I want to oversee security protocols so that the platform remains secure.

Scenario: High-Level Security Management

- Given I am logged into the AI EXAMS platform as a Super Admin
- And I have access to the "Security Management" section
- When I configure settings such as encryption keys, SSL certificates, and global access controls
- And I click on "Apply Changes"
- Then the security settings should be updated across the platform
- And all relevant users should be notified of the changes.

Acceptance Criteria:

- The system should allow the Super Admin to configure and monitor security measures such as encryption, 2FA, and intrusion detection.
- The Super Admin should receive alerts for any potential security breaches and be able to take immediate action.
- The system should log all security-related activities and allow the Super Admin to review and audit these logs.
- The Super Admin should be able to coordinate with IT teams to address any vulnerabilities or incidents.

User Story 3: As a Super Admin, I want to generate system-wide reports so that I can analyze overall performance and security.

Scenario: Generate a comprehensive system report

- Given I am logged into the AI EXAMS platform as a Super Admin
- And I have access to the "Reports" section
- When I select the system-wide report option
- And I specify the report criteria (e.g., date range, user activity, security events)
- And I click on "Generate Report"

- Then I should see a detailed report on system performance, user activity, and security events.

Project Timeline and Pricing

Phase	Status	Cost	Due Dates
Product Information Document	Done	Free	DONE
Administrator Dashboard Design	Pending		
Super Admin Dashboard Design	Pending		
Landing Page Design	Pending		
Frontend Development	Pending		
Backend Development	Pending		
Quality Assurance Testing	Pending		
	Total		#3,000,000