Software Requirements Specification

for

Online Examination System

Version 1.0

Prepared by Pavit Agrawal 230953406
Rajat Goyal 230953362
Ryan Gupta 230953288

Manipal Institute of Technology, Manipal

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Revision History

Name	Date	Reason For Changes	Version

1. Introduction

1.1 Purpose

This report outlines requirements of the Online Examination System we built, allowing faculty to develop and admin to manage exams and students to complete timed tests with automated grading.

1.2 Document Conventions

Requirements labeled as:
- [FR] Functional Requirements
- [NFR] Non-Functional Requirements
- Priority levels: High (H), Medium (M), Low (L)

1.3 Intended Audience and Reading Suggestions

- Developers (PHP/MySQL implementation)
- Faculty users (exam creators)
- Students (test takers)
- Admin (user managers)

1.4 Product Scope

Web-based system providing:
- Secure role-based access (admin/faculty/student)
- Exam creation with multiple question types (MCQs, Short Answer, True/False)
- Timed test environment
- Automated scoring and analytics

1.5 References

- MySQL Official Documentation – Provides details on database structure, queries, and best practices for managing relational data.
- PHP Official Documentation – Serves as a technical reference for backend development, handling server-side logic.
- User Interface Style Guide – Defines the design principles, UI components, and accessibility considerations for the frontend.
- System Requirements Specification (SRS) Template – Standard framework followed for structuring this document.

2. Overall Description

2.1 Product Perspective

The Online Exam System(OES) is a standalone application intended to simplify the examination process by providing an online platform for test creation, administration, and evaluation. It will interact with databases to store user credentials, exams, and results.

The OES consists of three main components: frontend, backend, and database. The frontend is developed using CSS, JS and HTML, ensuring a dynamic and responsive user experience. MySQL is used as the database to store structured information, including user details, exam records, and exam analytics.

The system is designed with a modular architecture, allowing different user roles—Admin, Faculty and Students —to interact with specific functionalities. The Admin module enables efficient management of Faculty, Students, and exams, ensuring automated exam analytics updates. Faculty handle exam creation and teach students, while students take exams.

2.2 Product Functions

- User Registration and Login
- Exam Creation and Management
- Result Generation and Analysis
- Student Profile Management
- Faculty Profile Management

2.3 User Classes and Characteristics

- Students: Register, take exams, view results.
- Faculty: Create exams, manage questions, view and analyze results.
- Admin: Manage students and faculty, exams, and system logs.

2.4 Operating Environment

- Hardware Requirements: The system is designed to run on standard desktops, laptops, tablets, and mobile devices. A minimum of 4GB RAM and a dual-core processor is recommended for smooth performance.
- Browsers: Chrome, Firefox, Edge
- Operating Systems: Windows, Linux, macOS
- Server: XAMPP (Apache with MySQL)

2.5 Design and Implementation Constraints

- Browser compatibility
- Database schema for storing exams and results
- Security protocols for data protection

2.6 User Documentation

• Key Features: A detailed information covering system features, navigation, and usage instructions for Admins, Faculty, and Students. It will include step-by-step procedures for performing key functions such as

exam management, exam scheduling, and viewing results.

• Online Help System: An integrated help section within the OES that provides contextual assistance and troubleshooting guidelines.

2.7 Assumptions and Dependencies

Assumptions:

- Users will have a stable internet connection to access the web-based application.
- The system will be deployed on a server with sufficient resources to handle concurrent users efficiently.
- Admins, Faculty, and Students will have basic familiarity with web applications and Online Examination System.
- Security protocols will be in place to prevent unauthorized access, and users will comply with authentication requirements.

Dependencies:

- The frontend will be developed using CSS, HTML and JS, and its proper functioning depends on compatible browser environments (e.g., Chrome, Firefox, Edge).
- The database will be MySQL, requiring appropriate hosting and database configurations.
- The availability and performance of cloud hosting services (if deployed online) may affect system uptime and response time.
- Future scalability and feature enhancements will rely on modular code architecture and database optimization.

3. External Interface Requirements

3.1 User Interfaces

1. Authentication Interfaces
- Login Page: Secure entry point with role-based redirection (admin/faculty/student)
- Registration Page: Account creation with validation (email, password strength)
- Password Reset: Secure recovery flow with email verification

2. Admin Interfaces
- User Management Dashboard: CRUD operations for all user accounts
- System Configuration: Settings for exam policies and security
- Audit Logs: Timeline of system activities and events

3. Faculty Interfaces
- Exam Creation Wizard: Step-by-step test builder with question types
- Question Bank: Repository of reusable questions with tagging
- Results Dashboard: Performance analytics with filtering options

4. Student Interfaces
- Exam Lobby: List of available/upcoming tests with timers
- Test Environment: Full-screen interface with:
    - Question navigation
    - Time remaining display
    - Submission controls
- Results Portal: Score breakdown with correct/incorrect answers

5. Shared Interfaces
- Profile Management: Personal details and password updates
- Responsive Design: Adapts to desktop/tablet/mobile views
- Accessibility Features: High contrast mode, text scaling

3.2 Hardware Interfaces

Supported Device Types:

- Servers: The application will be hosted on a cloud-based or on-premise server, which will handle requests, process data, and manage the database.
- User Devices: The OES shall be accessible on:
    - o Desktops and Laptops (Windows, macOS, Linux)
    - o Tablets and Mobile Devices (iOS, Android)

Data and Control Interactions:

- The system will process and store all data in a SQL database, ensuring reliable retrieval and updates.
- Hardware components such as printers may be used for printing reports or match schedules, requiring PDF or direct print support.
- The system shall support external storage devices (USB, external hard drives) for backup and export functionalities, if required.

3.3 Software Interfaces

Operating System Compatibility
- The LMS will be compatible with the following operating systems:
  - o Windows Server/Linux (for hosting the backend)
  - o Windows 10/11, macOS, Linux (for administrative and manager access)
  - o iOS/Android (for user accessibility via mobile browsers) Database Interface

- The system will use MySQL for storing exam-related data, including faculty, exams, student statistics, and admin information.

- The database will support CRUD operations (Create, Read, Update, Delete) for authorized users (Admin, Faculty, Student). Data Flow and Shared Data

- Incoming Data:
  - o User authentication requests (username, password)
  - o Exam and question data updates (by Admin and Faculty)
  - o User queries

- Outgoing Data:
  - o Exam statistics and exam results for users
  - o Data exports (CSV, PDF reports)

4. System Features

The Online Examination System (OES) is designed to facilitate the management of exams by providing essential functionalities for admin, faculty, and student. The system ensures efficient exam conduction, exam scheduling, and statistical analysis, all while maintaining role-based access and security.

4.1 Authentication System [FR-01-H]

4.1.1 Description and Priority

The Authentication System feature is responsible for handling user registration, authentication, and role-based access control. It ensures that only authorized users can access specific functionalities based on their roles (Admin, Faculty, Student).
- Priority: High

4.1.2 Stimulus/Response Sequences

- User Registration

  Stimulus: A new user submits a registration form with required details.

  Response: The system validates inputs, assigns a default role, and stores the user record in the database.

- User Login

  Stimulus: A registered user enters credentials and attempts to log in.

  Response: The system verifies credentials, grants access if correct, or denies access with an error message if incorrect.

- Role-Based Access

  Stimulus: A user (Admin, Manager, or General User) attempts to access a system feature.

  Response: The system checks role permissions and either grants or denies access.

- Profile Management

  Stimulus: A user attempts to update profile details.

  Response: The system validates the changes and updates the user record.

4.1.3 Functional Requirements

- REQ-1: The system shall authenticate users using a secure login mechanism.
- REQ-2: The system shall enforce role-based access control, ensuring users can only access permitted features.
- REQ-3: The system shall allow users to update their profile information, excluding role changes (only Admins can change roles).
- REQ-4: The system shall implement account recovery mechanisms, including password reset functionality.
- REQ-5: The system shall lock an account after multiple failed login attempts and notify the user.
- REQ-6: The system shall log all authentication attempts for security auditing.

4.2 Exam Management [FR-02-H]

4.2.1 Description and Priority

The Exam Management feature allows managers to create, edit, and manage exams by assigning questions and defining question attributes. It ensures that students adhere to exam rules and provides a structured framework for organizing exams.

- Priority: High

4.2.2 Stimulus/Response Sequences

Student Assignment

- Stimulus: A Faculty selects students to assign to an exam.
- Response: The Admin verifies eligibility, updates exam details, and prevents duplicate assignments.

Exam Editing

- Stimulus: A Faculty modifies exam details.
- Response: The Admin validates updates and ensures compliance with examination rules before saving changes.

Question Insertion and Deletion

- Stimulus: Faculty requests to insert or delete a question.
- Response: The Admin checks if the student has existing exam; if yes, it adds or removes the question to be inserted or deleted and updates the records accordingly.

4.2.3 Functional Requirements

- REQ-1: The system shall allow Faculty to create new exams by entering an exam name and other relevant details.
- REQ-2: The system shall validate student eligibility before exam.
- REQ-3: The system shall provide an interface for Faculty to edit exam details.
- REQ-4: The system shall restrict Student from modifying any exam-related information.

4.3 Exam Taking [FR-03-H]

4.3.1 Description and Priority

The Exam Taking feature allows Student to take Exam within the scheduled time. It ensures that exams are scheduled efficiently without conflicts and adheres to predefined examination rules and availability constraints.

- Priority: High

4.3.2 Stimulus/Response Sequences

Exam Creation

- Stimulus: An Admin selects students, a date, time, and venue to schedule an exam.
- Response: The system verifies availability, assigns a unique Exam ID, and stores the exam details.
- affected teams.

Exam Cancellation

- Stimulus: An Admin cancels a scheduled exam.
- Response: The system removes the match from the schedule, updates exam records, and notifies the students.

5. Other Nonfunctional Requirements

5.1 Performance Requirements

User requests, such as page navigation, form submissions, and data retrieval have to be executed within appropriate time frame. For instance, showing Exam schedules, results, and Student analytics should happen within appropriate time frame of being requested. Moreover, in the case of student and faculty registration, the system is expected to handle registration applications within appropriate time frame after the form submission. These functionalities cater to a better user experience by facilitating the quick interactions and effective data processing. The system will ensure a hassle-free user experience, minimal delays, and improved functionalities in the online examination system (OES) by supporting these response times.

5.2 Safety Requirements

To deter unauthorized access and cheating, the system will keep a record of all the actions of the Students, which includes the Admin, to be able to recognize and curb the illegal handling of the records. Besides, the system is installed with the role-based access control (RBAC) feature which depicts that only the users who have the authority will access the vital information. Meanwhile, in the event of failed logins, there will be a limit of five attempts per hour per user to prevent a breach of security. Once the number of chances exceeds the limit, the user's account will be locked temporarily and he/she will have to consult with the administrator to get the account reactivated. Such security measures serve the purpose of users' data protection, protection against unauthorized changes, and system integrity, which consequently provides a safe and secure environment for those who operate in the Online Examination System (OES).

5.3 Security Requirements

The system will enforce strict biometric access control and strict identity management measures to strengthen security. Admin and users will certainly have to use Multi-Factor Authentication (MFA). The system will check that all users are who they claim to be by asking them to provide at least one acceptable form of proof of their identity before they are allowed to access the system. Access control decisions will be made based on the roles of the users (for example, Admin, Student, Faculty) by Role-Based Access Control (RBAC). Passwords, which will never be stored in plain text, will be protected by the implementation of the following complex password rules: minimum length, special characters, and a combination of upper and lower case letters. These actions will promote user data protection, put a stop to unauthorized entry, and keep system integrity safe.

5.4 Software Quality Attributes

The system is going to be developed in a way that modification can be done to cater for the new types of exams, changes in rules, and feature updates. The frontend being designed using CSS will not only be future-proof but also be easy on the update of new features with just a little refactoring needed. Making sure the system is up 99.9% of the time, the system will have a strong error-handling mechanism and correct data processing which will be verified by automated tests. The system will not only easily be able to communicate with external APIs but will also plug into third-party services and consume REST APIs that are standardized. The use of the modular architecture, a version control system, and thorough documentation will make the system more maintainable. The system will also be cross-platform compatible, regular backups from the system will keep it reliable, common components that can be reused through several systems, protection from security threats, tests to a greater extent, and the presence of a user-friendly UI will make it user-friendly to the users and easy to understand.

5.5 Business Rules

To keep things in order and prevent any unauthorized activities, the system utilizes a rigid user role and permission system. More specifically, the admin is provided with the power to manage exams, faculty, students, exam schedules, results. Faculties are responsible for the procedure of Exam Creation, Exam availability, and Exam submissions. Whenever it is necessary, Faculties insert exam results and violations reports. Students are able to see the results and gain notifications. The top-secret data is open to a very small number of people but all the activities done there are recorded and encrypted for security reasons and to protect the confidentiality.

6. Other Requirements

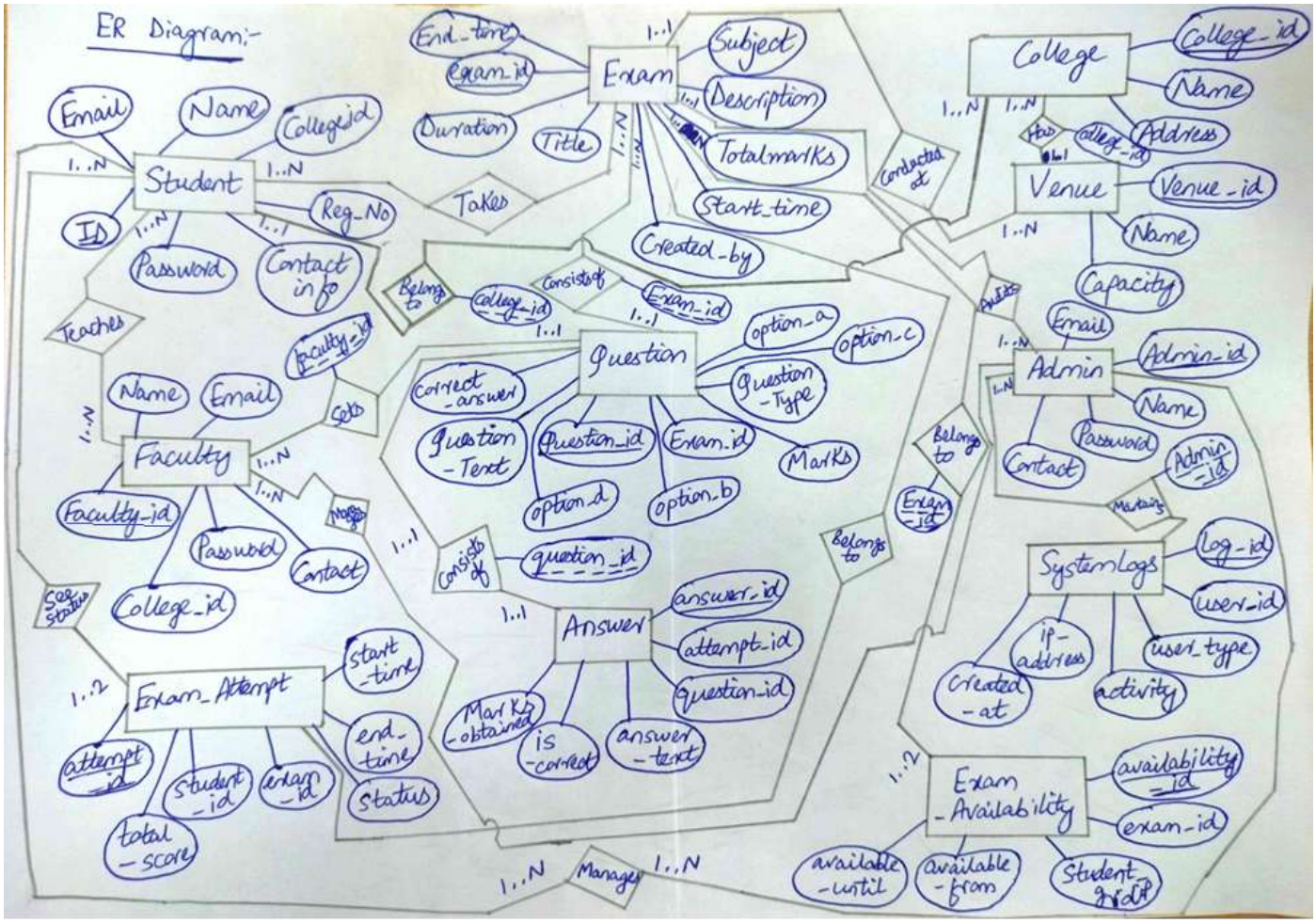
<Define any other requirements not covered elsewhere in the SRS. This might include database requirements, internationalization requirements, legal requirements, reuse objectives for the project, and so on. Add any new sections that are pertinent to the project.>

Appendix A: Glossary

Key Terms
- Admin – The user role responsible for managing the exams, student, faculty, schedules, and system logs.
- Faculty – A user responsible for registering and managing the questions, updating exam details, and making exam-related requests.
- Student – A user who can access exam information, result, can take exams and notifications.

Acronyms and Abbreviations
- SRS – Software Requirements Specification
- GUI – Graphical User Interface
- SQL – Structured Query Language
- OES – Online Examination System

Appendix B: Analysis Models



Appendix C: To Be Determined List

- Bulk question import
- Advanced analytics
- Mobile optimization