

Section I: Cover Page

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Section III: Project Description

A school management system database is intended to address various urgent difficulties encountered by educational institutions today, such as fragmented data management, poor communication routes, and the time-consuming manual processing of academic and administrative work. This system's single platform intends to simplify operations, improve data accuracy and increase stakeholder participation across the board.

The fundamental impetus for developing the school management system database comes from the requirements to:

Consolidate data management :Schools frequently use distinct systems for grades attendance, scheduling and financing,resulting in data silos and inefficiencies .

Improve Communication: The lack of integrated communication tools makes it difficult for instructors,students and parents to communicate successfully.

Move from manual work to automated platform: Manual administration operations can take a longer time comparing to automated solution.

Overview

As its core, the school management System database serves as the backbone for a comprehensive platform that integrates various functions such as students information ,academic records and scheduling and financial transactions.

By centralizing data,the system ensures that the information is consistently updated and accessible.

Unique Features

The school management system will introduce several unique features designed to enhance usability and functionality:

Customizable Dashboards: Users will have personalized dashboards that provide fast access to the most relevant information.

Advanced Analytics: The system will offer advanced analytics capabilities, enabling the generation of insights into academic performance, resource utilization, and financial management.

Integrated Communication Tools: A built-in messaging and notification system will support direct communication between teachers, students, and parents, fostering a collaborative community.

Enhanced Security and Privacy: With robust data encryption and access controls, the system will ensure the security and privacy of sensitive information.

Market Relevance

Existing software that significantly benefits from the integration with the school management system :

Canvas: Canvas could leverage the School Management System database to enhance its capabilities in scheduling, real-time analytics, and integrated communication tools. This integration would allow for a more seamless user experience, where academic and administrative data are synchronized across platforms, enabling educators and students to access a wider array of services within a single interface.

Section IV: Functional Database Requirements

1.User

- 1.1. User shall create only one account.
- 1.2. User shall be able to log into the system from multiple devices.
- 1.3. User shall have at least one role.
- 1.4. User can be assigned to multiple tasks.
- 1.5. User shall update their personal information.

2. Account

- 2.1. An account shall be created by one user .
- 2.2. Account shall have a unique username and password.
- 2.3. Account can be activated and deactivated.
- 2.4. Account shall log the last login time and date.

3. Role

- 3.1. A role shall be linked to many users .
- 3.2. A role defines access and permissions within the system.
- 3.3. Roles include Administrator, Teacher, Student, and Parent.

4. Student

- 4.1. A student shall be enrolled in multiple courses.
- 4.2. A student shall have a unique student ID.
- 4.3. A student can have multiple guardians .
- 4.4. A student shall have grades recorded for each course enrollment.
- 4.5. A student's enrollment history shall be trackable .

5. Teacher

- 5.1. Teacher can teach multiple courses.
- 5.2. Teacher shall create, update, and grade assignments.
- 5.3. Teacher can advise multiple students
- 5.4. Teacher shall have a schedule including all classes they teach.
- 5.5. Teacher can access and update student performance records.

6. Course

- 6.1. A course can have multiple enrolled students .
- 6.2. course shall be assigned to at least one teacher .
- 6.3. course may have prerequisites .
- 6.4. course includes multiple assignments and exams .
- 6.5. course shall have a defined maximum capacity for students.

7. Grade

- 7.1. A grade is associated with a student and a course .
- 7.2. Grades include assignments, exams, and final marks.
- 7.3. A grade shall be entered by the teacher of the course.
- 7.4. A student can view grades for their courses.
- 7.5. Grades can be revised by a teacher within a defined period.

8. Assignment

- 8.1. An assignment belongs to a course .
- 8.2. An assignment shall have a submission deadline.
- 8.3. Students can submit assignments multiple times until the deadline.
- 8.4. Assignments can be graded with feedback provided to students.

9. Schedule

- 9.1. A schedule is associated with each student and teacher.
- 9.2. A schedule includes class times, locations, and exam dates.
- 9.3. Schedules can be updated to reflect changes in course timings or locations.

10. Classroom

10.1 A classroom shall be assigned to multiple courses throughout the academic year .

10.2. A classroom has a defined capacity limit.

10.3 Classroom assignments consider course capacity and equipment needs.

11. Parent/Guardian

11.1. A parent/guardian can be linked to multiple students .

11.2 Parents/guardians can view their children's academic progress and attendance.

11.3. Parents/guardians receive notifications for academic events, grades, and absences.

12. Attendance

12.1. Attendance records are kept for each student for each class session.

12.2. Teachers mark attendance for each class session.

12.3. Attendance records can be reviewed by students, parents, and administrators.

13. Exam

13.1. An exam shall be scheduled for the classes .

13.2. Exam grades are input into the system by the teachers.

14. School Event

14.1. School events can be added to the calendar.

14.2. Events can have reservation capabilities for participants.

15. Library Resource

15.1. Users can check the library resources.

15.2. Setup due dates for the return

16. Textbook

16.1. Textbooks should be assigned for the courses.

16.2. Textbooks can be checked out from the library.

Section V: Non-functional Database Requirements

1. Performance

1.1. The database system shall support concurrent access by up to 1000 users without significant degradation in response time.

1.2. The system shall process transactions within 2 seconds under normal load conditions.

1.3. Query response times shall not exceed 5 seconds for complex queries under normal operational conditions.

1.4. The system shall provide real-time updates to user interfaces within 1 second of data changes.

1.5. Batch processing of daily attendance and grading updates shall be completed within a maximum of one hour.

2. Security

2.2. All user passwords shall be stored using secure hash.

2.3. The system shall implement role-based access control to limit access to sensitive data.

2.4. The system shall support secure login mechanisms, including two-factor authentication for administrative roles.

2.5. Regular security audits shall be performed, with vulnerabilities addressed within a defined timeframe.

3. Scalability

3.1. The database shall be designed to easily scale horizontally to accommodate growth in user numbers and data volume.

3.2. The system shall support the addition of new schools, each with up to 2000 students, without significant changes to the database schema.

3.3. The system's architecture shall support the distribution of database load across multiple servers.

3.4. The database shall maintain performance levels with a 10% annual growth in data volume.

3.5. The system shall provide mechanisms for easy backup and restoration to ensure data integrity during scaling operations.

4. Reliability

4.1. The database system shall achieve 99.9% uptime, excluding scheduled maintenance.

4.2. The system shall automatically recover from common database failures without data loss.

4.3. Data backup shall be performed daily, with the capability to restore data to any point within the last 30 days.

4.4. The system shall provide real-time data replication to a secondary site to ensure availability in case of a primary site failure.

