

Data Base Management System

Project Report

School Management System



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School Management System Report

SYSTEM OVERVIEW

The **School Management System** is a relational database designed to efficiently manage all operations related to students, teachers, subjects, classes, grades, attendance, timetable, and user roles in an academic institution. The system supports tracking academic records, scheduling, enrollment, and administrative activities.

DATABASE STRUCTURE & RELATIONSHIPS

1. STUDENTS TABLE

- **Purpose:** Stores detailed information about each student.
- **Key Attributes:** StudentID, FirstName, LastName, Gender, ClassID, DateOfBirth, AdmissionDate, Email, Phone.
- **Constraints:**
 - ClassID is a foreign key referencing Classes.
 - FirstName and LastName are NOT NULL.
 - Address was removed as per update.

2. TEACHERS TABLE

- **Purpose:** Stores teacher profiles.
- **Key Attributes:** TeacherID, FirstName, LastName, Email, Phone, SubjectID.
- **Constraints:**
 - Email must be unique.
 - SubjectID is a foreign key referencing Subjects.

3. SUBJECTS TABLE

- **Purpose:** Holds the list of subjects offered.
- **Key Attributes:** SubjectID, SubjectName, ClassLevel.

4. ENROLLMENTS TABLE

- **Purpose:** Represents the many-to-many relationship between students and subjects.
- **Key Attributes:** EnrollmentID, StudentID, SubjectID.
- **Constraints:**

- Foreign keys reference Students and Subjects.

5. GRADES TABLE

- **Purpose:** Records students' exam scores per subject and term.
- **Key Attributes:** GradeID, StudentID, SubjectID, ExamScore, Term, Year.
- **Constraints:**
 - Cascade delete for StudentID to ensure integrity.

6. ATTENDANCE TABLE

- **Purpose:** Tracks daily attendance for each student.
- **Key Attributes:** AttendanceID, StudentID, Date, Status, RecordedBy.
- **Constraints:**
 - Status must be one of 'Present', 'Absent', 'Late'.
 - RecordedBy references Teachers and is set to NULL if deleted.

7. USERS TABLE

- **Purpose:** Stores login credentials and roles for application access.
- **Key Attributes:** UserID, Username, PasswordHash, Role, LinkedID.
- **Roles Examples:** Admin, Teacher, Student.

8. TIMETABLE TABLE

- **Purpose:** Stores class schedules.
- **Key Attributes:** TimetableID, ClassID, SubjectID, TeacherID, DayOfWeek, StartTime, EndTime.
- **Relationships:**
 - Each class is taught by a teacher for a subject at a scheduled time.

9. SCHOOLYEARS TABLE

- **Purpose:** Defines academic years and terms.
- **Key Attributes:** AcademicYearID, YearStart, YearEnd, Term, Description.

10. CLASSES TABLE

- **Purpose:** Groups students into classes for a given academic year.
 - **Key Attributes:** ClassID, ClassName, AcademicYearID, RoomNumber, ClassTeacherID.
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RELATIONSHIPS DIAGRAM SUMMARY (ERD-STYLE)

- **Students ↔ Classes:** Many-to-One (a student belongs to one class).
 - **Teachers ↔ Subjects:** One-to-One (each teacher teaches a subject).
 - **Students ↔ Subjects (via Enrollments):** Many-to-Many.
 - **Students ↔ Grades:** One-to-Many.
 - **Students ↔ Attendance:** One-to-Many.
 - **Classes ↔ Timetable:** One-to-Many.
 - **Subjects ↔ Timetable:** One-to-Many.
 - **Teachers ↔ Timetable:** One-to-Many.
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DATA INSIGHTS

- **Student Count:** 14 students enrolled across different classes.
 - **Teacher Count:** 6 teachers, each assigned a unique subject.
 - **Subjects:** 5 core subjects currently offered.
 - **Attendance Status:**
 - Students are marked as **Present**, **Absent**, or **Late**.
 - **Grades Recorded:** Covers Term 1 and Term 2 for 2023–2024 academic years.
 - **Timetable:** Scheduled by day and time, linking class, subject, and teacher.
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INTEGRITY CONSTRAINTS AND UPDATES

- Added constraints for **cascading deletions** and **nullifying relationships** to maintain referential integrity.
 - Required fields like `FirstName`, `LastName` have been enforced with `NOT NULL`.
 - Removed unnecessary fields (e.g., `Address`) to streamline the schema.
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FEATURES SUPPORTED

- **Student Management** (enrollment, grades, attendance)
- **Teacher Management** (subject allocation, timetable)
- **Curriculum Planning** (subject-class level association)

- **Scheduling** (weekly class timetable)
 - **Performance Tracking** (grades per term)
 - **User Authentication** (with roles and linked IDs)
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RECOMMENDATIONS FOR FURTHER ENHANCEMENT

1. **Normalization:** Consider splitting full names into separate Name and MiddleName fields if needed.
 2. **Validation Triggers:**
 - Prevent multiple attendance entries per day per student.
 - Ensure grades are within a valid range (e.g., 0–100).
 3. **Views & Reports:**
 - Create views for current term grades.
 - Attendance percentage per student/class.
 4. **Audit Tables:**
 - Log grade changes or attendance modifications.
 5. **GUI Integration:**
 - Link this system to a frontend (web app or desktop app) for administrative ease.
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