A PROJECT ON SCHOOL MANAGEMENT SYSTEM DATABASE

submitted by,

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CSA0537-DATABASE MANAGEMENT SYSTEM FOR DATA MODEL

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School Management System Database Project

ABSTARCT:

This project proposes a School Management System (SMS) database to streamline school operations. Traditional paper-based methods are inefficient. The SMS offers a digital platform for managing students, staff, classes, and communication. Benefits include improved efficiency, data accessibility, and communication. It caters to administrators, teachers, students, and parents. The system utilizes a relational database and can be web-based or desktop-based. Future enhancements include online fee payment and integration with learning platforms. This project provides a database solution for improved school administration.

KEYWORDS: Student, Staff, Class, Enrolment, Attendance, Grades, Schedule, Database, Reports, Web-based, Inventory, Security, Communication, Permissions, Analytics.

1. INTRODUCTION:

The daily operations of a school rely on the efficient management of a vast amount of data. This data encompasses everything from student enrollment details and academic performance to class schedules and staff information. Traditionally, paper-based filing systems have been the primary method for storing this data. However, these manual processes are cumbersome and time-consuming. Accessing specific information can be a challenge, updates often become a tedious task, and generating reports can be a laborious process. This inefficiency can significantly hinder a school's ability to function smoothly and maintain clear communication between staff, students, and parents.

This project proposes a School Management System (SMS) database as a solution to these challenges. The SMS creates a centralized digital platform that streamlines all aspects of school administration. It offers a user-friendly interface accessible by authorized personnel, including administrators, teachers, students, and parents. This web-based or desktop-based system replaces the need for paper-based methods, promoting efficiency, improved data accessibility, and enhanced communication channels.

2.METHODOLOGY:

The database design involves creating several key tables to store relevant information:

1.Project Scope Definition:

- Manage student enrollment and registration processes.
- Store and maintain student demographic information, contact details, and academic records.
- Track attendance data and generate reports.

2.Requirement Gathering:

- Data points needed (student info, grades, etc.)
- Functionalities important to each user group (grading for teachers, reports for administrators)
- Security needs (access levels, data encryption)
- Reporting requirements (individual progress reports, attendance summaries)
- User interface (UI) preferences for an intuitive experience

3. System Design:

- The SMS utilizes a relational database with key entities like Students, Staff, and Classes. Relationships connect them (e.g., Students enroll in Classes).
- Data normalization ensures accuracy. The user interface prioritizes ease of use with role-based access and clear navigation.
- Security measures include secure logins, data encryption, and backups. The design is scalable for future growth.

4. Database Design:

The SMS utilizes a relational model with core tables: Students, Staff, Classes, Enrollments, Attendance, and Grades. Relationships are established (e.g., Students enroll in Classes) using foreign keys for data integrity. Each table stores relevant information (e.g., Students table stores student names, grades). This design enables efficient data organization and retrieval for the School Management System.

5.Implementation:

The SMS database takes flight through:

- Database Development: Building the core structure and migrating existing data (if needed).
- User Interface Creation: Crafting a user-friendly interface with role-based access.
- Testing & Deployment: Rigorous testing followed by secure server deployment and user training.

6.Testing:

The SMS undergoes rigorous testing to ensure flawless operation. Unit testing verifies individual modules, integration testing checks component interaction, and system testing simulates real-world use. User feedback is incorporated through acceptance testing. Diverse testing methodologies, including black-box, white-box, and data-driven testing, guarantee a secure and reliable school management system.

7.Deployment:

The SMS takes center stage with a strategic deployment. We'll choose a reliable server (on-premise or cloud) and securely migrate existing data (if needed). Following system installation and user training, a smooth launch is accompanied by ongoing support for a successful digital transition.

8.Training and Documentation:

- Provide training sessions for users on how to use the SMS effectively.

- Create user manuals and documentation to help users troubleshoot common issues

and perform routine tasks.

3. LITERARTURE REVIEW:

1. The primary goal of creating this system is to replace the current manual, pen-and-paper-based approach of manually recording attendance with an automated system. This system will replace the laborious old technique with a computer-based one that will save instructors time and lessen the amount of work they have to perform. It will

also replace the stationery material. The upkeep of the student's attendance information is handled by this system. Based on the student's attendance in class, it creates their attendance. It is kept up to date based on their attendance each day.

2. Over time, the majority of educational institutions have continued to use the manual attendance method. We currently use a web-based attendance management system, which can be installed on any computer, to solve the issue of manually recording attendance. The goal of this system's development is to keep database information easily accessible. The program uses Java, HTML, and CSS for the front end and MySQL for the back end. From the first day of class to the finish, it records every aspect of a student's attendance.
3. Software called "Students Attendance Management System" was created to track students' everyday attendance at the collage. Here, the staff members in charge of the topics will be in charge of recording the students' attendance. A unique login and password will be assigned to each staff member based on the topic matter they cover. This produces an accurate report depending on the attendance of the students. This approach will also assist in assessing a student's attendance eligibility requirements.
4. Monitoring student attendance is a critical component of the modern educational system for improving the quality of instruction. Traditional attendance forms that must be filled out by hand might cause a number of annoying problems. We devise an attendance system that tracks students' attendance using their fingerprints in order to prevent these problems. Making examinations simpler and more accurate for students is the goal of this work.
5. ICT and school management is a significant topic because it is widely acknowledged that senior administrators have a significant influence on curriculum and classroom practices, and that ICT use in schools is influencing many facets of school operations to the point where it will affect the work of all staff members (teaching and non-teaching). The aim of this review is to initiate an investigation into the breadth of literature in this sector, with the goal of identifying pertinent areas that might enhance our comprehension of current practices and requirements.
6. All schools need to implement E-School is an internet connection and desktop computers; expensive hardware and software are not needed. Our solution functions as a centralized database and application, which schools can conveniently access from any location with the right login information. Through a typical internet-accessible system,

almost any user can access E-School, a platform-independent system, from any location. E-School may also be tailored to meet the needs of certain schools.

4. CODE:

```
CREATE TABLE students (
    student_id INT PRIMARY KEY,
    first_name VARCHAR(50),
    last_name VARCHAR(50),
    date_of_birth DATE,
    address VARCHAR(255),
    phone_number VARCHAR(20)
);

CREATE TABLE teachers (
    teacher_id INT PRIMARY KEY,
    first_name VARCHAR(50),
    last_name VARCHAR(50),
    date_of_birth DATE,
    address VARCHAR(255),
    phone_number VARCHAR(20)
);

CREATE TABLE courses (
    course_id INT PRIMARY KEY,
    course_name VARCHAR(100),
    teacher_id INT
```

```
    FOREIGN KEY (teacher_id) REFERENCES teachers(teacher_id)
);

CREATE TABLE grades (
    grade_id INT PRIMARY KEY,
    student_id INT,
    course_id INT,
    grade DECIMAL(3, 2),
    FOREIGN KEY (student_id) REFERENCES students(student_id),
    FOREIGN KEY (course_id) REFERENCES courses(course_id)
);

CREATE TABLE classes (
    class_id INT PRIMARY KEY,
    class_name VARCHAR(50),
    teacher_id INT,
    course_id INT,
    schedule VARCHAR(100),
    room_number VARCHAR(10),
    FOREIGN KEY (teacher_id) REFERENCES teachers(teacher_id),
    FOREIGN KEY (course_id) REFERENCES courses(course_id)
);
CREATE TABLE enrollments (
    enrollment_id INT PRIMARY KEY,
```

```
    student_id INT,
    class_id INT,
    enrollment_date DATE,
    FOREIGN KEY (student_id) REFERENCES students(student_id),
    FOREIGN KEY (class_id) REFERENCES classes(class_id)
);
```

5. IMPLEMENTATION:

To implement the provided SQL code for the movie School Management database system in your project, you can follow these step-by-step instructions:

1. Entity-Relationship Model:

- Entities:

- Student: Contains information about students, such as student ID, name, date of birth, address, and phone number.

- Teacher: Contains information about teachers, such as teacher ID, name, date of birth, address, and phone number.

- Course: Contains information about courses, such as course ID and course name.

- Grade: Contains information about grades, such as grade ID, student ID (foreign key referencing the student table), course ID (foreign key referencing the course table), and grade value.

- Class: Contains information about classes, such as class ID, class name, teacher ID (foreign key referencing the teacher table), course ID (foreign key referencing the course table), schedule, and room number.

- Enrollment: Contains information about student enrollments, such as enrollment ID, student ID (foreign key referencing the student table), class ID (foreign key referencing the class table), and enrollment date.

2. Database Schema:

- Create tables for each entity with the specified columns and relationships (foreign keys) as described above.

- Define primary keys for each table to uniquely identify records.

- Define foreign keys to establish relationships between tables.

3. Normalization:

- Normalize the database to minimize redundancy and improve data integrity.

- Ensure each table represents a single entity and each attribute is atomic.

- Use foreign keys to link related tables instead of duplicating data.

4. Data Insertion:

- Insert sample data into the tables to populate them with initial values.

- Ensure data integrity by following referential integrity constraints (e.g., ensuring that foreign keys reference valid primary keys).

5. Queries:

- Use SQL queries to retrieve information from the database, such as querying all students, teachers, courses, grades, classes, and enrolments.

- Use JOIN operations to combine data from multiple tables when necessary (e.g., to retrieve student names along with their grades for a specific course).

8.TABLES:

student_id	first_name	last_name	date_of_birth	address	phone_number
1	John	Doe	2000-01-01	123 Main St	555-1234
2	Alice	Smith	2001-02-02	456 Elm St	555-5678

teacher_id	first_name	last_name	date_of_birth	address	phone_number
1	John	Doe	1980-05-15	123 Main St	555-1234
2	Jane	Smith	1975-08-20	456 Elm St	555-5678

course_id	course_name	teacher_id
1	Introduction to Mathematics	1
2	History of Science	2

grade_id	student_id	course_id	grade
1	1	101	85.50
2	1	102	90.00
3	2	101	78.00
4	2	102	88.50

class_id	class_name	teacher_id	course_id	schedule
1	Math Class A	1	101	Monday 9:00 AM - 11:00 AM
2	English Class B	2	102	Tuesday 10:00 AM - 12:00 PM

enrollment_id	student_id	class_id	enrollment_date
1	1	201	2024-01-01
2	1	202	2024-01-01
3	2	201	2024-01-01

7. CONCLUSION:

The SMS database empowers schools to ditch paper and embrace a digital future. This translates into improved efficiency, real-time data access, better communication, and data-driven decision making. All this while keeping information secure. This project provides a solid foundation, with exciting possibilities for future growth. By working with stakeholders and prioritizing user-friendliness and security, the SMS paves the way for a more streamlined and effective learning environment.

8. FUTURE ENHANCEMENT:

The SMS database is a springboard for even greater innovation. Here's a glimpse into the future:

- Online Payments: Integrate with payment gateways for convenient fee collection.
- Learning Platform Synergy: Connect with learning platforms for a unified learning hub.
- Mobile Access: Develop a mobile app for on-the-go information access.
- Deeper Insights: Leverage data visualization for informed decision-making.
- Parent Engagement: Create secure parent portals for progress reports and communication.
- AI-powered Future: Explore AI for personalized learning, automated tasks, and predictive analytics.

By embracing these advancements, the SMS can become a comprehensive ecosystem, empowering schools to thrive in the ever-evolving educational landscape.

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