أكاديمية البرمجة
Coding Academy
powered by Simplon

Database

School Management System

A school wants to manage its students, teachers, courses, classrooms, and attendance records efficiently. The system will store information about students, teachers, and the courses they teach, as well as the classrooms where classes are held and the attendance records of students.

Entities and Attributes:

1. Student (StudentID, Name, DateOfBirth, Gender, ClassroomID)
    - Stores information about students.
    - Each student belongs to one classroom.

2. Teacher (TeacherID, Name, Email, PhoneNumber, Specialization)
    - Stores details of teachers.
    - A teacher may teach multiple courses.

3. Course (CourseID, CourseName, TeacherID)
    - Stores course information.
    - Each course is assigned to one teacher.

4. Classroom (ClassroomID, ClassroomName, Capacity)
    - Stores classroom details.
    - Each classroom has multiple students.

5. Attendance (AttendanceID, StudentID, CourseID, Date, Status)
    - Tracks student attendance for each course.
    - Status can be "Present" or "Absent".

- Make the ERD and relational schema for this school, then create the database with all tables.
- Insert sample of data in each table (I will provide you with sample of data below)
- For Classroom:
    - (1, 'Grade 1 - A', 30)
    - (2, 'Grade 1 - B', 28)
    - (3, 'Grade 2 - A', 32)
    - (4, 'Grade 2 - B', 29)
    - (5, 'Grade 3 - A', 31)

- For Teachers:
    - (101, 'John Smith', 'john.smith@example.com', '123-456-7890', 'Mathematics')
    - (102, 'Jane Doe', 'jane.doe@example.com', '987-654-3210', 'English')
    - (103, 'Robert Brown', 'robert.brown@example.com', '555-666-7777', 'Science')
    - (104, 'Emily Clark', 'emily.clark@example.com', '444-555-6666', 'History')
    - (105, 'Michael Johnson', 'michael.johnson@example.com', '111-222-3333', 'Physics')

- For Courses:
    - (201, 'Algebra I', 101)
    - (202, 'Grammar Basics', 102)
    - (203, 'Biology Fundamentals', 103)
    - (204, 'World History', 104)
    - (205, 'Introduction to Physics', 105)

- For Students:
    - (301, 'Alice Johnson', '2012-05-10', 'Female', 1)
    - (302, 'David Williams', '2011-07-22', 'Male', 2)
    - (303, 'Sophia Martinez', '2012-03-18', 'Female', 3)
    - (304, 'James Anderson', '2011-09-30', 'Male', 4)
    - (305, 'Olivia Thomas', '2012-01-25', 'Female', 5)

- For Attendance:
    - (401, 301, 201, '2025-02-12', 'Present')
    - (402, 302, 202, '2025-02-12', 'Absent')
    - (403, 303, 203, '2025-02-12', 'Present')
    - (404, 304, 204, '2025-02-12', 'Present')
    - (405, 305, 205, '2025-02-12', 'Absent')

SQL QUERIES

1- Retrieve all students whose gender is 'Female'.
2- Get all teachers whose specialization is 'Mathematics' or 'Physics'.
3- Retrieve students born between '2011-01-01' and '2012-12-31'.
4- Display all courses in ascending order by their names.
5- Show students whose names start with 'A'.
6- Get all students whose names **contain** 'a'.
7- Find the minimum capacity among all classrooms.
8- Get the maximum capacity among all classrooms.
9- Find the average classroom capacity.
10- Count the total number of students.
11- Get the total number of students in each classroom.
12- Retrieve student names along with their classroom names
13- Get the course name along with the teacher's name.
14- Show all students and their attendance records (even if no attendance exists).
15- Show all courses and their assigned teachers (even if no teacher is assigned).
16- Retrieve all teachers and their courses, including teachers who don’t have any assigned courses.
17- Show the students who attended at least one class.
18- Retrieve students who have not attended any classes.
19- Find courses with more than 1 student enrolled (assuming students enroll via attendance records).
20- Retrieve the teacher who teaches the most courses.
21- Find all students who belong to the classroom with the highest capacity.
22- Get all courses taught by a teacher named 'John Smith'.
23- Retrieve the names of students who attended at least one class of 'Algebra I'.
24- Count the number of teachers per specialization.
25- Get the top 3 courses with the highest number of students enrolled.
26- Find students who have **never been absent**