

Student Management System

1) Project Overview

The Student Management System (SMS) is a console-based C++ application integrated with an SQL database. It enables users to manage student records, including adding, updating, deleting, and searching. This project strengthens your understanding of Object-Oriented Programming (OOP) and database management while practicing problem-solving.

2) Tools

- C++ – for application logic and OOP implementation.
- MySQL – for database management.
- MySQL Connector – to connect C++ with the database.
- An IDE (choose what you want).
- **Optional GUI Framework:** Qt or wxWidgets (It's advanced, do it if you want a graphical interface).

3) System Components

- Student Table – stores student details such as ID, name, age, department, and GPA.
- DatabaseManager Class – handles database connection and queries (INSERT, UPDATE, DELETE, SELECT).
- Student Class – represents student objects in C++ with attributes and methods.
- Main Menu – provides user interaction through console options.

4) Development Pipeline (Phases 1–5)

- Phase 1: Install tools, create the database, and create the student table.
- Phase 2: Create the C++ structure (Student, DatabaseManager classes).
- Phase 3: Database Connection. Use MySQL connector to execute SQL queries from C++.
- Phase 4: Implement Add, View, Search, Update, and Delete functionalities.
- Phase 5: Add looping menu.

Bonus Ideas

- Export data to CSV files.
- Top 5 students report.
- Input validation (validate age, grade, etc).
- Simple GUI interface using Qt or wxWidgets.