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CIS 344 – Database Design

Individual Project 1

1. Project Selection

Selected Mini World: SchoolsDB

The SchoolsDB system is designed to manage data within a school environment. It provides an organized structure for managing departments, teachers, students, courses, classrooms, schedules, and enrollments. The system ensures proper relationships between each entity, allowing for efficient data retrieval and management.

2. System Design Requirements

To design the SchoolsDB system, requirements were gathered by analyzing common school management structures and sample education database models. The main goal was to create a scalable and normalized relational database that represents real-world interactions among departments, teachers, students, and courses.

The design process included the following steps:
1. Identifying main entities: Departments, Teachers, Students, Courses, Classroom, Schedule, Enrollment.
2. Defining relationships between entities.
3. Ensuring data normalization to reduce redundancy.
4. Creating the Chen ER diagram and UML ER diagram in MySQL Workbench.
5. Forward engineering the model to generate SQL scripts.

3. Entity-Relationship (ER) Diagrams

Two ER diagrams were created to represent the database structure:

• Chen Style ER Diagram – Hand-drawn diagram showing entities as rectangles, attributes as ovals, and relationships as diamonds.
• UML Style ER Diagram – Created using MySQL Workbench to visually represent tables, columns, and connections using UML notation.

Entities and their relationships include:
- A Department can have many Teachers and Courses.
- A Teacher can teach multiple Schedules.
- A Course can appear in multiple Schedules.

- A Classroom can have multiple Schedules.
- A Student can enroll in multiple Schedules (via Enrollment).

4. Database Creation

The SchoolsDB database was implemented in MySQL Workbench and forward-engineered into SQL. The database contains the following tables:

- Departments
- Teachers
- Students
- Courses
- Classroom
- Schedule
- Enrollment

The `SchoolsDB.sql` file includes all SQL commands for schema creation, table definitions, and foreign key constraints.

5. Project Submission

All files are organized within a GitHub repository for easy navigation and evaluation. The repository contains the following items:

- SchoolsDB.mwb (MySQL Workbench file)
- SchoolsDB.sql (Database creation script)
- Chen_ER_Diagram.jpg (Hand-drawn diagram)
- UML_ER_Diagram.png (MySQL Workbench diagram)
- report.pdf (This report)
- README.md (Project overview and setup instructions)

The project demonstrates understanding of database modeling, entity-relationship design, and SQL implementation following best practices.