Database Project Proposal: University Management System

1. Introduction

As part of our database course, we are developing a University Management System to apply the concepts learned throughout the semester. This system will enable efficient management of students, instructors, courses, and departments within a university. The project will focus on designing a robust relational database, implementing it using JDBC (Java Database Connectivity), and performing essential database operations such as inserting, updating, and retrieving data.

This project aligns with the database principles covered in class, such as entity-relationship modeling, data manipulation, and database connectivity. By implementing this system, we will gain hands-on experience in designing, managing, and interacting with relational databases programmatically.

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2. Group Members

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• Sofiri Jaja

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3. Project Overview

The University Management System (UMS) will serve as a structured database system for handling university-related operations. It will store and manage data for students, instructors, courses, and departments while ensuring efficient retrieval and modification of records.

Key Functionalities

• Student registration and enrollment in courses

• Instructor assignment to courses

• Course management (creating, updating, and deleting courses)

• Departmental organization and structure

• Retrieving student grades and instructor salaries (with tax calculations)

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4. Database Requirements

Entities and Attributes

Our system will include the following core entities:

1. Students: (Student_ID, Name, Age, Email, Department_ID)

2. Instructors: (Instructor_ID, Name, Salary, Department_ID)

3. Courses: (Course_ID, Course_Name, Instructor_ID, Department_ID)

4. Departments: (Department_ID, Department_Name)

5. Enrollments: (Enrollment_ID, Student_ID, Course_ID, Grade)

Operations to be Implemented

• Entity-Relationship (ER) Diagram: A visual representation of relationships between entities.

• DDL (Data Definition Language) Statements: SQL scripts to create tables and relationships.

• DML (Data Manipulation Language) Statements: SQL scripts for inserting, updating, and retrieving data.

• JDBC Implementation: Java-based database connection for interacting with the system programmatically.

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5. Implementation Plan

Tools & Technologies

• Database: MySQL / PostgreSQL

• Programming Language: Java

• Connectivity: JDBC (Java Database Connectivity)

Version control : Github

| Task | Deadline |
|---|---|
| ER Diagram Design | March 30, 2025 |
| Database Schema Creation (DDL) | April 2, 2025 |
| JDBC Connection Setup | April 5, 2025 |
| Insert Sample Records | April 7, 2025 |
| Retrieve and Manipulate Data using JDBC | April 9, 2025 |
| Final Testing & Report Preparation | April 20, 2025 |

6. Conclusion

The University Management System will demonstrate our understanding of relational database design, SQL operations, and JDBC programming. By working on this project, we will enhance our skills in database connectivity and application development.

Some challenges we anticipate include ensuring data consistency, handling JDBC errors, and implementing optimized queries. However, through collaborative effort and effective problem-solving, we aim to successfully build a fully functional database system.

GitHub Repository

A repository will be created to host the project code, proposal, and final report. The link to the repository will be shared upon creation.