Institute Management System Using Command Line Interface (CLI)

Introduction

The CLI-Based Institute Management System is designed to streamline administrative tasks within an educational institute. It provides functionalities for student management, course enrollment, teacher access to student records for grade updates, and student access to their grades and marks using a unique assigned ID. The system ensures efficient data handling while allowing easy interaction through a command-line interface.

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Problem Statement

Managing an institute manually is inefficient and prone to errors. A command-line automated system is needed to streamline operations, improve accuracy, and securely handle concurrent processes.

Objectives and Scope

The system will have three types of users.

1. Admin
2. Teachers
3. Students

Each user has specific roles and permissions to ensure a structured and well-managed academic system.

Admin Functionalities

- Hire teachers and students (Manage recruitment and admissions).
- View all registered teachers and students.
- Search for a student using their unique Student ID.
- Create new semesters (e.g., Spring 2025, Fall 2026).
- Introduce new courses or update current courses.

- Assign or reassign teachers to courses and vice versa.
- View student course enrollments.
- Remove students or teachers from the system.

Teachers Functionalities

- Edit and update student grades for specific courses.
- Allocate or modify paper marks.

Students Functionalities

- View their marks and grades.
- View their enrolled courses and assigned teachers.

Technical Implementation

1. **Dining Philosopher Problem**

   Ensures fair resource allocation, particularly in managing concurrent access to data stored in CSV files.
2. **Reader-Writer Problem**

   Allows students to review their marks and grades while enabling teachers to update student records.
3. **Producer-Consumer Problem**

   Manages the teacher hiring process by ensuring smooth allocation of teachers to relevant courses.
4. **Programming Language**

   Bash (Shell Scripting) / C++
5. **Data Storage**

   Manages the teacher hiring process by ensuring smooth allocation of teachers to relevant courses.