COSC 439: Operating Systems Project
Title: Page Replacement Algorithm Simulation Project

Objective: The aim of this project is to create a page replacement algorithm simulation program implementing three widely-used algorithms: First-In-First-Out (FIFO), Least Recently Used (LRU), and Optimal. The program will simulate page replacement for a minimum of 30 pages, accepting input for page reference sequences, and providing detailed output for page faults. This includes not only the total number of page faults but also the entire page frame up to the current reference. Students are free to choose any programming language for this project.

Requirements:

1. **Progress Report:** Submit a progress report outlining encountered challenges, how you have solved them, the current status, and forthcoming steps. Upon submission, feedback will be given for project adjustment based on the provided feedback. **(1 pt)**
2. **Code Implementation:** Implement page replacement algorithms for a minimum of 20 pages using FIFO, LRU, and Optimal, with input for page reference sequences and output for page faults. Ensure the code is functional. **(6 pts)**.
3. **Technical Report:** Prepare a detailed report that includes **(5 pts)**:
    - **Introduction to the Project:** Define the project's objectives and its significance within memory management. Introduce page replacement concepts and highlight the scope of the project.
    - **Page Replacement Algorithms Used:** FIFO, LRU, Optimal. Describe the implementation and simulation of FIFO, LRU, and Optimal page replacement algorithms for memory management.
    - **Implementation Details:** Present technical insights into the implementation of the page replacement algorithms. Discuss challenges faced and significant decisions made during the development process.
    - **Study of the Results:** Showcase detailed outputs for FIFO, LRU, and Optimal page replacement algorithms. Analyze the performance of each algorithm individually and comparatively.
    - **Conclusion:** Summarize key findings from the implemented algorithms. Discuss the implications and importance of efficient page replacement in operating systems.
4. **Presentation:** In person presentation that focuses on the technical aspects of the project. Utilize PowerPoint slides to highlight project goals, algorithms employed, implementation details, evaluations, challenges encountered, and insights gained. Additionally, ensure the presentation includes a live demonstration of the project to provide a practical illustration of its functionality. **(5 pts)**
5. **Retrospective and Contribution Report:** Reflect on the Operating Systems (OS) course, summarizing significant lessons learned, their practical relevance, and their impact on understanding OS principles. Additionally, list your own contributions as well as those of your teammates towards the project. **(1 pt)**

Deadlines:

- **Progress Report:** November 17, 2025
- **Presentation and Demo:** December 3–8, 2025 (In person)
    - Presentations will take place in the professor's office (YR 456) or in the library (YR 454).
    - Each group will present together, and all group members must be present.

    - The professor may ask questions or request modifications to the project or source code to verify that the work was done by the students and not generated by GenAI or copied from online sources.
    - Time slots will be provided via Calendly, and students should book a slot according to their convenience.
- **Source Code Submission:** December 8, 2025
- **Technical Report:** December 11, 2025
- **Retrospective and Contribution Report:** December 11, 2025