

COSC 439: Operating Systems Project
Title: CPU Scheduling Simulation Project

Objective: The objective of this project is to develop a CPU scheduling simulation program that implements three scheduling algorithms: Round-Robin, First-Come First-Served (FCFS), and Priority. The program will simulate scheduling for a minimum of 20 processes, allowing input for arrival time complexities and I/O request details (time of I/O request since the process started and duration of the I/O request). The output will include waiting and turnaround times, along with any additional necessary information such as the time spent in the ready queue. For this project, you might select any programming language of your choice. You can use C/C++/Python/JAVA to complete 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. **Simulation Code:** Implement scheduling algorithms for at least 20 processes using RR, FCFS, and Priority, with input for arrival time complexities and output for waiting and turnaround times. It has to be a working code. **(6 pts)**
3. **Technical Report:** Prepare a detailed report consisting of the following sections **(5 pts):**
 - **Introduction to the Project: Purpose, Overview, and Scope**
 - Define the project's objectives and its significance within CPU scheduling.
 - Introduce CPU scheduling concepts and highlight the scope of the project.
 - Discuss the attributes of processes and measurable metrics for evaluation.
 - **Scheduling Algorithms Used: FCFS, RR, Priority**
 - Describe the implementation and simulation of First-Come First-Served, Round-Robin, and Priority scheduling algorithms for process management.
 - **Implementation Details: Technical Aspects and Development Insights**
 - Present technical insights into the implementation of the scheduling algorithms.
 - Discuss challenges faced and significant decisions made during the development process.
 - **Study of the Results: Analysis of Algorithm Outputs**
 - Showcase detailed outputs for FCFS, RR, and Priority scheduling algorithms.
 - Analyze the performance of each algorithm individually and comparatively.
 - **Conclusion: Insights and Significance of CPU Scheduling**
 - Summarize key findings from the implemented algorithms.
 - Discuss the implications and importance of efficient CPU scheduling 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