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CPUScheduler Report

Video link: https://youtu.be/njQFEpnwoMk?si=pkAph7Ltg234sTS-

Design Description:

This project implements three classic **CPU scheduling algorithms** in **Python**: **First-Come-First-Served (FCFS), Priority Scheduling, and Round-Robin (RR).** The system **reads a list of tasks** with their **name**, **priority**, and **CPU burst time**, then schedules them according to each algorithm's specific criteria. The **FCFS scheduler** processes tasks in arrival order **WITHOUT preemption**. The **Priority scheduler** selects tasks based on **priority values** (1-10), with **higher numbers** indicating **higher priority**. The **Round-Robin scheduler** allocates each task a **fixed time quantum** of **10ms** before cycling to the next task.

Our implementation follows an **object-oriented approach** with a central **Task class** for storing process attributes. Each scheduler is implemented as a standalone class with two primary methods: **add() for inserting tasks** and **schedule()** for **executing** the **scheduling algorithm**. The **FCFS** implementation **maintains** the **original task order**, while **Priority scheduling sorts** tasks by **priority value**. **Round-Robin** uses a queue data structure to manage **task rotation** with **time slicing**. We calculate and display key metrics including **average waiting time** and **average turnaround time** to compare algorithm performance.

Melody:

- Implemented **Task class** and **FCFS** scheduling algorithm
- Created **file parsing** functionality and **driver** script
- Built **CPU simulation** and process execution functionality
- Implemented performance metrics calculation
- Added detailed documentation and testing framework

Andrea:

- Implemented **Priority** and **Round-Robin** scheduling algorithms
- Designed **queue-based** implementation for **task rotation**
- Created statistics collection and reporting system
- Added execution tracing for visualizing task order
- Implemented edge case handling and algorithm comparisons