Project Proposal – CSCE 5640: Operating System Design

Project Overview & Objectives

The Project main goal is to design and implement 5 different ***CPU scheduling algorithms*** and analyse their performance using the following scheduling metrics: **1. Average waiting time, 2. turnaround time, and 3. response time**. The Schedule will read task data from external files and simulate the following algorithms: ***1. First-Come, First-Served (FCFS), 2. Shortest Job First (SJF), 3. Priority Scheduling, 4. Priority with Round Robin (PRR for tasks with equal priority) & 5. Round Robin (RR)*** *(Time Quantum is set to 10ms).* All the processes information is randomly generated, and all the 5 algorithms will have the same randomly generated process information. The test cases are created to check different algorithms' performance effectively and we use the final result of the execution to pick the best performing algorithm.

Team Size (3) and Team Members

Name	Role	Responsibility
Teja Piepur Chakravarthi	Developer, Tester & Report	Core algorithm implementation, integration, result analysis, Test case generation & Report
Yashvikumari Bhagat	Documentation & Validation Engineer	Input file design, performance metrics computation, report preparation & validation of results.
Harshitha Arugonda	Tester & Documentation	Test case generation, documentation, report preparation, validation of results.

Project Plan A: Task Division and Subtasks

Project Setup Task (Yashvi kumari & Harshitha) [Day 1-2; Tentative Due Date Oct/22/2025]: Planning the project structure, creating the file parser and initializing the C++ project.

Algorithm Implementation Task (Teja & Yashvi kumari) [Day 3 – 4; Tentative Due Date Oct/24/2025]: Implementing the scheduling algorithms.

Test Case Development Task (Teja & Harshitha) [Day 4 – 6; Tentative Due Date Oct/26/2025]: Generating multiple scheduling files with random burst times and random priorities.

Experimental Evaluation Task (Yashvi Kumari & Teja) [Day 6 – 8; Tentative Due Date Oct/28/2025]: Executing the created test cases and collecting the execution results such as waiting time, turnaround time and response time.

Result Analysis Task (Team) [Day 8 – 9; Tentative Due Date Oct/29/2025]: Execution results of all the algorithms are strictly analysed and compared against each other using the scheduling metrics.

Documentation & Final Report (Team) [Day 9 – 10; Tentative Due Date Oct/30/2025]: The Final step is compiling all the tasks, methodologies, results and the execution result analysis and its conclusion.

Project Plan B: Deliverables

1. Providing the Input schedule files: The Schedule files can be “schedule1.txt”, “schedule2.txt” and so on.
2. The Source code for the entire project (i.e**., C++ files**) for all five different scheduling algorithms.
3. The Project report “**.pdf file**”, which includes the compilation of all the steps and Comparative performance report and conclusion.

Experimental Environment

A. Programming Language Considered is C++: The C++ is choosed for its efficient memory management ability, efficient file handling and also performance suitability for the simulation in the CSE machines provided. (i.e., Previous assignments are submitted in C++).

B. Operating System is CSE Machine Terminal provided: Ensuring the ability of the project execution in the CSE Machine. Secondary testing will be performed on Windows 11 machine. Using Visual Studio Code.

C. Test Cases: we are creating a total of 15 test files. The test files are categorized in the following way.

1. 5 files with 5 Processes Each
2. 5 files with 10 Processes each
3. 5 files with 15 Processes each

Each file includes tasks in the format: **[task name] [priority] [CPU burst]**

Example Text file content for 2 tasks:

T1, 4, 20

T2, 2, 25

The Priorities range from **1 to 15**, CPU burst times range from **5 to 50 ms**.

The Evaluation Metrics considered for the scheduling algorithm:

1. **Average Waiting Time (AWT)**
2. **Average Turnaround Time (ATT)**
3. **Average Response Time (ART)**

Proposed Duration: 10 Days [*Oct/20/2025 to Oct/30/2025*]
Submission Format: Source code + Report