OPERATING SYSTEM

CPU SCHEDULING SIMULATOR

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Report on CPU Scheduling Simulator

Introduction

A. Background Information

The field of computer science and operating systems has seen significant advancements, especially in the area of CPU scheduling algorithms. CPU scheduling plays a crucial role in managing the execution of processes in a computer system, ensuring efficient resource utilization. As systems become more complex and diverse, the need for effective CPU scheduling simulators arises to analyze and optimize various scheduling algorithms.

B. Purpose of the Report

The purpose of this report is to provide a comprehensive understanding of CPU scheduling and present the development and utilization of a CPU scheduling simulator. By delving into the various scheduling algorithms, their advantages, and limitations, this report aims to highlight the significance of simulation tools in evaluating and improving the performance of operating systems.

C. Scope of the Report

The scope of this report encompasses an in-depth exploration of CPU scheduling concepts and the development of a simulator to emulate different scheduling algorithms. It also outlines the problem statement, objectives, and scope of the project, providing a roadmap for understanding the complexities involved in CPU scheduling simulations.

II. CPU Scheduling

A. Definition

CPU scheduling is the process of managing the execution of processes in a computer system, determining which process

should run next in order to achieve optimal resource utilization and system performance.

B. Objectives

The primary objectives of CPU scheduling include minimizing waiting times, maximizing throughput, and ensuring fairness in the allocation of CPU time among competing processes.

C. Types of CPU Scheduling

1. First Come First Serve (FCFS)

This algorithm schedules processes based on their arrival order, giving precedence to the first process that arrives.

2. Shortest Job First (SJF)

SJF schedules processes based on their burst time, executing the shortest job first to minimize overall completion time.

3. Priority Scheduling

Priority scheduling assigns priorities to processes, and the process with the highest priority is selected for execution first.

4. Round Robin Scheduling

Round Robin scheduling allocates fixed time slices to each process in a cyclic manner, ensuring fairness in CPU time distribution.

5. Longest Job First (LJF)

LJF selects the process with the longest burst time for execution, potentially leading to longer waiting times for other processes.

D. Advantages of CPU Scheduling

- Improved system responsiveness
- Enhanced resource utilization
- Increased throughput and efficiency

E. Limitations of CPU Scheduling

- Possibility of starvation for low-priority processes
- Complexity in managing priorities

- Sensitivity to process burst time estimation

III. Aim of the Project

A. Problem Statement

The project addresses the need for a CPU scheduling simulator to analyze and compare the performance of different scheduling algorithms under various scenarios.

B. Objectives of the Project

1. Develop a user-friendly CPU scheduling simulator.

2. Implement and integrate various CPU scheduling algorithms into the simulator.

3. Evaluate and compare the performance of scheduling algorithms through simulation.

C. Scope of the Project

The project scope involves designing and implementing a simulator capable of emulating the behaviour of different CPU

scheduling algorithms. It includes creating a user interface for ease of use and generating performance metrics for analysis.

IV. Conclusion and Recommendations

In conclusion, CPU scheduling plays a pivotal role in optimizing system performance, and the development of a CPU scheduling simulator provides a valuable tool for understanding and improving scheduling algorithms. Based on the simulation results, recommendations can be made for selecting the most suitable algorithm based on specific system requirements and characteristics. The continuous evolution of operating systems calls for ongoing research and development in the field of CPU scheduling to meet the ever-growing demands of modern computing environments.

Thank You