

Final Project Documentation: Advanced Operating System Simulator

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1 Introduction

1.1 Problem Statement

- Module 1: Process Simulation
- Module 2: Advanced Memory Management
- Module 3: Process Scheduling and Context Switching
- Module 4: Interrupt Handling and Dispatcher
- Module 5: Efficiency Analysis of Concurrency

1.2 Outline

2 Key Concepts and Features

2.1 Project 1

2.2 Project 2

2.3 Project 3

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2.4 Project 4

Wasn't Assigned

3 Module 1: Process Simulation

3.1 Problem Statement

3.2 Implementation

3.2.1 Core CPU Components and Registers

3.2.2 Process Control Block

3.2.3 Fetch-Decode-Execute Cycle

4 Module 2: Advanced Memory Management

4.1 Problem Statement

4.2 Implementation

4.2.1 Hierarchical Memory System

4.2.2 Memory Table

4.2.3 Dynamic Memory Allocation and Deallocation

5 Module 3: Process Scheduling and Context Switching

5.1 Problem Statement

5.2 Implementation

5.2.1 Process Control Block Enhancements

5.2.2 Scheduling Algorithms

Round-Robin

Priority-Based Scheduling

Shortest Time Remaining

Highest Response Ratio Next

First Come First Serve

Shortest Process Next

Feedback Scheduling

5.2.3 Context Switching

5.2.4 Integration with Fetch-Decode-Execute Cycle

6 Module 4: Interrupt Handling and Dispatcher

6.1 Problem Statement

6.2 Implementation

6.2.1 Types of Interruption

6.2.2 Interrupt Vector Table

6.2.3 Context Switching

7 Module 5: Efficiency Analysis of Concurrency

7.1 Problem Statement

7.2 Implementation

7.2.1 Performance Metrics Setup

7.2.2 Implementation of Time Tracking

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7.2.4 Performance Comparison

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8 The Simulation

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11 Appendix A: Screenshots