**OS Project:-**

**Overview**

This repository contains a Java-based simulator for an **Adaptive OS Scheduler for Real-Time Systems**. Real-time operating systems (RTOS) require highly predictable and responsive scheduling mechanisms to ensure that critical tasks are completed within their deadlines. This simulator provides a platform where users can visualize and analyze the performance of adaptive scheduling strategies specifically designed for real-time environments. The simulator dynamically adjusts the scheduling policy based on system load, task priority, and execution constraints to meet real-time deadlines effectively.

**Problem Statement**

In real-time systems, ensuring that tasks meet their deadlines is of utmost importance. Traditional scheduling algorithms such as Rate Monotonic Scheduling (RMS) and Earliest Deadline First (EDF) work well under certain conditions but may fail to adapt to changing system loads and unpredictable variations in task execution times. An **Adaptive OS Scheduler** aims to dynamically switch between different scheduling policies or modify scheduling parameters in real-time to optimize system performance. This project aims to address the challenge of designing an adaptive scheduler that intelligently adapts to variations in task characteristics and system workload to ensure predictable and efficient task completion.

The simulator allows users to select different task sets with varying deadlines, priorities, and execution times. It visualizes how the adaptive scheduler responds to these variations and ensures that deadlines are met while minimizing system latency and maximizing throughput.

**Features**

* **Adaptive Scheduling Policies:** Implements dynamic switching between different real-time scheduling algorithms such as RMS, EDF, and LLF (Least Laxity First).
* **Real-Time Simulation:** Visualizes task execution, deadline misses, and response times to give a clear picture of system performance.
* **Performance Metrics:** Displays task completion status, waiting time, response time, and deadline misses.
* **Custom Data Structures:** Tailored data structures for efficiently managing real-time tasks and scheduling events.

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**Contribution**

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