OS-Project Report

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Chapter 1

Introduction

1.1 Main idea

The Completely Fair Scheduler (CFS) is a process scheduler used in the Linux kernel. It was designed to provide fairness and good interactive performance for desktop applications. CFS models an "ideal, precise multi-tasking CPU" on real hardware. It is a time-sharing algorithm that assigns a virtual runtime to each task. The virtual runtime of a task specifies when its next timeslice would start execution on the ideal multi-tasking CPU described above.
This algorithm uses a red-black tree to store its running processes. A red–black tree is a specialised binary search tree data structure noted for fast storage and retrieval of ordered information.Since operations such as inserting, deleting, and finding values require worst-case time proportional to the height h of the tree, this upper bound on the height allows red–black trees to be efficient in the worst case, namely logarithmic in the number n of entries $h \in O(logn)$ which is not the case for ordinary binary search trees.

1.2 Main Goal

Our goal was to design and implement the CFS algorithm and test it on XV-6 operating system.

Chapter 2

Red-Black Tree

Chapter 3

Process weights and Nice value

Chapter 4

Preemption Logic

Chapter 5

Test and integration