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February 2, 2020

Operating System COP4600
Project-1 Report

Introduction

In this project, we test and measure the cost of system calls and the cost of context switch by the processor. For system call, we repeatedly call a system call and use timer function like gettimeofday() to measure the time cost of the loop of calls, then divide by the number of iteration for average cost. For context switch, we need to make sure to run process in the same CPU and use pipe and fork to perform context switch, then proceed to measure it.

Why

This problem helps see the cost of processes in the system. Knowing the cost of these processes could enhance overall performance.

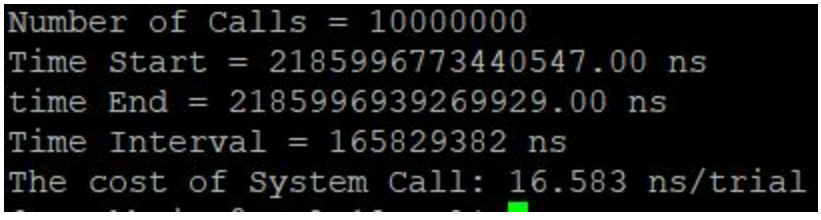
Approach

The approach we took is to make the program be simple and clear. To measure cost of system call we run a loop of 10000000 trials for a system call (gettimeofday(&temp, NULL)). Then we use clock_gettime(CLOCK_MONOTONIC &start) to record the start time and end time of the loop, and calculate the elapsed time by _____.

Approach for context switch is same as system call, simple and clear. To measure context switch we took the fork, read, write, pipe approach. Create two string messages, one for the parent process and one for the child, which will be read and write in parent and child array made for piping. We then pipe the two process, and assign pid_t to fork() to create new process.

Output

System call



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Context Switch

```
Time Interval = 34482176 ns
The cost of Context Switch is 3448.218 ns/trial
Time Interval = 34442817 ns
The cost of Context Switch is 3444.282 ns/trial
```

Obstacle

Initially, we use clock() and clock_t to measure time, but it was not accurate, outputting number less than 0.

Conclusion