Yue Duan' Homepage

LAB 3: PROCESS MANAGEMENT

Handed out Tuesday Mar 1 2022
Due Friday Apr 1 2022

1. INTRODUCTION

In this part of the assignment, you will change the scheduler from a simple round-robin to a priority scheduler. Add a priority value to each process (lets say taking a range between 0 to 31). The range does not matter, it is just a proof of concept. When scheduling from the ready list you will always schedule the highest priority thread/process first (the one with the lowest value). All the processes should have a default initial priority of 10. The deliverables for the assignment are the code that includes the required changes, as well as the user test program(s).
You will be graded by reports. Randomly seletected students (~10%) are expected to demonstrate that you understand what you did and why you did it that way.

2. GETTING STARTED

Based on Lab 1 to set up xv6 on your own machine.

To get started, look at the file `proc.c` .

3. ASSIGNMENT

a) Add a system call to change the priority of a process. A process can change its priority at any time. If the priority becomes lower than any process on the ready list, you must switch to that process.

b) Implement aging of priority. To avoid starvation, you need to implement aging of priority. If a process waits increase its priority (decrease its value). When it runs, decrease it (increase its value).

c) Track the scheduling performance of each process. You also need to add fields to track the scheduling performance of each process. These values should allow you to compute the turnaround time and wait time for each process. Add a system call to extract these values or alternatively print them out when the process exits.

d) Write an test program to illustrate that your priority scheduling works. You have to modify the makefile to add your example program so that it can be executed from inside the shell once xv6 boots.

4. WHAT TO SUBMIT

You need to submit a report that includes the folowing:

- All code changes you made on xv6 source code (hint: `diff -r original_xv6 your_xv6`)
- Detailed explanation about these changes
- Screenshots about how you run the related program(s) and results