

# Project 1

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## 1.

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### Additional system call:

syscall(333) is used to get current time (precision to nanosecond), and syscall(334) is used to print result given pid, start time, end time.

### Program design:

First it initialize cpu affinity, shared memory used to lock and pass data, set scheduler process's priority to 10, read standard input and sort them by their start time.

Then, in order not to waste many computing time that will affect result during simulation, I precompute the schedule according to the policy first.

Next, simulate the requirement by fork many child processes, and by our scheduling policy, set priority to 1 for idle process and set priority to 80 for running process. In addition, I have used shared lock and memory to somewhat synchronize the programs and in order to let only one process run in a time.

At last, it will wait for all child processes to avoid zombie process, and close the shared memory.

For implementation of the scheduling algorithm. FIFO is simply maintaining a queue. RR maintains an array and then implement rotation when changing process. SJF and PSJF maintain a sorted array but the it is possible for the latter one that a new process might steal the ownership of the cpu.

## 2.

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Kernel version: 4.14.25

Environment: ubuntu 16.04 LTS, running under windows 10 using virtualbox

## 3.

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I average the time of TIME\_MEASUREMENT and get that 500 time unit is about 0.98596 seconds, then take FIFO\_1.txt for example:

	Reality start time	Reality end time	Theory start time	Theory end time
1	0.0000	1.1409	0.000	0.9860
2	0.0004	2.8291	0.000	1.9719
3	0.0008	4.0219	0.000	2.9579
4	0.0009	5.2345	0.000	3.9438
5	0.0010	6.3954	0.000	4.9298

We can find that the reality time is greater than theory time, since scheduling process, other process on the system will also waste some cpu time and thus affect the result. In fact, since I runs on normal personal laptop and I run it on virtual machine, it has less stability and sometimes, such as the second row of the table, has a big gap between reality and theory. I thought that this project should be run on a same device to avoid unfairness.