SOFT400227: Operating System 2022-Fall

Homework-**2** Solutions

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Honor Code: I promise that I finished the homework solutions on my own without copying other people's work.

Process

1. the differences among short-term, medium-term, and long-term scheduling

	short-term scheduler	medium-term scheduler	long-term scheduler
from	ready, in memory	blocked, in memory	
to	be executed (allocated CPU)	disk	ready queue (in main memory)
other			the degree of multiprogramming
invoke	very frequently		very infrequently
atlas	CPU scheduler		job scheduler

2. actions taken by a kernel to context-switch between processes

1. The state of the currently executing process must be saved to PCB(Processor Control Block). PCB includes all the registers that the process may be using, especially the program counter, plus any other operating system specific data that may be necessary.
2. The PCB might be stored on a stack in kernel memory. A handle to the PCB is added to the ready queue.
3. When the process is rescheduled for execution, OS can then switch context by choosing a process from the ready queue and restoring its PCB thus execution can continue in the chosen process.

3. the value of `pid` & `pid1` in line A,B,C,D

assume the pid of parent process and child process is 2600 and 2603 respectively.

```
1 int main()
2 {
3     pid_t pid, pid1;
```

```
    pid = fork();
    if (pid < 0){
        fprintf(stderr, "fork fail");
        return 1;
    }else if (pid == 0){
        pid1 = getpid();
        printf("child: pid=%d", pid);     //A
        printf("child: pid1=%d",pid1);    //B
    }else{
        pid1 = getpid();
        printf("parent: pid=%d",pid);     //C
        printf("parent: pid1=%d",pid1);   //D
        wait(NULL);
    }
    return 0;
}
```

Answer:

A	pid	**0**
B	pid1	**2603**
C	pid	**2603**
D	pid1	**2600**

4. P104,3.10

```
    CHILD: 0 CHILD: -1 CHILD: -4 CHILD: -9 CHILD: -16 PARENT: 0 PARENT: 1 PARENT: 2 PARENT: 3 PARENT: 4
    // X line: printout num[] after modified in child process.
    // Y line: printout num[] in parent process. The array won't change with child process because they
        are seperate in different physical address after fork().
```

Other things

LaTeX code refer to these things and was complied on texlive2020.

- UCB-CS70's given homework template.
- A free website useful to edit LaTeX formula code.

Some description refer to *Operating System Concepts 10th*, Wikipedia and Professor.Tian's PPT.

The purpose of writing in English is to adapt to bilingual teaching and to improve my poor English writing skills in preparation for a possible future exchange program.

Thanks for your correcting and grading :).