Operating Systems

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Spring 1400

Writing assignment #1 - Processes

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Due date : **1400/1/27 (23 : 59)**
Submission: upload your answers as a pdf file to Quera
(Answers must be written in **Persian)**

1. Suppose you want to design a scheduler for an operating system that has a very complex PCB (large in size). For each of the following suggestions, explain the corresponding pros and cons.

a) Define a constant time slice t, each process can use the cpu for time t, then the next process uses the cpu.

b) Sort the processes. [shortest … longest], Each process uses the cpu and does its job completely in the order.

2. How many child processes are created when the above code is executed? Explain your answer.

```
fork();
fork();
fork();
```

3. How many processes does the following pseudo-code generate? How many "s" characters will be printed? Explain your answers completely.
(call to wait() blocks the calling process until one of its child processes exits or a signal is received. After child process terminates, parent *continues* its execution after wait system call instruction)

Note: in all the writing questions, suppose “printf” method does not use buffering (explained in OS Group)

```
for (int i = 0; i < 3; i++)
{
int r = fork();
printf("s");
if (r > 0)  wait();
}
```

4. Explain what the following code does step by step and draw the corresponding process tree.

```
if (fork() && (!fork())) {
if (fork() || fork()) {
fork(); } }
printf("2 ");
```

5. Two IPC methods are **message passing** and **shared memory**. Answer the following questions about these two methods:

a) Which one do you think is faster in average and why?

b) Which one does not need to resolve data conflicts? Explain your answer.

6. Answer the following questions about threads:

a) can a thread do the jobs that a process does? If yes, what is the difference in their applications?

b) do two processes share the same address space? What about two threads in the same process?

c) which one (thread or process) is easier to create? Why?