COSC 3360/6310 FIRST QUIZ ANSWERS

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First question

- How can we prevent a process from ***writing*** into the address space of ***another process***?

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  - **Memory protection**
    - **It checks every reference issued by a core**

First question

- What made UNIX ***more portable*** than its predecessors?

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- What made UNIX ***more portable*** than its predecessors?
  - **It was written in a high-level language.**
  - ***Its source code was available.***

First question

- How do processors switch from ***user mode*** to ***privileged mode***?

First question

- How do processors switch from ***user mode*** to ***privileged mode***?
  - **Through the interrupt mechanism**
  - **By doing a system call (still full credit)**

First question

- Why do most operating systems on the market continue to use ***monolithic kernels***?

First question

- Why do most operating systems on the market continue to use ***monolithic kernels***?
  - **Because they are faster.**

First question

- Why is **fork()** one of the most ***expensive*** system calls?

First question

- Why is **fork()** one of the most ***expensive*** system calls?
  - **Because it has to create a new address space and fill it with an exact copy of the parent address space.**

First question

- What happens when a process does a **wait(…)** on a child process that has ***already terminated***?

First question

- What happens when a process does a **wait(…)** on a child process that has ***already terminated***?
  - **It keeps going without further delay.**

Second question

- ***Main advantage of timer interrupts:***

Second question

- ***Main advantage of timer interrupts:***
  - **They prevent processes from monopolizing a core.**

Second question

- ***Main advantage of microkernels:***

Second question

- ***Main advantage of microkernels:***
  - **They provide a safe mechanism for adding new features to the kernel.**
  - **They are both safe and extensible**

Second question

- ***Main advantage of dual-mode CPUs:***

Second question

- ***Main advantage of dual-mode CPUs:***
  - **They allow us to prevent user processes from directly accessing hard drives and other peripherals.**

Second question

- ***Main disadvantage of user-level threads:***

Second question

- ***Main disadvantage of user-level threads:***
  - **The kernel will block all threads of a process each time any of them does a blocking system call.**

Second question

- ***Main disadvantage*** of ***non-preemptive scheduling policies:***

Second question

- ***Main disadvantage*** of ***non-preemptive scheduling policies:***
  - **They let CPU-bound processes monopolize cores.**

Second question

- ***Main disadvantage of the round-robin scheduling policy:***

Second question

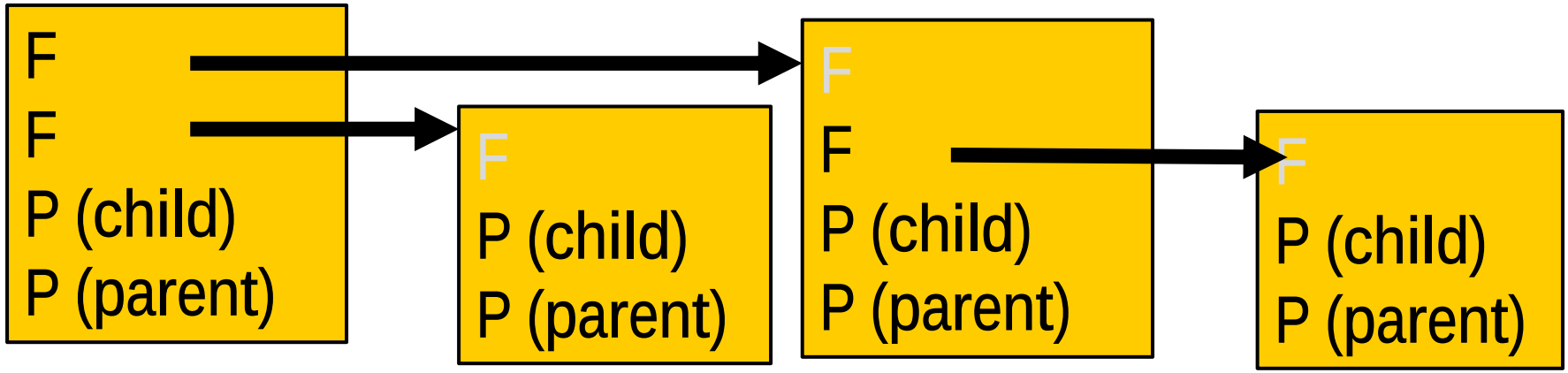
- ***Main disadvantage of the round-robin scheduling policy:***
  - **It performs poorly when the system is heavily loaded.**
    - **Too many context switches**

Third question

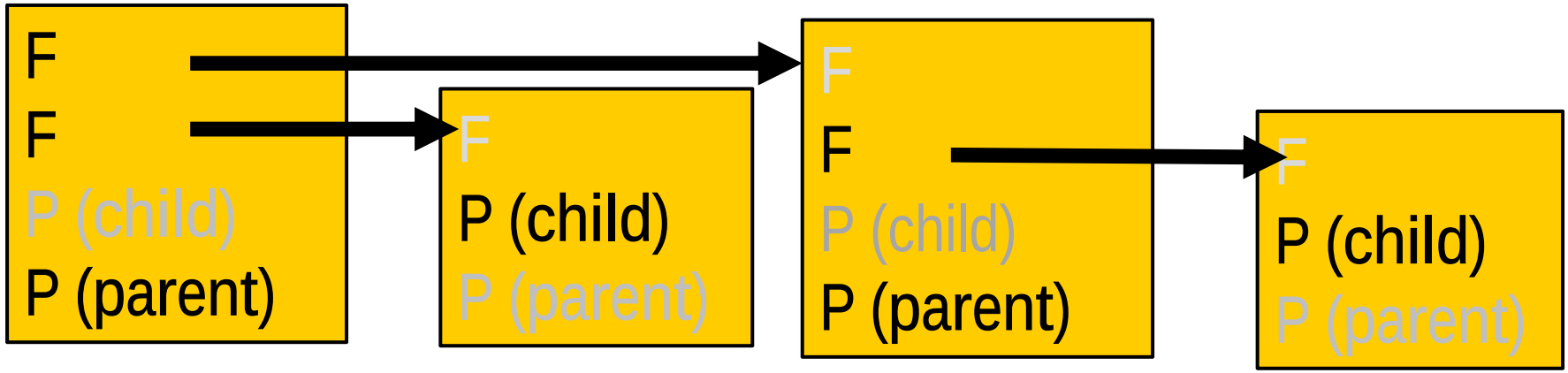
- What will the following program print out?

```
main() {
        fork();
        if (fork() == 0) {
            cout << "Hello!\n";
            _exit(0);
        }
        cout << "Goodbye!\n"
}
```

What will happen (II)



What will happen (III)



Third question

- **The program will print out <u>two</u> “Hello!” and <u>two</u> “Goodbye!”**

Fourth question

- Complete the following sentences:
  - A ***running process*** will return to the ***ready state*** if either

    _____

    or

    _____

  - It will go to the ***blocked state*** if

    _____

Fourth question

- Complete the following sentences:
  - A ***running process*** will return to the ***ready state*** if either
    a timer interrupt occurs
    or
    a higher priority process arrives
  - It will go to the ***blocked state*** if
    _____

Fourth question

- Complete the following sentences:
  - A ***running process*** will return to the ***ready state*** if either
    a timer interrupt occurs
    or
    a higher priority process arrives
  - It will go to the ***blocked state*** if
    it performs a system call

Fourth question

- Complete the following sentences:
  - **We can safely swap out processes that have remained a long time in the blocked state.**
  - **When a process does a blocking system call, it remains in the blocked state until the call is completed then goes to the ready state.**

Fifth question

- Why is it important to have a ***signal*** that ***no process can catch***?

Fifth question

- Why is it important to have a ***signal*** that ***no process can catch***?
  - **We should be able to terminate <u>all</u> processes.**

Sixth question

- When should we ***suspend processes***?

- Which processes are the ***best candidates*** for being suspended?

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- When should we ***suspend processes***?
  - **When we need to make space in main memory.**
- Which processes are the ***best candidates*** for being suspended?

Sixth question

- When should we ***suspend processes***?
  - **When we need to make space in main memory.**
- Which processes are the ***best candidates*** for being suspended?
  - **Processes that have been in the BLOCKED state for a long time.**