

NAME: _____ (FIRST NAME FIRST) TOTAL: _____

COSC 4330/6310

FIRST QUIZ

FEBRUARY 17, 2014

This exam is **closed book**. You can have **one** page of notes. UH expels cheaters.

1. Match each of the following features with the *single sentence* that describes it best: (10×3 points)
(*Hint: Several of the choices offered are plain wrong.*)

<i>dup()</i>	<u><i>d</i></u>	<i>microkernels</i>	<u><i>g</i></u>
<i>execv ()</i>	<u><i>j</i></u>	<i>pipe</i>	<u><i>p</i></u>
<i>fork()</i>	<u><i>e</i></u>	<i>privileged mode</i>	<u><i>a</i></u>
<i>kill()</i>	<u><i>k</i></u>	<i>signal()</i>	<u><i>m</i></u>
<i>lightweight processes</i>	<u><i>l</i></u>	<i>wait state</i>	<u><i>b</i></u>

- (a) Allows the CPU to execute input/output instructions.
- (b) Contains all processes that are waiting for the completion of a system request.
- (c) Contains all the processes waiting for the CPU. (*answer for the ready state*)
- (d) Creates a duplicate of a given file descriptor.
- (e) Creates a new process.
- (f) Define interrupt priorities. (*answer for vectorized interrupts*)
- (g) Delegate most of their duties to user-level servers.
- (h) Gives real-time processes faster access to the disk controller. (*plain wrong*)
- (i) Identifies a superuser process. (*plain wrong*)
- (j) Loads in memory the program to be executed by a given process.
- (k) Sends a signal to another process.
- (l) Share the address space of their parent.
- (m) Specifies what a process should do when it receives a signal.
- (n) Specifies which files cannot be accessed by the user processes. (*plain wrong*)
- (o) Terminates the process making that system call. (*answer for _exit()*)
- (p) Used to send the standard output of a process to the standard input of another one.

2. **Advantage and disadvantages:** you will get no credit if you answer mentions a disadvantage when an advantage is asked and vice versa. (6×5 points)

(a) What is the major disadvantage of **modular kernels**?

Modular kernels are much less reliable than other kernels because they allow users to load possibly unsafe extensions into the kernel.

(b) What is the major advantage of having **timer interrupts**?

They will prevent CPU-bound processes from monopolizing the CPU.

(c) What is the major advantage of **not allowing** processes to catch SIGKIL signals?

It provides a sure way to terminate any process no matter what.

(d) What is the major advantage of **DMA controllers**?

They speed up data transfers between the disks and the memory.

(e) What is the major disadvantage of **delayed writes**?

Data waiting to be written on disk will be lost if the writing process or the kernel crashes.

(f) What is the major advantage of **copy-on-write** implementations of the fork() system call?

They reduce the cost of the fork() system call by letting parent and child share the same address space and only copy the pages that either of them has modified.

3. Add the two system calls that will ensure that the program will print exactly once Hello World! and Goodbye! *in that order*. (2×5 points)

```
int main(){
    if (fork() == 0) {
        printf("Hello World!\n");

        _exit(0); // do not forget the underscore
    }

    wait(0);

    printf("Goodbye!\n")
} // main
```

4. Which of the following statements apply to (a) kernel-supported threads, (b) user-level threads and (c) all threads? (5 points per correct line)

	<i>Kernel- supported</i>	<i>User- level</i>	<i>All threads</i>
They can be ported to different architectures.	_____	_____✓_____	_____
They may require the use of non-blocking system calls.	_____	_____✓_____	_____
They allow the kernel to allocate several processors to the threads sharing the same address space.	_____✓_____	_____	_____

5. Which are the three states a running process can go and when? (3×5 points)

(a) To the ready state when the process gets preempted.

(b) To the waiting state when the process issues a (blocking) system request.

(c) To the terminated state when the process terminates.
