COSC 4330   FIRST MIDTERM   FEBRUARY 27, 2012

*This exam is **closed book**. You can have **one page** of notes. Please answer every part of every question.*

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**.*)

dup()	__d__	*kill()*	__l__
starvation	__k__	*execvp()*	__j__
microkernel	__f__	*pipe*	__p__
wait state	__b__	*signal()*	__m__
privileged mode	__a__	*vectorized interrupts*	__e__

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.

d) Creates a duplicate of a given file descriptor.

e) Define interrupt priorities.

f) Delegates most of its duties to user-level servers.

g) Gives a disk controller direct access to the main memory.

h) Gives real-time processes faster access to the CPU.

i) Identifies a superuser process.

j) Loads in memory the program to be executed by a given process.

k) Said to occur when one process is denied access to the CPU over a long period of time.

l) Sends a signal to another process.

m) Specifies what a process should do when it receives a signal.

n) Specifies which files cannot be accessed by the user processes

o) Terminates the process making that system call.

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 mention a disadvantage when an advantage is asked and vice versa.* (6×5 points)

a) What is the major disadvantage of ***delayed writes****?*

Data will be lost each time the system crashes while there are data waiting to be written in

the system I/O buffer.

b) What is the major advantage of ***symmetric multiprocessing***?

System requests can be performed on any processor, which avoid a potential bottleneck.

_____

c) What is the major advantage of ***modular kernels****?*

We can add new features to the kernel, such as new device divers without

recompiling it and having to reboot the system.

d) What is the major disadvantage of ***kernel-supported threads****?*

Switching between two threads of the same task requires two context switches.

_____

e) What is the main disadvantage of the ***round-robin scheduling policy*****?**

When the system is heavily loaded, the policy occasions too many context switches in order

to maintain an acceptable response time for interactive processes.

f) What is the major advantage of ***fair schedulers***?

They try to give to each process its "fair share" of CPU time

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

	Kernel-supported	*User-level*	*Both types*
They do not require kernel modifications.	____	__X__	____
They share the address space of their parent.	____	____	__X__
They allow the kernel to allocate several processors to the threads sharing the same address space.	__X__	____	____

4. Complete the following program fragment to redirect **stdin** to the pipe **mypipe**. (2×5 points)

```
int mypipe[2];
pipe(mypipe);
```

close(0); // close stdin _____

dup(mypipe[0]); // create a duplicate of pipe[0] in file descriptor 0 _____

5. Consider the following System V Release 4 scheduler:

```
#ts_quantum ts_tqexp ts_slpret ts_maxwait ts_lwait LEVEL
   800         0         1        16000       Y      # 0
   400         0         2         8000       2      # 1
   200         1         3         4000       3      # 2
   100         2         X         2000       Z      # 3
```

and add the three missing parameters: (3×5 points)

a) X should be equal to <u>3 (the process already is at is the highest priority level)</u>

b) Y should be equal to <u>1 (we should increase the process priority level from 0 to 1)</u>

c) Z should be equal to <u>3 (the process already is at is the highest priority level)</u>

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