COP 4600 – Midterm Examination - 1

Date: October 2, 2013

**Name: ………………………………………………………………………………………………………….**

Instructions:

* This exam is open book and open notes. Allotted time is 75 minutes.
* Note that the points add up to 100 + 20 bonus points.

# Problem 1 (10 points)

**Circle the correct answer:**

A \_\_\_\_ can be used to prevent a user program from never returning control to the operating system.

A) portal

B) program counter

C) firewall

D) timer

Embedded computers typically run on a \_\_\_\_ operating system.

A) real-time

B) Windows 7

C) network

D) clustered

When a child process is created, which of the following is a possibility?

A) The child process runs concurrently with the parent.

B) The child process has a new program loaded into it.

C) The child is a duplicate of the parent.

D) All of the above

# Problem 2 (10 points)

Explain why an operating system can be viewed as a resource allocator (3 sentences)

# Problem 3 (10 points)

Give two arguments why a printer driver should run in kernel mode, and two arguments why it should run in user mode (2+2 sentences)

# Problem 4. (10 points)

Describe why direct memory access (DMA) is considered an efficient mechanism for performing I/O. (3 sentences)

# Problem 5 (10 points)

Consider that you are designing Windows 9. Give two arguments in favor of a microkernel organization, and two arguments against it (2+2 sentences)

# Problem 6 (10 points)

Give two arguments for the use of virtual machines, and two arguments against it. (2+2 sentences)

# Problem 7 (10 points)

Give three reasons why it is advantageous to run a web server as a multi-threaded process (3 sentences)

# Problem 8 (10 points)

Discuss the way the in which the Round Robin algorithms behavior is impacted by the size of the time quantum? (about 4 sentences)

# Problem 9 (20 points)

Consider the following code segment. Explain what will happen and how many processes you will have (a drawing would help):

**for(int i = 0; i!=3; i++) {**

**fork();**

**}**

# Problem 10 (20 points)

You are a software developer. For each of the following things say whether

x. it happens or not, you as a software developer cannot do anything about it

y. it is bad thing, and you as a software developer can do things to avoid it

z. it is good thing, and you as a software developer can do things to make it happen

For each of the following,

* Specify if it is x,y or z and explain in one sentence why it is so.

(a) atomic operation

(b) critical section

(c) deadlock

(d) mutual exclusion

(e) race condition

(f) starvation

(g) Discuss what would change above if you are a hardware developer.