NAME: _____ (FIRST NAME FIRST) **SCORE**: ____

COSC 6360 SECOND MIDTERM NOVEMBER 1, 2008

This exam is closed book. You can have one sheet (that is, two pages) of notes. UH expels cheaters
Please answer every part of every question.

1. What is the function of SPIN ***externalized references***? (5 points) How are they implemented? (5 points)

SPIN externalized references are used to pass pointers to kernel data structures to user-level applications in a safe manner. To prevent any tampering with the pointer, the user-level application is given an index into a per-application table of safe references to kernel data structures.

2. What is the difference between a *logical clock* and a *physical clock*? (10 ***easy*** points)

Unlike physical clocks, logical clocks do not measure the passing of time.

3. What is the function of Totem *guaranteed vector messages?* (10 ***easy*** points)

Totem guaranteed vector messages let processes in a multiple ring protocol keep delivering the messages they receive hen one of the rings does not forward any messages.

4. Which are the respective strong points of (a) Kerberos and (b) one–time password systems for controlling remote access to computing services? **(**2×5 points)

The strong point of Kerberos is _ Kerberos does not require any additional hardware such as a smart card. _____

The strong point of one-time password is _ One-time passwords allow secure remote access from untrusted workstations (and dumb terminals too). _____

5. How does Nooks ***recover*** from an extension failure? (5 points)

It restarts the extension. _____

What is the ***main limitation*** of this approach? (5 points)

It does not work for all extensions._____

T:_____

6. Consider a RAID-5 system with four data blocks (b_0, b_1, b_2, b_3) and one parity block p per stripe.

a) How much of the total disk space is used by parity blocks? (5 ***easy*** points) __ 20 __ percent

b) How can we reconstitute the contents of block b_0 after the disk holding that block ***has failed***? (5 points)

_ $b_0 = b_1$ XOR b_2 XOR b_3 XOR p _____

7. Consider a ***single-ring*** Totem system comprising two processors A and B. Assuming that each of these two processors has received the following messages:

Processor	**Messages**
A	**3, 4, 7, 8**
B	**3, 4, 5, 7, 8**

Which messages will be delivered by each processor if all messages are ***agreed delivery messages***? (2×5 points and no partial credit)

A will deliver messages numbered __ 3 and 4 _____

B will deliver messages numbered __ 3, 4 and 5 _____

8. Consider the following CSP program:

```
ch :char; *[one ? c → two ! c];
```

a) What is the program doing? (5 points)

_ It sends to process two the characters it gets from process one. _____

b) When will it terminate? (5 points)

_ When process one terminates. _____

~~**9.** What is a Content Distribution Network (CDN)? (10 ***easy*** points)~~

~~**10.** What is the ***function*** of a Coral Distributed Sloppy Hash Table (DSHT)? (10 points for the function and no need to describe its operation)~~