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

COSC 4330/6310 THIRD QUIZ MAY 8, 2015

THIS EXAM IS CLOSED BOOK. YOU CAN HAVE ONE PAGE OF NOTES. UH EXPELS CHEATERS.

1. Current implementations of the AMD64 architecture use 48-bit virtual addresses. Assuming a page size of 4 KB,

(a) How many bits of the address would be used by the ***byte offset*** (5 points) **$\log_2 4{,}096 = 12$ bits**

(b) How many bits of the address would be used by the ***page number*****?** (5 points) **48 -12 = 36 bits**

(c) How ***many pages*** would there be in a process address space? (5 points) **2^{36} pages**

2. Explain why the FIFO page replacement policy

(a) Has a very low overhead. (5 points) **It does not keep track of page accesses.**

_____

(b) Produces more page faults than other policies. (5 points) **It does not keep track of page accesses.**

_____

3. A 32-bit FFS file system has a block size of 4 kilobytes. How many ***blocks*** of a 510 kilobyte file can be accessed :

(a) Directly from the i-node? (5 points) **12 (that's 48K bytes) blocks**

(b) With one level of indirection? (5 points) **(510 K- 48K)/4K = 116 (we round up to 512K) blocks**

(c) With two levels of indirection? (5 points) **Zero blocks**

(*Hint: The total of your three answers should equal to the number of blocks of the file.*)

Total: _____/40

4. ***Questions with short answers:*** (6×5 points)

(a) What is the purpose of the UNIX mount() system call? _____

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(b) How does a ***journaling file system*** record ***metadata updates***? _____

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_____

(c) What is the ***main disadvantage*** of letting the ***kernel*** handle ***TLB misses***? _____

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_____

(d) What is the purpose of the ***dirty bit*** in a virtual memory system? _____

_____

_____

(e) How can we prevent deadlocks by denying the ***circular wait*** condition? _____

_____

_____

(f) Why can ***inverted page tables*** fully reside in main memory? _____

_____

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Total: _____/30

5. Alice is the owner of the file netsimulator whose protection bits are **-rwxr-xr-x**. She has assigned the group networks to the file.

(a) What can she do with the file? (5 points) **Anything she wants.**

(b) What can members of the networks group do? (5 points) **Reading and executing the file.**

(c) What can other users do? (5 points) **Reading and executing the file.**

6. When does ***thrashing*** happen? (5 points) _____

What can we do to ***prevent it***? (5 points) _____

7. In the ***Windows page replacement policy***, what happens when a page is ***expelle***d from the resident set of a process? (5 points)

Total: _____/30