

## COP4610 Spring 2006 Homework Assignment 4

The material for this homework assignment covers Chapters 8 to 9.

1. Textbook exercise 8.9
2. What is/are the advantage(s) of sharing pages between processes in a paged memory system?
3. Consider a two-level page table scheme. A 7-bit logical address is divided into a page number consisting of 4 bits and a page offset consisting of 3 bits. The page number is further divided into an 2 bit page number and a 2 bit page offset:

p1	p2	d
2 bits	2 bits	3 bits

Given the following outer page table stored in the first four entries in memory (locations 0 to 3) and the page of page tables (locations 4 to 19):

0	12
1	4
2	8
3	16
4	28
5	44
6	140
7	76
8	36
9	20
10	92
11	108
12	132
13	116
14	84
15	52
16	68
17	124
18	100
19	60

map the following logical addresses (shown in binary) to physical addresses:

1111100	
0001000	
0010111	
1000001	
0111000	

4. Textbook exercise 8.12
5. What is the copy-on-write feature and how does it help to minimize the overhead of process forking?
6. Textbook exercise 9.6
7. How many page faults occur for FIFO compared to LRU with four page frames given the following reference string. Show the result of the replacements on the page frame over time. What is the minimum number of replacements for an optimal page replacement strategy?

1 2 3 4 5 3 4 1 6 3 8 4 8 9 7 8 9 5