Homework 3 for CS153 (Fall 2018)

Due Tuesday 11/20, 2018

1. Explain the concept of Copy on Write (CoW). Explain how Copy on Write when a child process is forked from its parent.

2. Consider the following segment table:

Segment	Base	Limit
0	400	600
1	1200	1400
2	70	100
3	1350	880
4	2200	96

what are the physical addresses for the following virtual addresses?

(a) 2,20

(b) 0,330

3. Consider a simple memory system in lec10.pdf. For each of the following virtual addresses, answer the following questions: TLB miss or hit? Page fault? Physical address if applicable? Cache miss or hit if applicable? Actual value if applicable?

   (a) 0x03C6

   (b) 0x0B8D

   (c) 0x0022

4. Consider a process that has been allocated 5 pages of memory: P1, P2, P3, P4, and P5. The process accesses these pages in the following order:

   P1 P2 P3 P4 P1 P2 P5 P1 P2 P3 P4 P5

   (i) Illustrate Belady's anomaly by precisely describing the execution of the FIFO page eviction algorithm in two cases: a) where the machine has 3 pages of physical memory, and b) where the machine has 4 pages of physical memory, and by comparing the number of page faults incurred in these two cases. (When the process begins executing, none of its pages are present in memory.)

   (ii) Show how the LRU page eviction algorithm would work in the same scenarios a) and b) described above.