**CSC415 OPERATING SYSTEM PRINCIPLES**

**Homework 2**

1. (15 Points) Consider the following segment table:

Segment Base Length

0 219 600

1 2300 14

2 90 100

3 1327 580

4 1952 96

What are the physical addresses for the following logical addresses?

* 1. 0,430
  2. 1,10
  3. 2,500
  4. 3,400
  5. 4,112

1. (10 Points) What is internal fragmentation? Give an example of when it occurs.
2. (10 Points) Assuming a byte-addressed system with 24-bit logical addresses and 8 frames in the physical memory. The size of one page is 2 MB (i.e., 221 entries in one page). Translate the following logical addresses into physical addresses using the provided page table:

Page Frame

0 1

1 4

2 7

3 3

4 2

5 5

6 6

7 0

* 1. 0x234800
  2. 0xBB4400

1. (18 Points) Consider the following page reference string: 1, 3, 2, 4, 3, 5, 6, 7, 2, 3, 2, 1, 7, 6, 5, 4, 7, 2, 5, 6. How many page faults would occur for the page replacement algorithms FIFO, Optimal, and LRU, assuming one, four, and seven free frames at the beginning?
2. (14 Points) What is the cause of thrashing? Once thrashing is detected, what can the system do to eliminate this problem?
3. (18 Points) Suppose that a disk drive has 5,000 cylinders, numbered 0 to 4999, with the read-write

head having just finished a request at cylinder 1056. The queue of pending requests, in order of arrival, is:

333, 1200, 922, 4545, 3786, 3605

Starting from the current head position, what is the order in which the requests will be serviced for each of the following disk-scheduling algorithms (assuming no other requests arrive and the head's initial movement is toward higher numbered cylinders for c-f)?

a. FCFS b. SSTF c. SCAN d. LOOK e. C-SCAN f. C-LOOK

1. (15 Points) Describe the procedure for handling the page fault when there is always a free frame in demand paging.