

# **Homework2 (CSE660-Winter 2008)**

## **Memory Management**

**Student Name (First, Last):** \_\_\_\_\_

**Due: Monday, March 3<sup>rd</sup>, In Class.**

**1. Swapping (20 points)**

Consider a swapping system in which memory consists of the following hole sizes in memory order: 10 KB, 4 KB, 20 KB, 18 KB, 7 KB, 9 KB, 12 KB, and 15 KB. Which hole is taken for successive segment requests of

- (a) 12 KB
- (b) 10 KB
- (c) 9 KB

for first fit? Now repeat the question for best fit, worst fit, and next fit. (Look the text and slides for details of these schemes).

## **2. Virtual Memory (30 points)**

A computer provides each process with 65,536 bytes of address space divided into pages of 4096 bytes. A particular program has a text size of 32,768 bytes, a data size of 16,386 bytes, and a stack size of 15,870 bytes. Will this program fit in the address space? If the page size were 512 bytes, would it fit? Explain your answers to get full credit. Remember that a page may not contain parts of two different segments.

### 3. Segmentation (20 points)

Consider the following segment table:

| <u>Segment</u> | <u>Base</u> | <u>Length</u> |
|----------------|-------------|---------------|
| 0              | 219         | 600           |
| 1              | 2300        | 14            |
| 2              | 90          | 100           |
| 3              | 1327        | 580           |
| 4              | 1952        | 96            |

What are the physical addresses for the following logical address (segment#, offset)?

- (a) (0, 430)
- (b) (1, 10)
- (c) (2, 500)
- (d) (3, 400)
- (e) (4, 112)

#### 4. Page Replacement (30 points)

A computer has four page frames. The time of loading, time of last access, and the *R* bit for each page are as shown below (the times are in clock ticks):

| Page | Loaded | Last ref. | R |
|------|--------|-----------|---|
| 0    | 126    | 280       | 1 |
| 1    | 230    | 265       | 0 |
| 2    | 140    | 270       | 0 |
| 3    | 110    | 285       | 1 |

- (a) Which page will FIFO replace?
  - (b) Which page will LRU replace?
  - (c) Which page will second chance replace?
- Briefly explain your answers to get full credit.