

**CS471: Operating System Concepts**  
**Fall 2007**  
**Sample questions/answers from Chapter 8**

**Question 1 Exercise 8.3**

Five partitions are 100 KB, 500 KB, 200 KB, 300 KB and 600 KB

**First Fit:** This algorithm allocates the first hole that is big enough.

212 K → 500 K  
417 k → 600 K  
112 K → 288 K (500K – 212k = 288 K)  
426 K → Can't be placed.

**Best Fit:** This algorithm allocates the smallest hole that is big enough.

212 K → 300 K  
417 k → 500 K  
112 K → 200 K  
426 K → 600 K

**Worst Fit:** This algorithm allocates the largest hole.

212 K → 600 K  
417 k → 500 K  
112 K → 388 K (600K – 212k = 388 K)  
426 K → Can't be placed.

**Best fit** makes efficient use of memory.

**Question 2 Exercise 8.9**

a) 400 ns (200 ns to access page table + 200 ns to access memory)

b) 75 % of page table references are found in TLB. 25 % page references end up referring page table for memory address.

75 % page references take 200 ns and 25 % page references take 400 ns.

Therefore, effective memory access time =  $(.75) * 200 + (.25) * 400 = 250$  ns

**Question 3 Exercise 8.12**

Physical address = Base address + offset (offset < length)

- a)  $0,430 \rightarrow 219 + 430 = 649$  (base = 219)
- b)  $1,10 \rightarrow 2300 + 10 = 2310$  (base= 2300)
- c)  $2,500 \rightarrow 90 + 500 = 590$  **Illegal ref.** because offset 500 is greater than length 100
- d)  $3,400 \rightarrow 1327 + 400 = 1727$  (base= 1327)
- e)  $4,112 \rightarrow 1952 + 112 = 2064$  **Illegal ref.** because offset 112 is greater than length 96

#### **Question 4 Exercise 8.5**

##### **a) External Fragmentation:**

Contiguous memory allocation and pure segmentation has external fragmentation.  
There is no external fragmentation in pure paging.

##### **b) Internal Fragmentation:**

There is internal fragmentation in pure paging and pure segmentation. There is no internal fragmentation in contiguous memory allocation.

##### **c) Ability to share code across processes.**

Contiguous memory allocation is ineffective to share code. Both paging and segmentation has the ability to share code across processes.