Spring 2013, COMP4100 Homework-7 3/8 Name: Due Date 3/18

1. Consider a swapping system in which memory consists of the holes as shown in Fig. 1. Note that A to I represent processes in memory, and H_1 to H_8 are eight holes. Which hole is taken for the following newly generated processes P1, P2, and P3, when the first fit algorithm is used?

(i) P_1 requests 8 KB.

(ii) P_2 requests 10KB.

(iii) P_3 requests 9KB.

Now repeat the question for best fit, worst fit, and next fit algorithm. Write the answers in the corresponding cell in Table 4.

H_1	A	H_2	B	H_3	C	H_4	D	H_5	E	H_6	G	H_7	I	H_8
4KB		10KB		5KB		16KB		8KB		9KB		15KB		13KB

Fig. 1

Table 4:

	H_1	H_2	H_3	H_4	H_5	H_6	H_7	H_8
First fit								
Best fit								
Worst fit								
Next fit								

2. The page table in Fig. 2 shows the mapping between 64-KB virtual address space and 32-KB physical address space (the page size is 4 KB). Answer the following questions.

(1) Compute virtual page number and offset for 1234, 9321, 13189, and 65000.

(2) Compute the physical address for the virtual addresses 1234, 9321, 13189, and 65000.

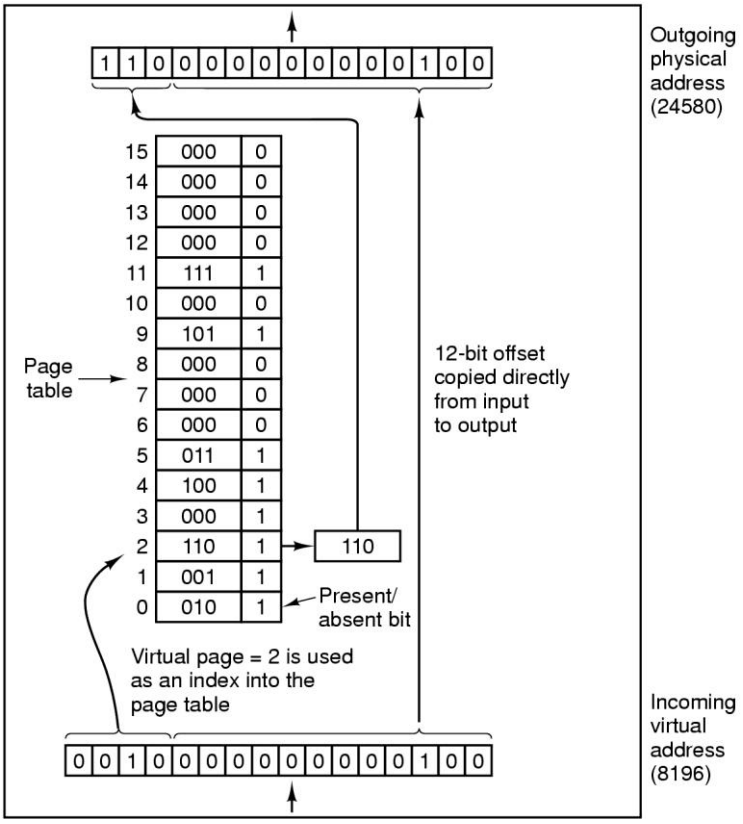

Fig.2

3. A swapping system eliminates holes by compaction. Assuming a random distribution of many holes and many data and a time to read or write a 32-bit memory word of 10 nsec, about how long does it take to compact 128 MB? For simplicity, assume that word 0 is part of a hole and that the highest word in memory contains valid data.

4. A machine has a 32-bit address space and an 8-KB page. The page table is entirely in hardware, with one 32-bit word per entry. When a process starts, the page table is copied to the hardware from memory, at one word every 50 nsec. If each process runs for 100 msec (including the time to load the page table), what fraction of CPU time is devoted to loading the page table?

5. Suppose that a machine has 48-bit virtual addresses and 32-bit physical address.

(a) If pages are 4KB, how many entries are in the page table?

(a) If pages are 8KB, how many entries are in the page table?