Operating Systems (COMP2006)

CURTIN UNIVERSITY
Computing Discipline
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Worksheet 6

1. Explain the different between internal and external fragmentation.

2. What are the advantages of using paging? What is contained in the page table?

3. Most systems allow programs to allocate more memory to its address space during execution. Data allocated in the heap segments of programs are an example of such allocated memory. What is required to support dynamic memory allocation in the following schemes:

   - contiguous-memory allocation
   - pure segmentation
   - pure paging

4. Consider a computer with 16-bit logical address, and a page size of 4K. How many bits are there for the page number and for the offset number? How many pages are there?

5. Given memory partitions of 100K, 500K, 200K, 300K, and 600K (in order),

   a. How would each of the First-fit, Best-fit, and Worst-fit algorithms place processes of 212K, 417K, 112K, and 426K (in order)?
   b. Which algorithm makes the most efficient use of memory?
   c. Show how compaction can be done on each

6. Consider a paging system with the page table stored in memory.

   a. If a memory reference takes 200 nanoseconds, how long does a paged memory reference take?
   b. If we add associative registers, and 75 percent of all page-table references are found in the associative registers, what is the effective memory reference time? (Assume that finding a page-table entry in the associative registers takes zero time, if the entry is there)

7. Consider a logical address space of eight pages of 1024 words each, mapped onto a physical memory of 32 frames

a. How many bits are there in the logical address?
b. How many bits are there in the physical address?

8. 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?

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