COMP 3410 : Operating systems

Practice Activity : Paging & Segmentation

Q1. Consider a user program of logical address of size 6 pages and page size is 4  bytes. The physical address contains 300 frames. The user program consists of  18 instructions a, b, c, . . . q, r . Each instruction takes 1 byte. Assume at that  time the free frames are 7, 26, 52, 20, 55, 6, 18, 21, 70, and 90.

Find the following?

A) Draw the logical and physical maps and page tables?

B) Allocate each page in the corresponding frame?

C) Find the physical addresses for the instructions m, d, n, r?

D) Calculate the fragmentation if exist?

Q2. If the hit ratio to a TLB is 85%, and it takes 15 nanoseconds to search the TLB, and 150 nanoseconds to access the main memory, then what must be the effective memory access time in nanoseconds?

Q3.  Consider a logical address space of 8 pages of 1024 words mapped into memory of 32 frames.

1. How many bits are there in the logical address?
2. How many bits are there in physical address?

Q4. If the no of pages in a 32 bit machine is 8kB then what is the size of the page table?

Q5. In a 64 bit machine, with 256 MB RAM, and a 4KB page size, how many entries will there be in the page table if it iss inverted?

Q6. If the total number of available frames is 50, and there are 2 processes one of 10 pages and the other of 5 pages then how much of memory would be proportionally allocated to each of these processes?

a. Depends on the process requirements

b. 33 and 16 frames respectively

c. Memory is allocated equally for both

d. 5 and 10 respectively

Q7. Consider a system with 80% hit ratio, 50 nano-seconds time to search the associative registers , 750 nano-seconds time to access memory. Find the time to access a page

a. When the page number is in associative memory.

b. When the time to access a page when not in associative memory.

c. Find the effective memory access time.

Q8. Consider a paging system with the page table stored in memory. If a memory reference takes 200 nanoseconds, how long does a paged memory reference take?

Q9. What are the differences between?

a) Logical and physical address?

b) Page table and segment table?

c) First-fit placement and best-fit placement?

d) Contiguous and non – contiguous storage allocation

e) Multiple contiguous fixed partitions (MFT) and multiple contiguous variable partitions (MVT).

f) Segmentation and paging storage?

Q10. What are the advantages of?

a)  Overlays allocation storage.

b) Compaction.

c)  Page table.

d) Segment table.