**Chapter 4 - Memory**

1. **What is the problem with no memory abstraction?**

A page table is the data structure used by a virtual memory system in a computer operating system to store the mapping between virtual addresses and physical addresses.

**2. What is swapping - batch system?**

Swapping is a mechanism in which a process can be swapped temporarily out of main memory (or move) to secondary storage (disk) and make that memory available to other processes. At some later time, the system swaps back the process from the secondary storage to main memory.

**3. What are the two methods of memory management?**

Static loading:- loading the entire program into a fixed address. It requires more memory space.

Dynamic loading: The entire program and all data of a process must be in physical memory for the process to execute

**4. What are the advantages of the linked list method (Section 4.2.1 & 4.2.2)?**

The advantages of linked lists include:

Overflow can never occur unless the memory is actually full. Insertions and deletions are easier than for contiguous (array) lists. With large records, moving pointers is easier and faster than moving the items themselves.

5. Understand algorithms to allocate memory: first fit, next fit, best fit, worst fit (Sectio 4.2.2).

**First Fit**

In the first fit approach is to allocate the first free partition or hole large enough which can accommodate the process. It finishes after finding the first suitable free partition.

**Best Fit**

The best fit deals with allocating the smallest free partition which meets the requirement of the requesting process. This algorithm first searches the entire list of free partitions and considers the smallest hole that is adequate. It then tries to find a hole which is close to actual process size needed.

**Worst fit**

In worst fit approach is to locate largest available free portion so that the portion left will be big enough to be useful. It is the reverse of best fit.

**6. What is the unit of virtual memory, and of physical memory?**

It works in terms of units called pages and page frames. Virtual memory is divided into pages and physical memory is divided into page frames.

**7. What is the page table mainly for?**

A page table is the data structure used by a virtual memory system in a computer operating system to store the mapping between virtual addresses and physical addresses.

**8. What is TLB and what is that for?**

A translation lookaside buffer (TLB) is a memory cache that stores the recent translations of virtual memory to physical memory. It is used to reduce the time taken to access a user memory location. It can be called an address-translation cache.

**9. Differentiate page faults, TLB soft misses and TLB hard misses.**

**TLB Miss**

If we don't find the page frame number inside the TLB, it is called a TLB miss only then we go to the page table to look for the corresponding page frame number.

**TLB Hit**

If we find the page frame number in TLB, its called TLB hit, and we don't need to go to page table.

**Page Fault**

Occurs when the page accessed by a running program is not present in physical memory. It means the page is present in the secondary memory but not yet loaded into a frame of physical memory.

**10. What is the essence of PRAs?**

An experiential learning activity conducted in community, centrally, systematically, semi- structured, over a short period of time.

**Question for Lab**

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A translation lookaside buffer (TLB) is a memory cache that stores the recent translations of virtual memory to physical memory. It is used to reduce the time taken to access a user memory location. It can be called an address-translation cache. It is a part of the chip's memory-management unit (MMU).

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1. **A memory free in 4 frames. Which state of the memory after the page 4 is accessed when the requested page as 2 3 2 0 1 5 2 4 5 3 2 5 2 using LRU**

=> Answer 7.

1. **Assume that the Page Table below is in effect. The number of lines per page is 400. The actual memory location for line 1634 is \_\_34\_\_\_\_ .**

|  |  |
| --- | --- |
| Page Number | Page Frame Number |
| 0  1  2  3  4 | 8  10  5  11  0 |

=> The actual memory location for line 1634 is 13406.