**Chapter 4 - Memory**

1. What is the problem with no memory abstraction?

It is possible to run multiple programs without having memory abstraction. The idea is to have just one running process in main memory at any point oftime.

1. What is swapping - batch system?

Swapping is the technique used by an operating system for efficientmanagement of memory space of a computer system.

3. What are the two methods of memory management?

Paging. Swapping.

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

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.

Advantage

Reduces the rate of production of small gaps.

Disadvantage

If a process requiring larger memory arrives at a later stage then it cannot be accommodated as the largest hole is already split and occupied.

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 acomputer operating system **to store the mapping between virtual addressesand physical addresses**.

8. What is TLB and what is that for?

A translation lookaside buffer (TLB) is **a memory cache that is used to reducethe time taken to access a user memory location**.

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

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

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.

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.

10. What is the essence of PRAs?

Aggregate data are mainly used by researchers and analysts, policymakers, banks and administrators for multiple reasons. They are used to evaluate policies, recognise trends and patterns of processes, gain relevant insights, and assess current measures for strategic planning. Aggregate data collected from various sources are used in different areas of studies such as comparative political analysis and APD scientific analysis for further analyses. Aggregate data are also used for medical and educational purposes. Aggregate data is widely used, but it also has some limitations, including drawing inaccurate inferences and false conclusions which is also termed ‘ecological fallacy’.[3] ‘Ecological fallacy’ means that it is invalid for users to draw conclusions on the ecological relationships between two quantitative variables at the individual level.

**Question for Lab**

1. What is the page table mainly for?
2. What is TLB and what is that for?
3. Differentiate page faults, TLB soft misses and TLB hard misses.
4. 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
5. 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 |