180010011

Assignment - 10

1 AND) **Write Through Method** - The simple method is to update the main memory with every memory write operation, when the cache memory is update in parallel when it contains the word at the specified address. This can be known as the write through method.

Write Back method - During write operation, only the cache location is updated in the write back method. Then, the location is marked by a flag so that it is later copied to the main memory when the word is removed from the cache. For the write back method, the reason is that during the time a word remains in the cache, it can be updated multiple times. Thus, as long as the word remains in the cache, it does not matter if the copy in the main cache, This is only when the word is displaced from the cache which needs an exact copy that is rewritten into main memory.

Differences -

	WRITE THROUGH METHOD	WRITE BACK METHOD
1)	In this method main memory is updated with every memory write operation as well as cache memory is updated in parallel if it contains the word at the specified address.	1) In this method only cache location is updated during write operation.

2) Main memory always contains same data as cache.	2) Main memory and cache memory may have different data.
3) Number of memory write operation in a typical program is more.	3) Number of memory write operation in a typical program is less.
4) When I/O device communicated through DMA would receive most recent data.	4) When I/O device communicated through DMA would not reciere most recent data.
5) It is a process of writing cache and main memory simultaneously	5) It is a process of writing cache and data is removed from cache, first copied to main memory.

2Ans) LRU Page Replacement Policy -

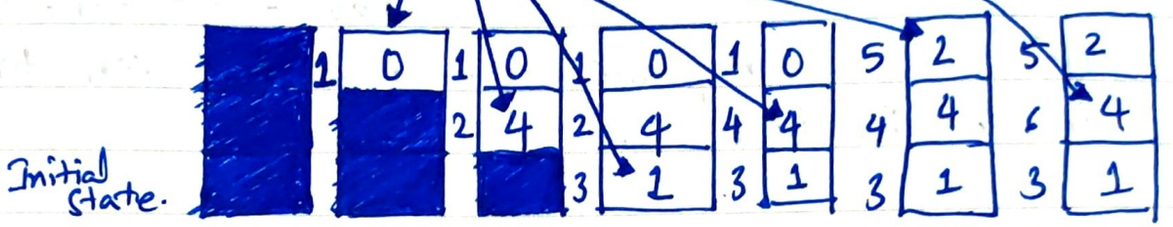
In the Least Recently Used (LRU) page replacement policy, the page that is used least recently will be replaced.

Implementation -

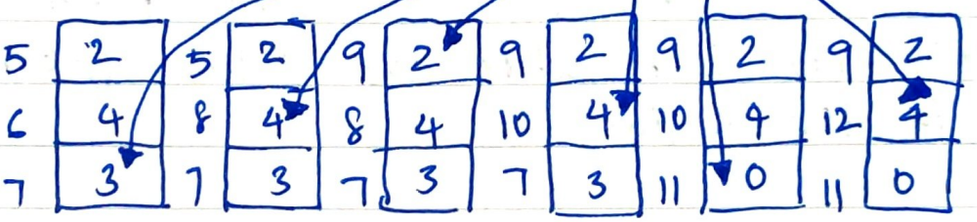
- Add a register to every page frame - contain the last time that the page in that frame was accessed.
- Use a "logical clock" that advance by 1 tick each time a memory reference is made.
- Each time a page is referenced, update its register.

Eg:-

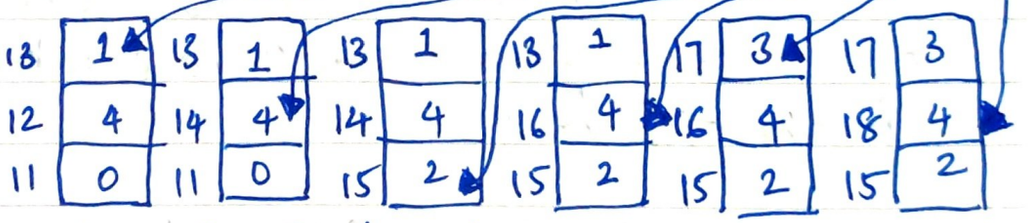
Page request Summary - 0 4 1 4 2 4 3 4 2 4 0 4 1 4 2 4 3 4



Page request summary - 0 4 1 4 2 4 3 4 2 4 0 4 1 4 2 4 3 4



Page request summary - 0 4 1 4 2 4 3 4 2 4 0 4 1 4 2 4 3 4



- We can see notably that the bad replacement decisions made by FIFO is not present in LRU.
- There are a total of 9 page red operations to satisfy the total of 18 page requests - that is almost a 20% improvement over FIFO in such a short experiment.
- In fact, it has been shown experimentally that LRU is the preferred page replacement policy.

→ Disadvantages of LRU replacement policy

- To identify the page to replace, you need to find the minimum time stamp value in all the registers...
- There is a more efficient scheme that approximate the behaviour of LRU that runs more efficiently.