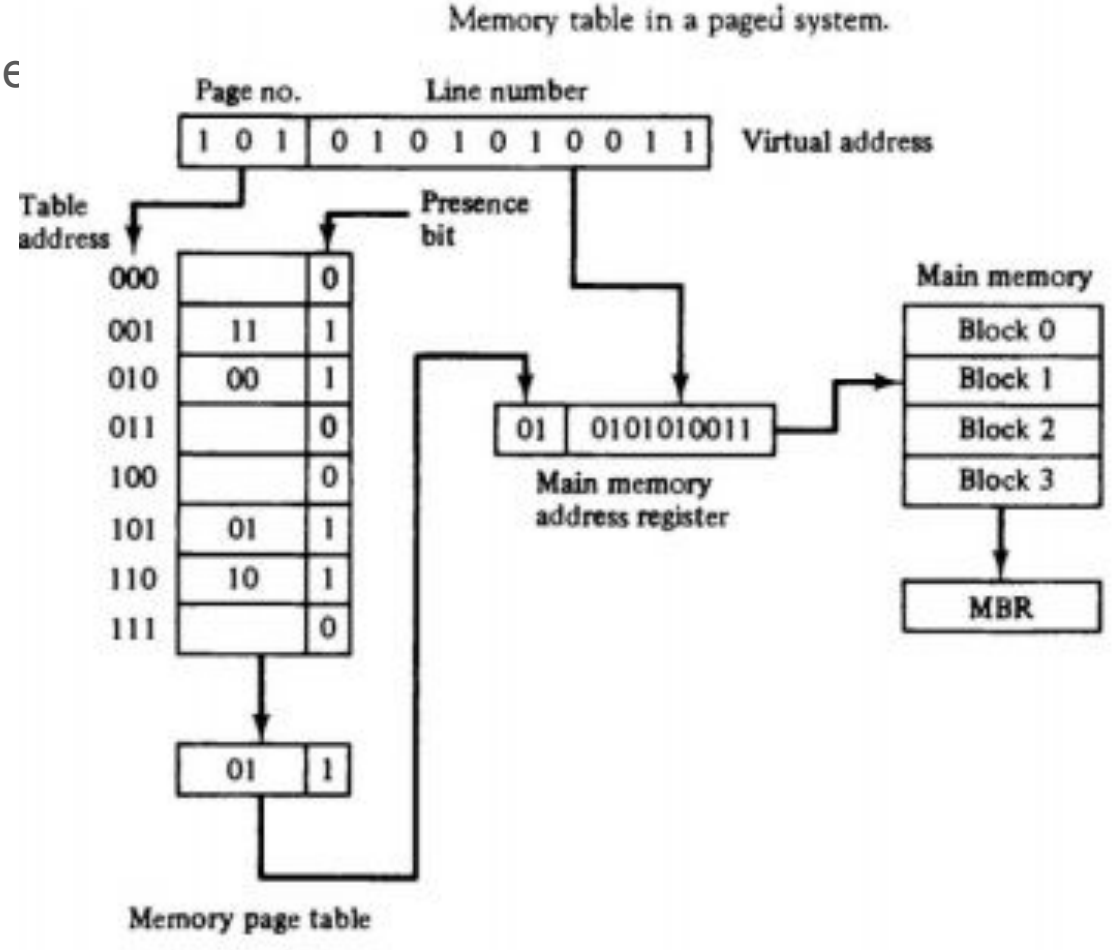
Virtual memory

- Address space- virtual memory- pages
- Memory space- main memory- blocks

Address mapping using page



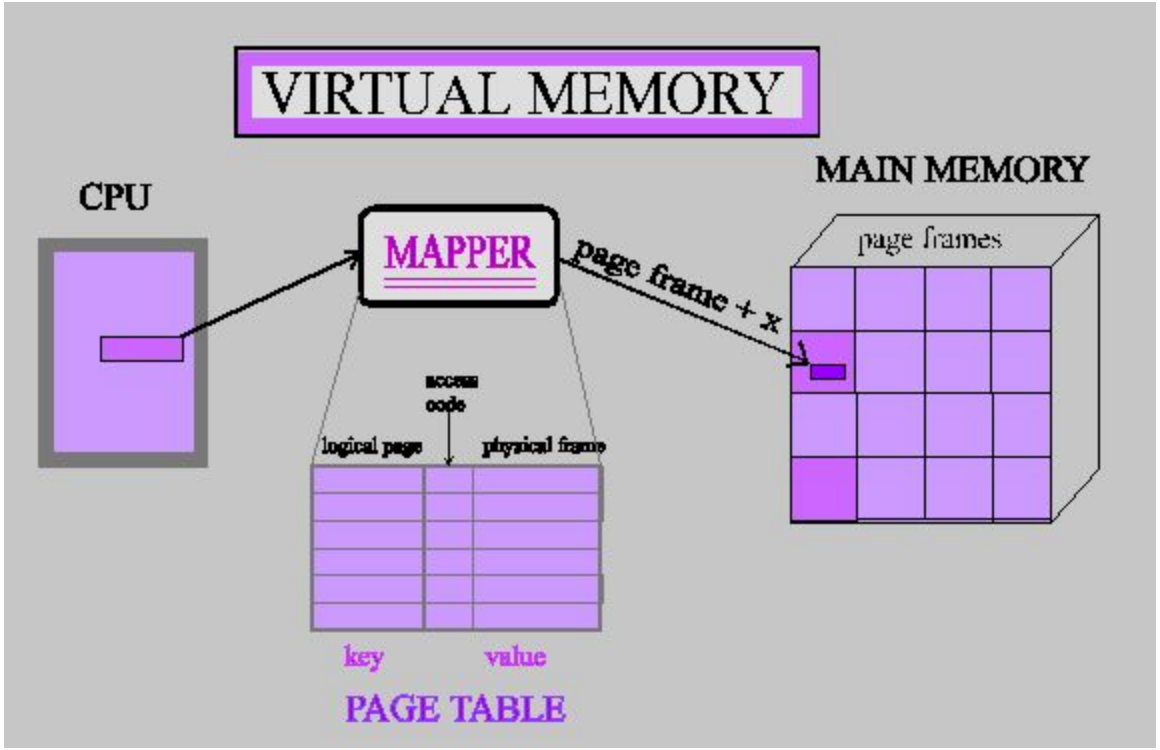
Associative memory page table

Page table

Page Table is a data structure used by the virtual memory system to store the mapping between logical addresses and physical addresses.

Logical addresses are generated by the CPU for the pages of the processes therefore they are generally used by the processes.

Physical addresses are the actual frame address of the memory. They are generally used by the hardware or more specifically by RAM subsystems.

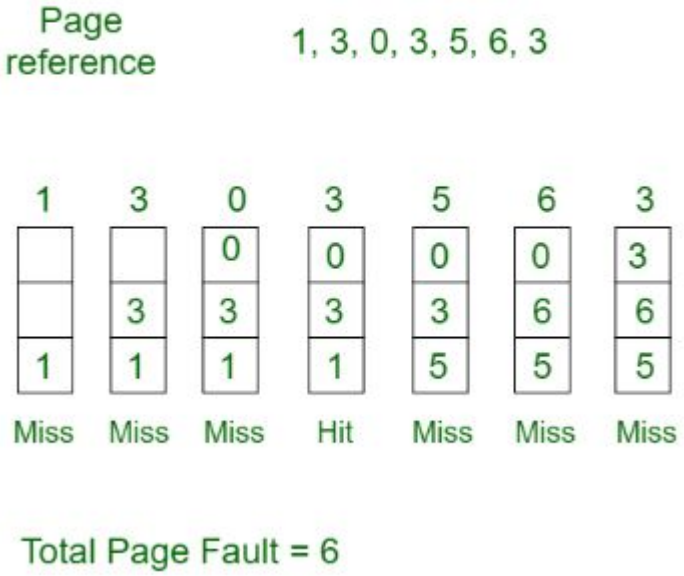

VIRTUAL MEMORY
CPU
MAPPER
MAIN MEMORY
page frames
page frame + x
access code
logical page
physical frame
key
value
PAGE TABLE

Page Replacement

In an operating system that uses paging for memory management, a page replacement algorithm is needed to decide which page needs to be replaced when a new page comes in.

Page Fault: A page fault happens when a running program accesses a memory page that is mapped into the virtual address space but not loaded in physical memory. Since actual physical memory is much smaller than virtual memory, page faults happen. In case of a page fault, Operating System might have to replace one of the existing pages with the newly needed page.

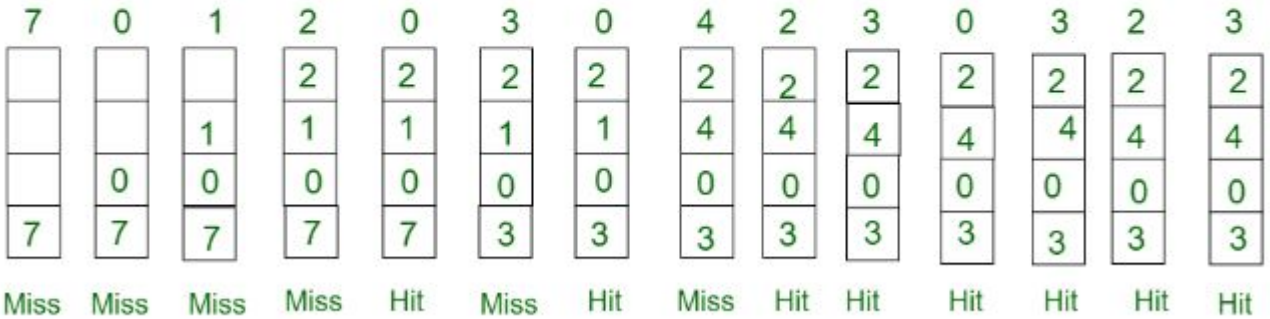
First In First Out (FIFO)



Optimal Page replacement

Page reference 7,0,1,2,0,3,0,4,2,3,0,3,2,3

No. of Page frame - 4



Total Page Fault = 6

Least Recently Used