Virtual Memory :

> It is a Technique used to Increase the apparent size of the main memory.

> It uses the secondary storage to extend the memory in the main memory.

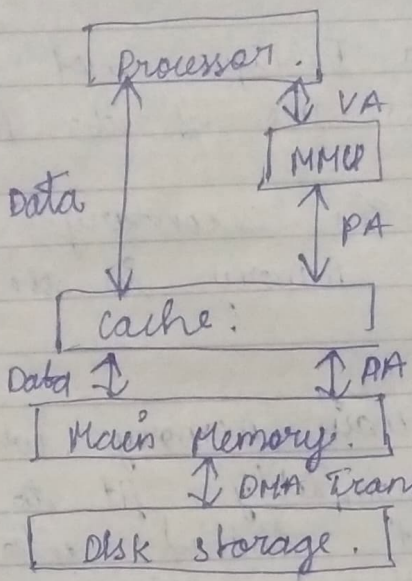
> In the main memory, when a program is not completely fit to the main memory. It divided into segements. The currently executed segements are kept in the main memory and the remaining segements are kept in the secondary memory such as hard disks.

> If an executing program needs a segements which is not currently in the main memory, the required segement is copied from the secondary storage device.

> when a new segment is copied into the main memory it should replace the memory already exists in the main memory.

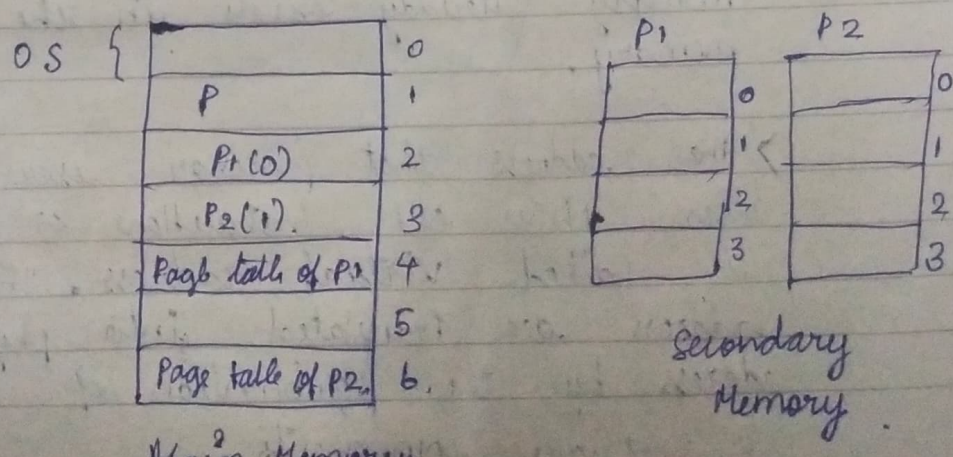
> The address that processor issues to acess either the instructions or data is called virtual address. These address are Translated into physical address by the combination of hardware & Software components.

Diagram:

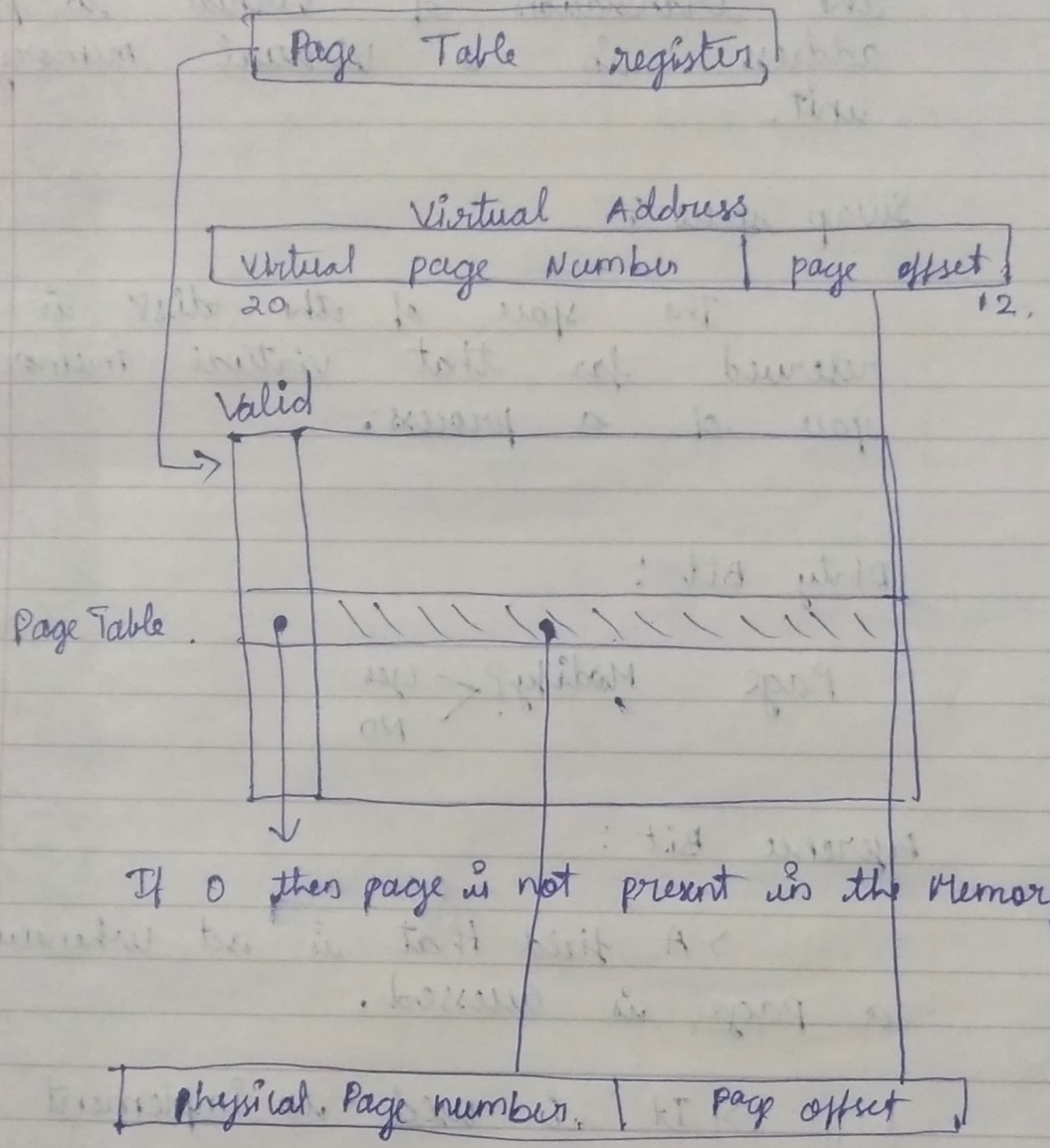


* The Memory Management unit controls the Virtual Memory system. It translates the Virtual Address into physical address.

* A simple method to translate the virtual address into physical address is to assume that all the programs and data is composed to the fixed length called pages:



Address Translation :



Page Fault :

> This event is occur when the needed page is not found in the page Table.

Page Table:

This is the Table which contains the translation of virtual to physical address in a virtual memory unit.

Swap space:

The space of the disk is reserved for that virtual memory space of a process.

Dirty Bit:

Page Modify? < yes / NO

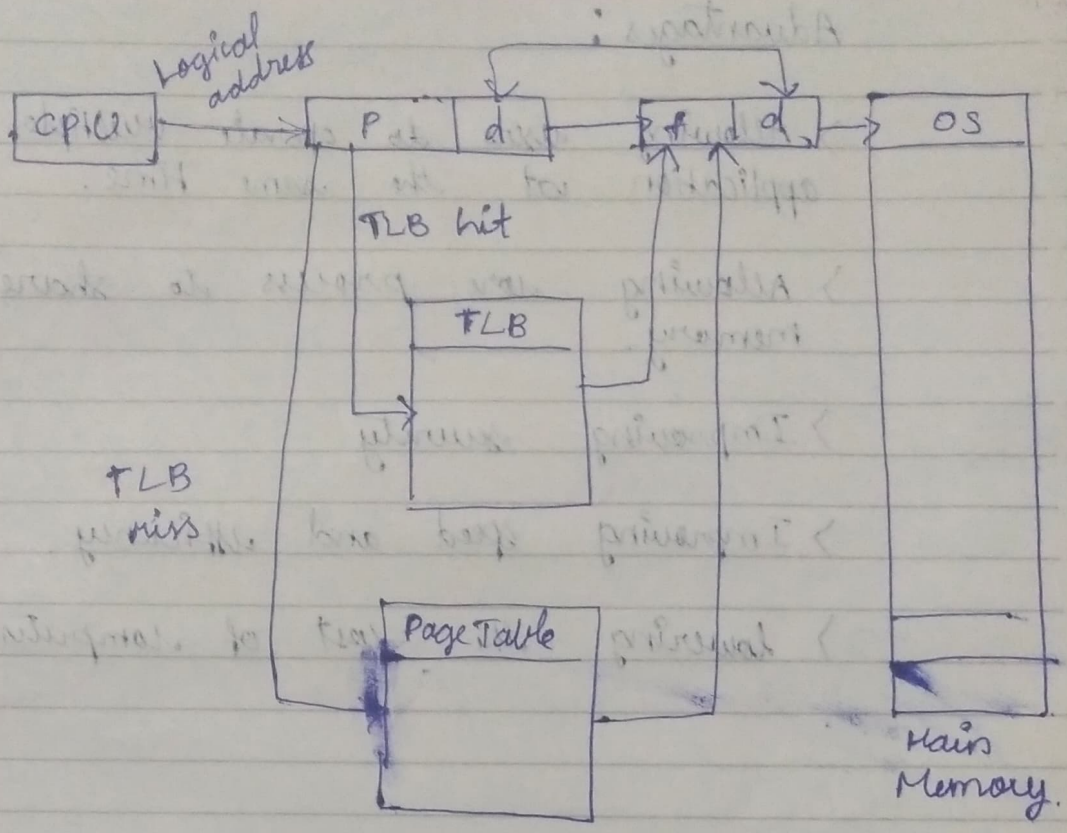
Reference Bit:

> A field that is set whenever a page is accessed.

> It is used to implement LRU.

Translation Lookaside Buffer:

> It is also called as an address-Translation cache.



> TBA is a memory cache that stores the recent translations of V.M to p.M.

> It is used to reduce the Time taken to acces a user memory location.

> Since the page Tables are stored in the main memory, every memory acces by a program can take at least twice as long. i.e one memory acces ~~by a program can take at least twice as long; one~~ to obtain the p.A. and a second acess to get the data.

Advantages:

- Allowing users to operate multiple application at the same time.
- Allowing more process to share memory.
- Improving security
- Improving speed and efficiency.
- Lowering the cost of computer system.