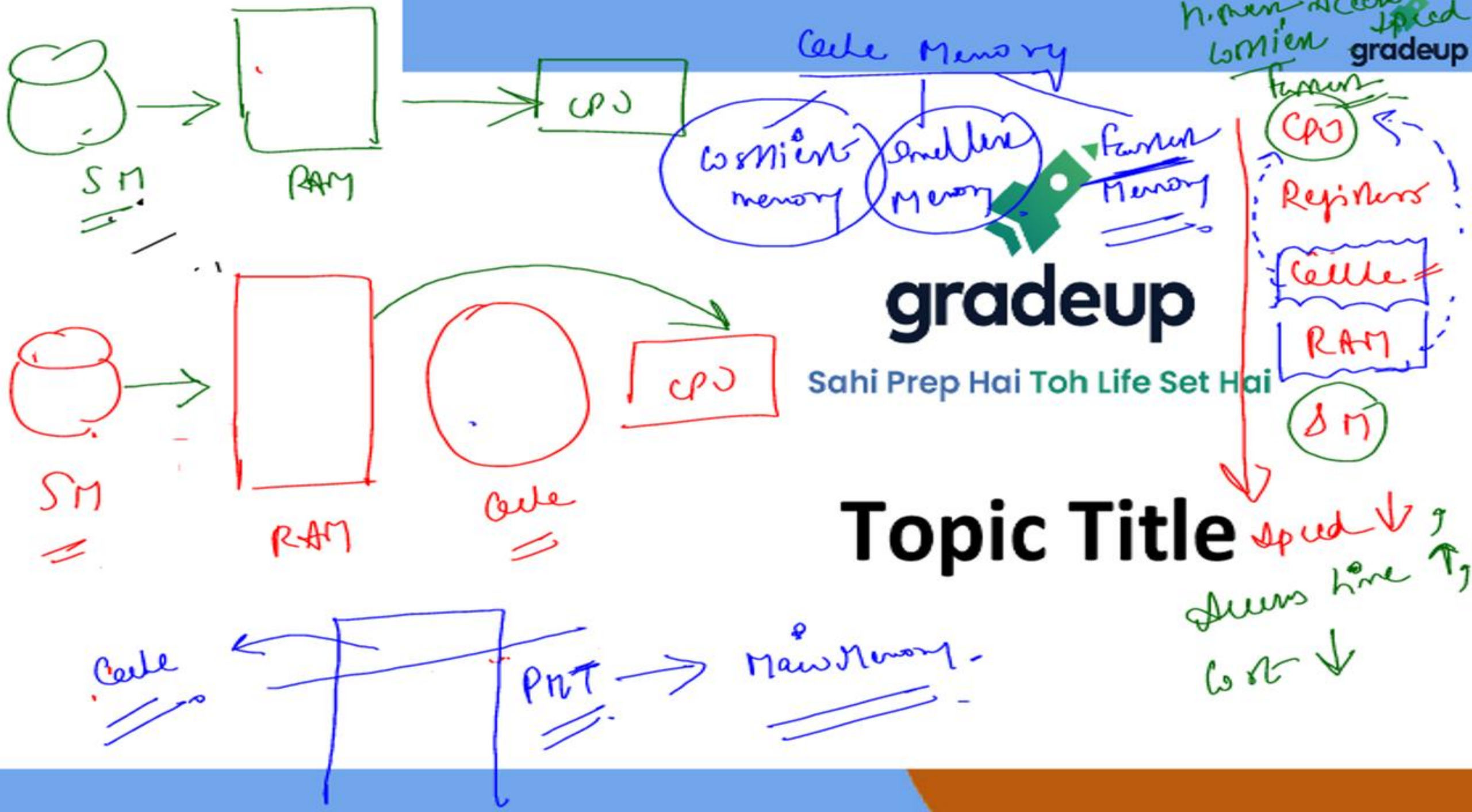
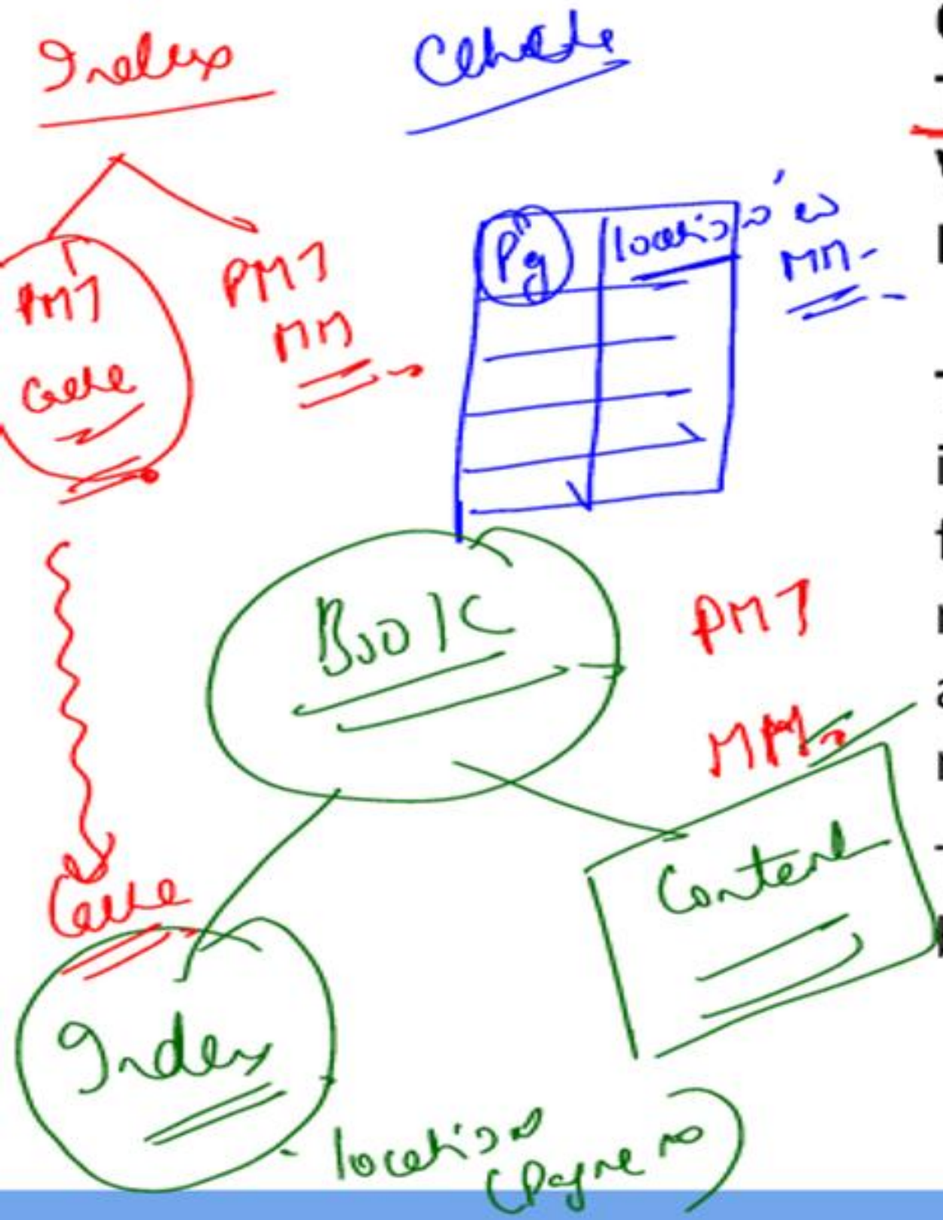

SM
RAM
CPU
Cache Memory
Smaller memory
Faster Memory
gradeup
Sahi Prep Hai Toh Life Set Hai
Registers
Cache
RAM
SM
Topic Title
SM
RAM
Cache
CPU
Cache
PMT
Main Memory



Content :-

TLB

Virtual Memory

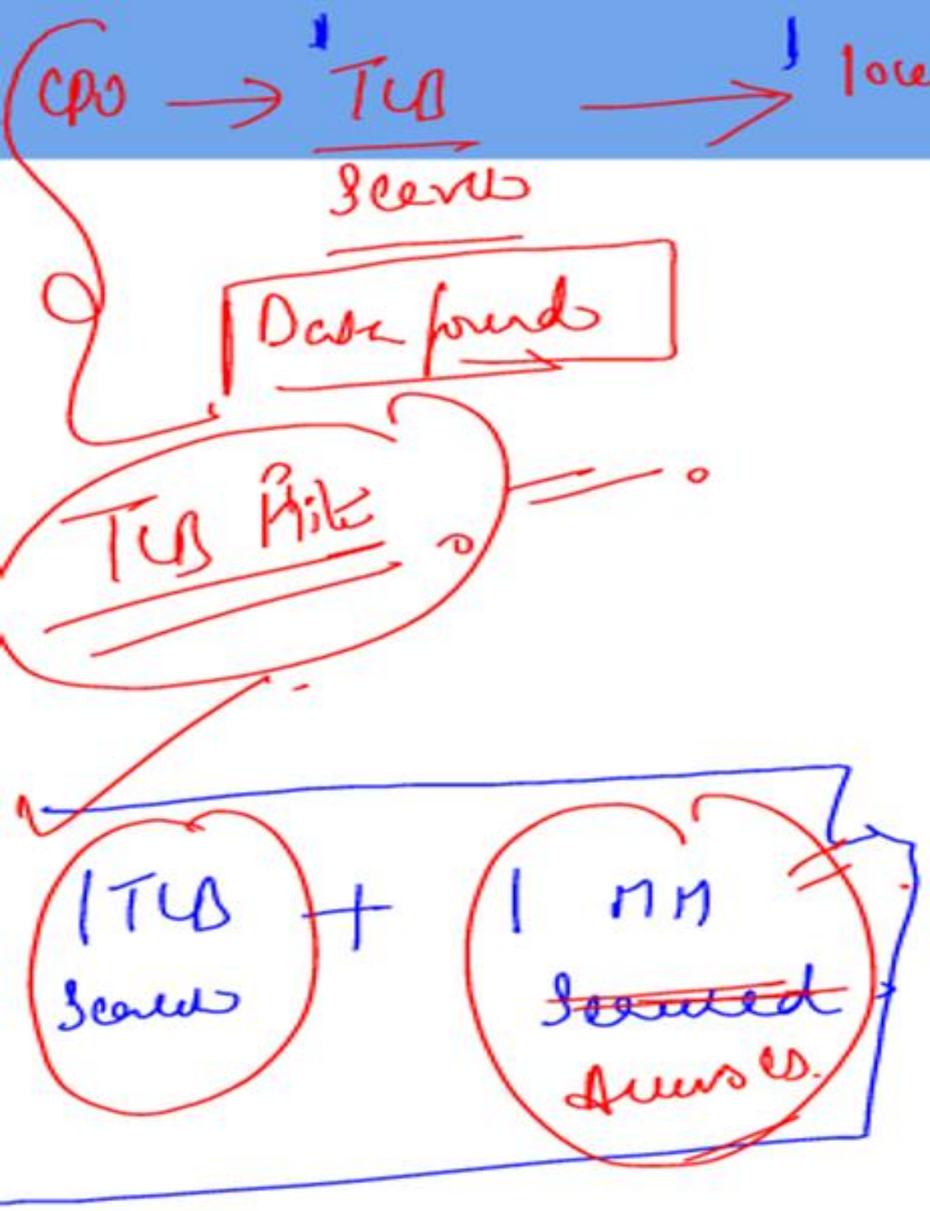
Demand Paging

TLB:- The TLB is associative, high speed memory. Each entry in TLB consists of two parts: a value and a tag. If the page is found in TLB then it is called TLB hit by which the frame number is immediately available in physical memory to access it. If the page number is not in TLB then it called TLB miss.

To find the effective access time , we must weight each case by its probability as :

$$T_{eff} = \text{hit ratio} * (t_1 + t_2) + \text{miss ratio} * (t_1 + t'_1 + t_2)$$

$t'_1 = t_2$ for a particular hardware



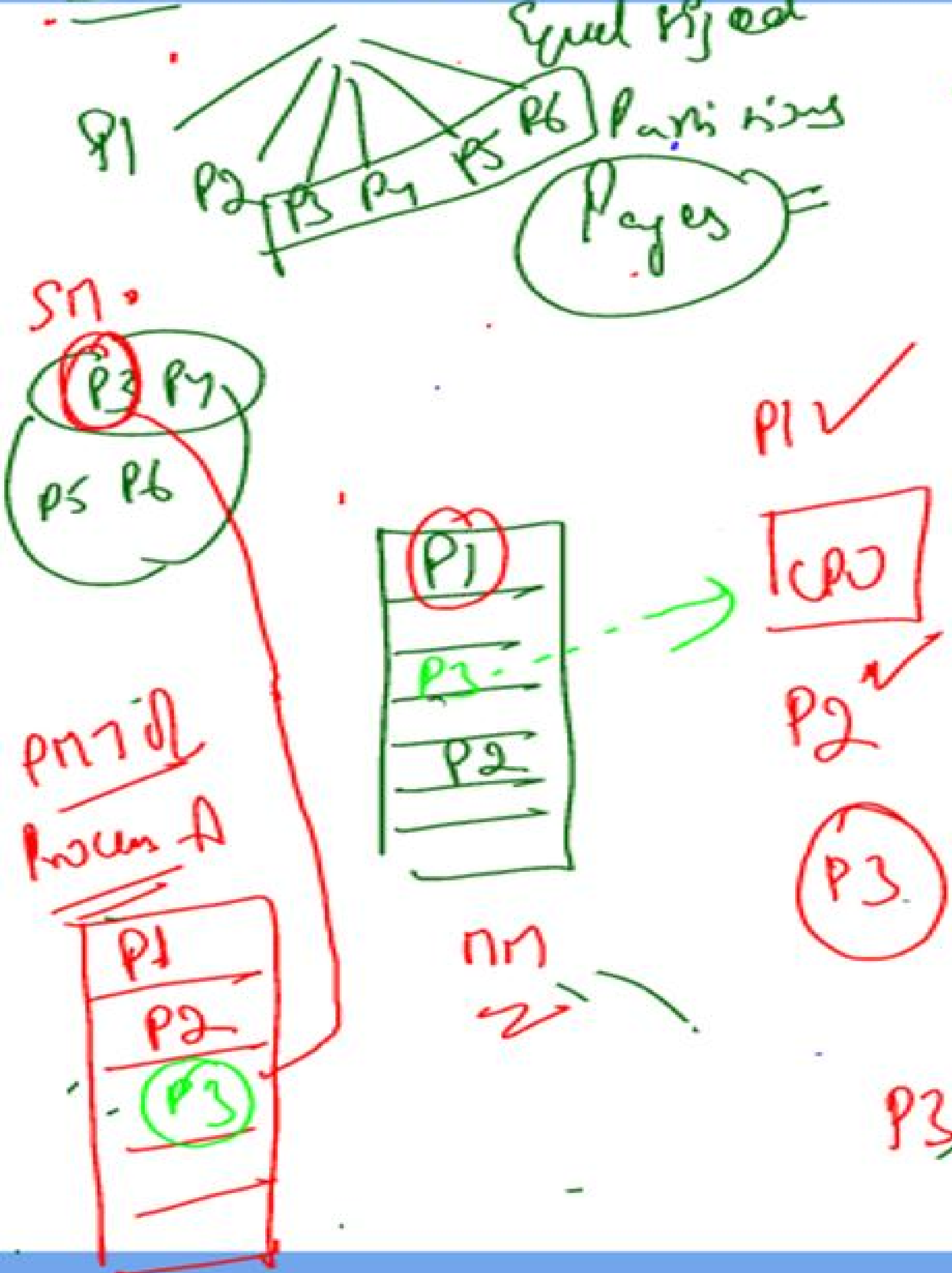
Virtual Memory :- It is virtual resource of a computer. It is an illusion that a computer system processes more memory that is actually having. This illusion makes a process independent of the size of real memory(main memory). If also permits a large number of processes to share computer system without constraining each other. In other words, virtual memory allows execution of **partially**loaded processes.

As a consequence, the sum of virtual address space of active processes in a virtual-memory space of active processes in a virtual-memory system can be exceed the capacity of the available physical memory provided that the physical memory is large enough to hold a minimum amount of address space of each active process. The choice of **which**sectionsto bring in , **when** to bring them in and **where** to place them is made by the operating system. Thus , virtual memory system provide for automatic migration of portions of address space between secondary and primary storage of memory.

Implementation of Virtual Memory :-

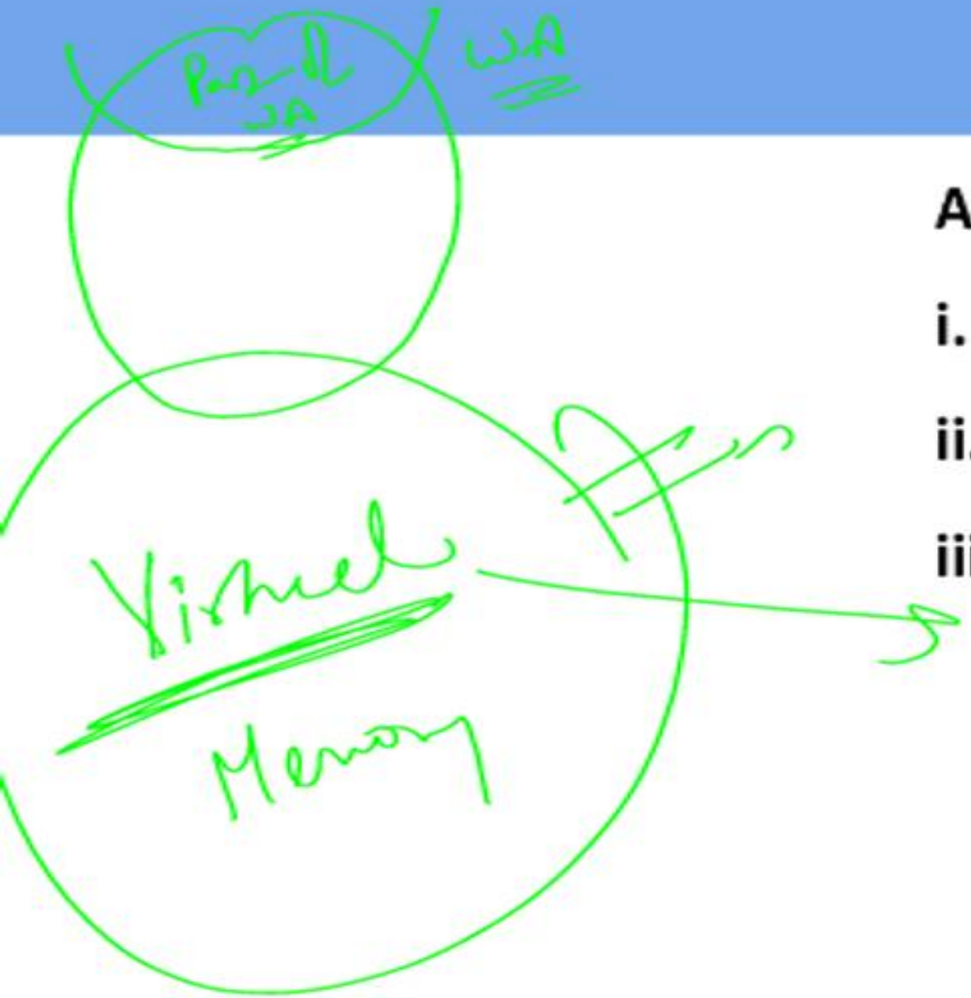
Virtual Memory is implemented by demand paging. **Segmentation** system can also be implemented with the help of VM. Several systems provide paged segmentation where segments are broken into page but the operating system can be implement this scheme with demand paging. Demand segmentation can be used to provide virtual memory. The segment replacement algorithm is very complex in use because of variable size of segments while page replacement algorithm are easy to use and implement

$$\text{Effective Access time} = h(t_1 + t_2) + m(t_1 + t_2' + t_2)$$



Demand Paging:-

In demand paging, a page is brought into the memory of its execution only when it is demanded, otherwise it is remained in backing storage (disk). The name seems to have been derived from demand feeding- a policy used for feeding the by the mother in which the food is given to the baby only when he cries for it . This method is combination of paging and swapping method. The main requirement of this method is that the complete program should be present in the backing storage (disk) in the form of pages. Swapping is used to swap the contents of the program from disk to main memory when it is required.



Advantages :

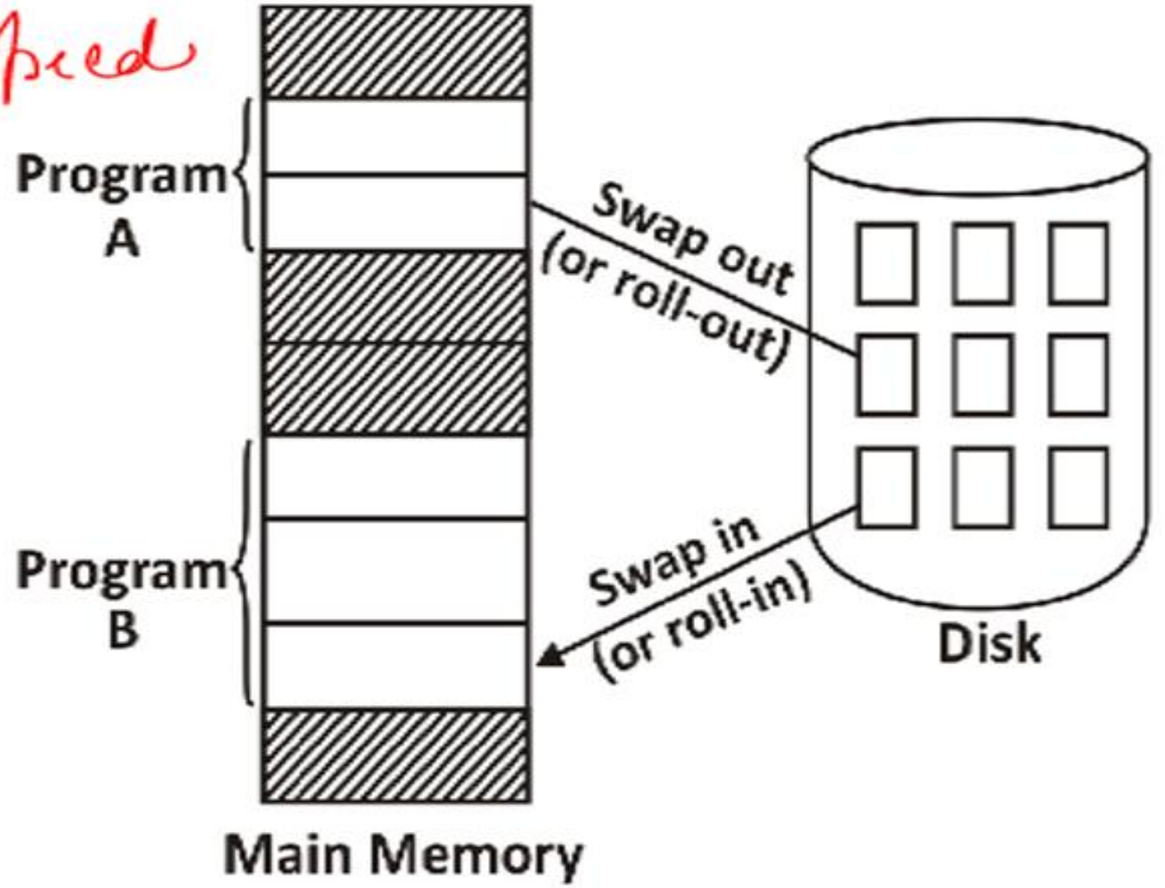
i. **Reduced memory requirement**

ii. **Swap time is also reduced**

iii. **Increase the degree of multiprogramming**

Q1 Who is the high speed memory between Main Memory & CPU?

1. Register
2. Cache
3. Secondary
4. Virtual



Disadvantage : Using this method swapping is done using hit-and-trail method which result in error and the error is known as **page fault error**.

Q: Which Memory allocation

1) Execution of a process which is not completely in the MM.
2) a program which is smaller than Physical Memory.
3) A program which is larger than SM.
4) Execution of a process without being in SM.

Performance Measurement:-

The performance of demand paging is measured by computing the effective access time for demand paging system. When there is no page fault i.e. all the pages are required for execution of a program is present in a main memory then effective access time is similar to memory access time.

Hence, the effective access time depends upon the probability of page fault 'p' and hence it is computed as :-

$$E_a = [(p * \text{“page fault time”}) + ((1-p)*m_a)]$$

where page fault time is the time required to service the page which consists of:

i. Service the page fault interrupt
ii. Swap the page
iii. Restart the process

Q. Virtual Memory is implemented by

(1) Buses
(2) Virtualization
(3) Demand Paging
(4) all of above

Principal of Page replacement :- The page replacement is done by **swapping** the required page from backup storage to main memory and vice-versa . This swapping is done by checking the contents of physical memory . If there is free frame in the memory then **swap-in** the required page into the frame which is free. In case , if there is no free frame in physical memory then first find the frame which is not currently in use. The content of this frame is **swapped-out** from the memory to backup storage. Then bring the required page in the frame which is now free.

The changes are also made in the **page table** to reflect that transfer of page from memory to backup storage and from backup storage to main memory.

Q. A Page fault occurs when ?

(1) a page gives inconsistent data
(2) A Page cannot be accessed due to its absence in memory
(3) Page is invisible
(4) All of these

(PURE DEMAND PAGING)

gradeup

① When a process being executed with no page in the memory?

(1) Process execution is impossible.

(2) A page fault will occur for every single page brought in memory.

(3) Process may cause system crash.

(4) None of these.

Following steps are performed in page fault routine for page replacement:

i. Find the location of desired page on backup storage

a. Find the free frame:

b. If the frame is free ;use it

c. Otherwise find the frame which is not currently being use . This is called "VICTIM FRAME"

d. Write the contents of victim frame on back store and change the page table entries to indicate that the page is no longer in the main memory.

i. Read the desired page into free frame; change page table and frame entries.

ii. Restart the user process

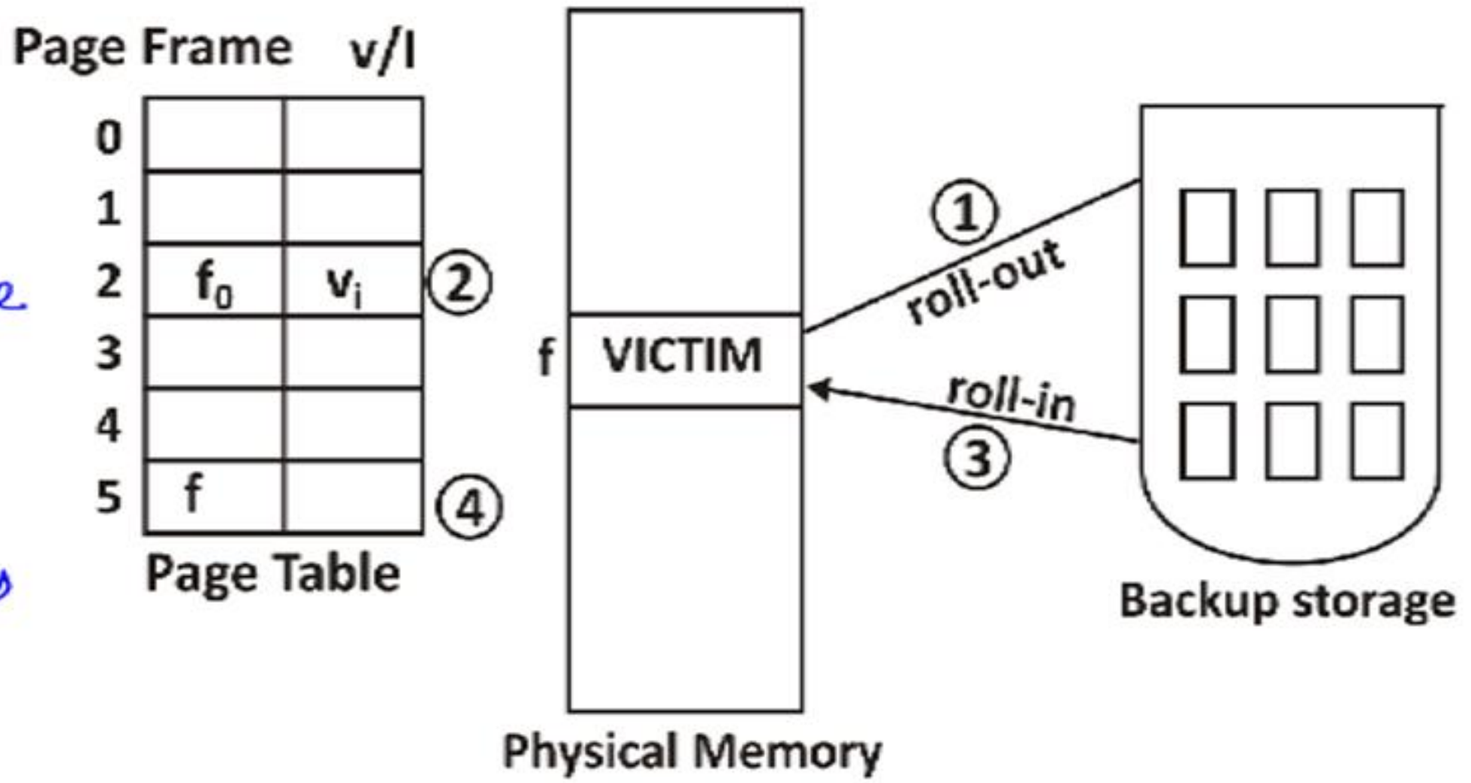
Q. If Page fault Rate is low ⟶

(1) Turnaround time ↑.

(2) Effective Access time ↑.

(3) Effective Access time ↓.

(4) None of these.



ARE YOU PREPARED?

UGC NET All India Mega Mock Challenge Paper 2

LIVE MOCK TEST	LIVE DATE
UGC NET Geography	Sat, 12-June
UGC NET Commerce	Sat, 19-June
UGC NET Labour Welfare	Sat, 26-June