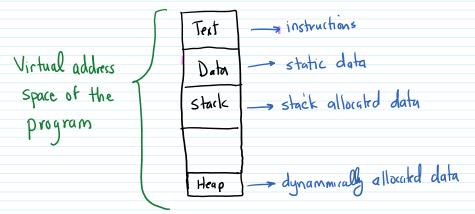
Virtual Memory -> Main memory management -> 05

Recall: In order to make memory translation table manageable, we needed refer to memory spots in larger granularity

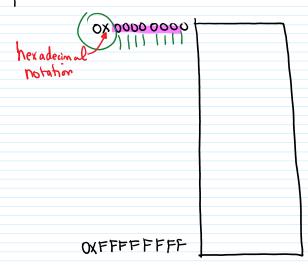
Page: - fixed size unit of memory (contiguous memory locations) for which a single piece of translation information is maintained

Paged Virtual Memory

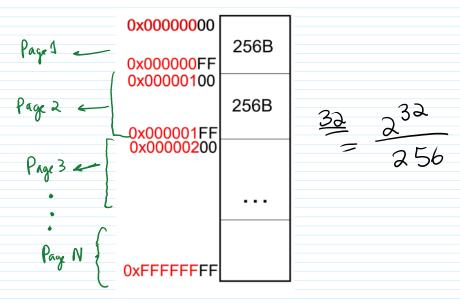
- · When a program is in execution, it can be thought of as a process
- . A process has many things which must be present in memory for it to execut.



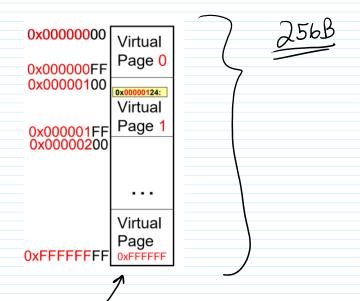
• The virtual address space can also be viewed as addresses 0 to some maximum possible address



• If I'm going to manage the address space in units of 156B, then the actual addresses associated with each unit can be calculated.



. Therefore, I can refer to each 256 B unit in terms of a page number



· In short, we now have this picture

• rather than thinking of virtual address space of a process as text, data, stack and heap, we can abstract out what is being stored in which part of the virtual address space and view the view the virtual address space as this sequence of virtual pages starting with virtual page 0 to page FFFFFF (hex)

Translation to Main Memory

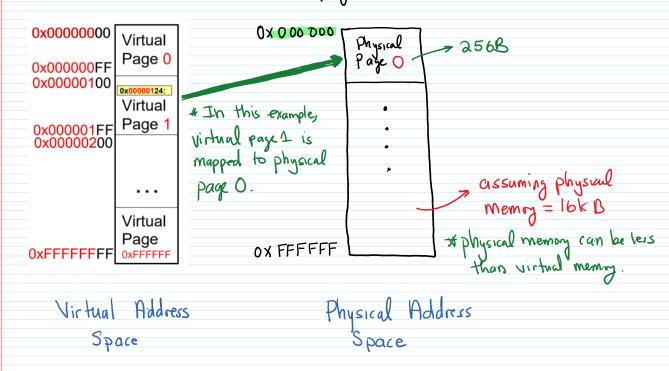
· We know that the address translation information is going to be managed in a table

. Within that table, there will be one entry for each virtual page.

. Therefore, each of the virtual pages maps into one unit in the main manay.

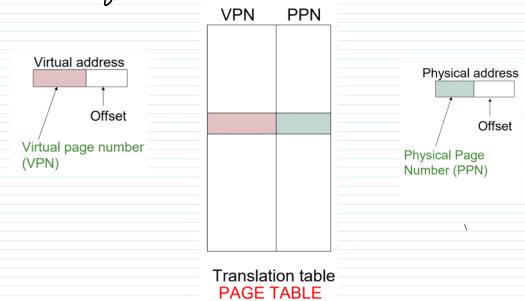
• And the address of that unit in main memory is what will be contained in the address translation table.

so the man momory can also be viewed in terms of pages.

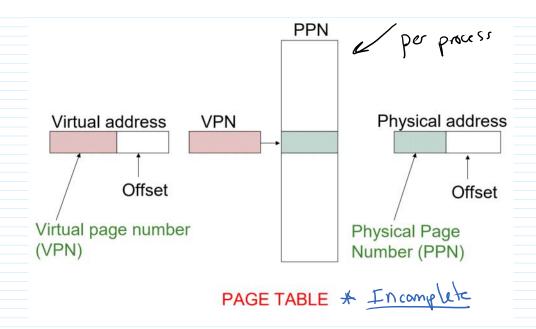


Address Translation

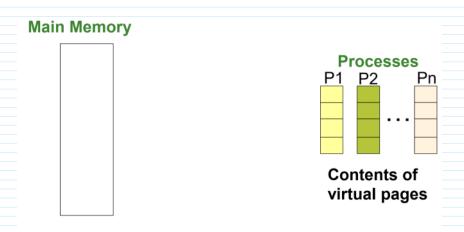
- · Purpose is to translate virtual address as generated by the processor into a physical address.
- This virtual address needs to be translated before it can be interpreted or sent to memory for accessing the data or the instruction



Actual Translation Implementation



- · We will augment this table as we go along
- . We still don't know how many processes will share the same main memory



Memory? => something that can remember things

Different kinds => SRAM

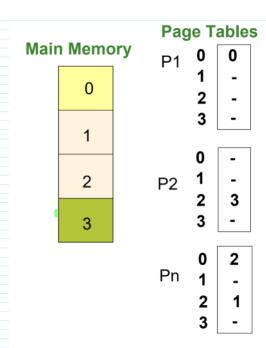
DRAM

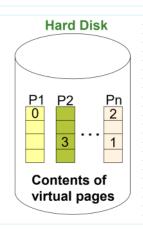
Varying Speeds

Hard disk

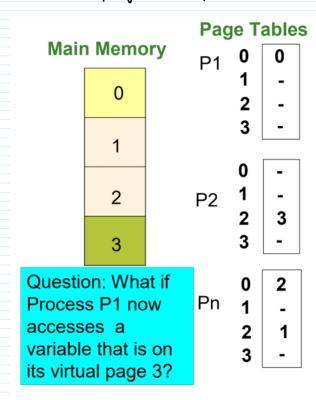
Varying Speeds

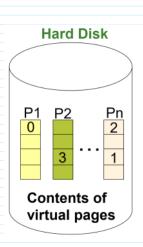
VCP/DVD





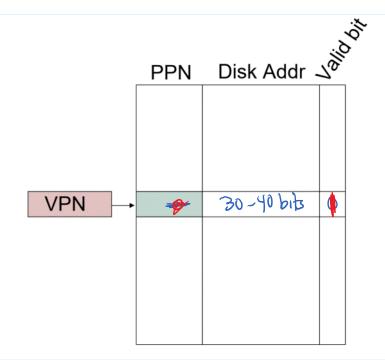
· What if a page is requested that is not in the page table?





Page Fault

· Situation where virtual address generated by the pracesor is not available in the main memory.



Empty slot link list Free list

Must be "handled" by the operating system.
 L> Identify a slot in main momony *
 L> get page from disk

Data can be provided to the process

Ly copy over Ly update page table entry.