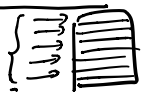
VIRTUAL MEMORY MANAGEMENT TECHNIQUES

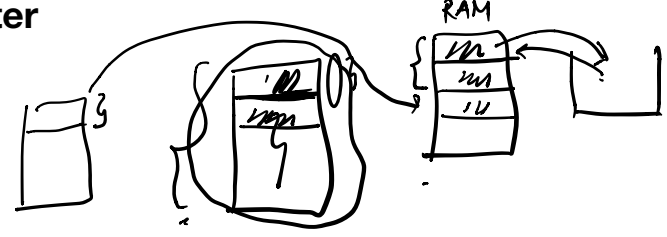
- During all the discussions on memory management techniques till now, we have assumed that the instructions being executed must be in physical memory
- To do this, we need to place the entire logical address space in physical memory
- Using this logic, what can be the maximum size of the program that can be run?
- Do we really need to load the whole logical address into physical memory before starting the process?
  - Code related to error handling are executed a few times
  - Arrays and lists are often allocated more memory than they actually use
  - Certain functions in the program are used very less frequently

- Even in case if the entire program is needed, it may not all be needed at the same time

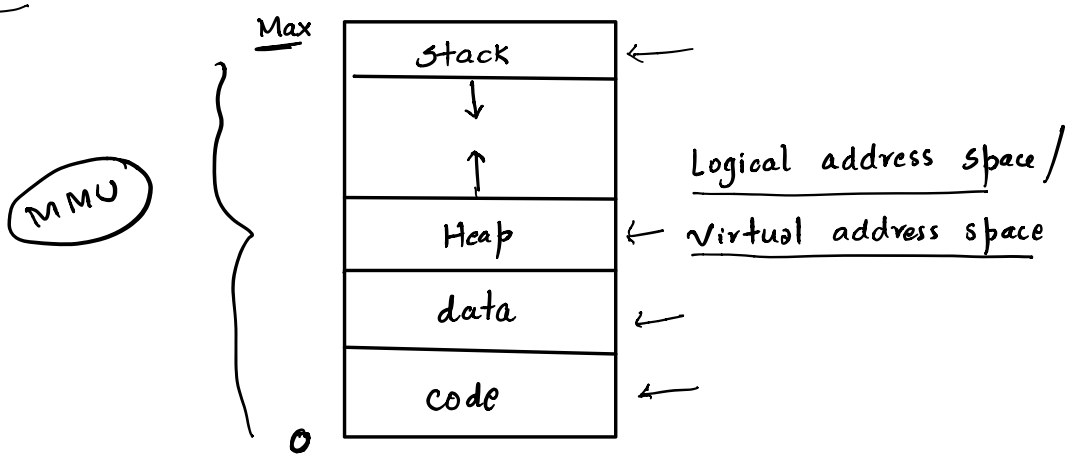


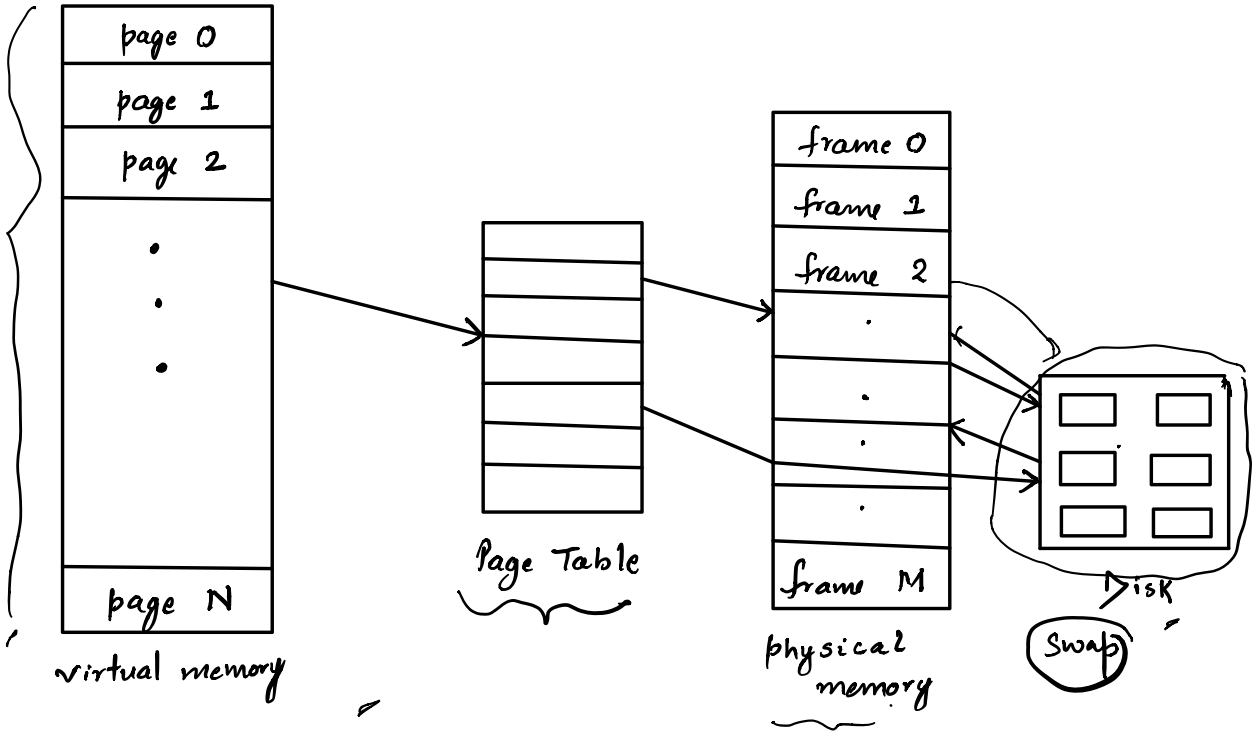
Advantages of loading a program partially and executing(virtual memory)

- A program will not be bounded by the size of the physical memory
- Since each program takes less physical memory, more programs could be run at the same time. Increase in cpu utilization and throughput
- Less I/O would be needed to load or swap user programs into memory. Programs will run faster



- What is virtual memory? Is it different from logical memory?
- What is virtual address space?
- Virtual memory is a memory management technique where the size of the process can be bigger then the size of the physical memory.
- This is achieved by using a combination of RAM and disk for the storing process
- Virtual address space of a process refers to the logical(virtual) view of how a process is stored in memory
- Users or programs view that their program starts from logical address 0 and exists in contiguous memory
- For using virtual memory technique, the division of process memory into logical addresses is very important
- Even without virtual memory, logical memory can exist as we saw in our previous discussions
- Virtual memory is a technique that takes advantage of the logical memory.
- Virtual memory = concept of logical memory + using disk for storing pages
- Logical addresses are also called virtual address because the logical addresses are not real address of the program

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virtual memory
Page Table
frame 0
frame 1
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physical memory
Disk
Swap