CIS 452 - Operating Systems Concepts

Nathan Bowman

Images taken from Silberschatz book

Virtual Memory

You may or may not have heard the term "virtual memory" before

Many of the memory management concepts we discuessed already involved aspects of virtual memory

Main point of **virtual memory** is separating logical view of memory from physical storage

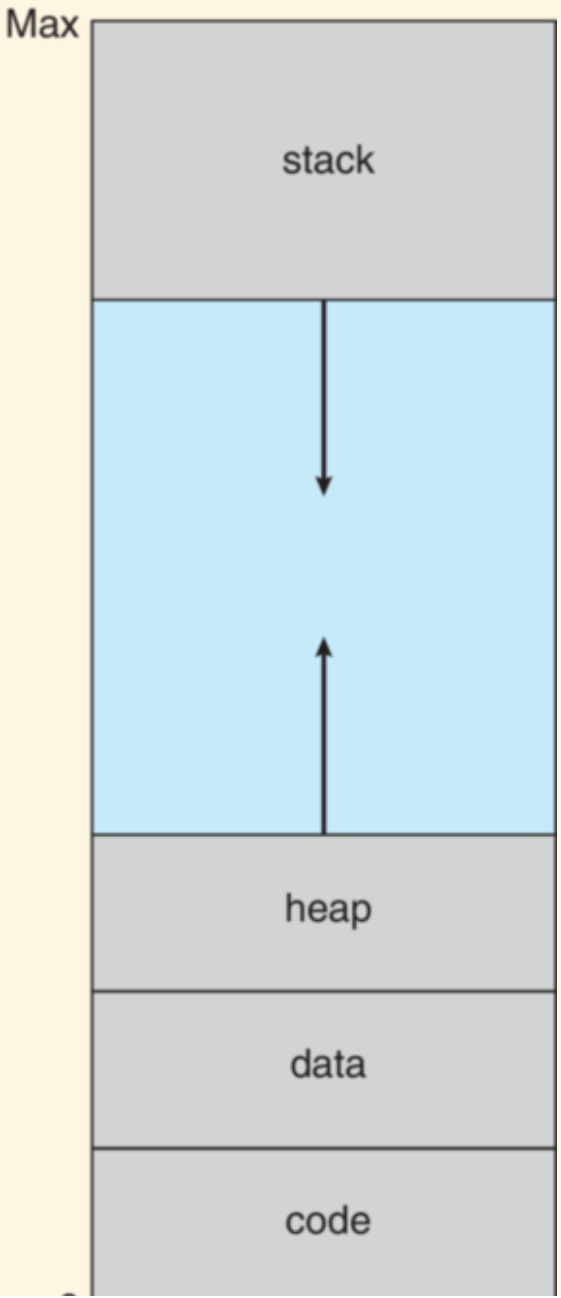
Advantages of virtual memory include

- present contiguous memory to processes
- memory mapping is invisible to processes
- no need for relocatable code
- built-in security for memory accesses
- easy to implement shared libraries and shared memory

The final aspect of virtual memory is that the *entire process need not be kept in memory at once*

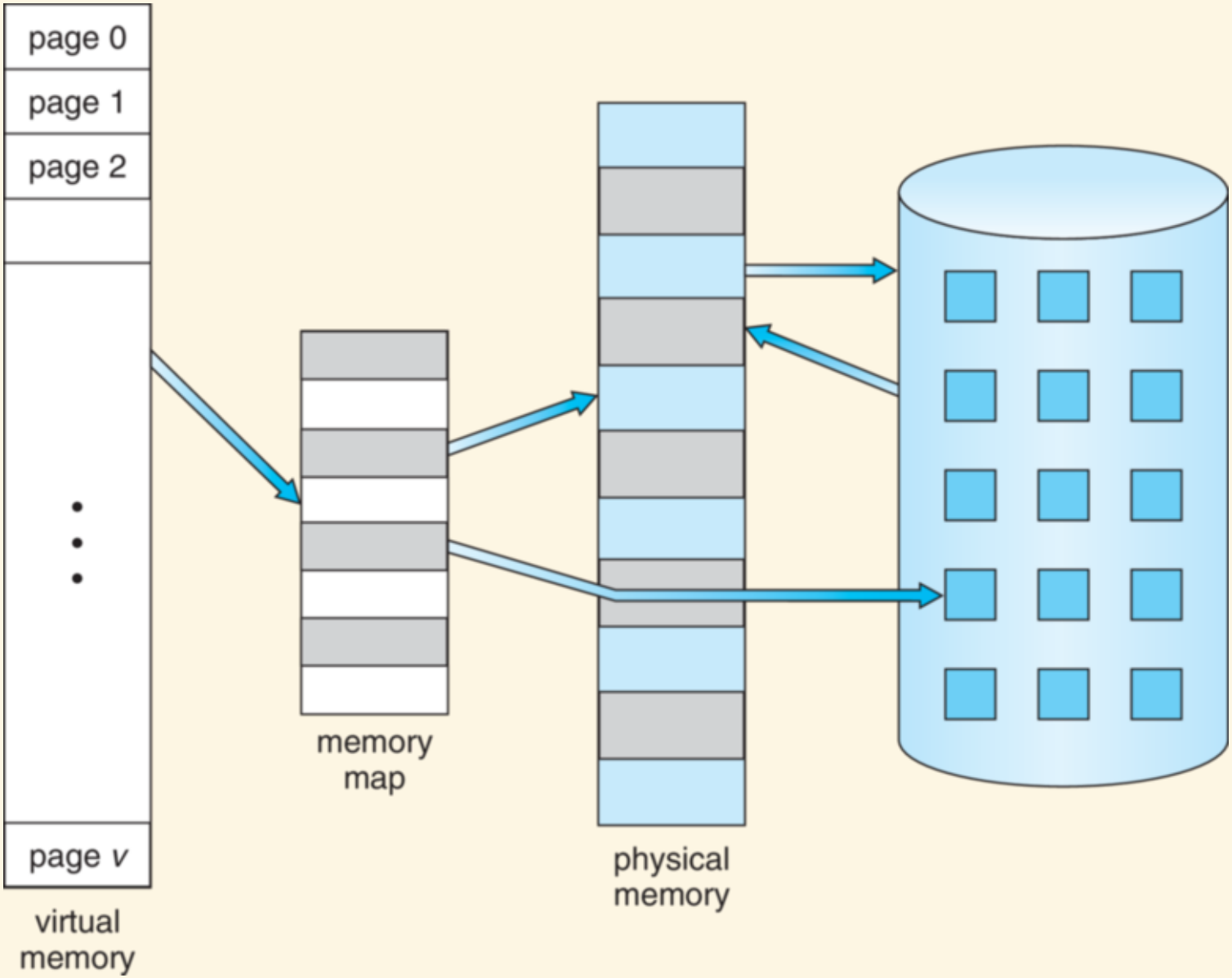
Routines that may not be used

Large gaps in address space that do not store data


Max
stack
heap
data
code

0

If entire process does not need to be in memory, virtual address space can be larger than physical address space


page 0
page 1
page 2
page v
virtual memory
memory map
physical memory

How does this new freedom help us?

Can run larger programs than computer can actually hold

Smaller physical-memory footprints for each process mean higher degree of multiprogramming

Less I/O required to read partial process into memory, so user may see faster response time