

Memory Management

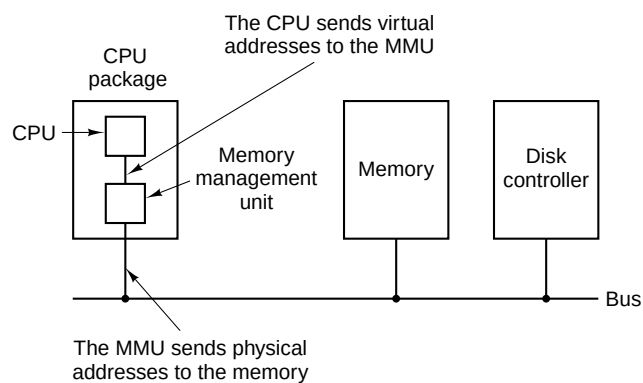
Purpose

- Administer the physical RAM memory resources
- Solve relocation issues
- Provide protection between processes
- Extend the RAM

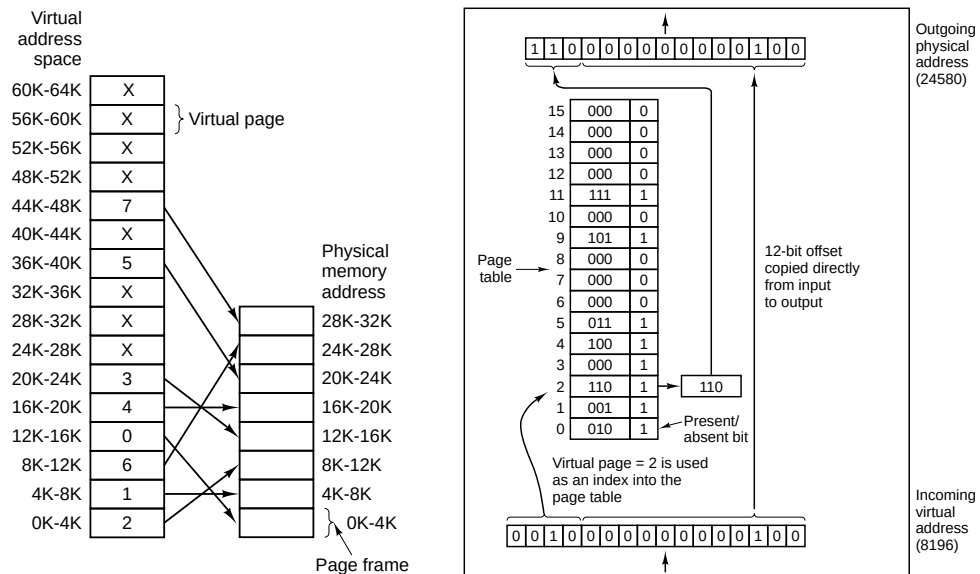
Means

- *Protected (kernel) mode*
- *Virtual Memory*
- *Swapping*

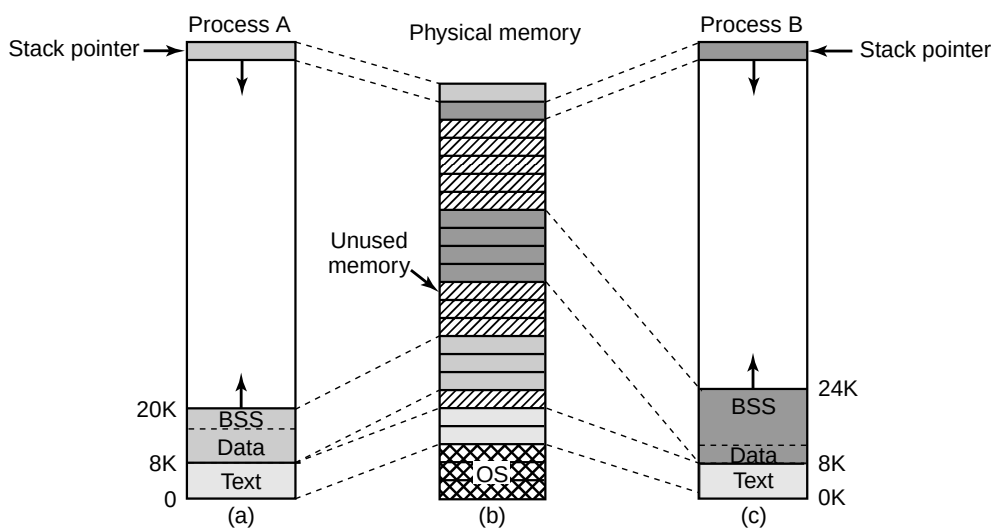
Virtual Memory



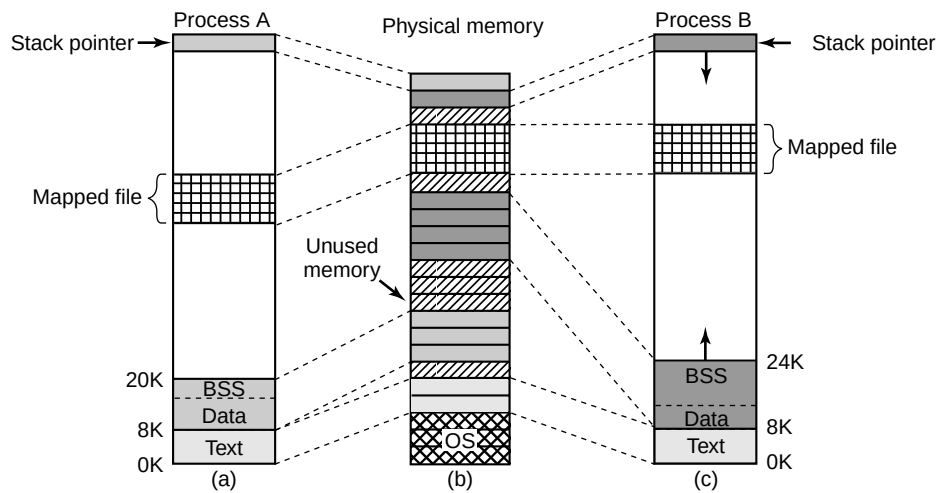
Page Tables



Virtual Memory Example



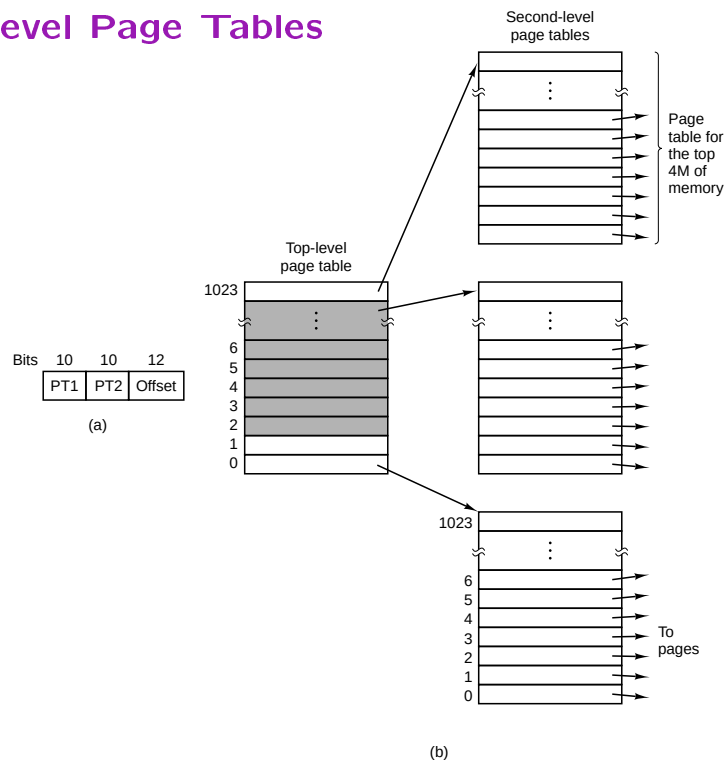
Sharing via Virtual Memory



Translation Look-aside Buffer (TLB)

- Cache of page table — holds a small number (<64) of entries
- Maintained by HW or SW

Multi-level Page Tables



Swapping

- Extends the RAM by "simulated RAM" pages on disk
- Useful for holding "unused" memory (~ 50 %)

Issues

- When to "swap in"?
 - *Demand paging*: Page swapped in when referenced
 - *Prepaging*: Pages swapped in before process scheduled
- When to "swap out"?
 - When all free pages exhausted
 - When free pages comes below a threshold
- What to "swap out"?
 - First swapped in (FIFO) — not optimal
 - Least recently used (LRU) — approximated by reference marker

Page Handling in Windows

