

# Operating System

Project #3

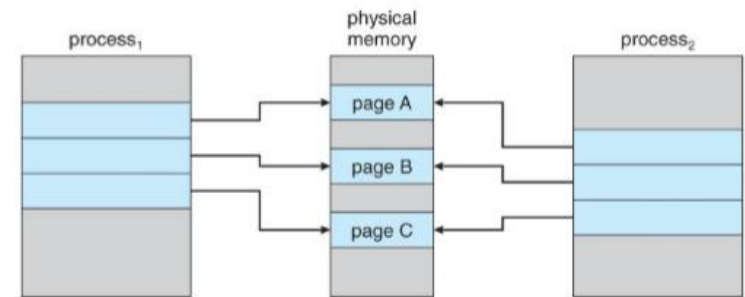
16.11.08

# Project Plan

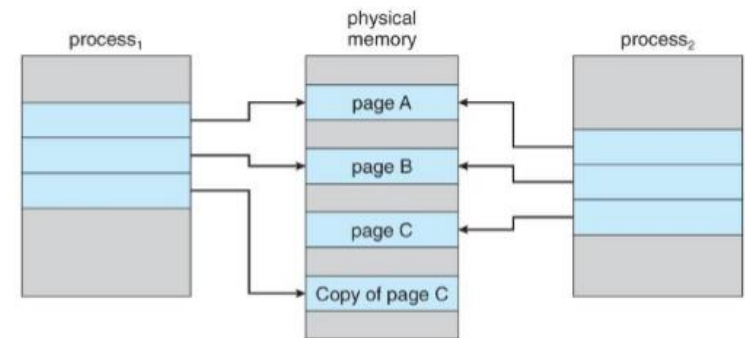
- 5 projects
  - Install Xv6
  - System call + scheduling
  - Virtual memory (stack growth + COW)
  - Thread-support
  - Concurrency
- Single-handed project

# Copy-on-Write

- When a process forks
  - Create shared mappings to the same page frames in physical page
  - Shared pages are protected as read-only
- When data is written to shared pages
  - Protection fault is generated
  - OS allocates new space in physical memory and directs the write to it
- Reference counter for physical pages is needed



Before process 1 modifies page C



After process 1 modifies page C

# Copy-on-Write (cont.)

- Page fault handler
  - Before handle, error check should be preceded
    - Virtual address must smaller than Kernel base
    - Page table entry must be existed
    - Page table entry has user flag
    - Page table entry has not writeable flag
- TLB flush
  - TLB should be flushed for changed page table
  - `lcr3(V2P(pde_t))`

# Project #3 – Copy-on-Write

- Implement copy-on-write in xv6
- Submit a tar.gz file
- Send e-mail to T.A
  - [SSE3044]Project#3-YOURID-YOURNAME
    - ex) [SSE3044]Project#3-2016710580-이규선
  - Email address : lgs0409@naver.com
- Due data
  - 2016-11-20(Sun) PM 23:59
  - -10% per day (until 11/23)