

SWE3004: Operating Systems  
prof. Euseong Seo

# Project 6. Copy on Write

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2019.6.05 (Wed.)

TAs

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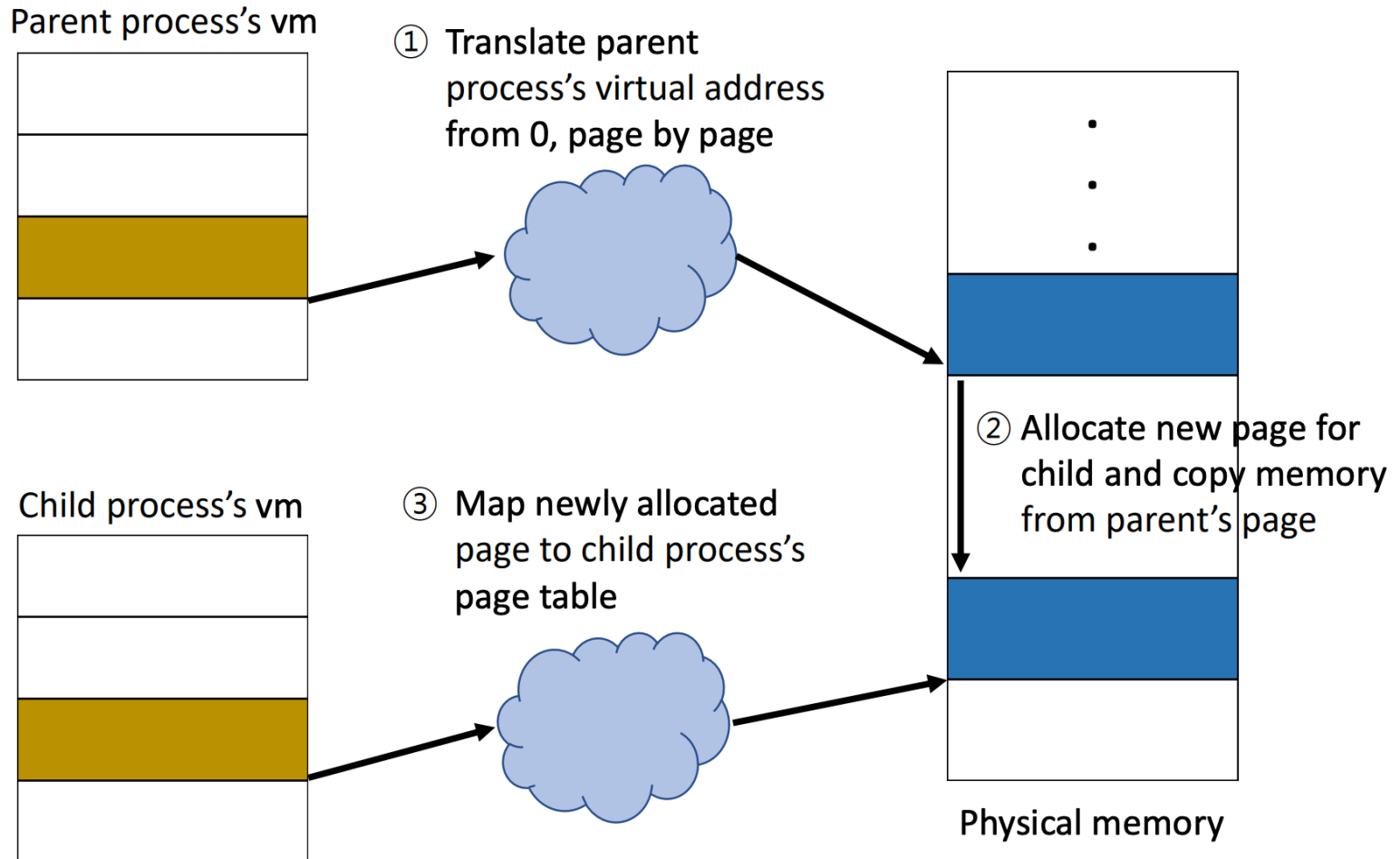
# Project plan

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- Total 7 projects

- 0) Starting xv6 operating system (5%)
- 1) System call (10%)
- 2) Thread (20%)
- 3) Synchronization (15%)
- 4) Scheduling (15%)
- 5) Page fault handler (15%)
- 6) Copy on Write (20%)

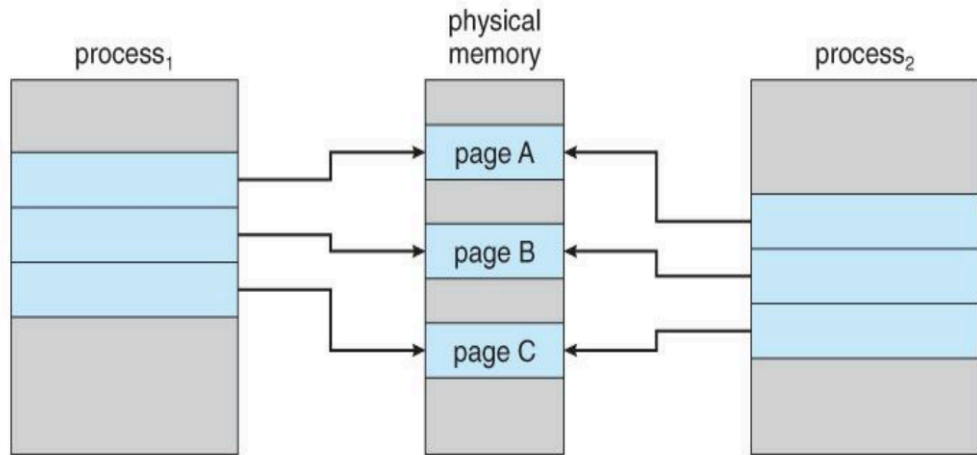
# fork() in xv6



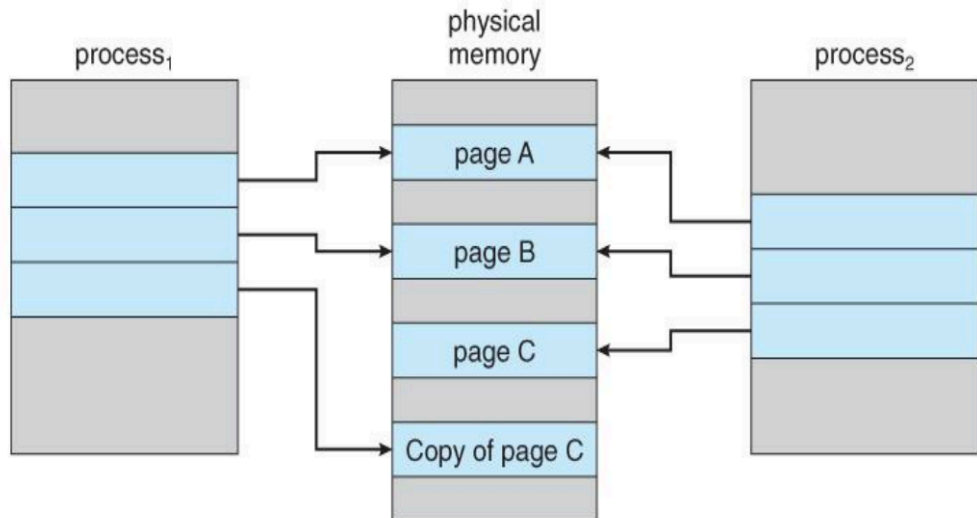
# What is Copy-on-Write (CoW) ?

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After fork() system call  
&  
No modify on pages



process 1 modifies page C



# Project 6. Copy-on-Write

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1. Use original xv6 code as a base

(<http://csl.skku.edu/uploads/SWE3004S19/xv6-skku.tar.gz>)

2. Add new system call “**numfree()**” which returns number of free page frames in physical memory

3. When process forks,

1. Create shared mapping to the same page frames in physical page
2. Shared pages are read-only (not writable)

# Project 6. Copy-on-Write

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4. When data is written to shared pages,
  1. Page fault is generated
  2. xv6 allocates new page frame in physical memory, and copy memory ofw original before write
  
5. Reference counter for physical pages is needed
  
6. `lcr3(V2P(pde_t))` -> update page table after modifying page table

# Submission

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- You should enter your ID & project no. (this time is 6) on **Makefile**
- `$make tarball`
- Then, `xv6-project-6-studentID.tar.gz` will be created in the parent folder.
- You need to submit a **document**.
  - What files were modified and why
  - Don't just copy-paste the code

# Submission

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- Send your code file (xv6-project-6-studentID.tar.gz) and document file to [gmj03003@gmail.com](mailto:gmj03003@gmail.com)
- Please send a mail with tittle including [SWE3004-P3]
  - Ex) [SWE3004-P6] 2014111111-project6
- **PLEASE DO NOT COPY**
  - **YOU WILL GET F GRADE IF YOU COPIED**
- Due date: 6/19(Wed.), 23:59:59 PM
  - Delays are allowed only one week from the deadline. And there will be up to -40%(6%\*6 day + 4%\*1 last day) penalty.



# Questions

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- If you have questions, please email to TA
- You can also visit #85533. Please email TA before visiting