

SSE3044 Introduction to Operating Systems  
Prof. Jinkyu Jeong

# Project 1-1. System Call

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TAs

이규선([gyusun.lee@cs.skku.edu](mailto:gyusun.lee@cs.skku.edu)) /

안민우([minwoo.ahn@cs.skku.edu](mailto:minwoo.ahn@cs.skku.edu))

# Project plan

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- Total 4 projects

- 0) Starting xv6 operating system

- 1) Process management

- 1) System Call

- 2) Priority Scheduler

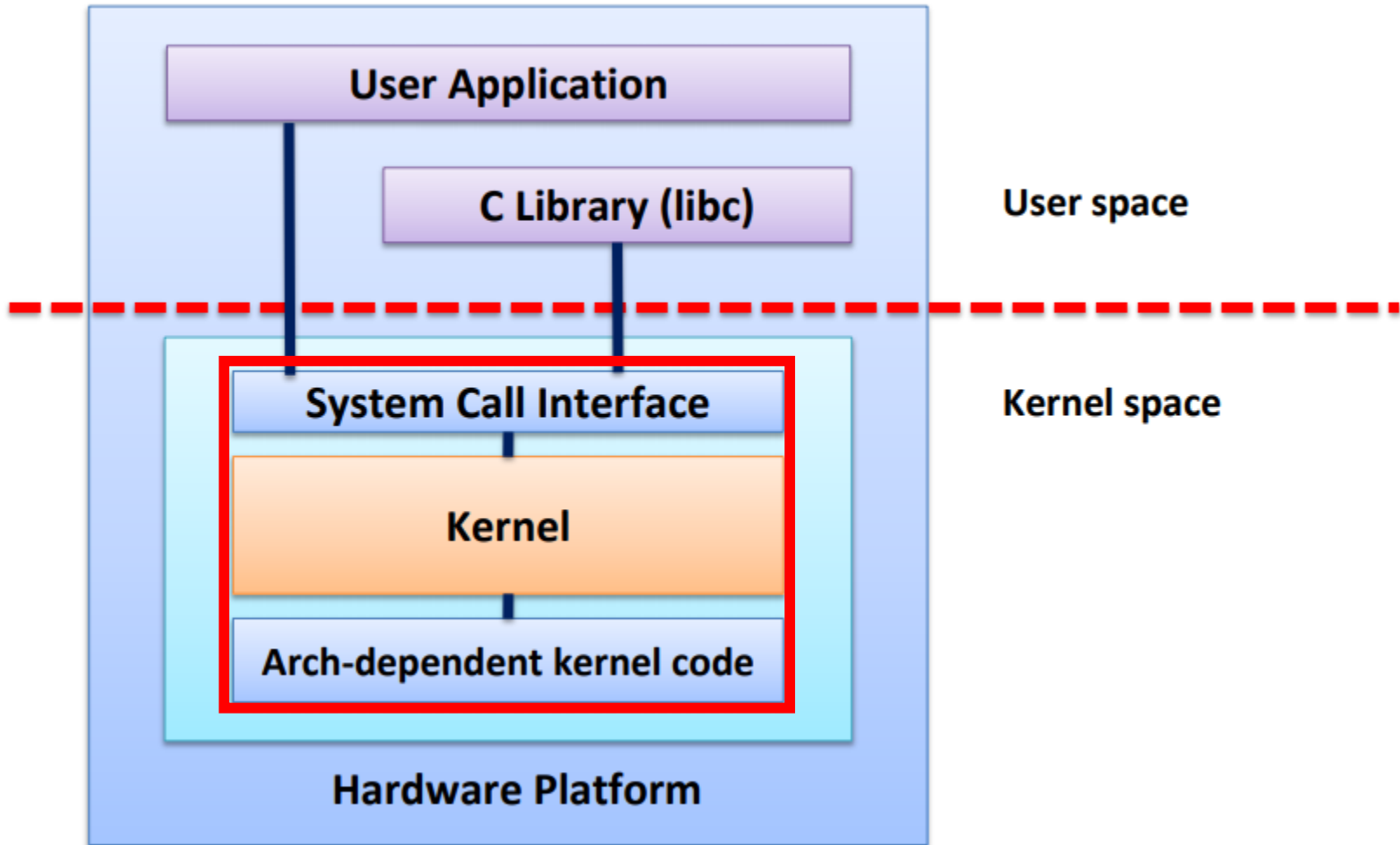
- 2) Virtual memory

- 3) Scheduling

- 4) File system

# Operating system

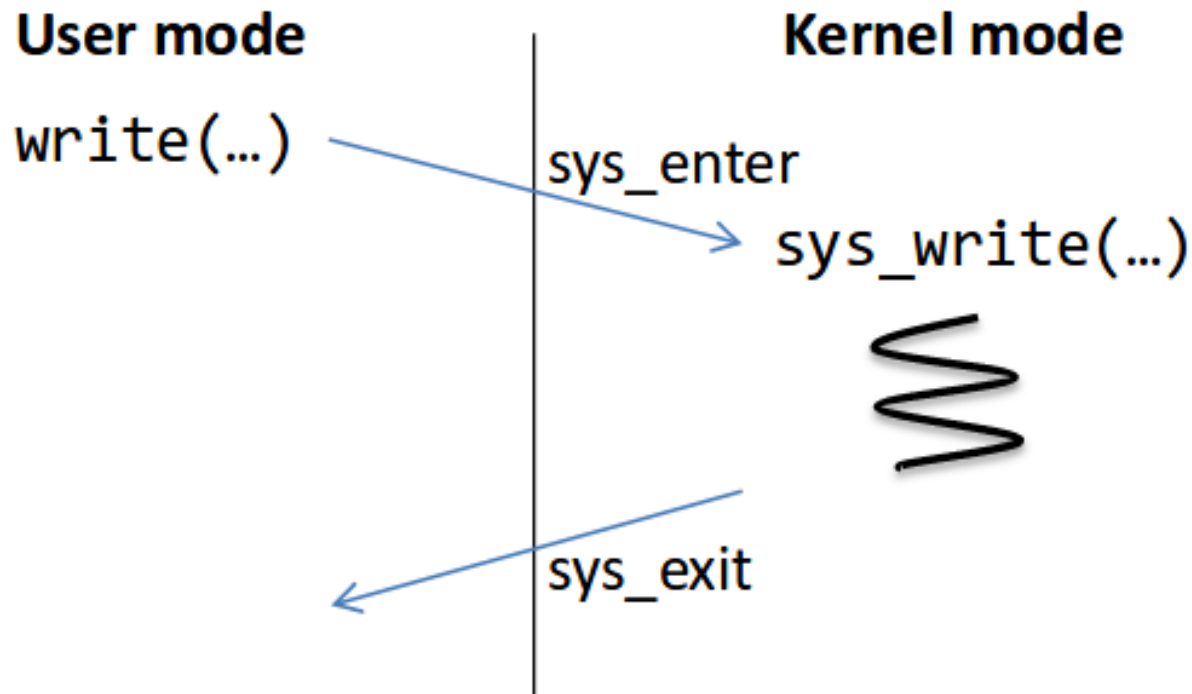
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# System Call

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- An interface for accessing the kernel from user space

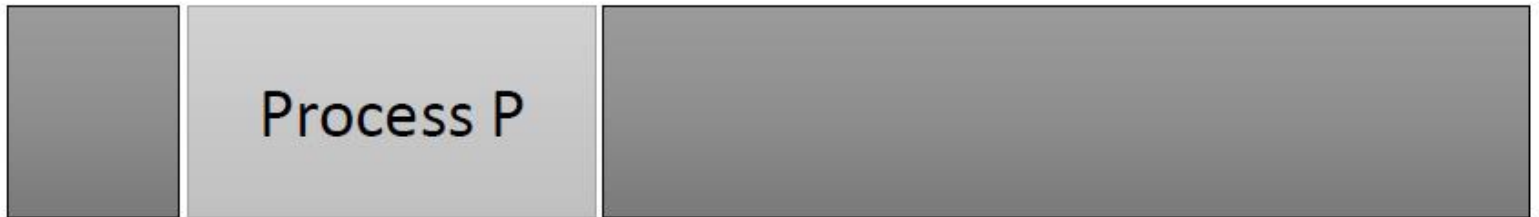


# Trap Handling Process

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- Intel architecture

Physical  
Memory  
(RAM)

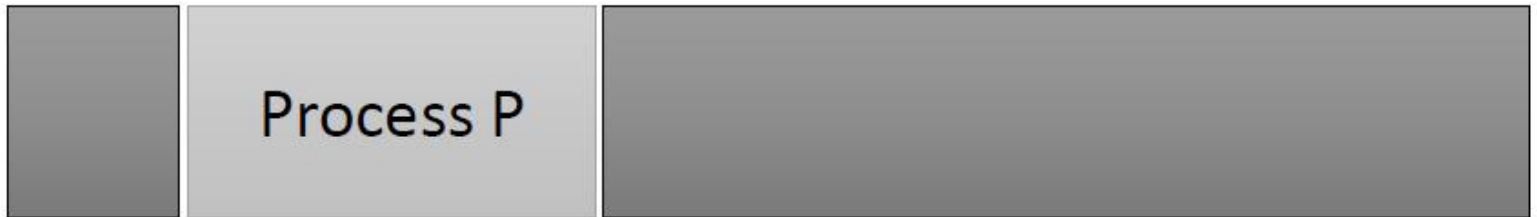


# Trap Handling Process (cont.)

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- User process P can only see its own memory

Physical  
Memory  
(RAM)



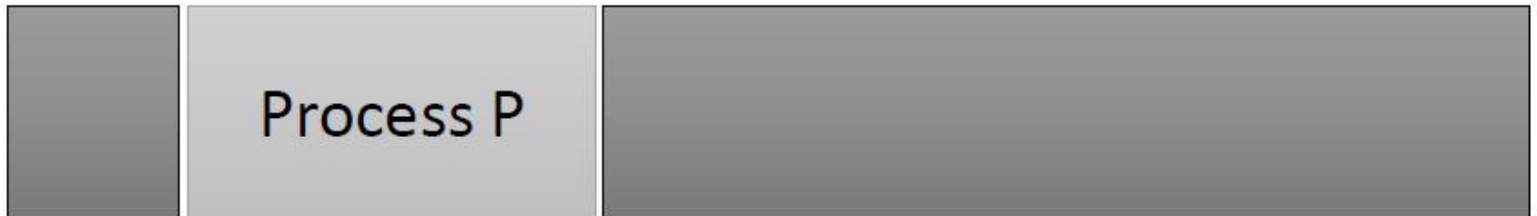
# Trap Handling Process (cont.)

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- Process P calls `fork()` system call

```
movl  $1, %eax  
int   $64
```

Physical  
Memory  
(RAM)



# Trap Handling Process (cont.)

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- Process P calls `fork()` system call

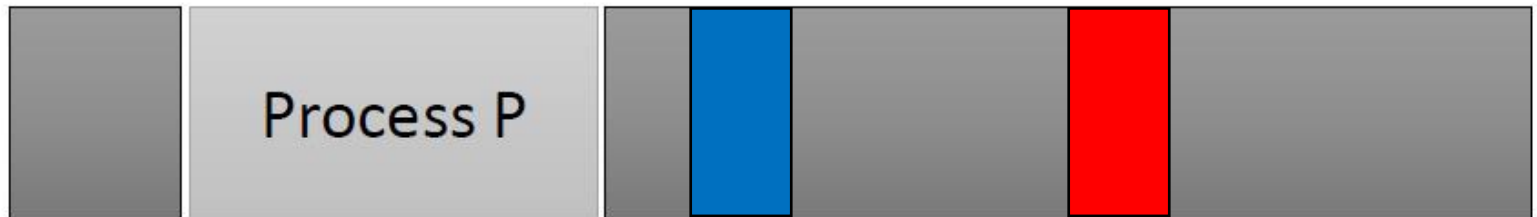
syscall table index

`movl $1, %eax`

`int $64`

trap table index

Physical  
Memory  
(RAM)

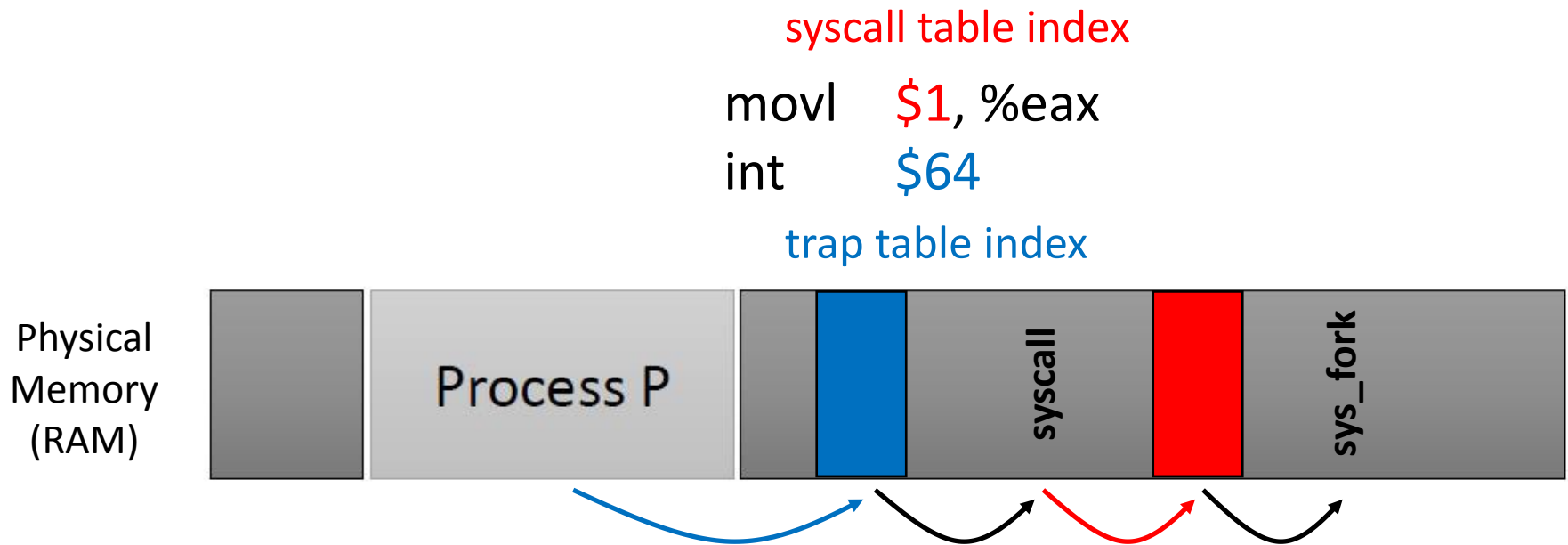




# Trap Handling Process (cont.)

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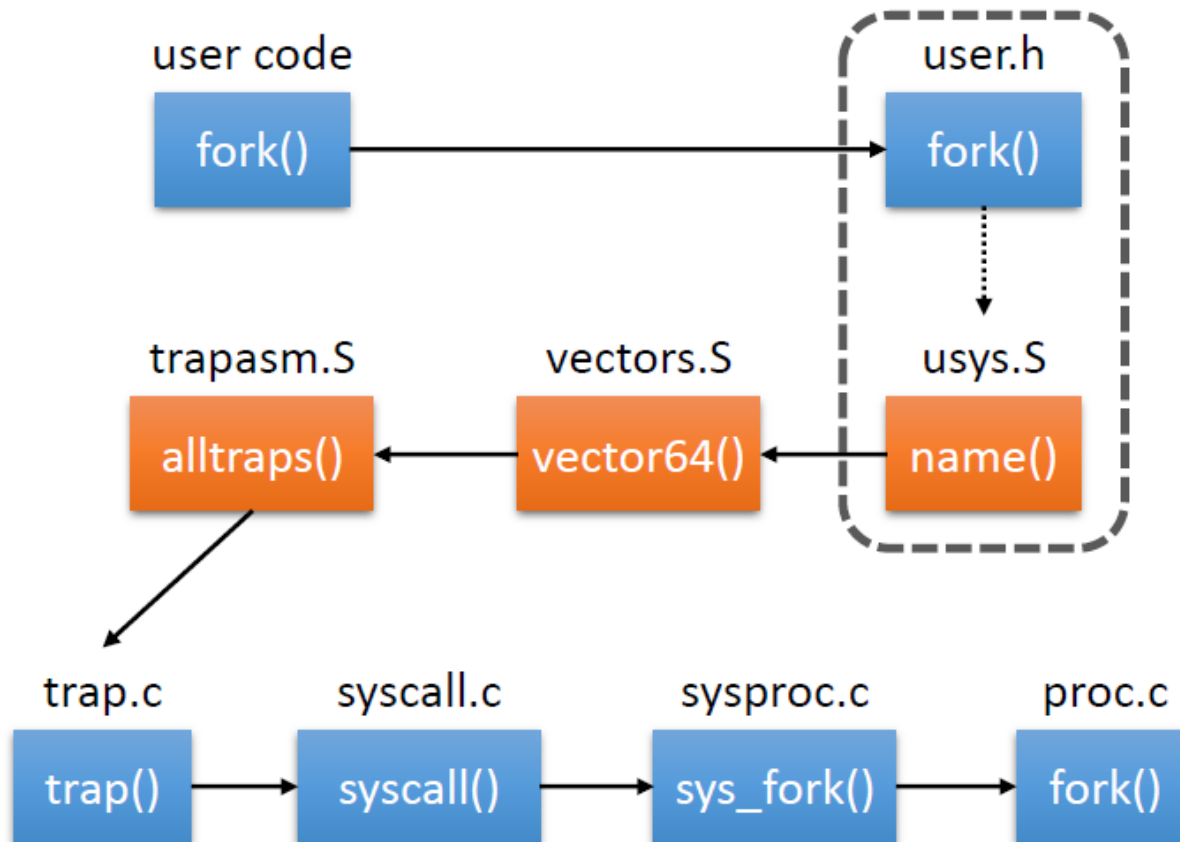
- Process P calls fork() system call



# System Call Process on Xv6

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- `fork()` system call

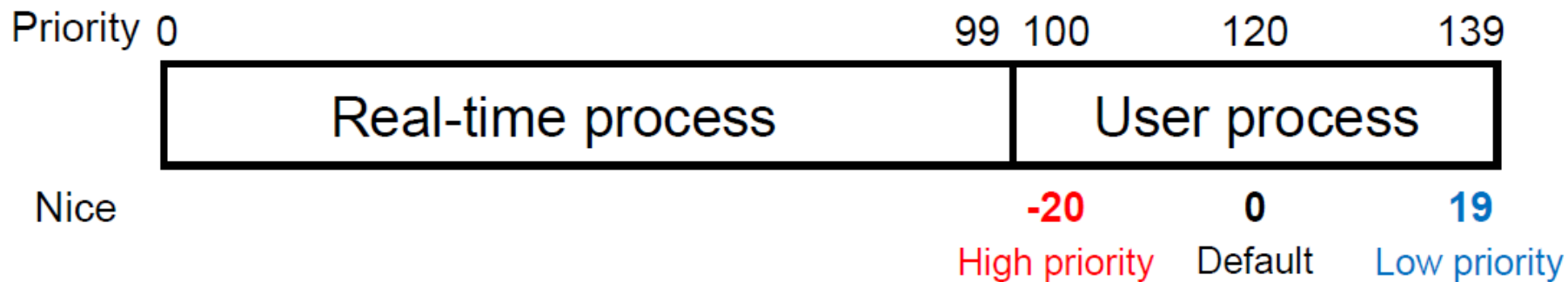


# Process Priority

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- For represent weight between processes

- In Linux



- In Xv6

- Not implemented!

# Project 1-1. Make System Calls

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- Make new system calls
  - `int setnice(int pid, int nice_value)`
    - Set the nice value of process (min: 0 / max: 39)
  - `int getnice(int pid)`
    - Return the nice value of pid(process)
- Make process status monitoring – minitop
  - Print all process status
  - Contents
    - Process ID
    - Parent process ID
    - Process priority
    - Process state
    - Process name

```
csl@simul:~/xv6-public$ make qemu-nox
qemu-system-i386 -nographic -drive file=
xv6...
cpu1: starting 1
cpu0: starting 0
sb: size 1000 nblocks 941 ninodes 200 nl
init: starting sh
$ minitop
pid      ppid     prio     state    name
1         1        20      sleep    init
2         1        20      sleep    sh
3         2        20      run      minitop
$
```

# Submission

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- Compress your xv6 folder as YourStudentID-1-1.tar.gz
  - `tar cvf 2016710580-1-1.tar.gz xv6-SSE3044`
- Send your tar.gz file to [gyusun.lee@csl.skku.edu](mailto:gyusun.lee@csl.skku.edu)
  - Please command `$make clean`, before submission
  - Please send mail with uniformized title
    - [SSE3044]YourStudentID-1-1
- **PLEASE DO NOT COPY**
  - **YOU WILL GET F GRADE IF YOU COPIED**
- Due date: 3/27(Tue.), 23:59:59 PM
  - -25% per day for delayed submission

# Questions

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- If you have questions, please email to TA
- You can also visit Semiconductor Building #400509
  - Please email TA before visiting

# Appendix. ctags & grep

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- Install ctags
  - `$sudo apt install ctags`
- Vim setting for ctags
  - `$ctags -R` (where you will use)
  - `$vi ~/.vimrc`
  - Add “set tags=[Location of tag file]/tags”
  - `$source ~/.vimrc`
- Ctags usage
  - `ctrl + ]` : follow tag
  - `ctrl + t` : back to last tag
- Grep Usage
  - `grep -nR “[string to search]”`

# Appendix. vi instructions

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\*\* \$sudo apt install vim

- ① vi [filename] -> Open file
- ② i -> keyboard typing mode
- ③ esc + :w -> save file
- ④ esc + :q -> exit file (esc + :wq -> save and exit)
- ⑤ /[string] -> search [string]
- ⑥ u -> back to last command
- ⑦ :vs -> open additional file on same session
- ⑧ dd -> erase one line
- ⑨ :set mouse=a -> activate mouse
  - ① Drag and y -> copy multi-line
  - ② p -> paste

\* Reference: [http://www.antsys.co.kr/data/vi\\_editor.htm](http://www.antsys.co.kr/data/vi_editor.htm)