EE6094
CAD for VLSI Design

Workstation User's Guide

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Slides Credit: TA Shih-Cheng Huang / TA Yi-Ting Lin

Outline

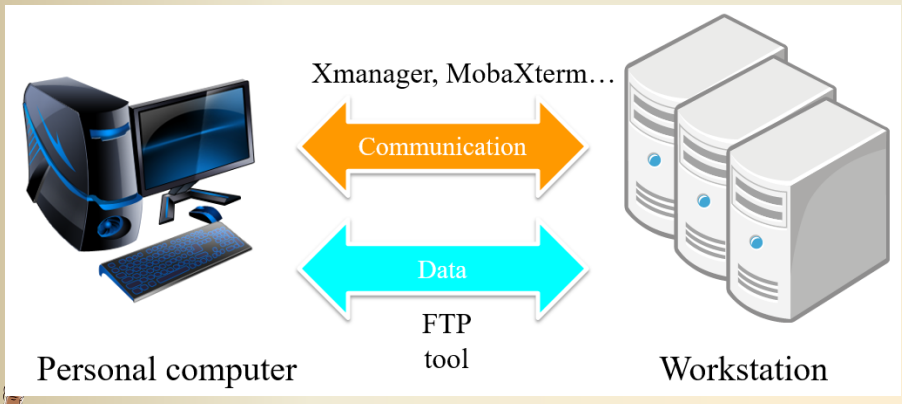
- Workstation
- Vim
- Tmux

Outline

- Workstation
- Vim
- Tmux

Workstation

- Introduction of workstation

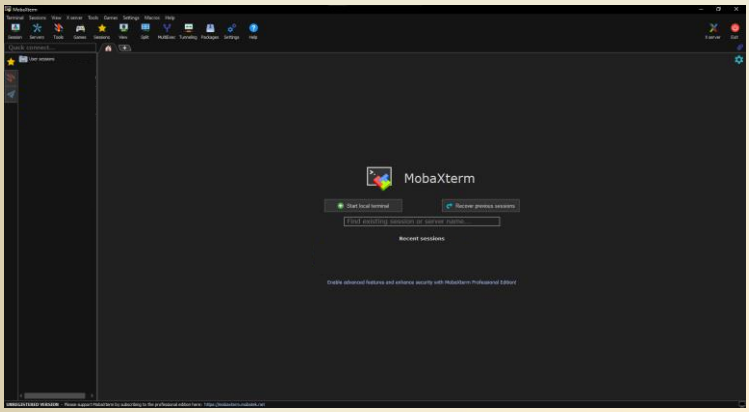


Workstation

- You are requested to complete most of your programming assignments on our server
  - And we will evaluate your program with the server
- Server setting
  - System: CentOS 7.1.1503
  - gcc version: 6.2.0
  - Host: 140.115.71.192
  - Port: 22 (Please use SSH to connect to the machine)
    - Default account: s(Your Student_ID)
      - Ex. s123456789
    - Default password: Your Student_ID
      - Ex. 123456789

Workstation

- How to connect to a server with SSH Client?
  - MobaXterm

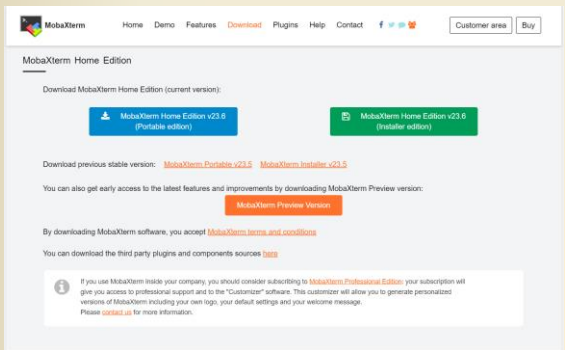


Workstation

- MobaXterm
  - MobaXterm is your ultimate toolbox for remote computing.
  - MobaXterm provides all the important remote network tools (SSH, X11, RDP, VNC, FTP, MOSH, ...) and Unix commands (bash, ls, cat, sed, grep, awk, rsync, ...) to Windows desktop
  - There are many advantages of having an All-In-One network application for your remote tasks

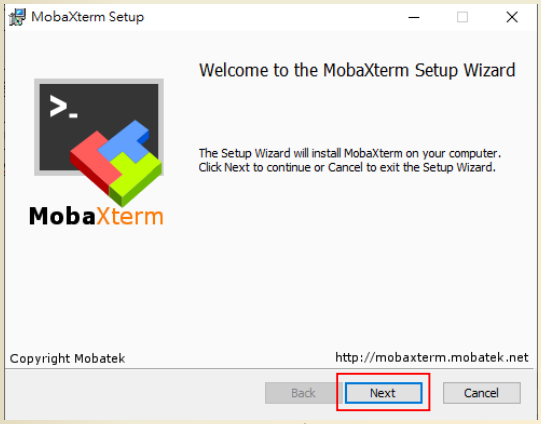
Workstation

- How to connect the Linux server
  - Step 1: download MobaXterm https://mobaxterm.mobatek.net/download-home-edition.html



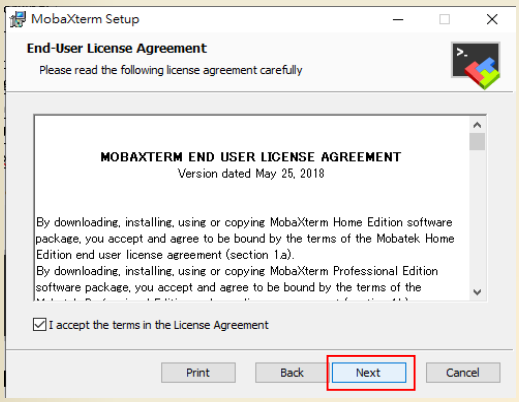
Workstation

- How to connect Linux server
  - Step 2-1: install MobaXterm



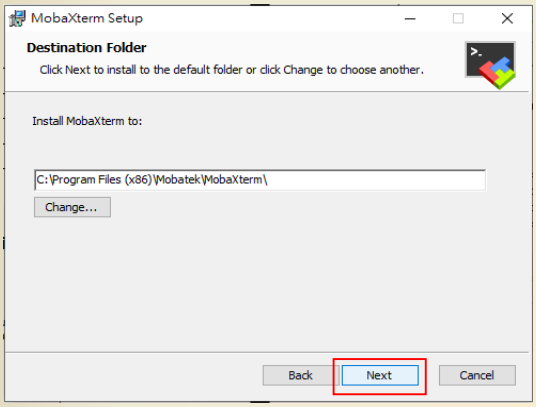
Workstation

- How to connect Linux server
  - Step 2-2: install MobaXterm



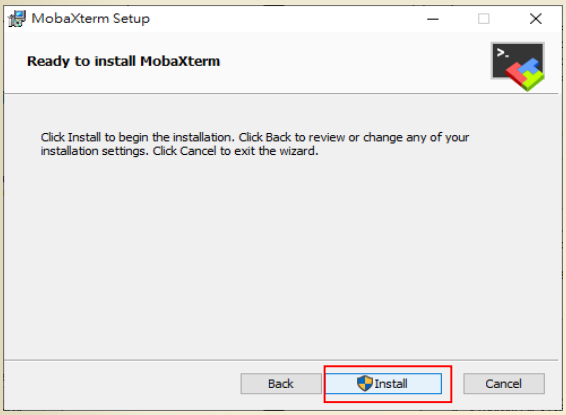
Workstation

- How to connect Linux server
  - Step 2-3: install MobaXterm



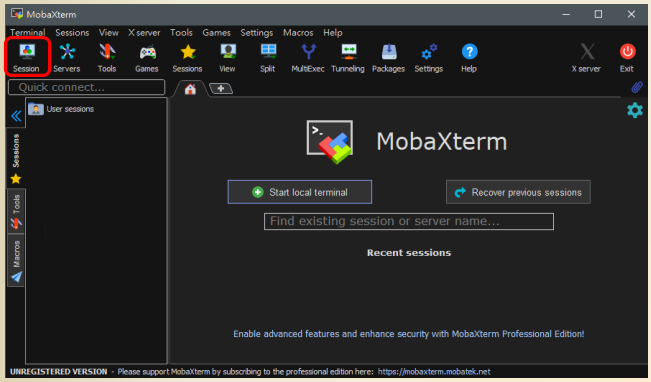
Workstation

- How to connect Linux server
  - Step 2-4: install MobaXterm



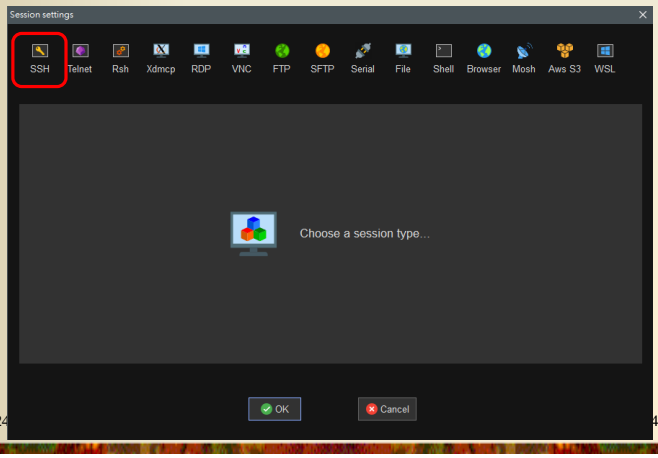
Workstation

- How to connect Linux server
  - Step 3-1: Click session to create a new session



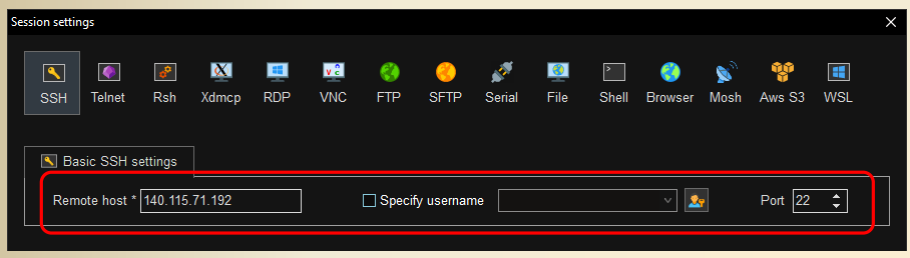
Workstation

- How to connect Linux server
  - Step 3-2: Click SSH to create a new SSH session



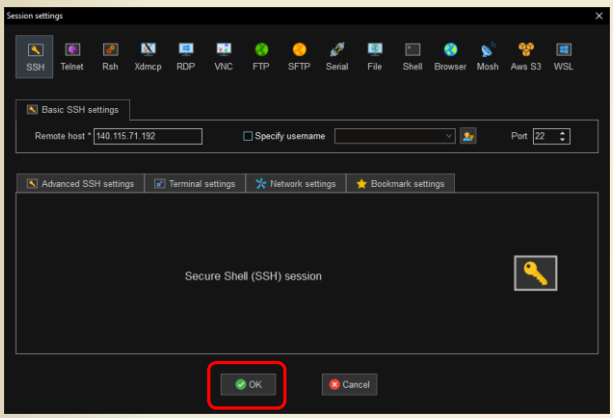
Workstation

- How to connect Linux server
  - Step 3-3: Fill in the given Host to the Host field and set the port number to 22



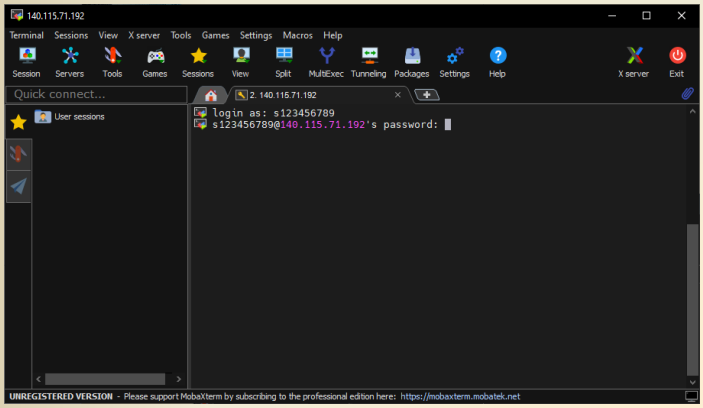
Workstation

- How to connect Linux server
  - Step 3-4: Click ok



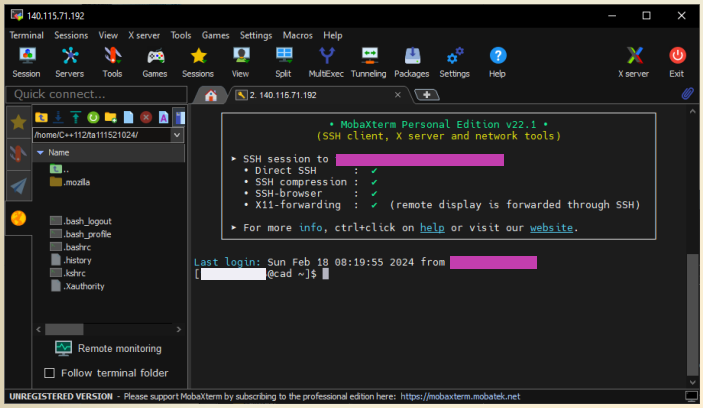
Workstation

- How to connect Linux server
  - Step 3-5: Login



Workstation

- How to connect Linux server
  - Step 3-6: Login



Workstation

- Change your workstation password
  - Step 4-1: Key in “ passwd ”
  - Step 4-2: Key in your current password
  - Step 4-3: Key in your new password
  - Step 4-4: Retype your new password again
  - The info with “**successfully**” means password change is success

```
[ [redacted]@cad ~]$ passwd Step4.1
Changing password for user [redacted].
Changing password for [redacted].
(current) UNIX password: Step4.2
New password: Step4.3
Retype new password: Step4.4
passwd: all authentication tokens updated successfully.
```


Basic command of workstation

- ls (list)
- ll (long list format)
- cd (change directory)
- pwd (print working directory)
- cp (copy)
- mv (move)
- rm (remove)
- mkdir (make directory)
- rmdir (remove directory)
- tar (compression tool)
- passwd (password)
- Ctrl + c (force quit)
- ps (process status)
- kill (kill process)

Basic Command

- mkdir

```
[            @cad ~]$ mkdir PA1
[            @cad ~]$
```

- ls

```
[            @cad ~]$ ls
                      PA1  PA2  PA3  PA4
```

- cd

```
[            @cad ~]$ cd PA1
[            @cad ~/PA1]$
```


Basic Command

- cp

```
[            @cad ~/PA1]$ cp ../test.cpp PA1.cpp
```

- rm

```
[            @cad ~/PA1]$ ls
PA1.cpp
[            @cad ~/PA1]$ rm PA1.cpp
[            @cad ~/PA1]$ ls
[            @cad ~/PA1]$
```

Basic Command

- rmdir

```
[            @cad ~]$ ls
             PA1  PA2  PA3  PA4  test.cpp
[            @cad ~]$ rmdir PA1
[            @cad ~]$ ls
             PA2  PA3  PA4  test.cpp
[            @cad ~]$
```


Basic Command

- mv

```
[            @cad ~/PA1]$ ls
README.md
[            @cad ~/PA1]$ ls ../
             PA1  PA2  PA3  PA4  test.cpp
[            @cad ~/PA1]$ mv ../test.cpp ./
[            @cad ~/PA1]$ ls
README.md  test.cpp
[            @cad ~/PA1]$ ls ../
             PA1  PA2  PA3  PA4
[            @cad ~/PA1]$
```

Outline

- Workstation
- Vim
- Tmux

Vim

- It is an efficient text editor especially developed for Linux users, that it is mainly used to edit or create different types of files
- Vim is the most popular and extremely powerful text editor
  - It possesses a lot of features that you would not expect to have in a text editor

```
[            @cad ~/PA1]$ vim parser.cpp
```

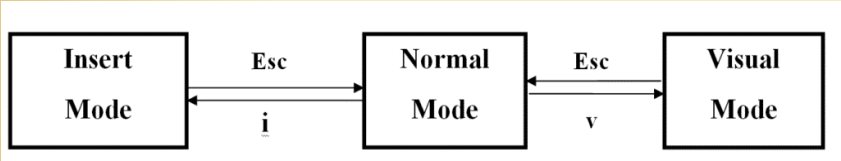
Open parser.cpp or create a new file named parser.cpp

Vim

- The Vim editor is a modal text editor
  - it uses modes for different purposes like inserting text, running commands, and selecting text
- There are three modes of operation
  - Normal
    - The initial mode of the Vim editor
    - Normal mode is also known as command mode because all the keystrokes you perform are interpreted as commands
  - Insert
    - Insert mode is where you can insert your text in the file
    - This mode inserts every character you type at the current cursor location
  - Visual
    - Visual mode allows you to select text so that you may perform certain operations (cut, copy, delete) on it

Vim

- Changing the modes



Vim

- Normal mode
  - You will see the below screen after executing the command
  - This is your normal mode in Vim

```
~
~
~
"parser.cpp" [New File]
```


Vim

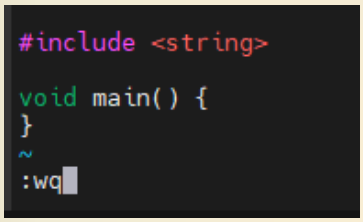
- Insert mode
  - You should be in the Insert mode if you want to **edit** your file
  - Press “i”, “a” or “o” from your keyboard, and you will be in insert mode
  - Press Esc to back to normal mode

```
#include <string>

void main() {
}
~
-- INSERT --
```

Vim

- Saving your work
  - When you are in normal mode, press ":w" to save your work and press ":q" to exit vim
  - You also can use ":wq" to save and exit vim



Vim

- File related commands

:w	write the file to the disk
:q	quit vi without saving the file
:wq	write the file to disk and quit vi
:q!	ignore the warning and discard the change
:w filename	save the file as filename

Vim

◆Moving the cursor

j	move the cursor down one line
k	move the cursor position up one line
l	move the cursor to the bottom of the screen
0	move to the beginning of the line
$	move to the end of the line

Vim

◆Inserting Text

I	insert text at the beginning of the line
i	insert text before the current cursor location
a	insert text after the current cursor location
o	create a new line for the text below the current cursor location
O	create a new line for text above the current cursor location

Vim

◆Changing text

cc	remove the whole line and start Insert mode
s	remove the character under the cursor and start Insert mode
r	replace the character under the cursor

Vim

◆Copying pasting

y	copy the selected text to clipboard
yy	copy current line
P	insert the text “before” the cursor
p	insert the text at the point after the cursor

Vim

◆Deleting Text

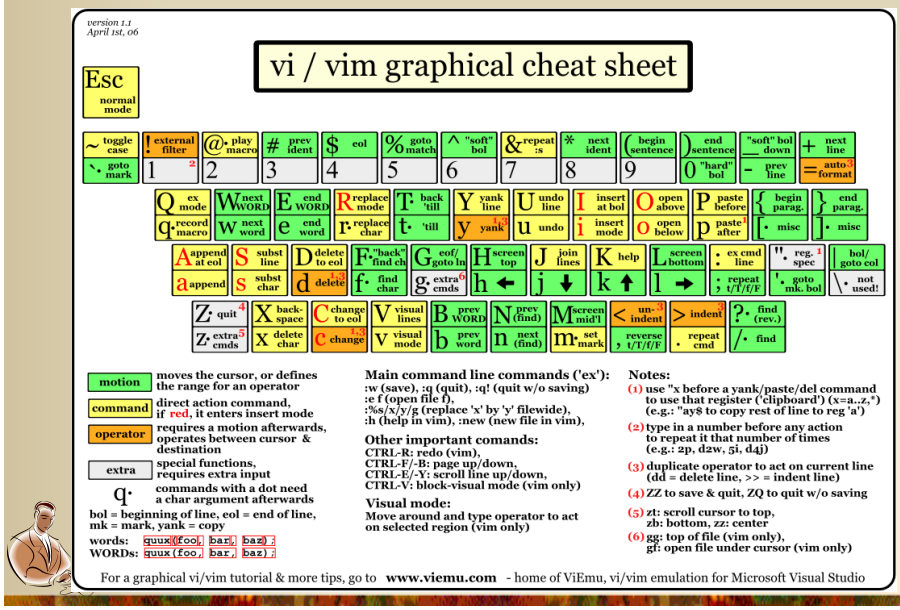
X	delete the character before the current location
x	delete the character under the current location
D	cut to the end of line
dd	cut current line

Vim

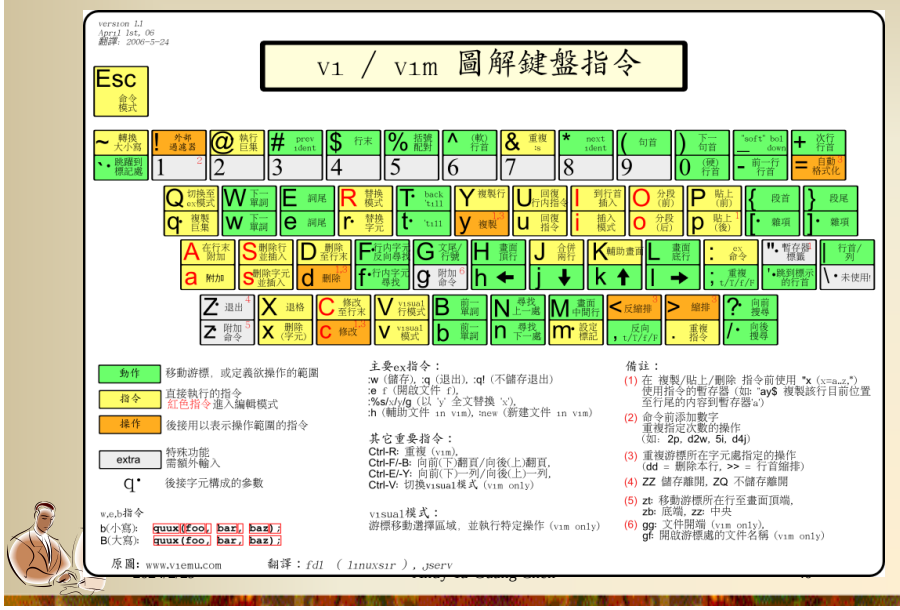
◆Undo/Redo

u	undo last change
Ctrl+R	redo

Vim


version 1.1
April 1st, 06
vi / vim graphical cheat sheet
Esc
normal mode
motion
moves the cursor, or defines the range for an operator
command
direct action command, if red, it enters insert mode
operator
requires a motion afterwards, operates between cursor & destination
extra
special functions, requires extra input
commands with a dot need a char argument afterwards
bol = beginning of line, eol = end of line, mk = mark, yank = copy
words: quux(foo, bar, baz);
WORDs: quux(foo, bar, baz);
Main command line commands ('ex'):
:w (save), :q (quit), :q! (quit w/o saving)
:e f (open file f),
:%s/x/y/g (replace 'x' by 'y' filewide),
:h (help in vim), :new (new file in vim),
Other important comands:
CTRL-R: redo (vim),
CTRL-F/-B: page up/down,
CTRL-E/-Y: scroll line up/down,
CTRL-V: block-visual mode (vim only)
Visual mode:
Move around and type operator to act on selected region (vim only)
Notes:
(1) use "x before a yank/paste/del command to use that register ('clipboard') (x=a..z,*)
(e.g.: "ay$ to copy rest of line to reg 'a')
(2) type in a number before any action to repeat it that number of times
(e.g.: 2p, d2w, 5i, d4j)
(3) duplicate operator to act on current line (dd = delete line, >> = indent line)
(4) ZZ to save & quit, ZQ to quit w/o saving
(5) zt: scroll cursor to top, zb: bottom, zz: center
(6) gg: top of file (vim only), gf: open file under cursor (vim only)
For a graphical vi/vim tutorial & more tips, go to www.viemu.com - home of ViEmu, vi/vim emulation for Microsoft Visual Studio

Vim


version 1.1
April 1st, 06
翻譯: 2006-5-24
vi / vim 圖解鍵盤指令
Esc
命令模式
動作
移動游標，或定義欲操作的範圍
指令
直接執行的指令
紅色指令進入編輯模式
操作
後接用以表示操作範圍的指令
extra
特殊功能
需額外輸入
後接字元構成的參數
主要ex指令：
:w (儲存), :q (退出), :q! (不儲存退出)
:e f (開啟文件 f),
:%s/x/y/g (以 'y' 全文替換 'x'),
:h (輔助文件 in vim), :new (新建文件 in vim)
其它重要指令：
Ctrl-R: 重複 (vim),
Ctrl-F/-B: 向前(下)翻頁/向後(上)翻頁,
Ctrl-E/-Y: 向前(下)一列/向後(上)一列,
Ctrl-V: 切換visual模式 (vim only)
visual模式：
游標移動選擇區域，並執行特定操作 (vim only)
備註：
(1) 在 複製/貼上/刪除 指令前使用 "x (x=a..z,*)
使用指令的暫存器 (如: "ay$ 複製該行目前位置至行尾的內容到暫存器'a')
(2) 命令前添加數字
重複指定次數的操作
(如: 2p, d2w, 5i, d4j)
(3) 重複游標所在字元處指定的操作
(dd = 刪除本行, >> = 行首縮排)
(4) ZZ 儲存離開, ZQ 不儲存離開
(5) zt: 移動游標所在行至畫面頂端,
zb: 底端, zz: 中央
(6) gg: 文件開端 (vim only),
gf: 開啟游標處的文件名稱 (vim only)
w,e,b指令
b(小寫): quux(foo, bar, baz);
B(大寫): quux(foo, bar, baz);
原圖: www.viemu.com
翻譯：fdl (linuxsir), jserv

Outline

- Workstation
- Vim
- Tmux

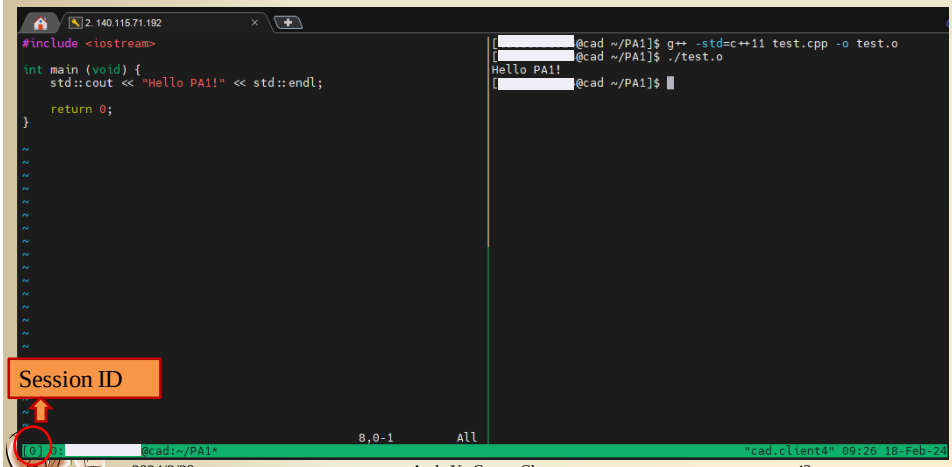
Tmux

- What is tmux?
  - Tmux is a terminal multiplexer that you can start a Tmux session and then open multiple windows inside that session
  - Session ➔ windows

```
[          @cad ~/PA1]$ tmux
```

Tmux

- A tmux session with two windows



Tmux

- Working with tmux windows and panes
  - Ctrl+b c: Create a new window.
  - Ctrl+b w: Choose window from a list.
  - Ctrl+b 0: Switch to window 0.
  - Ctrl+b n: Switch to next window.
  - Ctrl+b p: Switch to previous window.
  - Ctrl+b %: Split current pane horizontally into two panes.
  - Ctrl+b “: Split current pane vertically into two panes.
  - Ctrl+b arrow keys: Switch pane.

Reference

- Linux
  - https://files.fosswire.com/2007/08/fwunixref.pdf
  - https://linux.vbird.org/
- Vim
  - https://danielmiessler.com/study/vim/
  - http://www.vixual.net/blog/archives/234
- Tmux
  - https://blog.gtwang.org/linux/linux-tmux-terminal-multiplexer-tutorial/
  - https://linuxize.com/post/getting-started-with-tmux/#starting-your-first-tmux-session