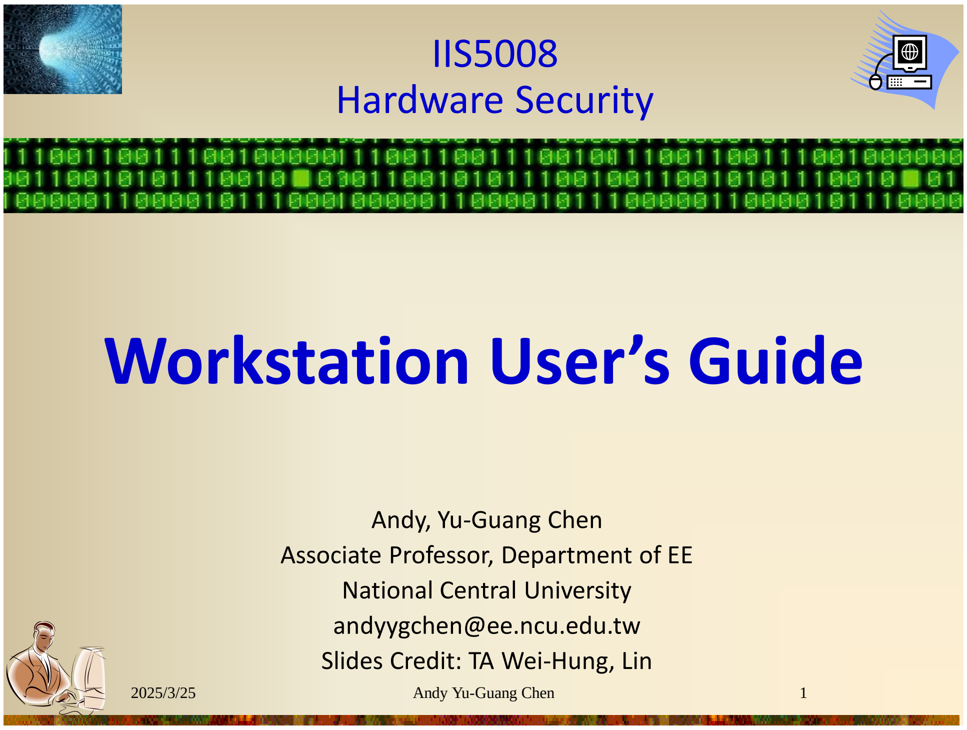
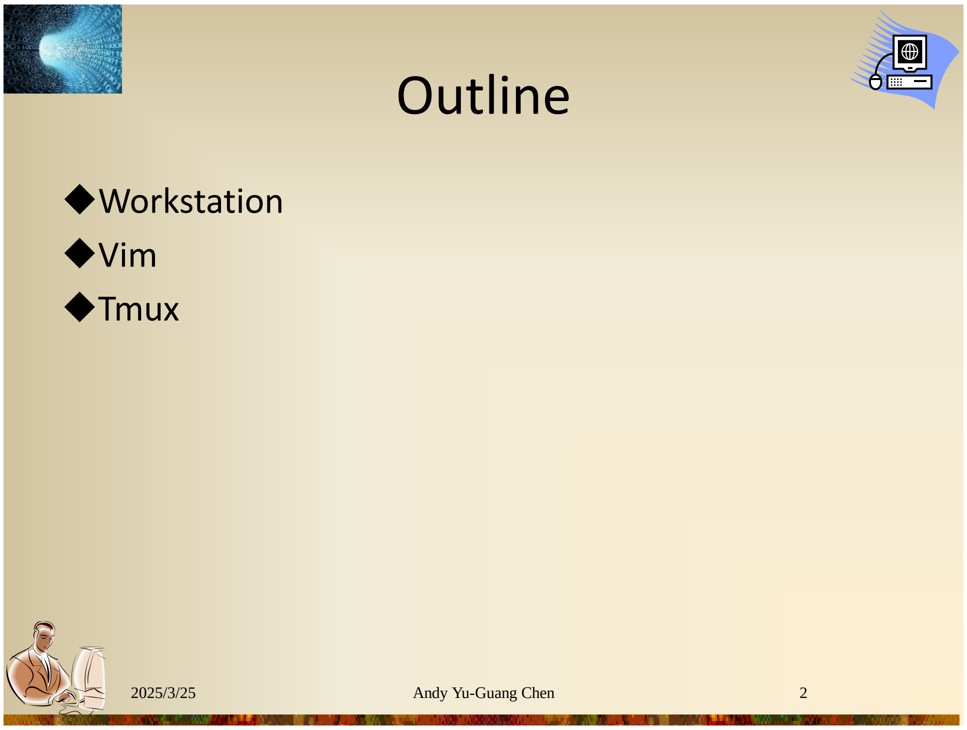


IIS5008
Hardware Security

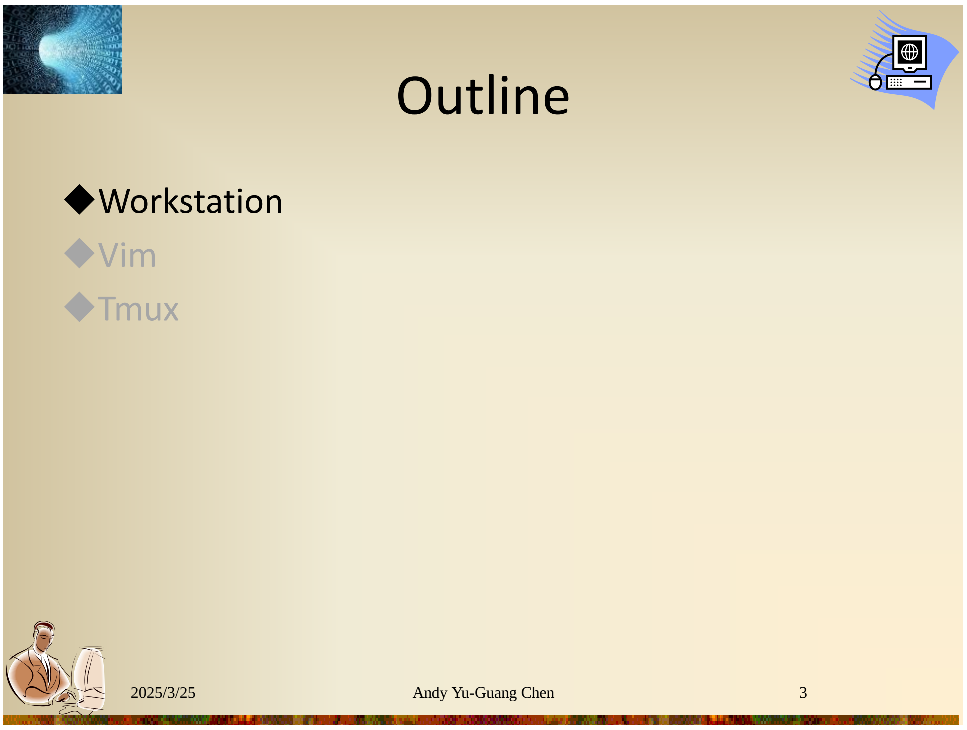
Workstation User's Guide

Andy, Yu-Guang Chen
Associate Professor, Department of EE
National Central University
andyygchen@ee.ncu.edu.tw
Slides Credit: TA Wei-Hung, Lin



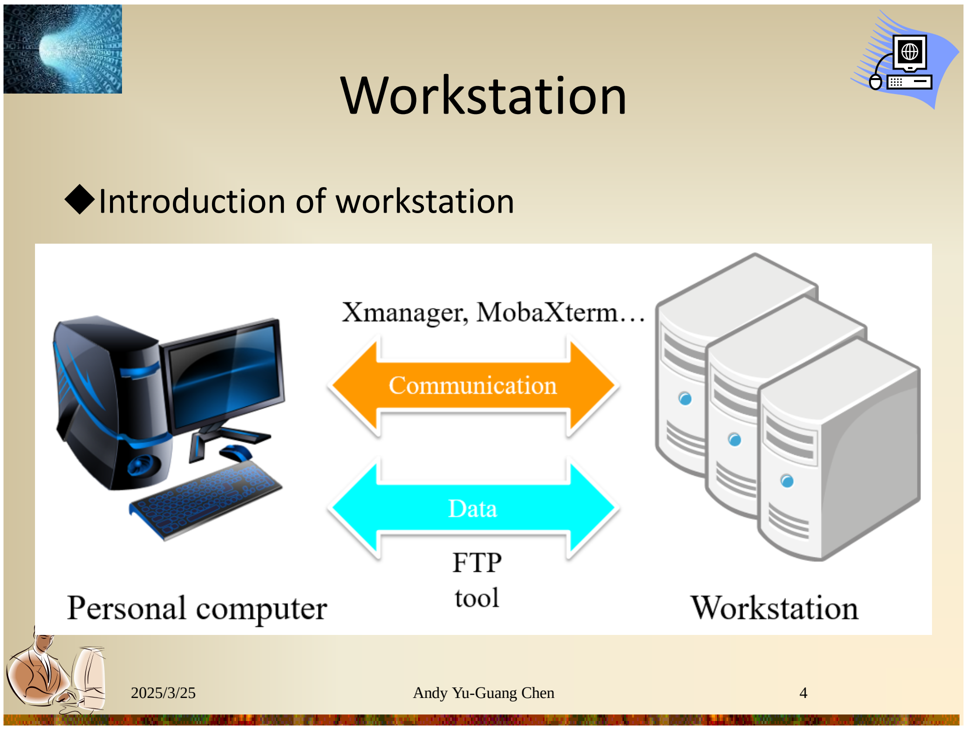
Outline

- Workstation
- Vim
- Tmux



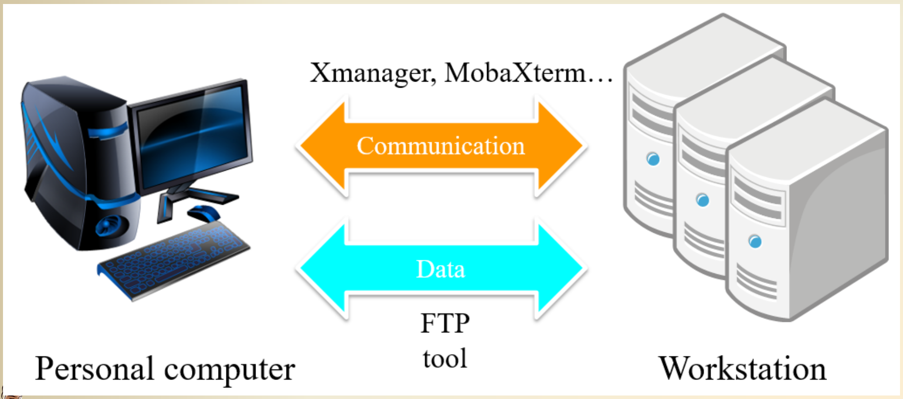
Outline

- ◆Workstation
- ◆Vim
- ◆Tmux



Workstation

◆Introduction of workstation

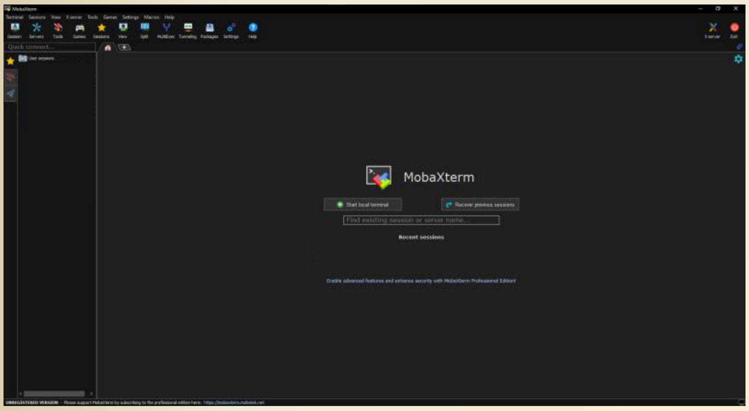


Workstation

- ◆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: Linux 3.10.0
  - ➢ Host: 140.115.71.44
  - ➢ Port: 22 (Please use SSH to connect to the machine)
    - Default account: ts(Your Student_ID)
      - – Ex. ts123456789
    - Default password: NTHUhsEDA

Workstation

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


MobaXterm
Terminal Sessions View X server Tools Games Settings Macros Help
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help
X server Exit
Quick connect...
User sessions
MobaXterm
Start local terminal
Recover previous sessions
Find existing session or server name...
Recent sessions
Enable advanced features and enhance security with MobaXterm Professional Edition!
UNREGISTERED VERSION - Please support MobaXterm by subscribing to the professional edition here: https://mobaxterm.mobatek.net

Workstation

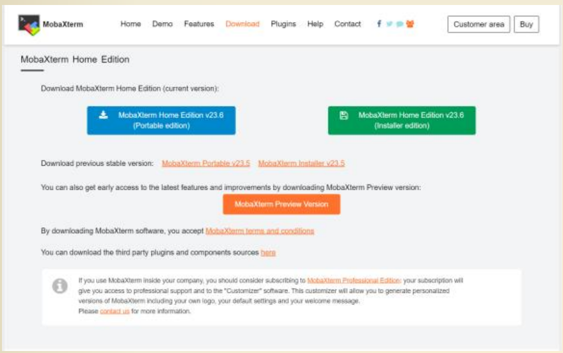
◆MobaXterm

- ➢ 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


MobaXterm
Home
Demo
Features
Download
Plugins
Help
Contact
Customer area
Buy
MobaXterm Home Edition v23.6 (Portable edition)
MobaXterm Home Edition v23.6 (Installer edition)
MobaXterm Preview Version

MobaXterm Home Edition

Download MobaXterm Home Edition (current version):

Download previous stable version: MobaXterm Portable v23.5 MobaXterm Installer v23.5

You can also get early access to the latest features and improvements by downloading MobaXterm Preview version:

By downloading MobaXterm software, you accept MobaXterm terms and conditions

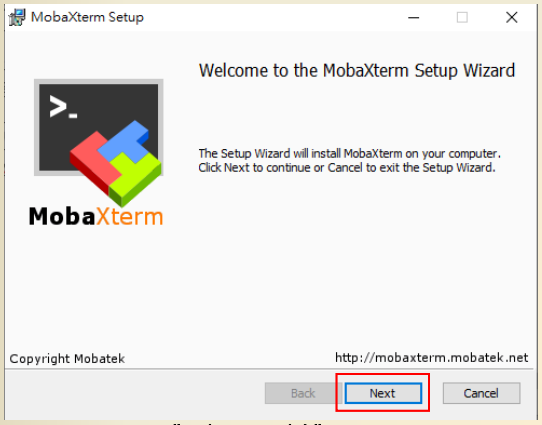
You can download the third party plugins and components sources here

If you use MobaXterm inside your company, you should consider subscribing to MobaXterm Professional Edition: your subscription will give you access to professional support and to the "Customizer" software. This customizer will allow you to generate personalized versions of MobaXterm including your own logo, your default settings and your welcome message.
Please contact us for more information.

Workstation

◆How to connect Linux server

➢ Step 2-1: install MobaXterm



Welcome to the MobaXterm Setup Wizard

The Setup Wizard will install MobaXterm on your computer. Click Next to continue or Cancel to exit the Setup Wizard.

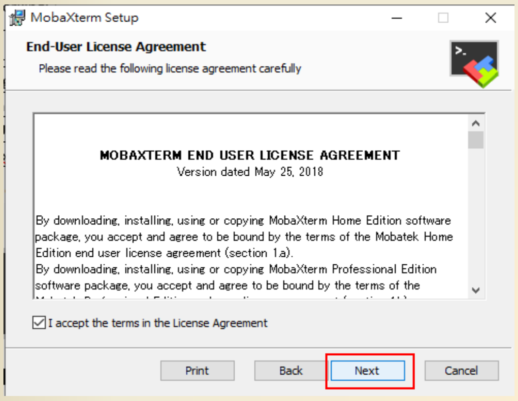
Copyright Mobatek

http://mobaxterm.mobatek.net

Workstation

◆How to connect Linux server

➢ Step 2-2: install MobaXterm



End-User License Agreement

Please read the following license agreement carefully

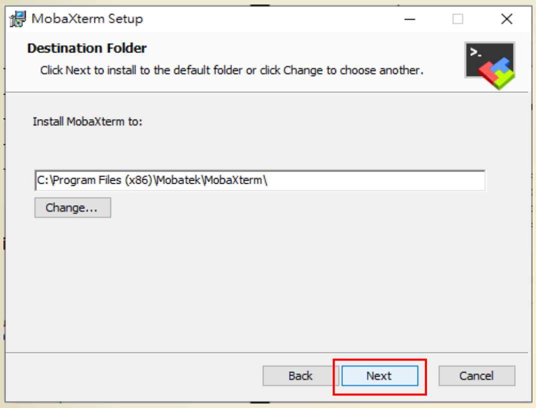
MOBAXTERM END USER LICENSE AGREEMENT
Version dated May 25, 2018

By downloading, installing, using or copying MobaXterm Home Edition software package, you accept and agree to be bound by the terms of the Mobatek Home Edition end user license agreement (section 1.a).
By downloading, installing, using or copying MobaXterm Professional Edition software package, you accept and agree to be bound by the terms of the

☑ I accept the terms in the License Agreement

Workstation

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


MobaXterm Setup

Destination Folder

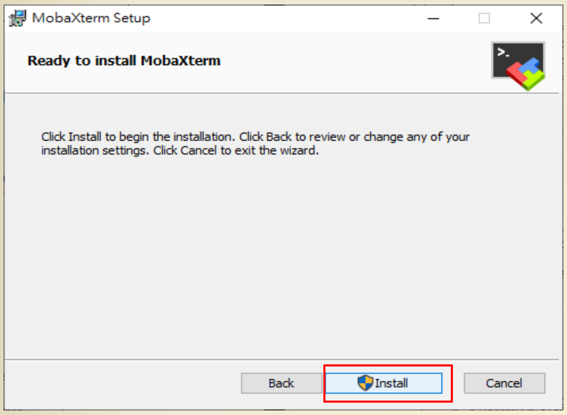
Click Next to install to the default folder or click Change to choose another.

Install MobaXterm to:

C:\Program Files (x86)\Mobatek\MobaXterm\

Workstation

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


MobaXterm Setup

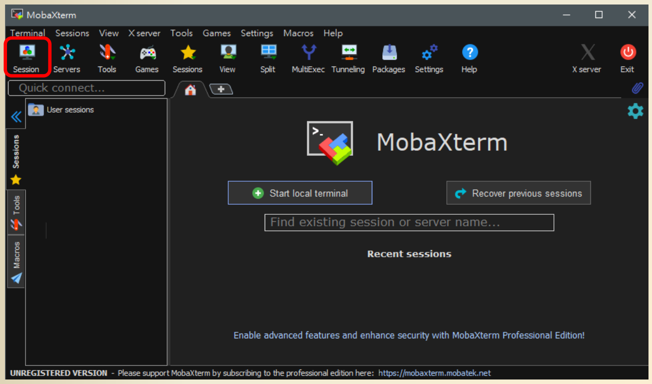
Ready to install MobaXterm

Click Install to begin the installation. Click Back to review or change any of your installation settings. Click Cancel to exit the wizard.

Workstation

◆How to connect Linux server

➢ Step 3-1: Click session to create a new session


MobaXterm
Terminal Sessions View X server Tools Games Settings Macros Help
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help X server Exit
Quick connect...
User sessions
Sessions Tools Macros
MobaXterm
Start local terminal
Recover previous sessions
Find existing session or server name...
Recent sessions

Enable advanced features and enhance security with MobaXterm Professional Edition!

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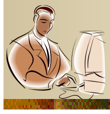
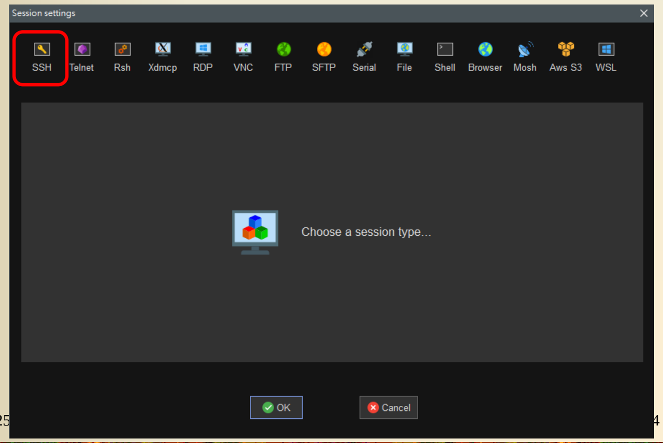
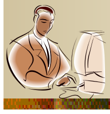


Workstation

◆How to connect Linux server

➢ Step 3-2: Click SSH to create a new SSH session

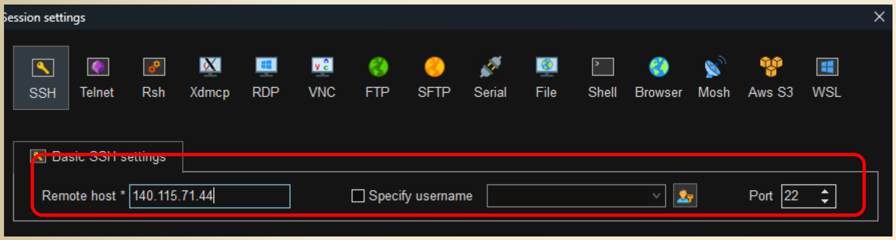

Session settings
SSH Telnet Rsh Xdmcp RDP VNC FTP SFTP Serial File Shell Browser Mosh Aws S3 WSL
Choose a session type...
OK
Cancel



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

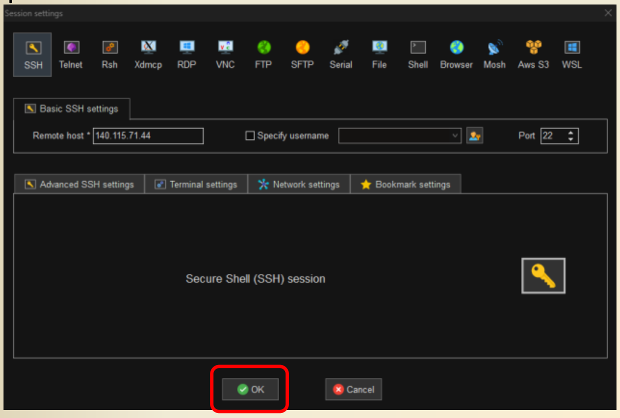


Remote host * 140.115.71.44 ☐ Specify username Port 22

Workstation

◆How to connect Linux server

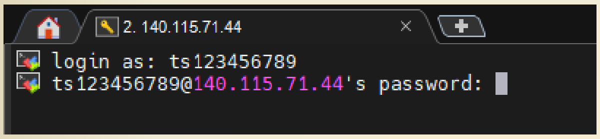
➢ Step 3-4: Click ok



Remote host * 140.115.71.44 ☐ Specify username Port 22

Workstation

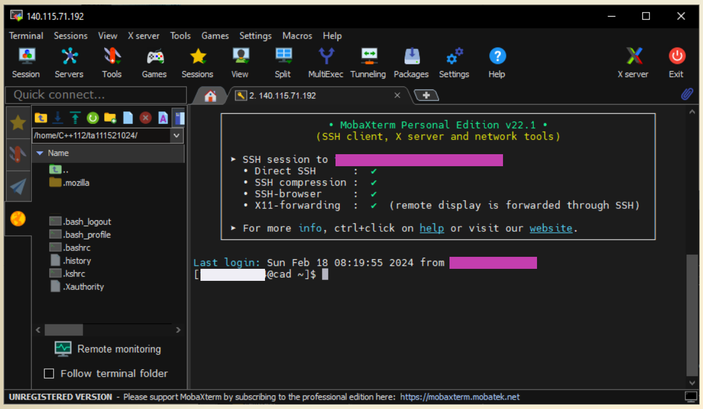
- How to connect Linux server
  - Step 3-5: Login



```
login as: ts123456789
ts123456789@140.115.71.44's password:
```

Workstation

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


140.115.71.192
Terminal Sessions View X server Tools Games Settings Macros Help
Session Servers Tools Games Sessions View Split MultiExec Tunneling Packages Settings Help X server Exit
Quick connect...
2. 140.115.71.192
/home/C++112/ta111521024/
Name
..
.mozilla
.bash_logout
.bash_profile
.bashrc
.history
.kshrc
.Xauthority
Remote monitoring
Follow terminal folder

```
• MobaXterm Personal Edition v22.1 •
(SSH client, X server and network tools)

► SSH session to [redacted]
  • Direct SSH      :  ✓
  • SSH compression :  ✓
  • SSH-browser     :  ✓
  • X11-forwarding  :  ✓  (remote display is forwarded through SSH)

► For more info, ctrl+click on help or visit our website.

Last login: Sun Feb 18 08:19:55 2024 from [redacted]
[[redacted]@cad ~]$
```

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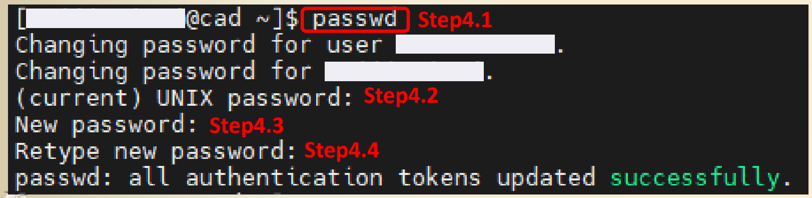
Workstation

- 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



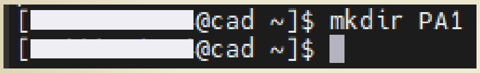
```
[[redacted]@cad ~]$ passwd  Step4.1
Changing password for user [redacted].
Changing password for [redacted].
(current) UNIX password: Step4.2
New password: Step4.3
Retype new password: Step4.4
passwd: all authentication tokens updated successfully.
```

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)

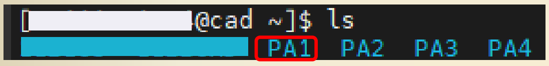
Basic Command

◆mkdir



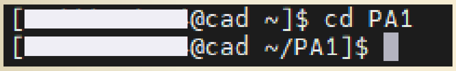
```
[[redacted]@cad ~]$ mkdir PA1
[[redacted]@cad ~]$ 
```

◆ls



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

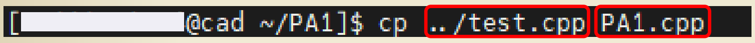
◆cd



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

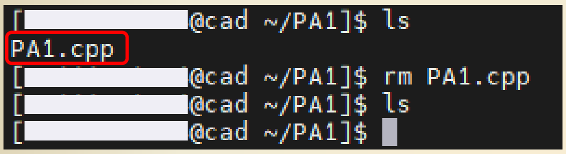
Basic Command

◆cp



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

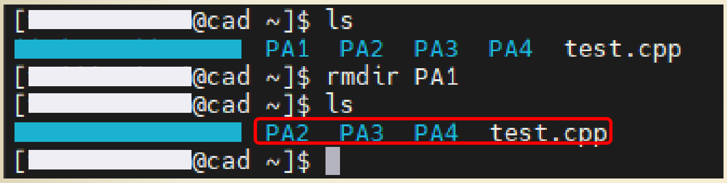
◆rm



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

Basic Command

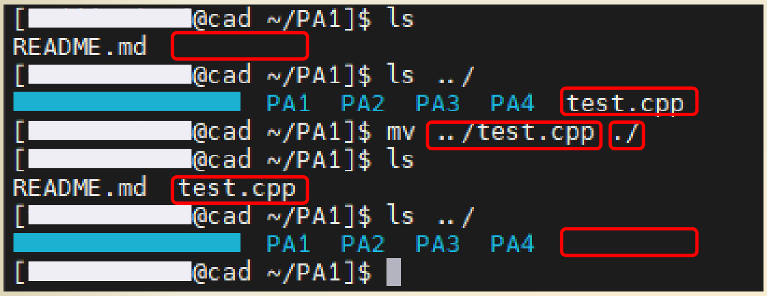
◆rmdir



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

Basic Command

◆mv



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

Outline

◆Workstation

◆Vim

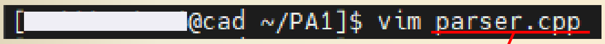
◆Tmux

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



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

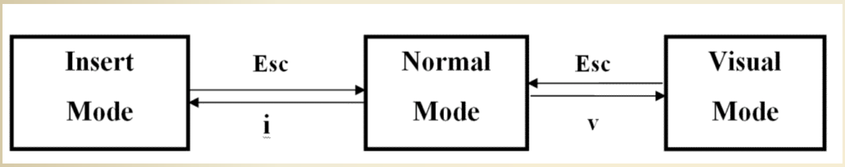
Open parser.cpp or create a new file named parser.cpp

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

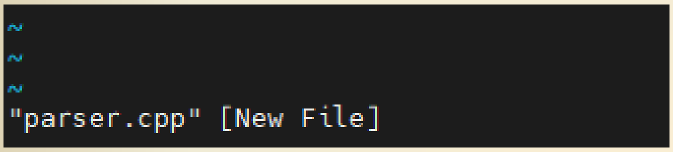
- Changing the modes



Vim

◆ Normal mode

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

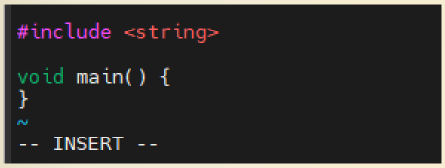


```
~
~
~
"parser.cpp" [New File]
```

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



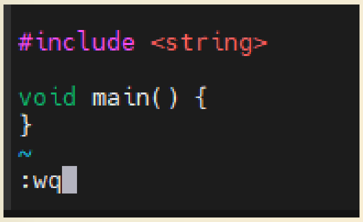
```
#include <string>

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



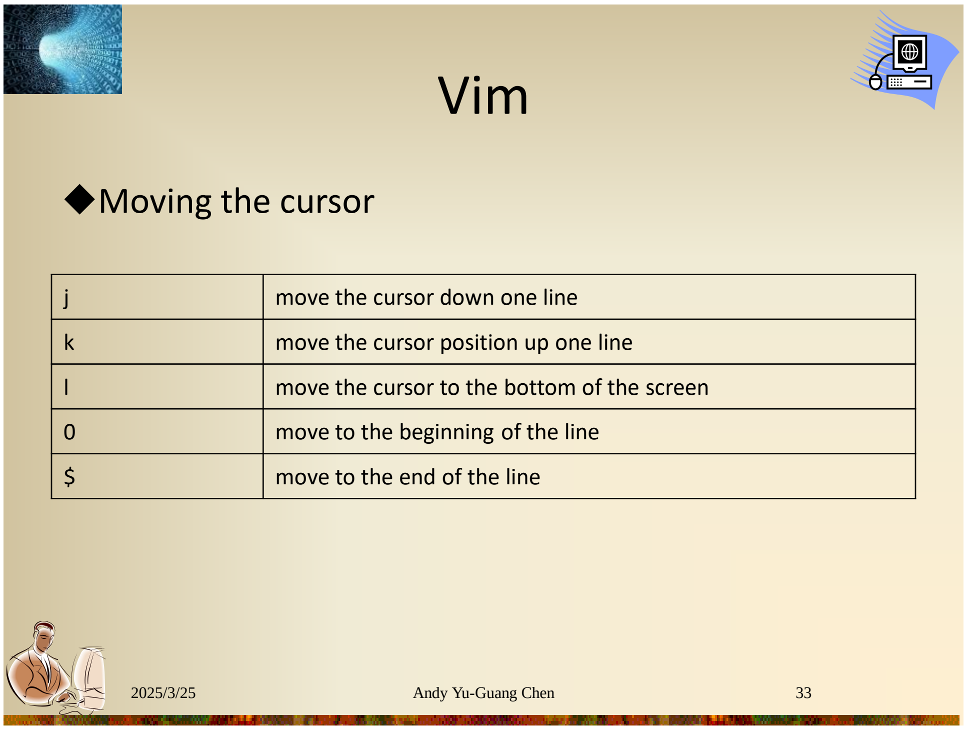
```
#include <string>

void main() {
}
~
:wq
```

Vim

◆File related commands

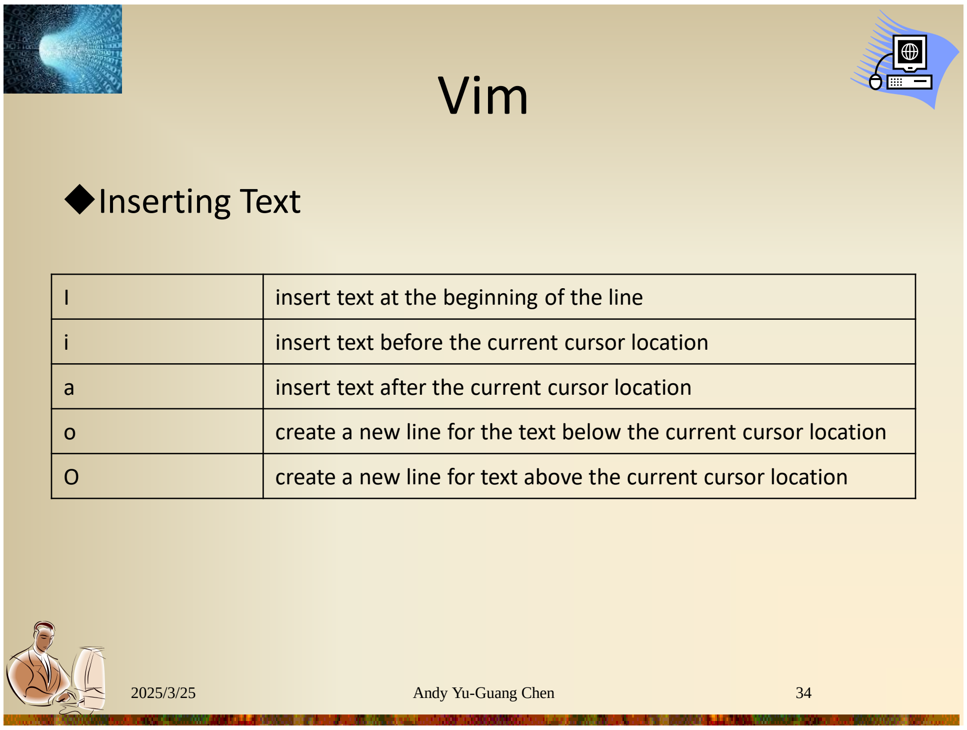
:w	write the file to the disk
:q	quit vi without saving the file
:wq	write the file to disk and quit vi
:q!	ignore the warning and discard the change
:w filename	save the file as filename



Vim

◆Moving the cursor

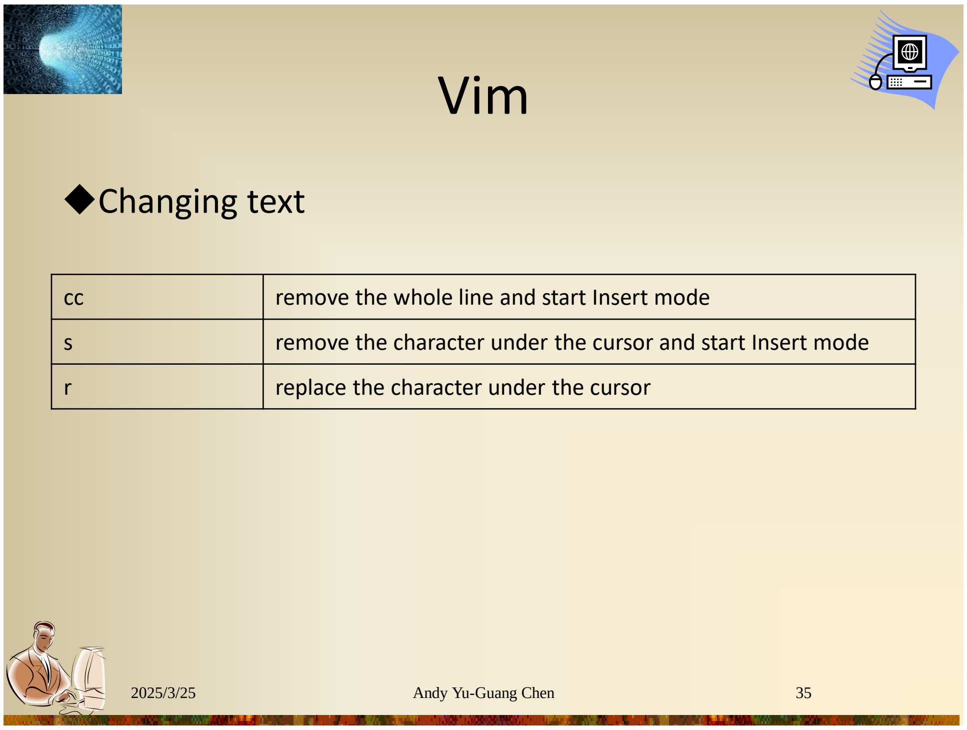
j	move the cursor down one line
k	move the cursor position up one line
l	move the cursor to the bottom of the screen
0	move to the beginning of the line
$	move to the end of the line



Vim

◆Inserting Text

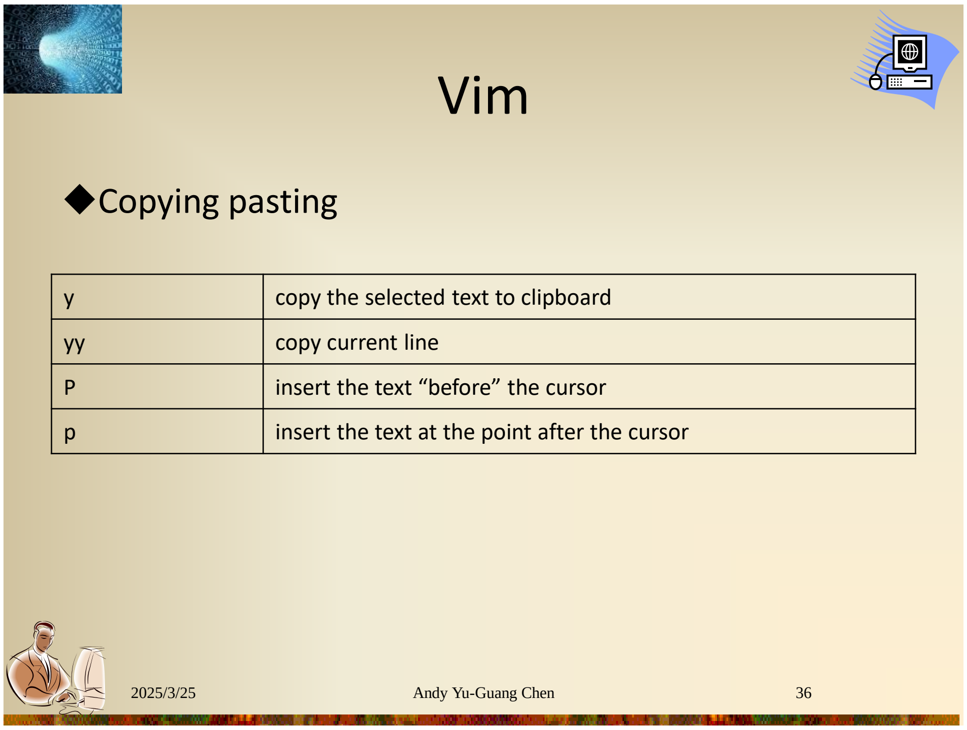
I	insert text at the beginning of the line
i	insert text before the current cursor location
a	insert text after the current cursor location
o	create a new line for the text below the current cursor location
O	create a new line for text above the current cursor location



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

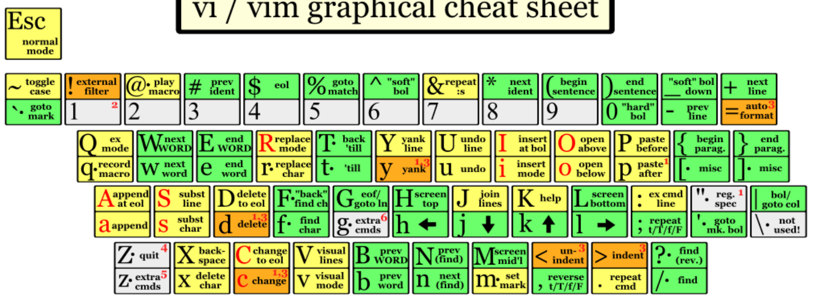
◆Undo/Redo

u	undo last change
Ctrl+R	redo

Vim

version 1.1
April 1st, 06

vi / vim graphical cheat sheet



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
q· — 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)

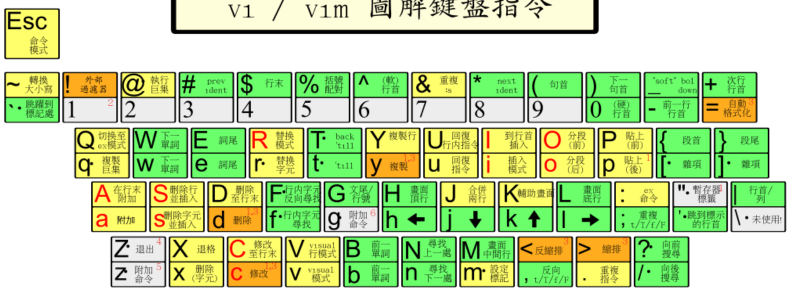
Notes:
(1) use "x before a yank/paste/del command to use that register ('clipboard') (x=a..z,*) (e.g.: "ay$ to copy rest of line to reg 'a')
(2) type in a number before any action to repeat it that number of times (e.g.: 2p, d2w, 5i, d4j)
(3) duplicate operator to act on current line (dd = delete line, >> = 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



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
q· — 後接字元構成的參數

w,e,b指令
b(小寫): quux(foo, bar, baz);
B(大寫): quux(foo, bar, baz);

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)

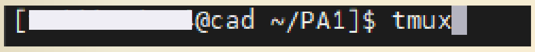
原圖: www.viemu.com　翻譯：fd1 （linuxsir）, jserv

Outline

- ◆Workstation
- ◆Vim
- ◆Tmux

Tmux

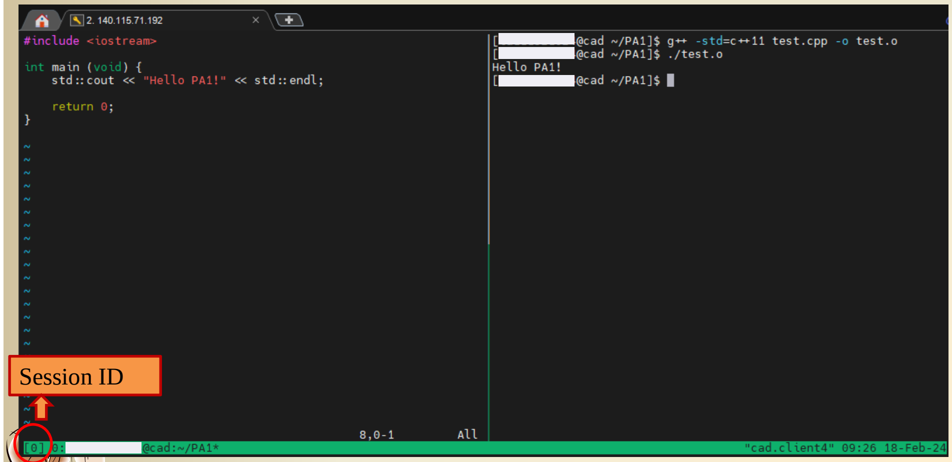
- ◆What is tmux?
  - ➢ Tmux is a terminal multiplexer that you can start a Tmux session and then open multiple windows inside that session
  - ➢ Session ➔ windows



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

Tmux

◆A tmux session with two windows



```
#include <iostream>

int main (void) {
    std::cout << "Hello PA1!" << std::endl;

    return 0;
}
~
~
~
                                8,0-1          All
```

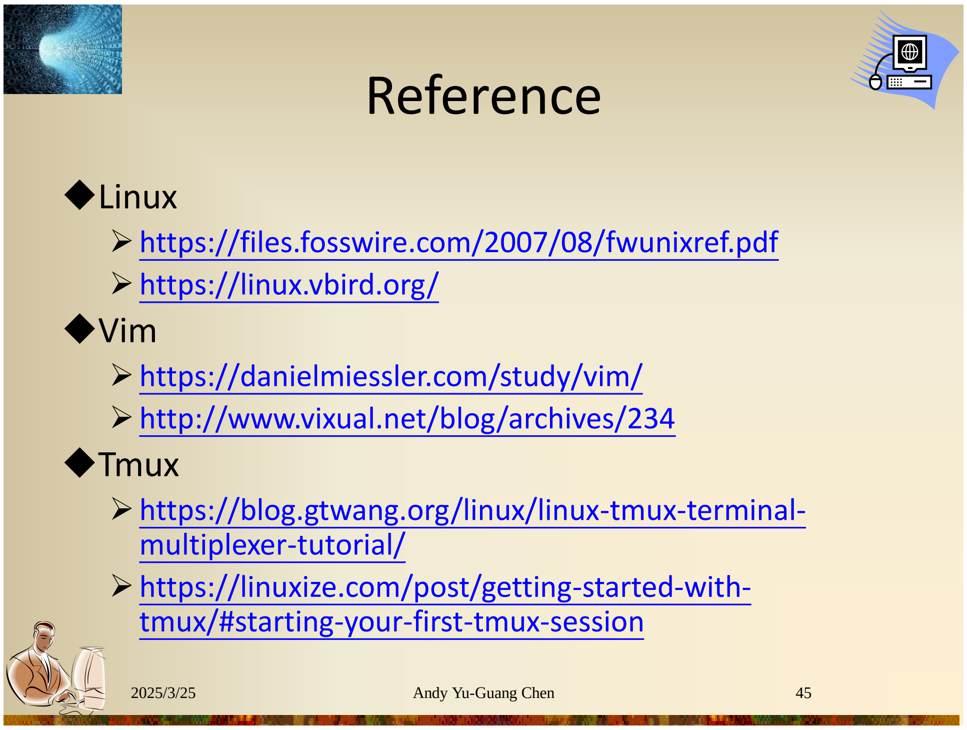
```
[[redacted]@cad ~/PA1]$ g++ -std=c++11 test.cpp -o test.o
[[redacted]@cad ~/PA1]$ ./test.o
Hello PA1!
[[redacted]@cad ~/PA1]$ 
```

```
[0] 0:[redacted]@cad:~/PA1*                    "cad.client4" 09:26 18-Feb-24
```

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

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- Tmux
  - https://blog.gtwang.org/linux/linux-tmux-terminal-multiplexer-tutorial/
  - https://linuxize.com/post/getting-started-with-tmux/#starting-your-first-tmux-session

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