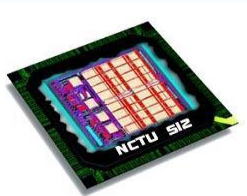


2024 Spring ICLAB

Lecturer: Wen-Yue Lin

System Integration and Silicon Implementation (Si2) Lab
Institute of Electronics
National Yang Ming Chiao Tung University, Hsinchu, Taiwan

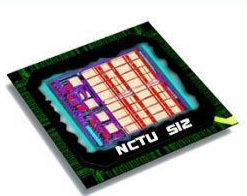


Outline

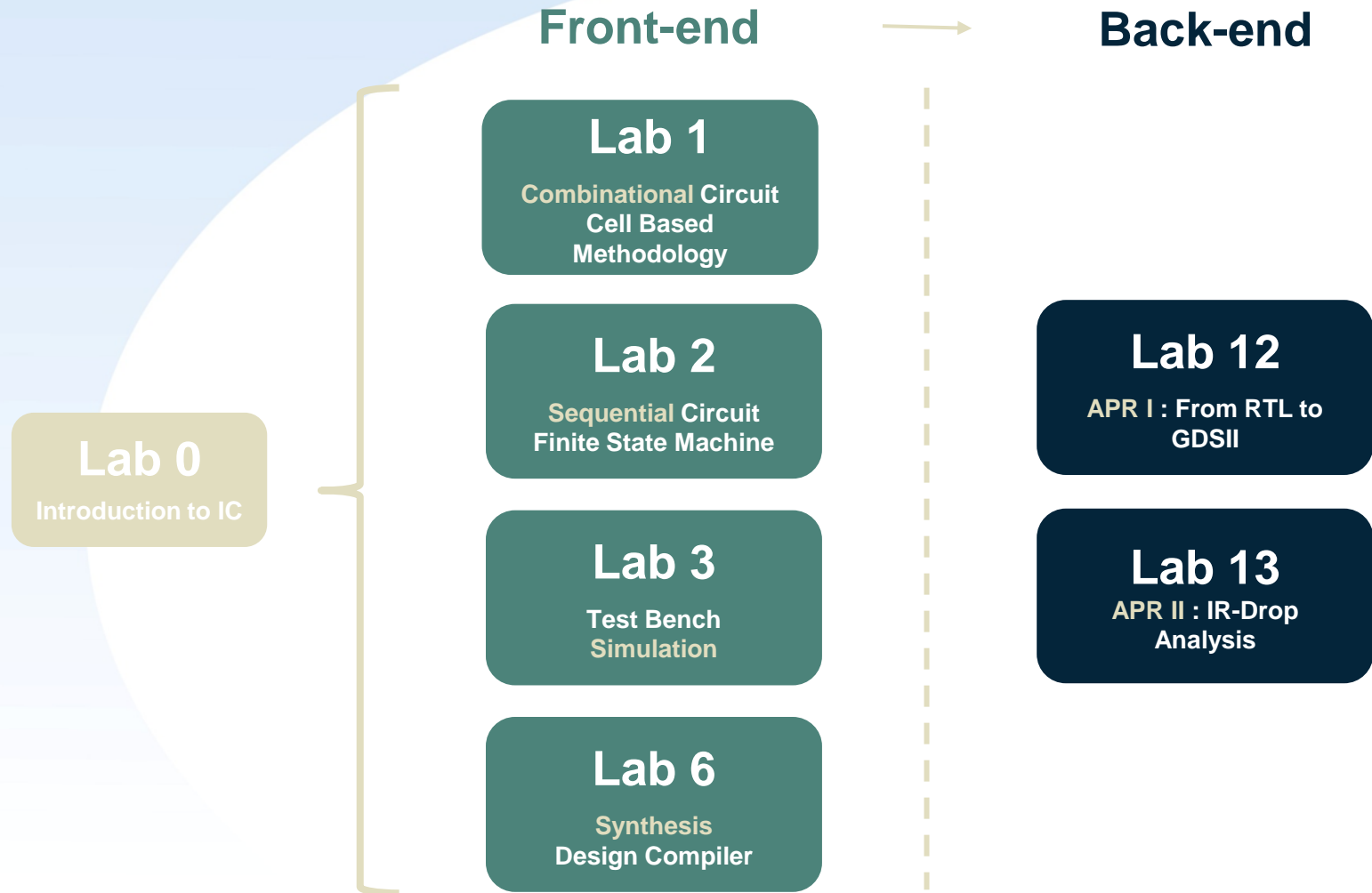
- ✓ **Course Introduction**
- ✓ **Course Syllabus / Rule / Grade**
- ✓ **Server Introduction – ED415**
- ✓ **Add / Drop Course Issue**



Course Introduction



What will we learn in IC Design Lab? (1/2)



What will we learn in IC Design Lab? (2/2)

Memory / IP

Lab 5

Memory Compiler
SRAM IP

Lab 2&6

Soft IP
Usage & Design

Timing

Lab 4

Static Time Analysis
Pipeline

Lab 7

Cross Clock Domain
Synthesis STA

Power

Lab 11

Lower Power Design
Prime Time

System Verilog & Verification

Lab 8

System Verilog
Design

Lab 9

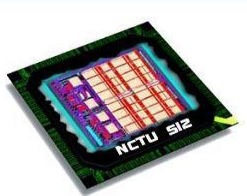
System Verilog
Verification

Lab 10

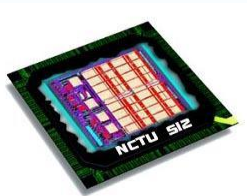
System Verilog
Formal Verification



IC Lab Course Rule



Environment Setting



Environment



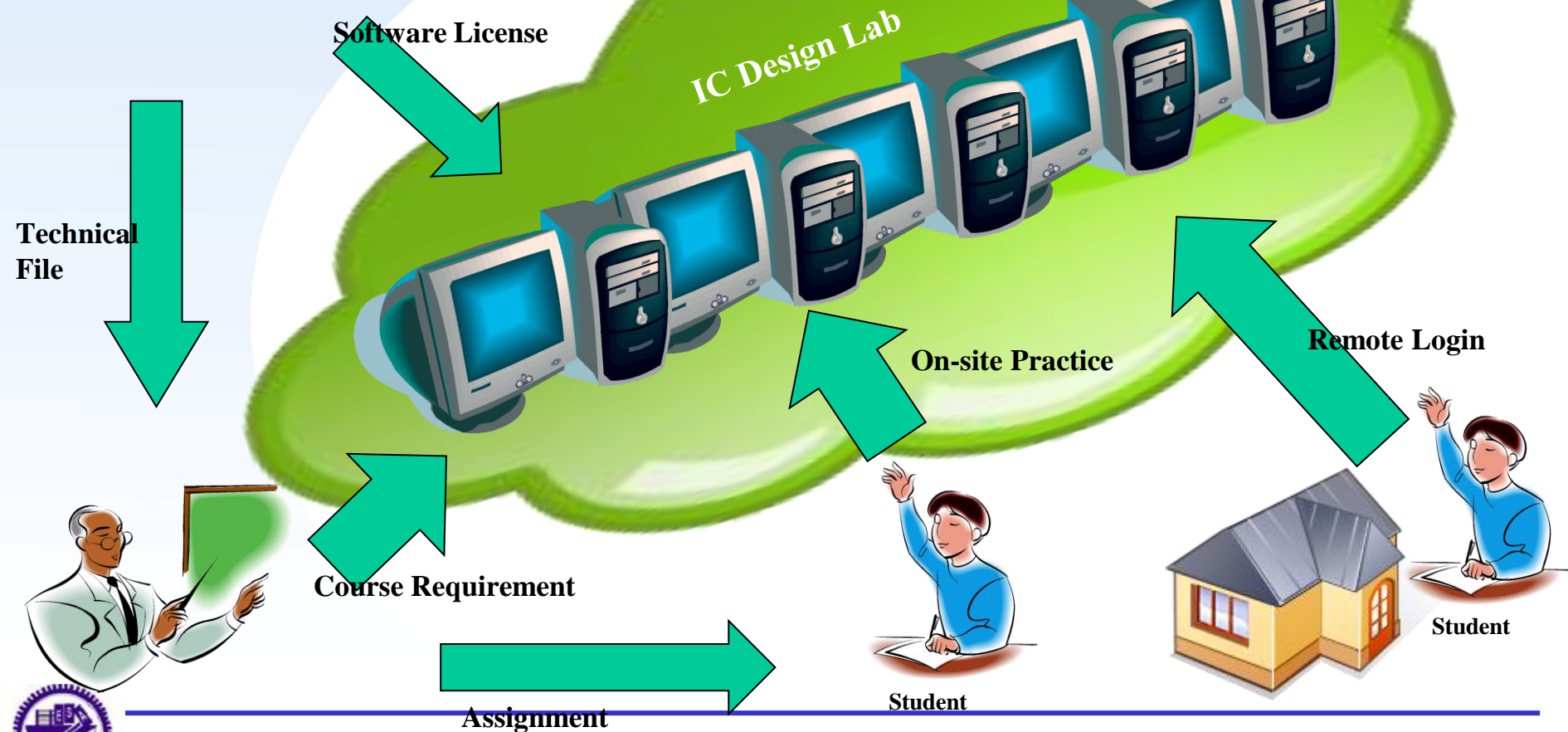
NAR Labs 國家實驗研究院

台灣半導體研究中心

Taiwan Semiconductor Research Institute



NYCU



ICLAB NCTU Institute of Electronics

Work Station

✓ Use SSH to connect

- port = 415

✓ ee{21~30}.ee.nctu.edu.tw

✓ Access

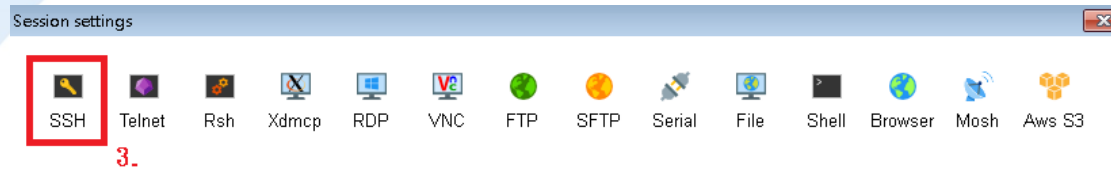
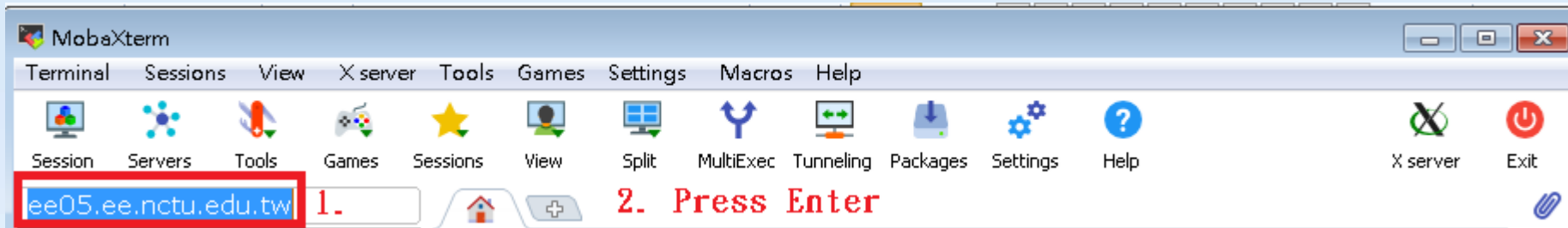
- MobaXterm (**Recommended**)

Appendix:

- Putty + X-display software (Xwin-32, Xming) + FTP (Filezilla)
- Sublime



Mobaxterm

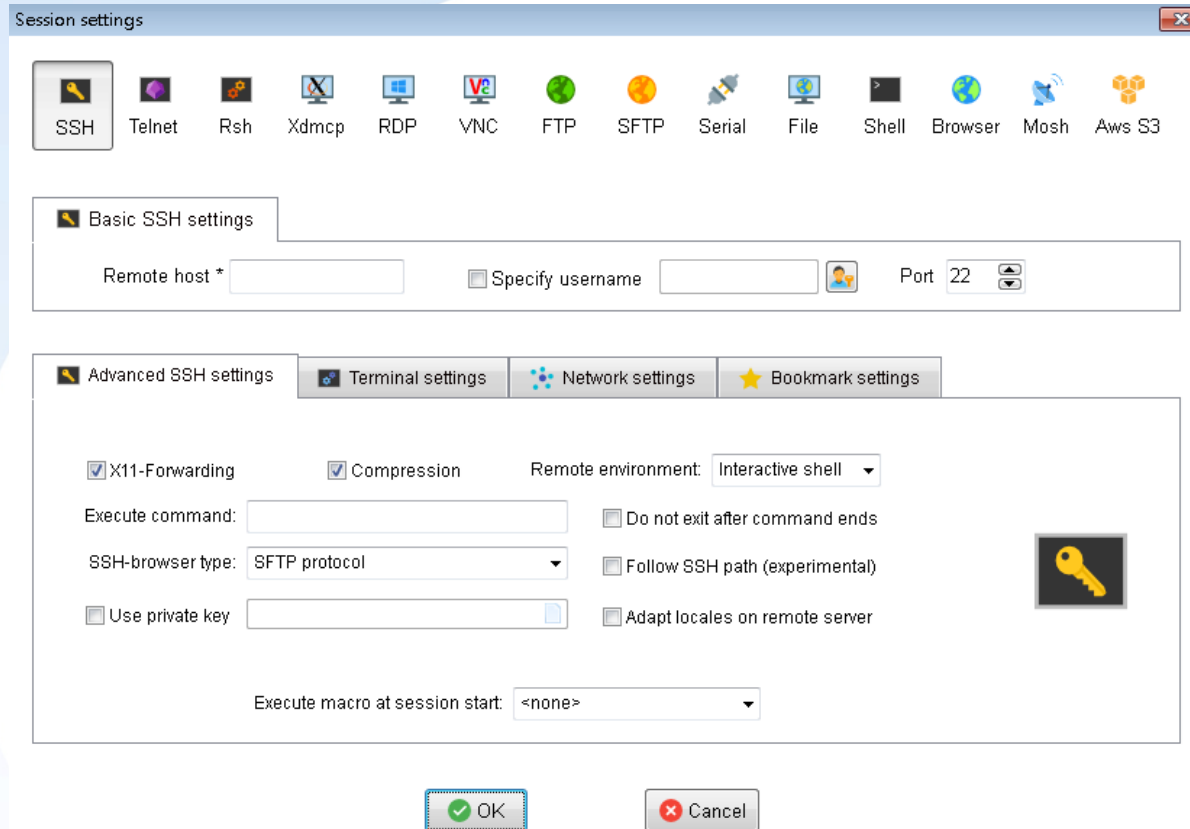


Choose a session type...



Mobaxterm

✓ Default with X11 Forwarding



The screenshot shows the 'Session settings' dialog box in Mobaxterm. The 'SSH' tab is selected. Under 'Basic SSH settings', the 'Remote host' field is empty, 'Specify username' is unchecked, and the 'Port' is set to 22. The 'Advanced SSH settings' tab is also visible, showing 'X11-Forwarding' and 'Compression' checked, 'Remote environment' set to 'Interactive shell', 'Execute command' empty, 'SSH-browser type' set to 'SFTP protocol', 'Use private key' unchecked, and 'Execute macro at session start' set to '<none>'. There are 'OK' and 'Cancel' buttons at the bottom.

Session settings

SSH Telnet Rsh Xdmcp RDP VNC FTP SFTP Serial File Shell Browser Mosh Aws S3

Basic SSH settings

Remote host * ☐ Specify username Port 22

Advanced SSH settings Terminal settings Network settings Bookmark settings

☒ X11-Forwarding ☒ Compression Remote environment: Interactive shell

Execute command: ☐ Do not exit after command ends

SSH-browser type: SFTP protocol ☐ Follow SSH path (experimental)

☐ Use private key ☐ Adapt locales on remote server

Execute macro at session start: <none>

OK Cancel

✓ Embedded step system

Linux : Basic Operations

- ✓ **>man COMMAND** //format and display the on-line manual pages
 - ex: man ln
- ✓ **>mkdir DIRECTORY** //make directory
 - e.g. mkdir -p /home/test
- ✓ **>cd DESTINATION** //change current directory
 - e.g. cd ../iclab08/Lab01/
 - e.g. cd (change to home directory)
- ✓ **>cp SOURCE DESTINATION** //copy files
 - e.g. cp ABC.v DEF.v
 - e.g. cp -rf Lab01/ Lab02/
- ✓ **>mv SOURCE DESTINATION** //move or rename files
 - e.g. mv ABC.v ../ABC.v
 - e.g. mv ABC.v DEF.v



Linux : Basic Operations

- ✓ **>rm FILE_NAME** //remove (delete) files
 - e.g. rm ABC.v
 - e.g. rm –rf Lab01/
- ✓ **>ls** //list directory contents
 - e.g. ls –l
 - or you can use *dir* as well.
- ✓ **>ln TARGET LINK_NAME** //make links between files
 - e.g. ln –s ~iclabt01/LIB/slow.db slow.db
- ✓ **>quota** //display disk usage and limits
 - e.g. quota

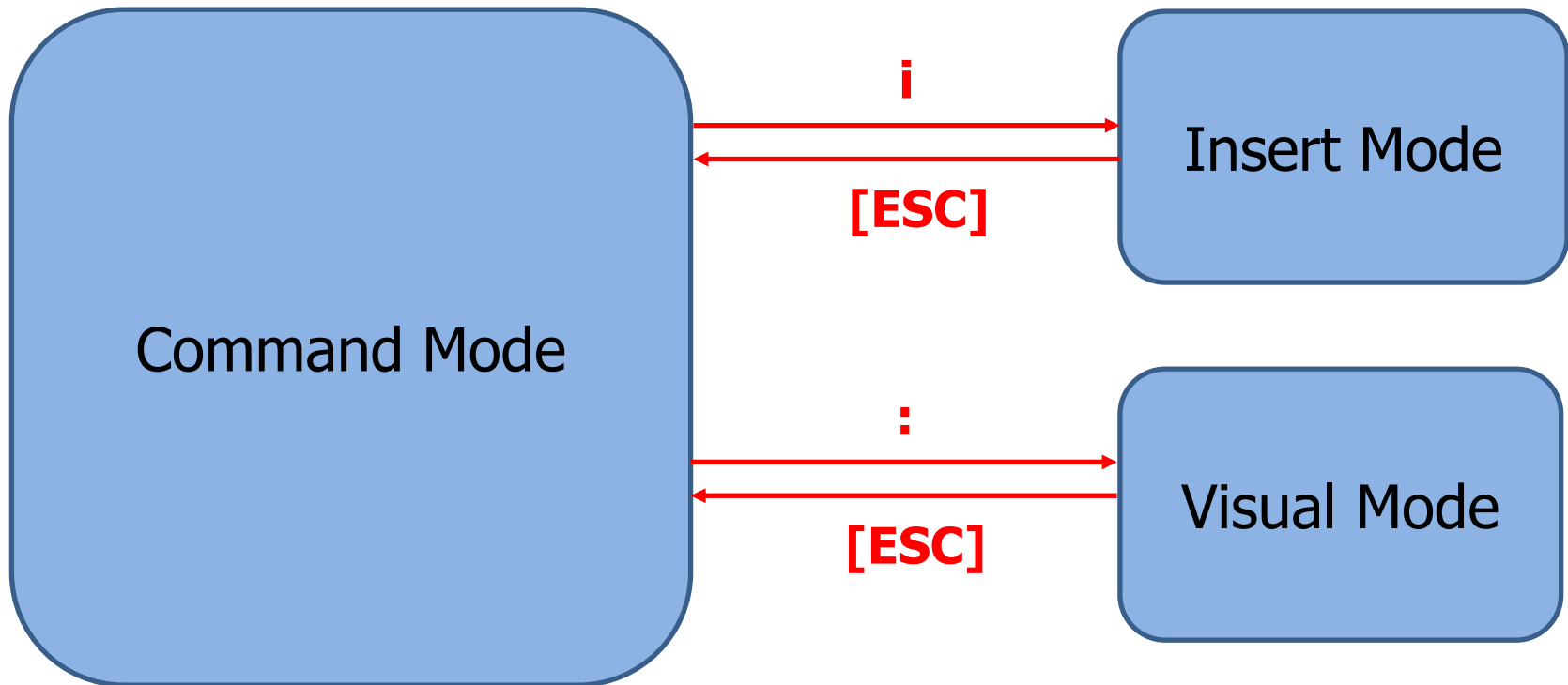


On-line Text Editor – VIM

✓ **>vi filename** //create a file

– e.g. vi test.v

– e.g. vim test.v



On-line Text Editor – VIM

✓ Command mode

- Move cursor:
 - [Page Down], [Page Up]
 - [Home], [End]
 - $\uparrow(k)\downarrow(j)\leftarrow(h)\rightarrow(l)$: move cursor
 - G: cursor moves to last column
 - nG: “n” is number. cursor moves to “n”th column
 - gg: cursor moves to the first column. (=1G)
 - n<Enter>: “n” is number. cursor moves down n columns.
- Search & Replace:
 - /word: search for “word”
 - n: search the next
 - N: search the previous



On-line Text Editor – VIM

- Delete & Copy & Paste:
 - [delete] or x: delete the character under the cursor.
 - X: delete the character before the cursor.
 - dd: delete a column where the cursor located at.
 - ndd: “n” is number. delete “n” columns.
 - yy: copy a column where the cursor located at.
 - nyy: “n” is number. copy “n” columns.
 - u: recover.
 - . : repeat the previous action.
 - [Shift]+v : select the column where the cursor located at.
 - [Ctrl]+v+[Shift]+I : edit multi-line.



On-line Text Editor – VIM

✓ Insert mode:

- i : switch to insert mode before the current position.
- [Esc]: switch from the insert mode to the command mode

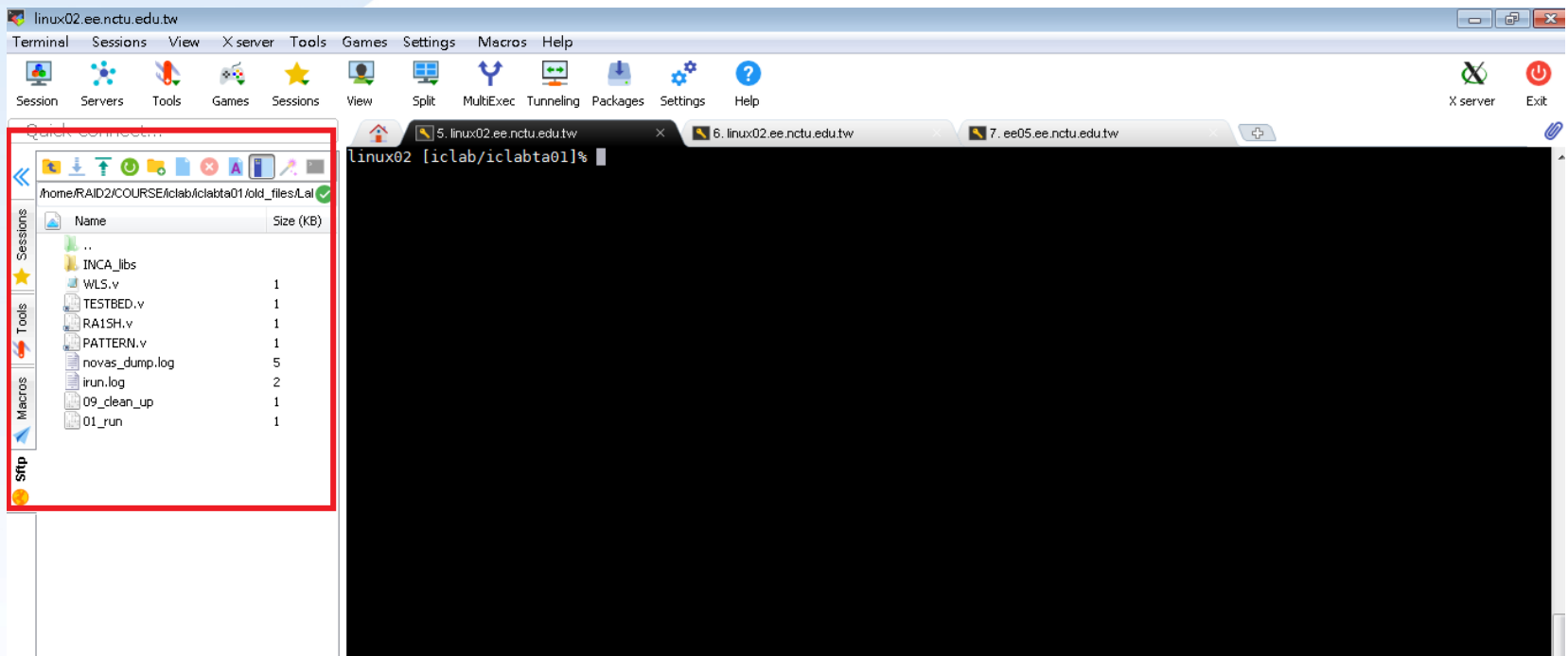
✓ Visual mode:

- :w : write the current buffer to disk.
- :q : closes current window.
- :wq : write the current buffer to disk and closes current window.
- :q! : closes current window forcibly.
- :set nu : display the column number.



Editor

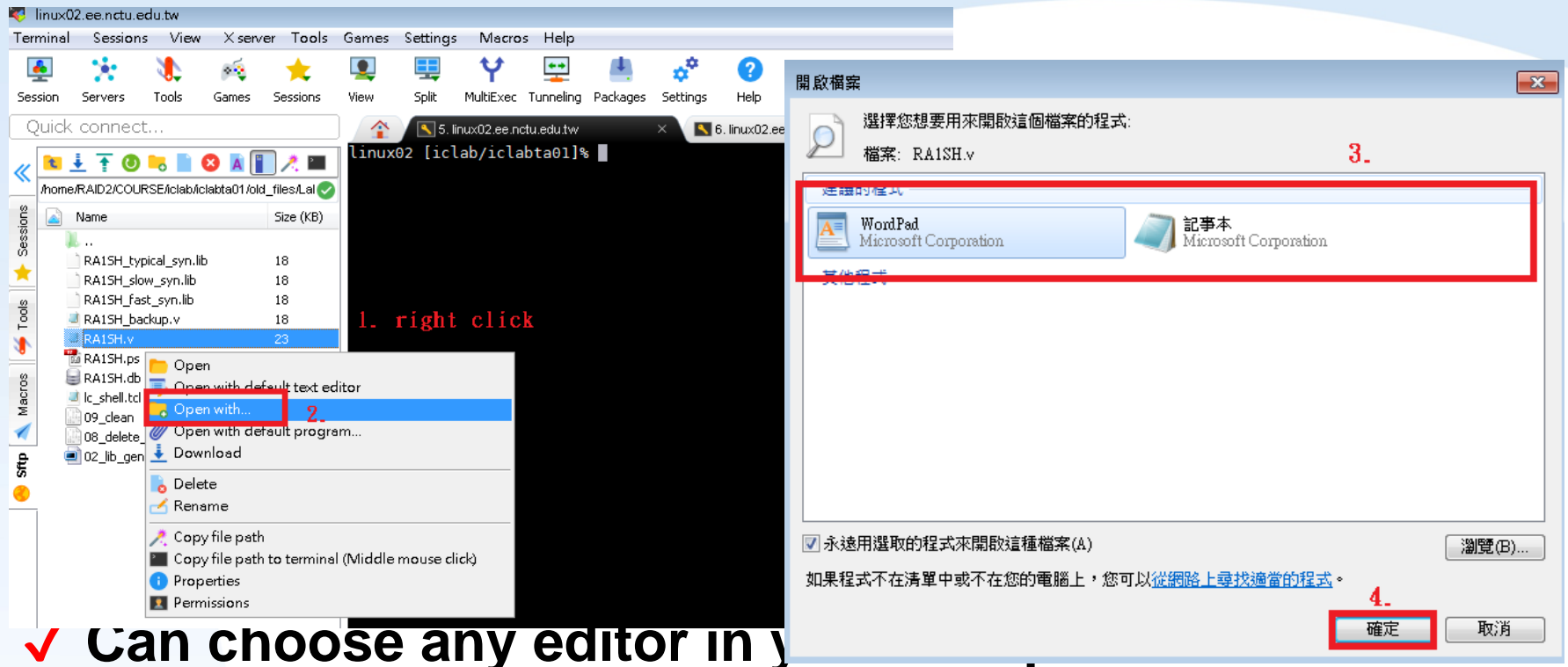
- ✓ **Download files, use your own editor and re-upload**
 - Manually
 - Supported by Mobaxterm



- Mobaxterm will download files into local computer and open it



Editor



✓ If 'notepad' does not display clear, first use 'wordpad' to open it and save, then 'notepad' displays good

✓ Always Remember to **BACKUP**

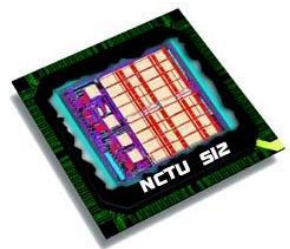


Appendix

- ✓ **Notepad ++**
- ✓ **Putty & Xming Setting**
(Alternative Login Software of Windos)
- ✓ **Sublime Editor**
(For Mac OS)
- ✓ **VScode**
(Recommended)



Notepad++



Text Editor – notepad++



<https://notepad-plus-plus.org/>

more languages

News

- **Notepad++ 6.8.3 released**
Sep 04 2015
- Notepad++ 6.8.2 released
Aug 20 2015
- Notepad++ 6.8.1 released
Aug 04 2015
- Notepad++ 6.8 released
Jul 21 2015
- Notepad++ Community
Jun 27 2015
- Notepad++ 6.7.9.2 released
Jun 23 2015
- Notepad++ 6.7.9.1 released
Jun 21 2015
- Notepad++ leaves
SourceForge
Jun 14 2015
- Notepad++ 6.7.9 released
Jun 12 2015
- Notepad++ 6.7.8.2 released
May 23 2015

[more news »](#)

About

Notepad++ is a free (as in "free speech" and also as in "free beer") source code editor and Notepad replacement that supports several languages. Running in the MS Windows environment, its use is governed by [GPL License](#).

Based on the powerful editing component [Scintilla](#), Notepad++ is written in C++ and uses pure Win32 API and STL which ensures a higher execution speed and smaller program size. By optimizing as many routines as possible without losing user friendliness, Notepad++ is trying to reduce the world carbon dioxide emissions. When using less CPU power, the PC can throttle down and reduce power consumption, resulting in a greener environment.

```
*D:\source\notepad4ever.cpp - Notepad++
1  #include <GPL.h>
2  #include <free_software.h>
3
4  void notepad4ever()
5  {
6      while (true)
7      {
8          Notepad++;
9      }
10
11
```

You're encouraged to [translate Notepad++](#) into your native language if there's not already a translation present in the [Binary Translations](#) page.

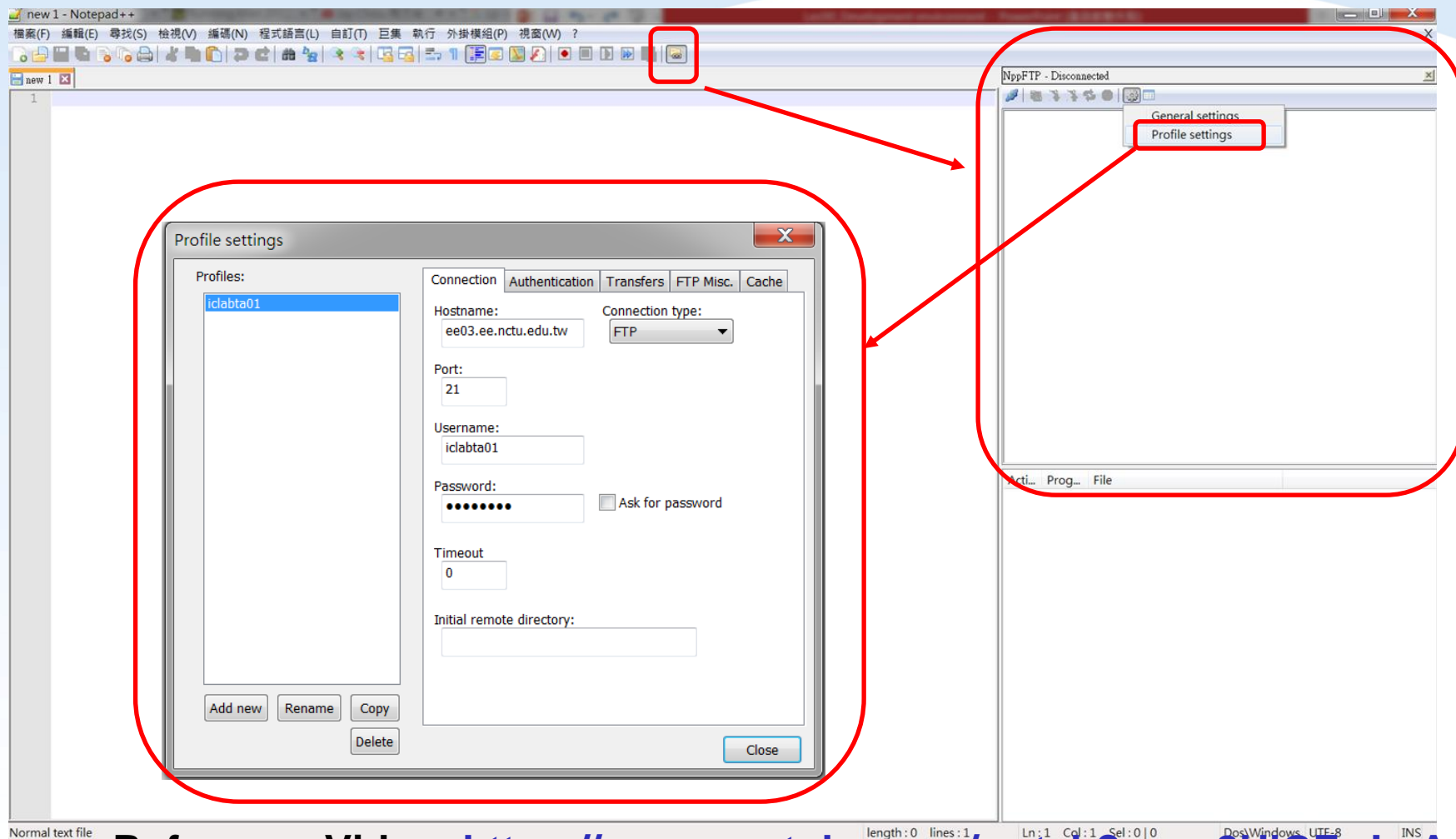
I hope you enjoy Notepad++ as much as I enjoy coding it.

Copyright © Don Ho 2015
HTML • CSS

Website kindly donated by [ecreate](#)



Text Editor – notepad++ setting



Reference Video: <https://www.youtube.com/watch?v=cu8UIGFwImA>



Text Editor – notepad++

The screenshot displays the Notepad++ text editor with a Verilog file named `INF.sv` open. The code defines an `interface INF` and a `modport DESIGN`. A red box highlights the `modport DESIGN` block, and a red arrow points from it to the text "Edit multi line: Alt + left mouse button".

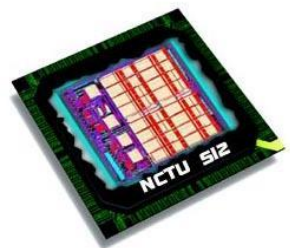
On the right, a file explorer shows the directory structure of the project, including folders like `misc`, `RAID2`, `COURSE`, `iclab`, and `iclabta01`. A red box highlights the `iclabta01` folder, and a red arrow points from it to the text "upload/download".

Below the file explorer, a context menu is open, showing the file type `Verilog` selected, indicated by a red box.

Edit multi line: Alt + left mouse button

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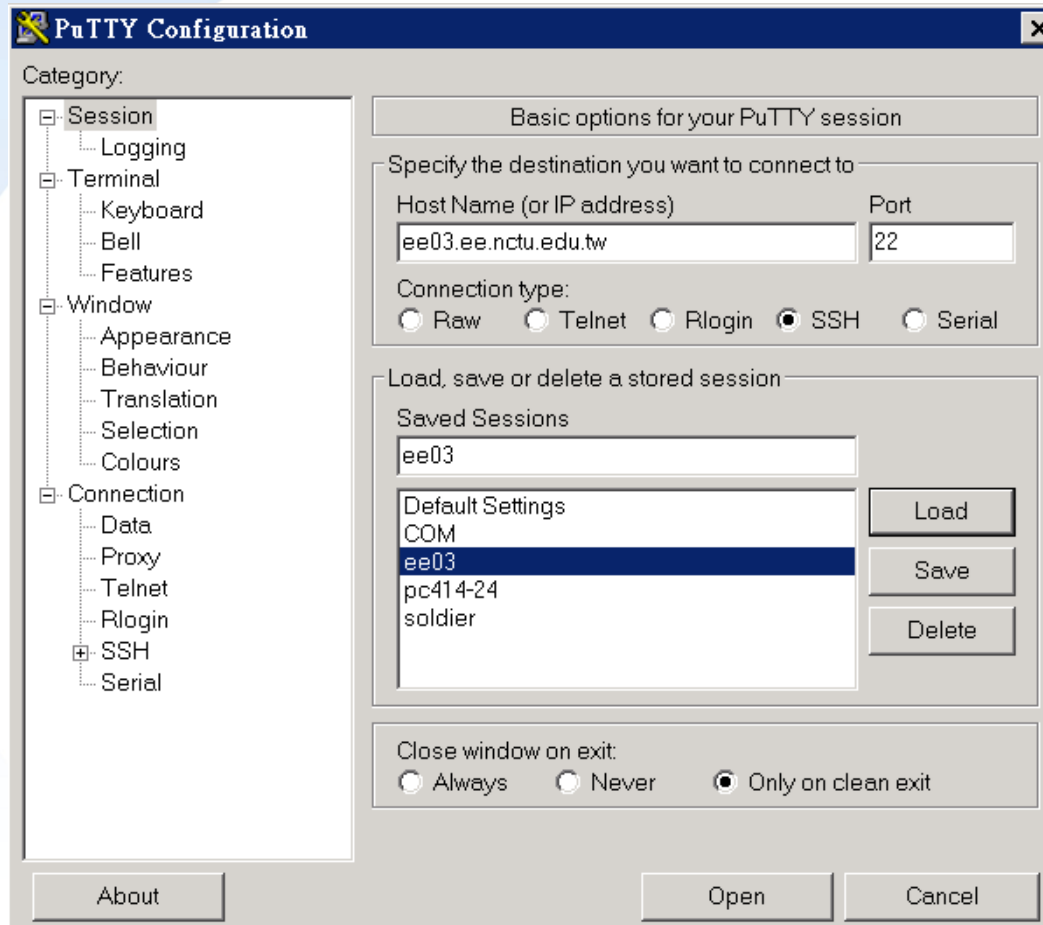
Putty & Xming



Putty & Xming

✓ Software

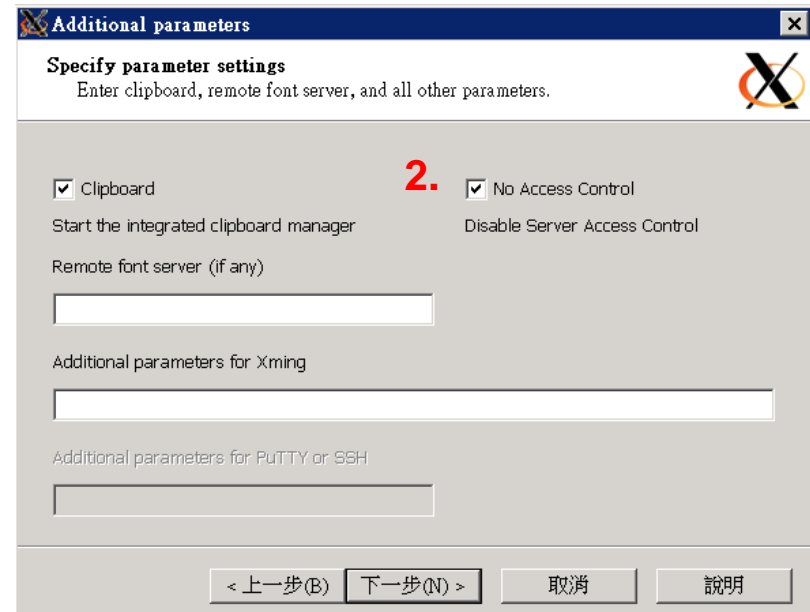
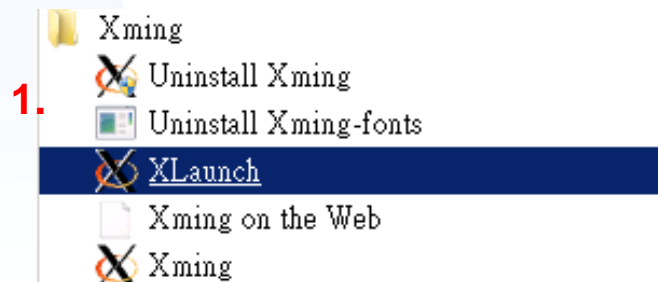
- Putty for connecting work station



Putty & Xming

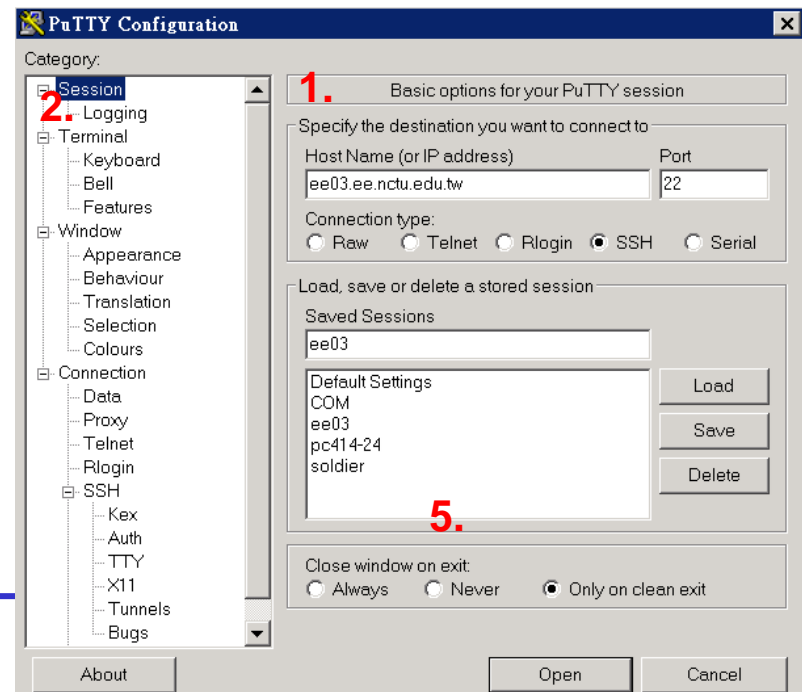
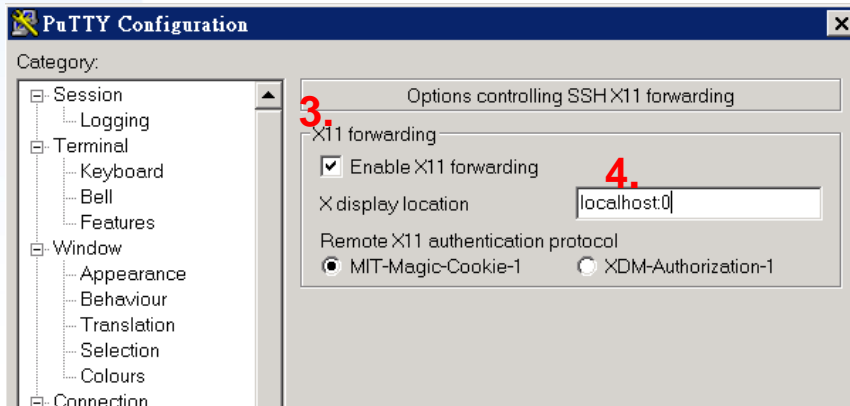
✓ Software

- Xming, Xwin-32 or other X viewer to display the GUI terminal to your computer
- Xming – Free Software
<http://sourceforge.net/projects/xming/>
<http://sourceforge.net/projects/xming/files/Xming-fonts/7.5.0.47/>
- 1. Execute **XLaunch**
2. **Check No Access Control**
3. Press **Next** or **Yes** for all other pages



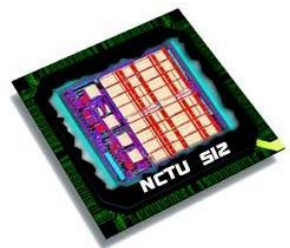
Putty & Xming

- ✓ Type `setenv DISPLAY 140.113.x.x:0` in work station to display the GUI interface onto your computer
- ✓ If you're using or your IP is floating, try the following flow
 - 1. Type Host Name IP Address
 - 2. Click Category: **Connection** -> **SSH** -> **X11**
 - 3. Check **Enable X11 forwarding**
 - 4. Fill in **Localhost:0**
 - 5. Click **Open**



Sublime

Courtesy of Chieh-Yu Lin

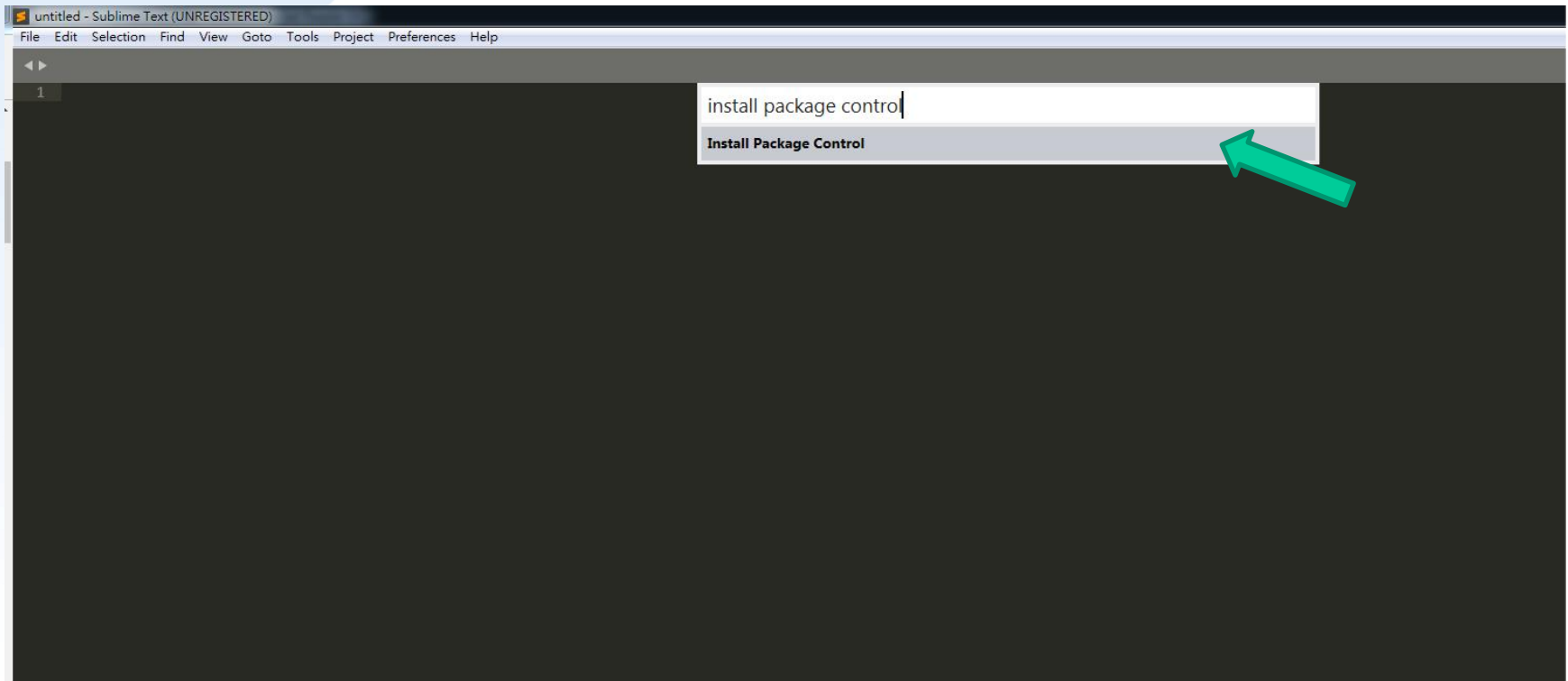


Step 1 Install Basic Plugin



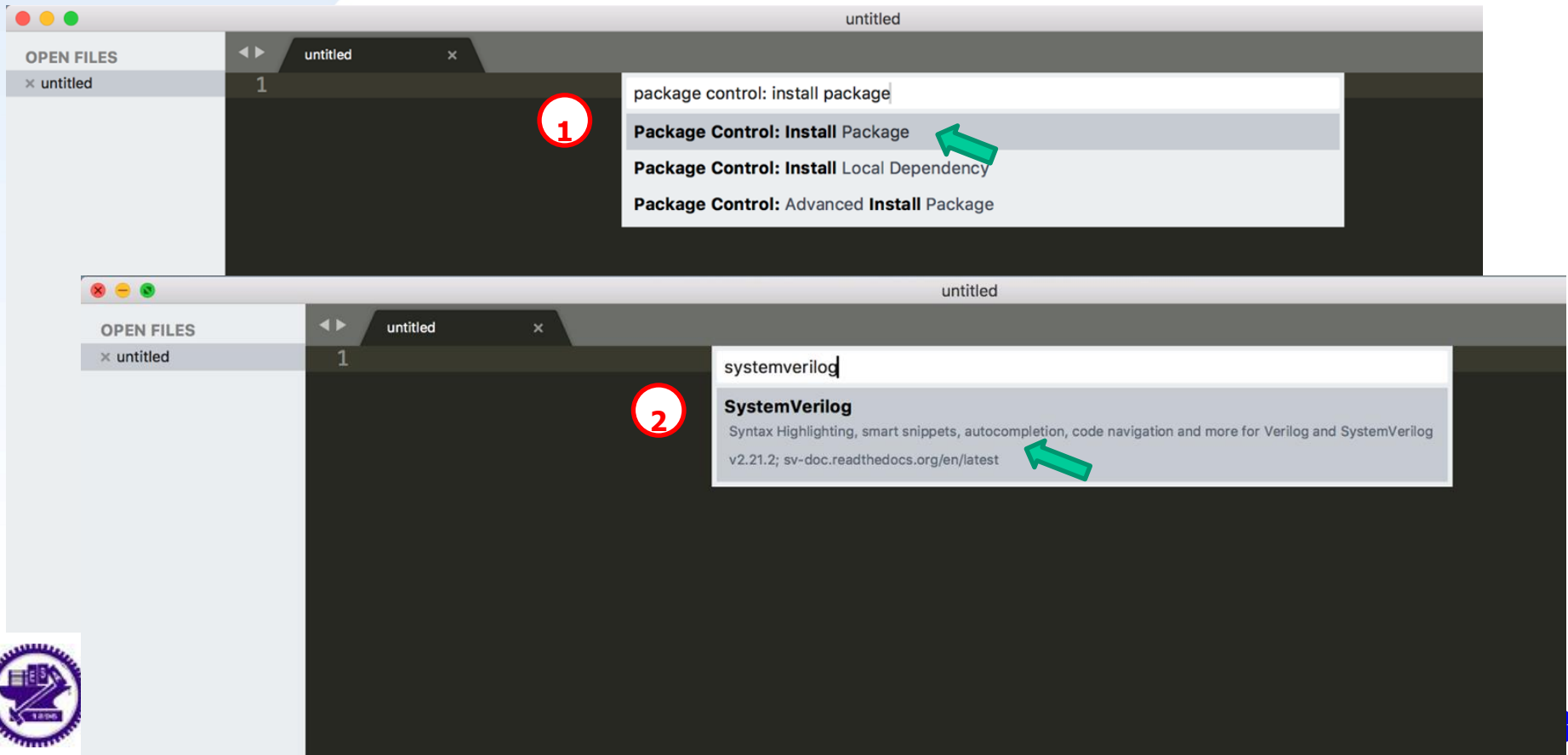
Install Package Control

- ✓ For Mac User, Please the following “Ctrl” would be command
- ✓ (Open Command Palette (Ctrl + shift + p) Type “ install package control ” click



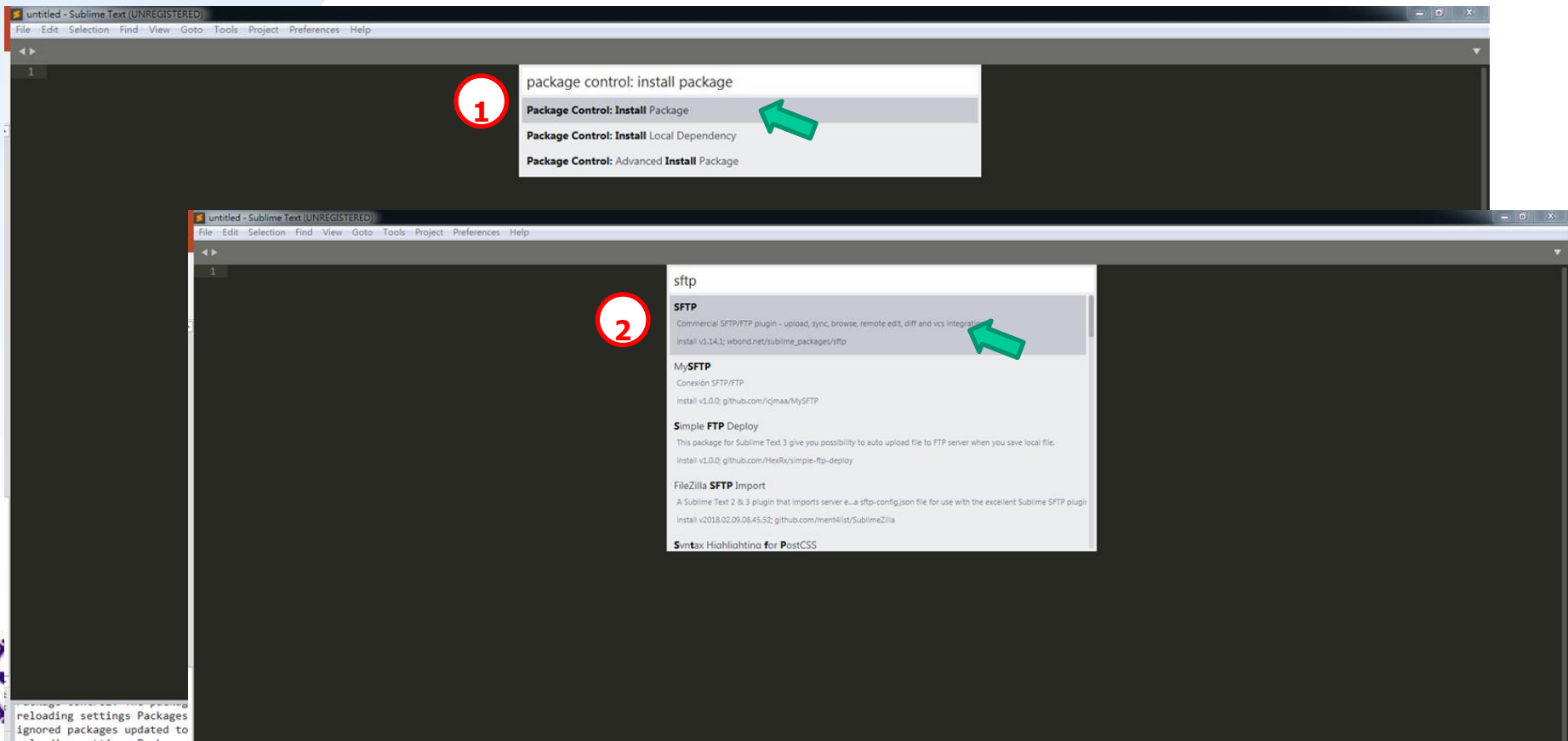
Install SystemVerilog Plugin

1. Open Command Palette (Ctrl + shift + p) □ Type “ Package Control: Install Package ” □ click
2. Type“ SystemVerilog ” □ click



Install SFTP Plugin

- 1. Open Command Palette (Ctrl + shift + p) ☐ Type “ Package Control: Install Package ” ☐ click**
- 2. Type “ SFTP ” ☐ click**

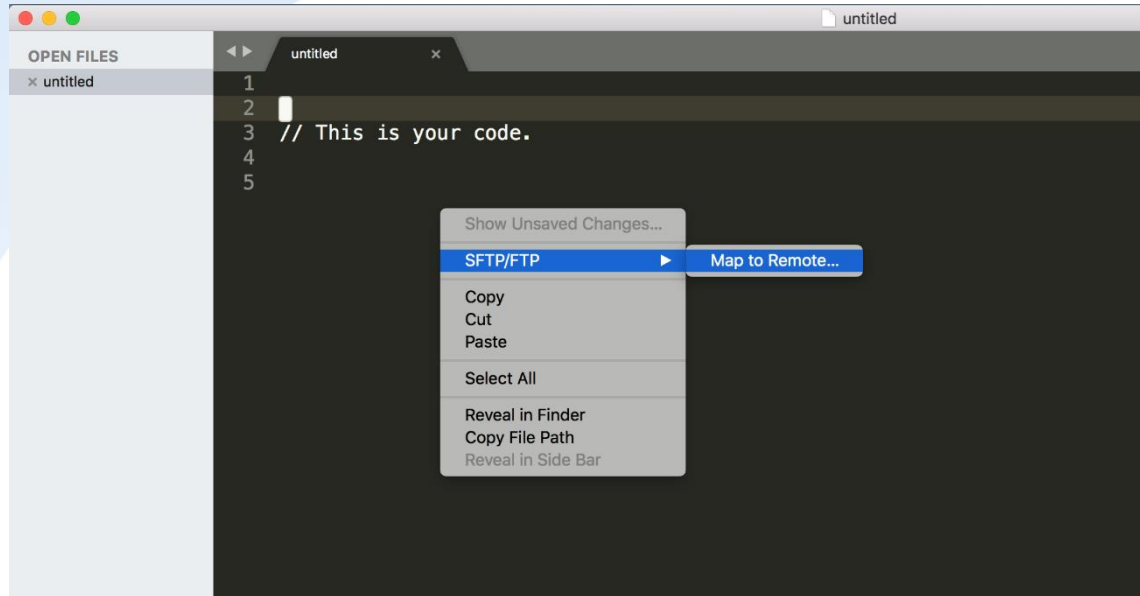


Step 2 Using SFTP Plugin to synchronize the remote file



Generate sftp-config.json

- ✓ **Method 1 : Right Click ☐ SFTP/FTP ☐ Map to Remote** , it would generate a new “sftp-config.js” in the same folder



- ✓ **Method 2 (Recommended) :** If you have already set your sftp-config.json, you just directly copy it into the synchronous folder, then modify the remote_path. Then You don't have to start from the blank sftp-config.json

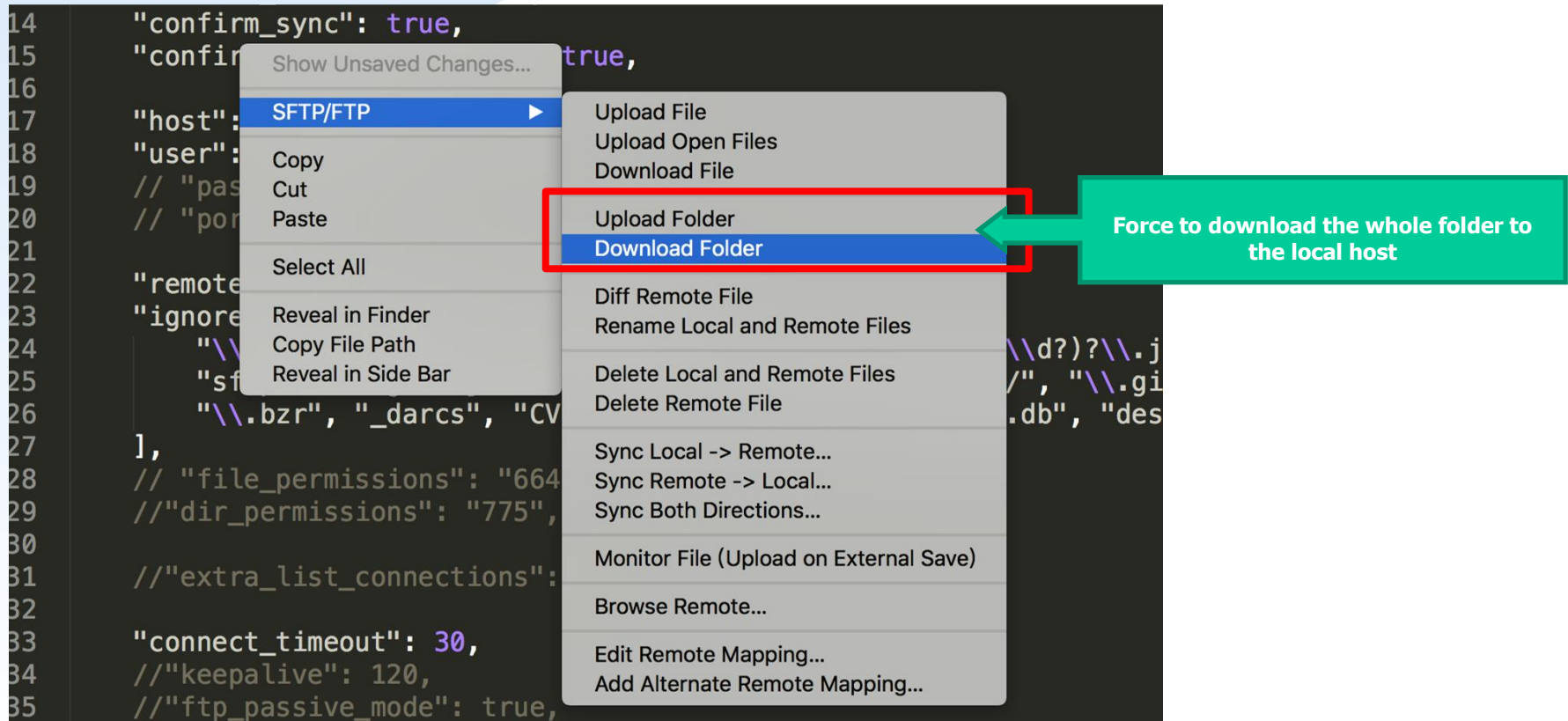
Setting sftp-config.json

```
sftp-config.json x
1 {
2   // The tab key will cycle through the settings when first created
3   // Visit http://wbond.net/sublime_packages/sftp/settings for help
4
5   // sftp, ftp or ftps
6   "type": "sftp",
7
8   "save_before_upload": true,
9   "upload_on_save": true,
10  "sync_down_on_open": true,
11  "sync_skip_deletes": false,
12  "sync_same_age": true,
13  "confirm_downloads": true,
14  "confirm_sync": true,
15  "confirm_overwrite_newer": true,
16
17  "host": "linux??ee.nctu.edu.tw",
18  "user": "clab?",
19  // "password": "password",
20  // "port": "22",
21
22  "remote_path": "Server Directory Path (Absolute Directory)",
23  "ignore_regexes": [
24    "\\sublime-(project|workspace)", "sftp-config(-alt\\d?)?\\.json",
25    "sftp-settings\\.json", "/venv/", "\\svn/", "\\hg/", "\\git/",
26    "\\bZR", "_darcs", "CVS", "\\DS_Store", "Thumbs\\.db", "desktop\\.ini"
27  ],
28  // "file_permissions": "664",
29  // "dir_permissions": "775",
30
31  // "extra_list_connections": 0,
32  "connect_timeout": 30,
33  // "keepalive": 120,
34  // "ftp_passive_mode": true,
35  // "ftp obey passive host": false
```

Upload to the server when saving the file

Open the file would automatically synchronize the latest file back to the local host.

Upload/download Folder



The screenshot shows a file manager interface with a context menu open. The menu is divided into two panes. The left pane contains options like 'Show Unsaved Changes...', 'SFTP/FTP', 'Copy', 'Cut', 'Paste', 'Select All', 'Reveal in Finder', 'Copy File Path', and 'Reveal in Side Bar'. The right pane contains options like 'Upload File', 'Upload Open Files', 'Download File', 'Upload Folder', 'Download Folder', 'Diff Remote File', 'Rename Local and Remote Files', 'Delete Local and Remote Files', 'Delete Remote File', 'Sync Local -> Remote...', 'Sync Remote -> Local...', 'Sync Both Directions...', 'Monitor File (Upload on External Save)', 'Browse Remote...', 'Edit Remote Mapping...', and 'Add Alternate Remote Mapping...'. The 'Download Folder' option is highlighted in blue and enclosed in a red rectangle. A green arrow points from a text box to this option.

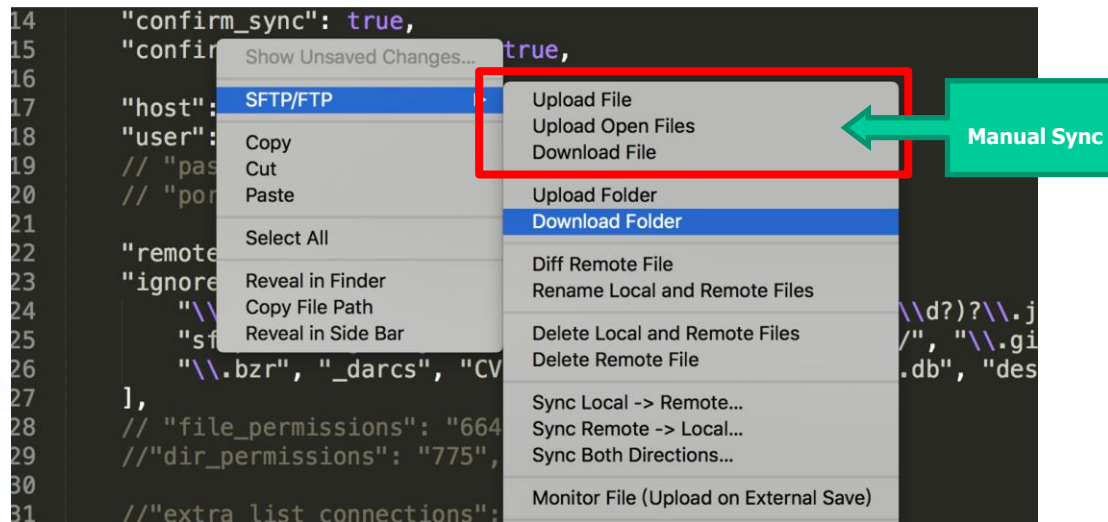
Force to download the whole folder to the local host

Sync Local and Remote File

✓ Automatic Sync :

- When you finish your design, Ctrl + s would save the file and automatically upload to the server
- When you open the file , it would automatically download the latest file to the local host (if **confirm_sync** is set **true**, it would have a query to sync)

✓ Manual Sync:



Add / Drop Course Issue

- ✓ If you cannot access New E3 material, please finish the google form before 02/22 11:59

<https://forms.gle/aeNm7EGQ2tMV46EL8>



- ✓ **Add / Drop Result Announcement**

- The add / drop result will be announced before 02/23 11:59
- If you are NYCU student, we can add you online
=> no need to sign paper add / drop form
- If you aren't NYCU student, please finish administration by yourself

Contact Senior TA by email if you have any problem

Email: kenlin.ee09@nycu.edu.tw

- ✓ **Same ICLAB course will be held next semester**



Sign Documents: NDA & Honor Code

Honor Code

NDA

Please sign the document either directly on the touch screen or by printing it out, signing it, and scanning the signed copy.

Upload it on New E3 before 02/23 23:59 (for those who still can't access New E3, you can access it after add to this course)

NCTU EE ICLab Honor Code

By signing this document, I hereby acknowledge that any form of plagiarism is not allowed in this class. Specifically, for this course, plagiarism includes but not limited to: copying/paraphrasing others' codes or reports partially or completely.

I am fully aware of the following principles:

- (1) Share ideas, not codes/reports.
- (2) Professor & TAs has the very right to ask you explain your codes/reports.
- (3) Not copying codes from the internet.
- (4) Any form of assistance should be declared in the report.
- (5) Don't share class video, content or your code on internet / with others.

I understand that breaking the Honor code will result in:

Failure in this course

Date: _____

Student ID : _____

Signature : _____



- ✓ Author: 2018 Ping-Yuan Tsai (bubblegame@si2lab.org)
- ✓ Modified: 2019 Li-Wei Liu (willvegapunk.ee03@g2.nctu.edu.tw)
- ✓ Modified: 2024 Wen-Yue Lin (kenlin.ee09@nycu.edu.tw)

