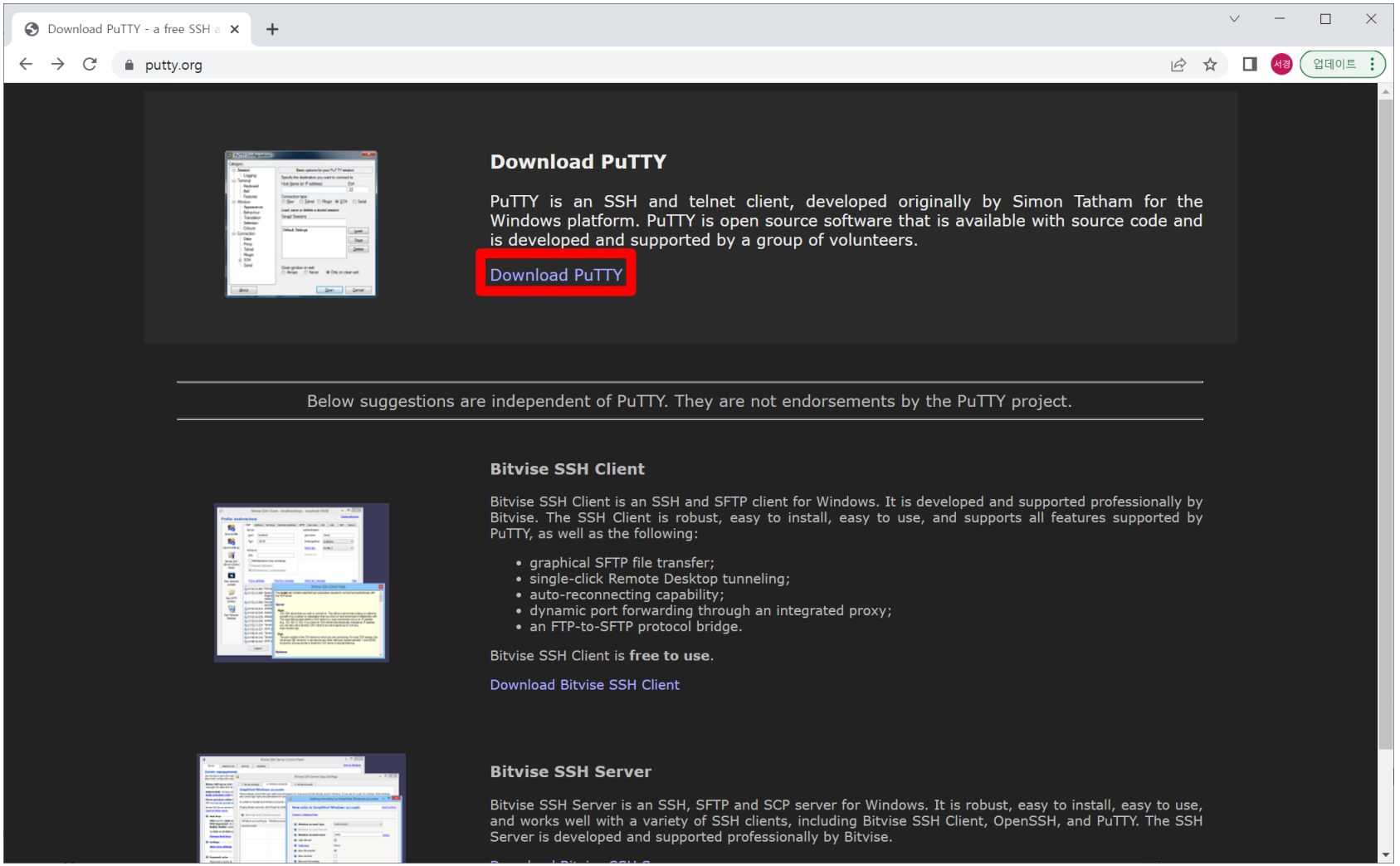
서강대학교

Linux Tutorial

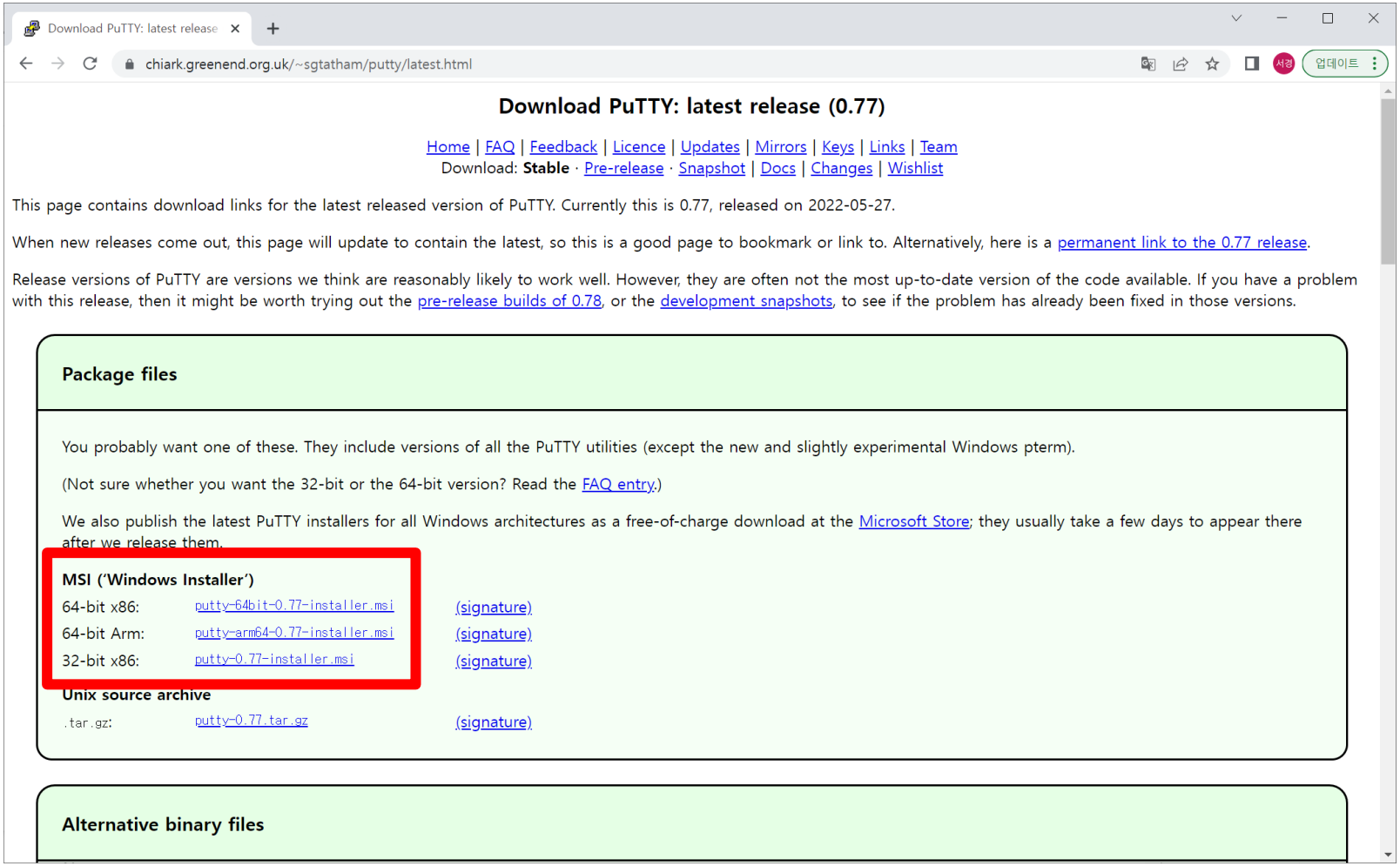
For CSE courses in Sogang University

Connecting to CSPRO (in Windows)

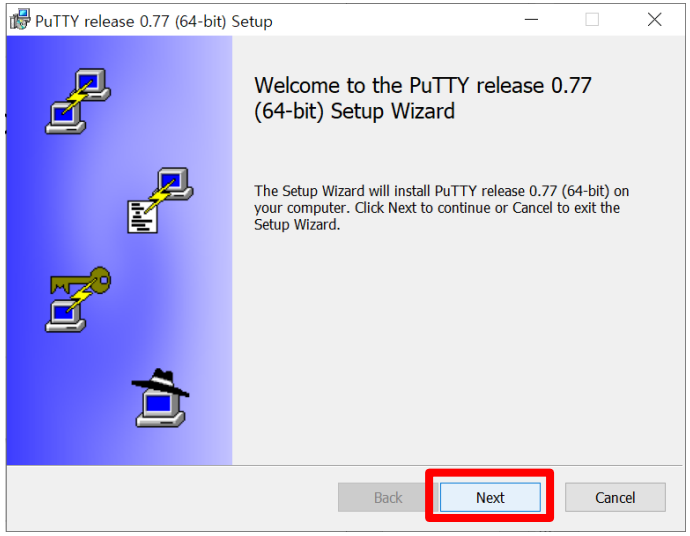
- **Go to 'https://www.putty.org/' and click 'Download PuTTY'**

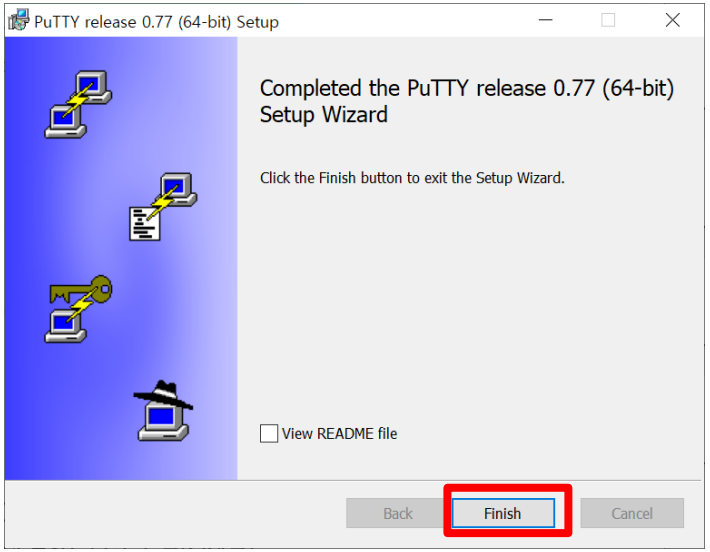


- **Choose installer according to your PC environment (maybe almost 64-bit x86)**
- **And execute installer**

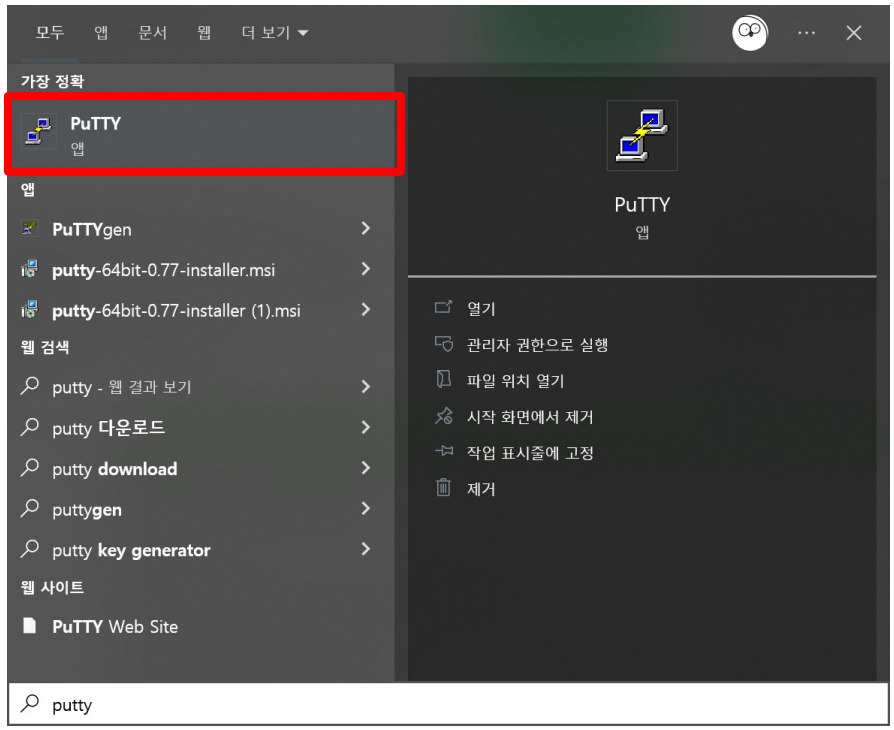


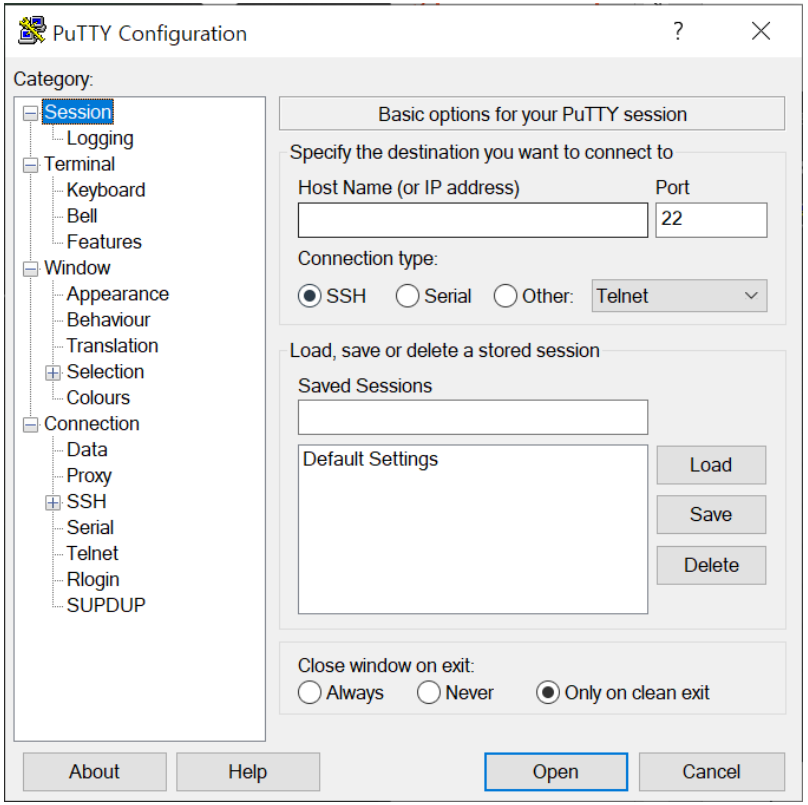
- **Continue to press the next button and press finish after the installation is complete**



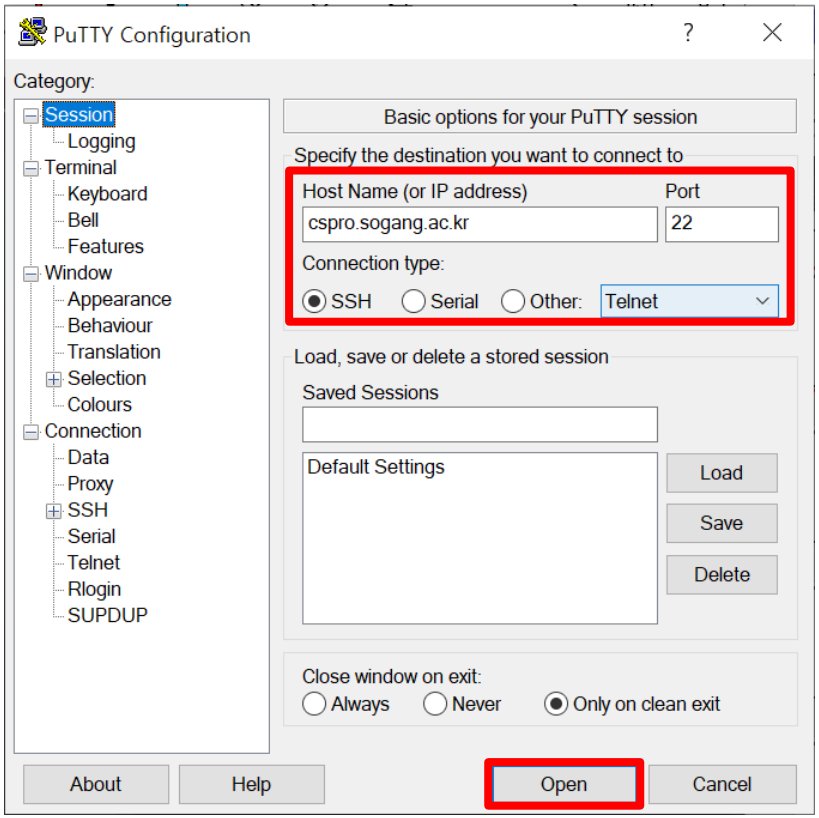


- **Run PuTTY Application**

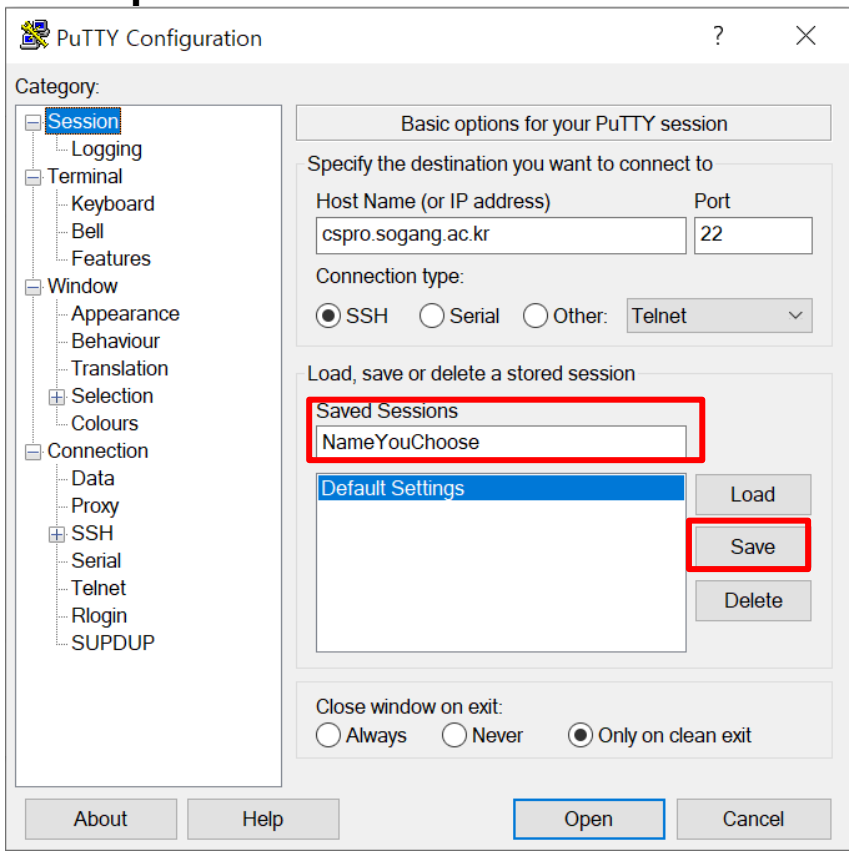


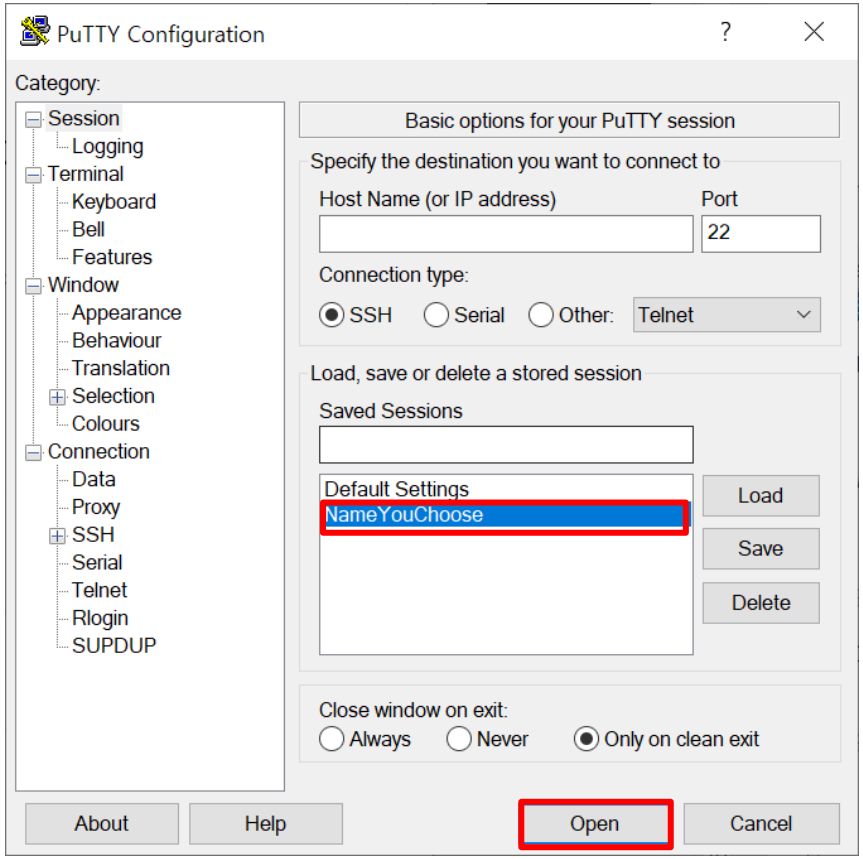


- **Setting in Session tap.**
  - **Host Name : cspro.sogang.ac.kr (or cspro1~10.sogang.ac.kr. ex) cspro7.sogang.ac.kr)**
  - **Port: 22 (fixed)**
  - **Connextion type: SSH (fixed)**
- **And press Open**

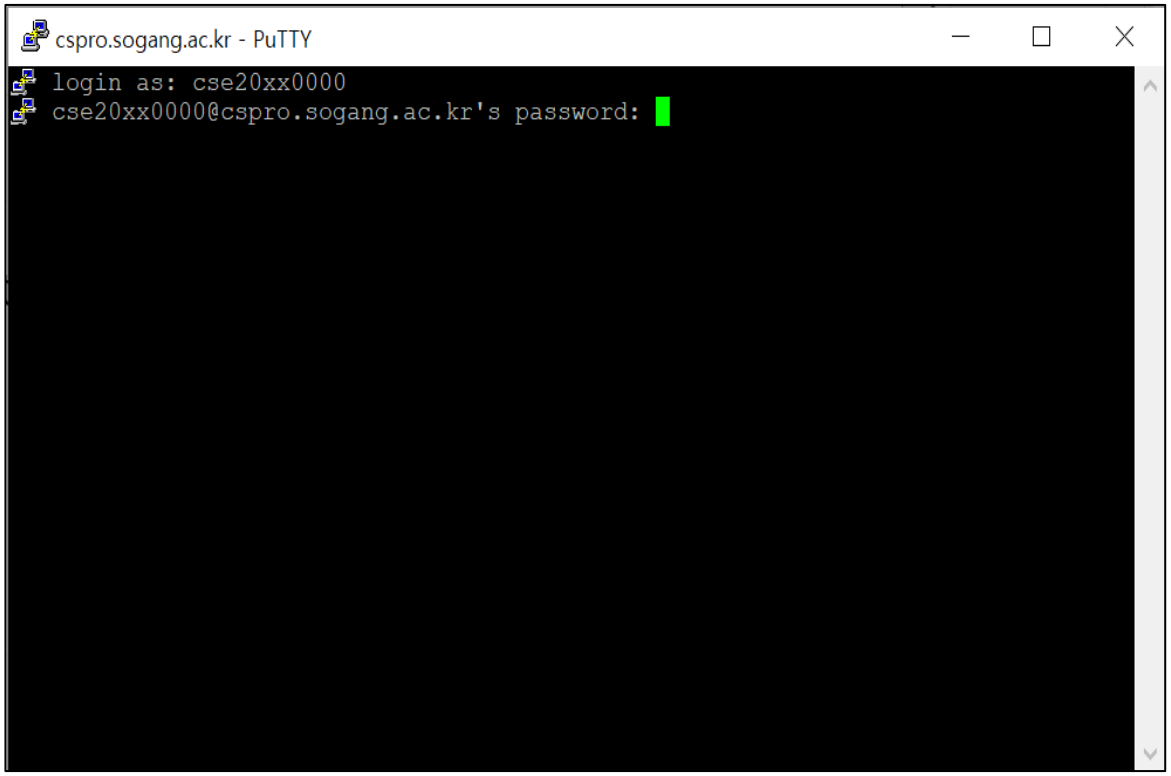


- **If you don't want to set these settings every time you run PuTTY, you can save the settings.**
  - **Enter the settings described on the previous page, select the setting name under Saved Sessions**
  - **And press the Save button**
- **Next time you open the PuTTY, you can simply select the session name and press Open button.**

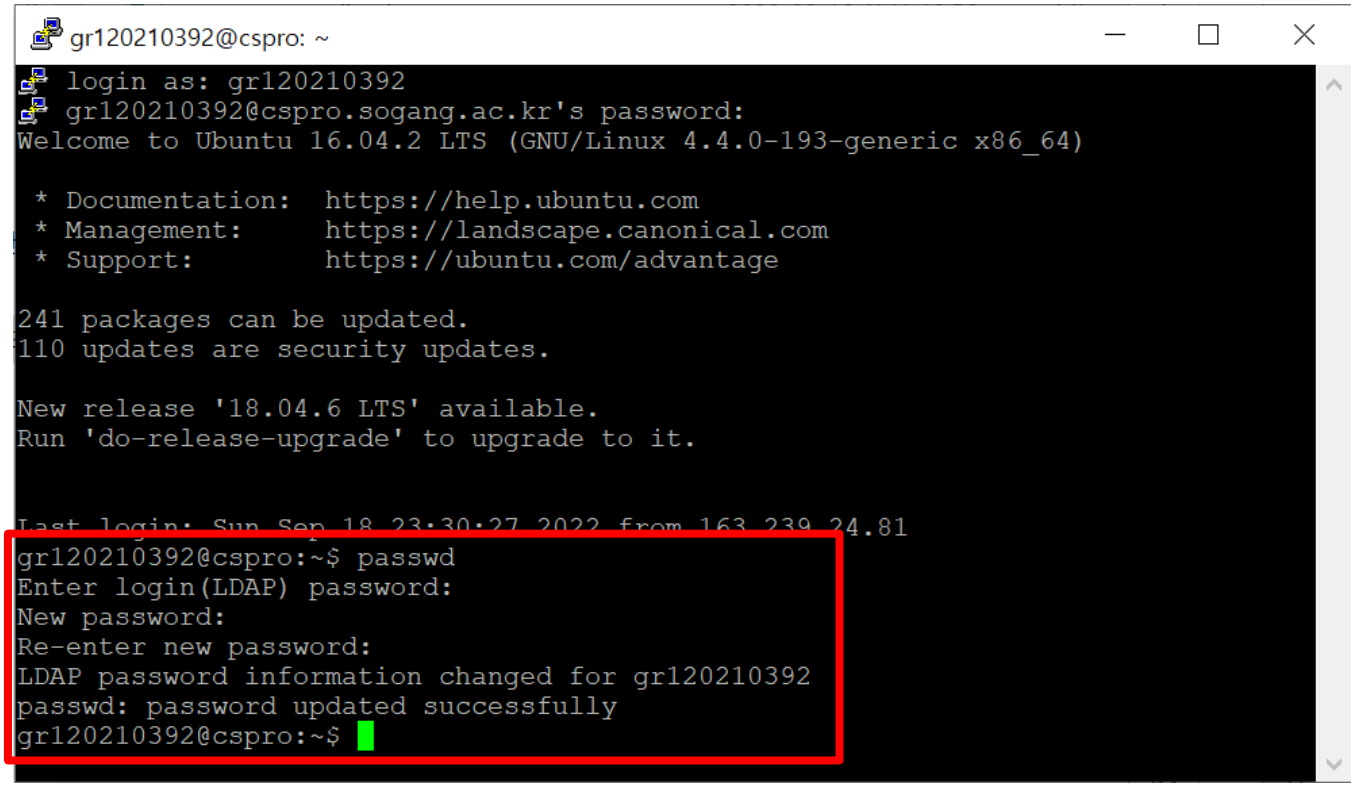




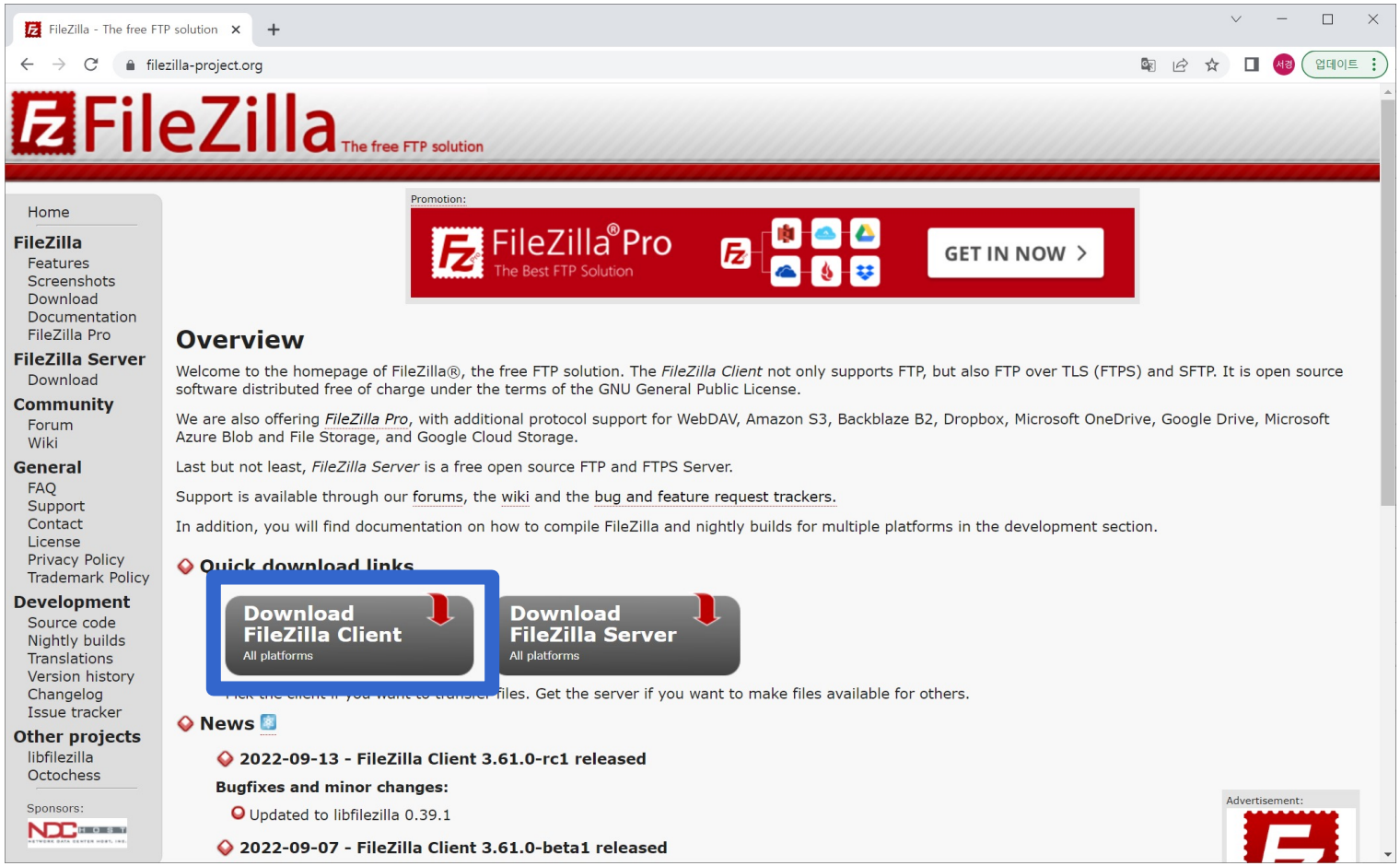
- Enter your account ID + press ‘Enter key’
  - ID: cse+student ID. Ex) cse20221234
- And Enter password + press ‘Enter key’ (it can’t be seen as it is being typed)
  - Default password: asdf1234
  - If you are taking another class that uses CSPRO, your account may have been created with a different default password.



- **IMPORTANT: You MUST need to change your password**
  - Enter 'passwd' command
  - and enter current password (the default password in the previous page)
  - and enter your new password twice

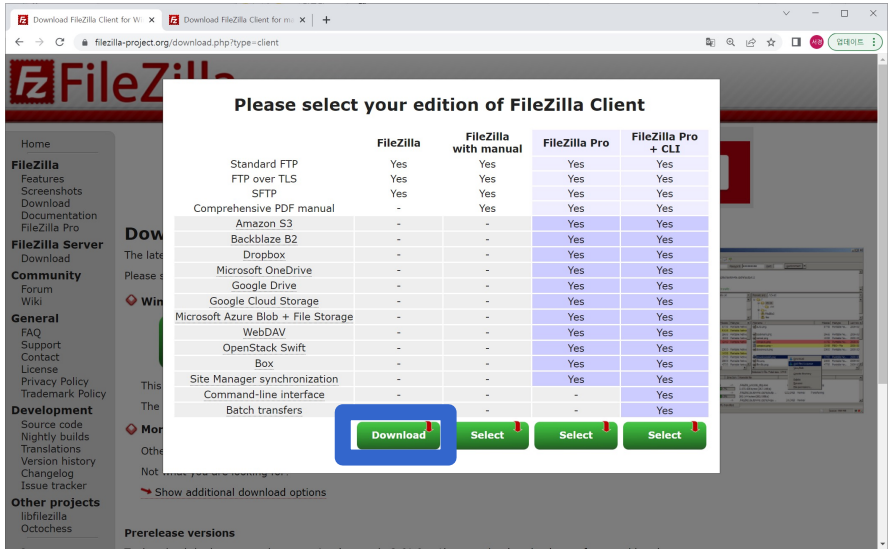


- FileZilla is a FTP solution that can manage the files which is on server
- go to ‘https://filezilla-project.org/’ and click ‘Download FileZilla Client’



install FileZilla (For Windows)

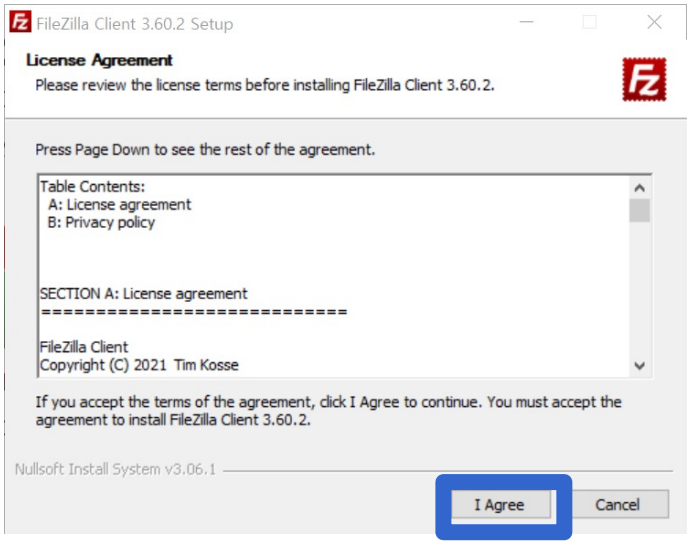
- Click Download FileZilla Client and then Download button
- After downloading the FileZila, execute the FileZilla

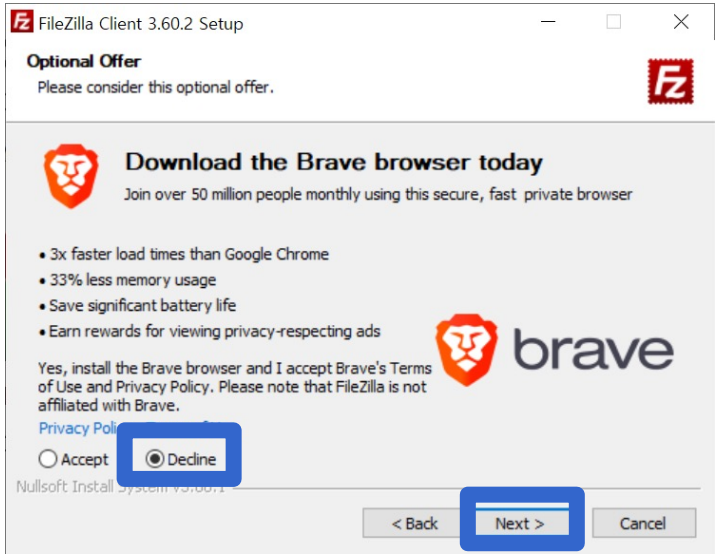


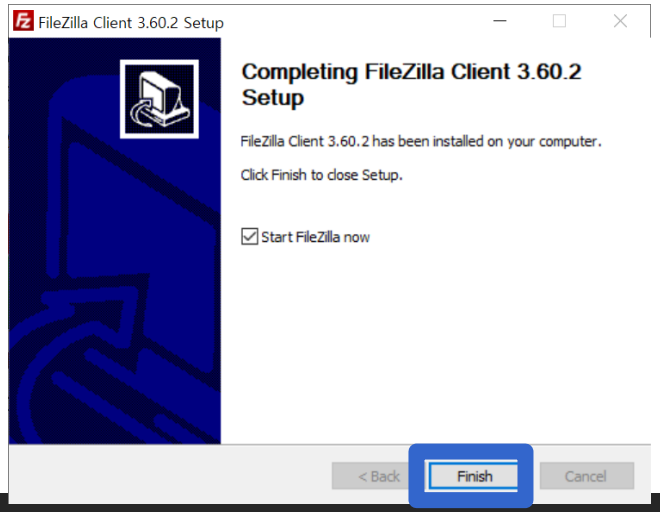
install FileZilla (For Windows)

서강대학교

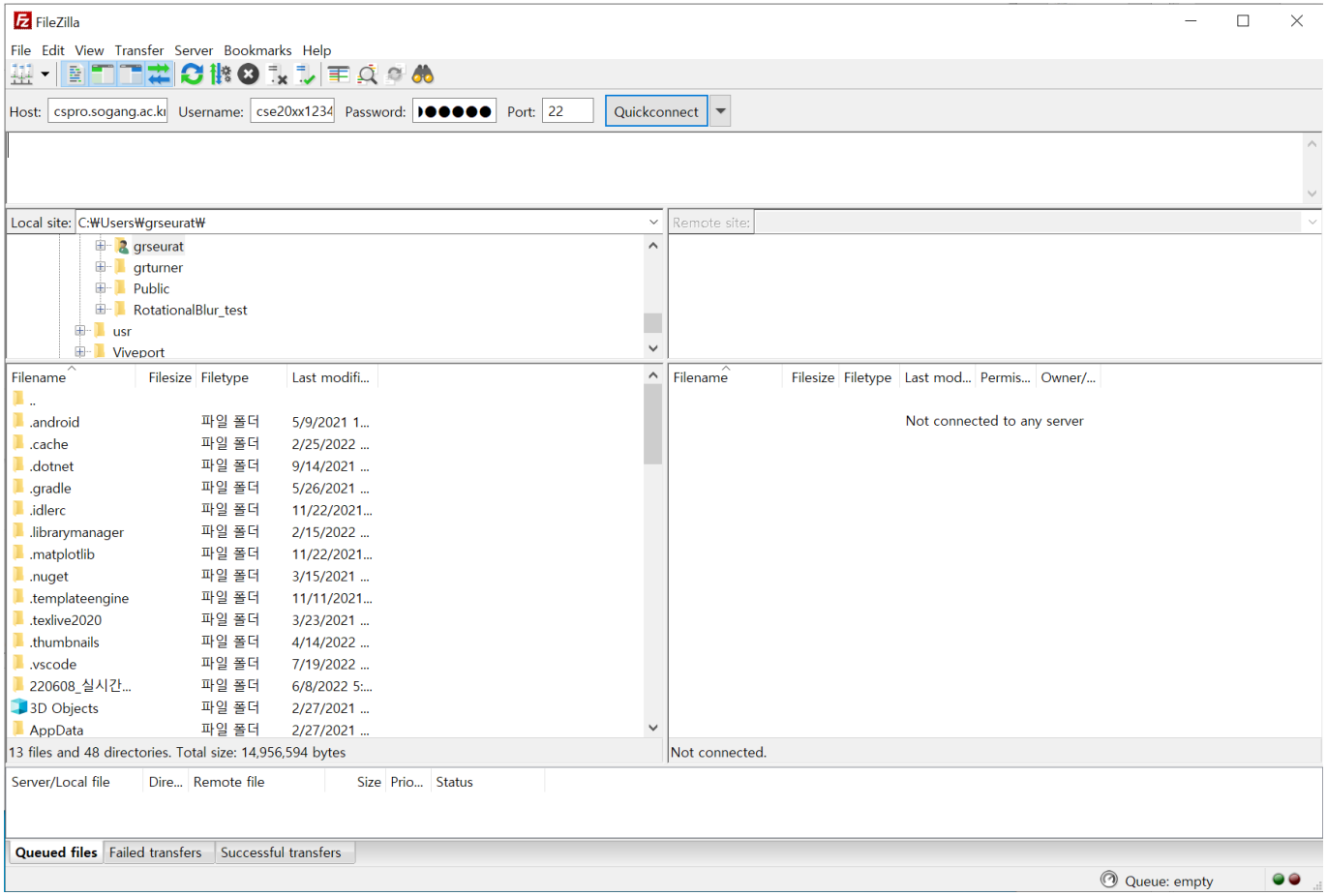
- **Be careful, Press the decline button to prevent unnecessary Brave Brower installation**
- **After that, you can keep pressing the “next” button**





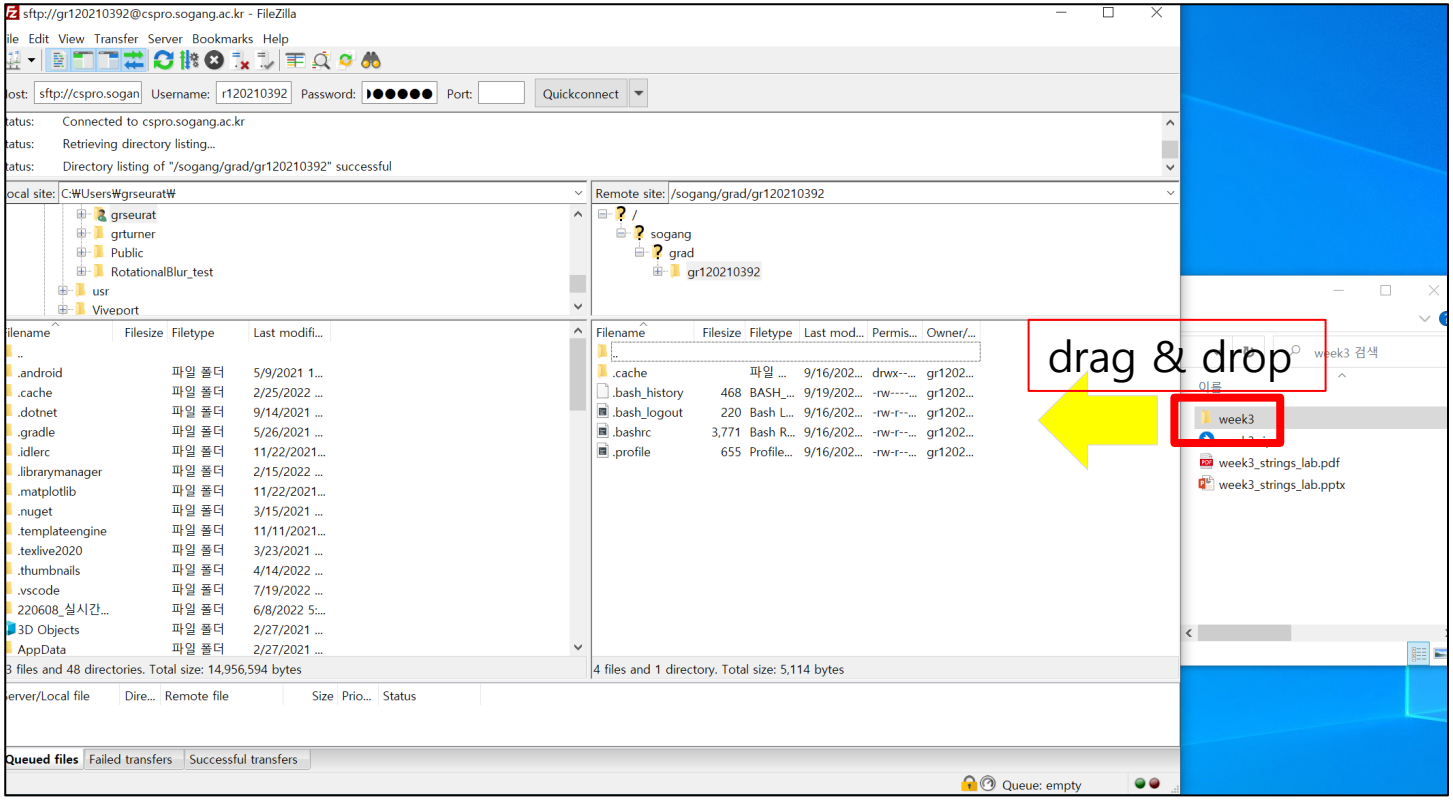


- **Enter settings, select 'Quickconnect' button. (settings are same with PuTTY)**
  - **Host: cspro.sogang.ac.kr (or cspro1~10.sogang.ac.kr. ex) cspro7.sogang.ac.kr)**
  - **Username: ID(cse+studentID)**
  - **Password**
  - **Port: 22 (fixed)**



- **There is no file in the Linux server yet (we will learn about 'ls' command later)**

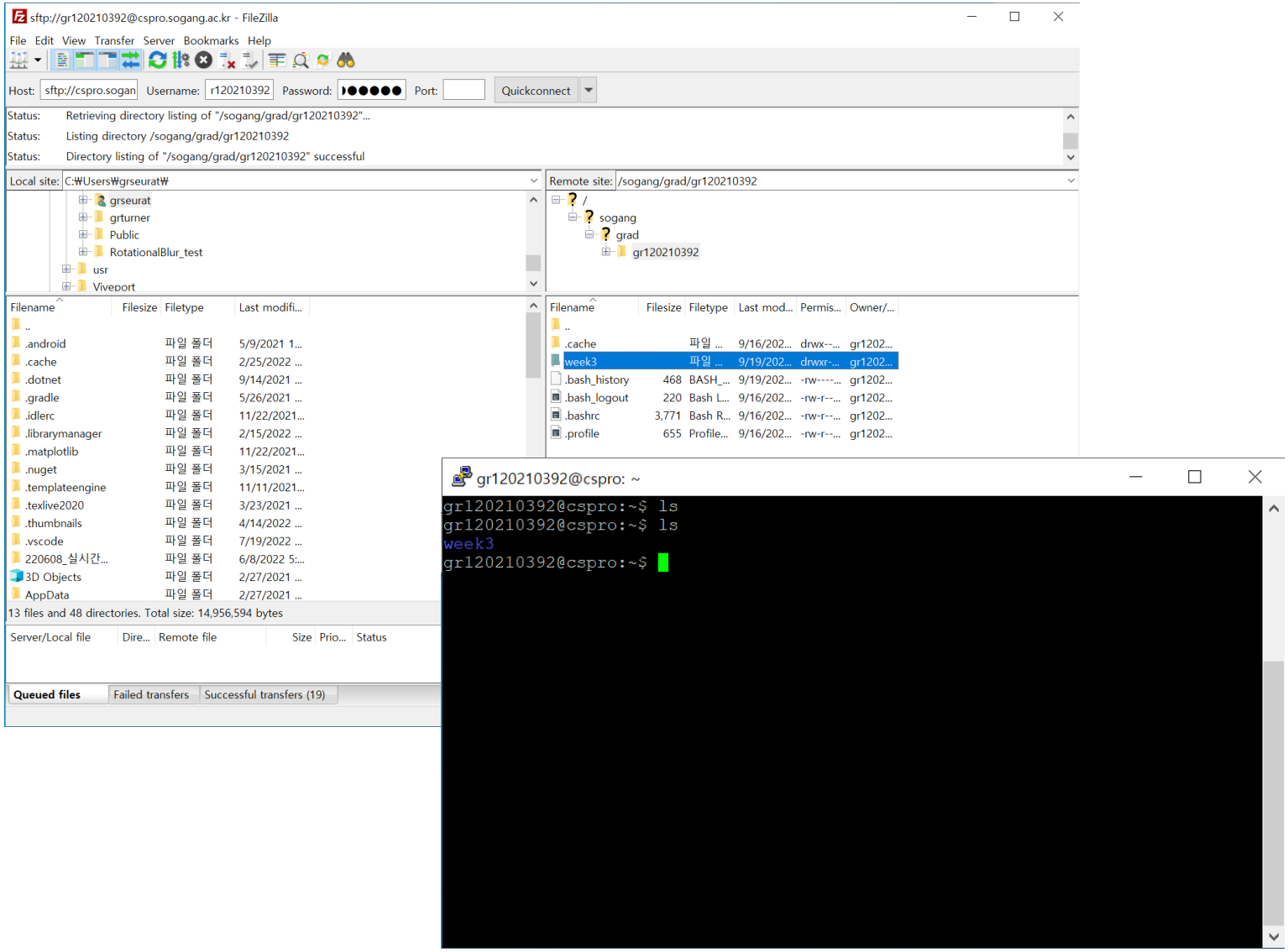
- **Drag and drop the file that you want to see on the Linux server**



copy file to cspro by FileZilla (For Windows)

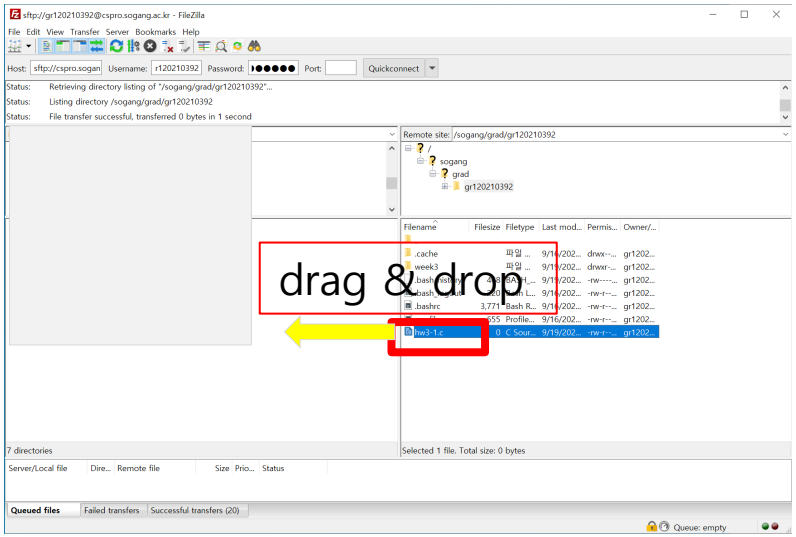
서강대학교

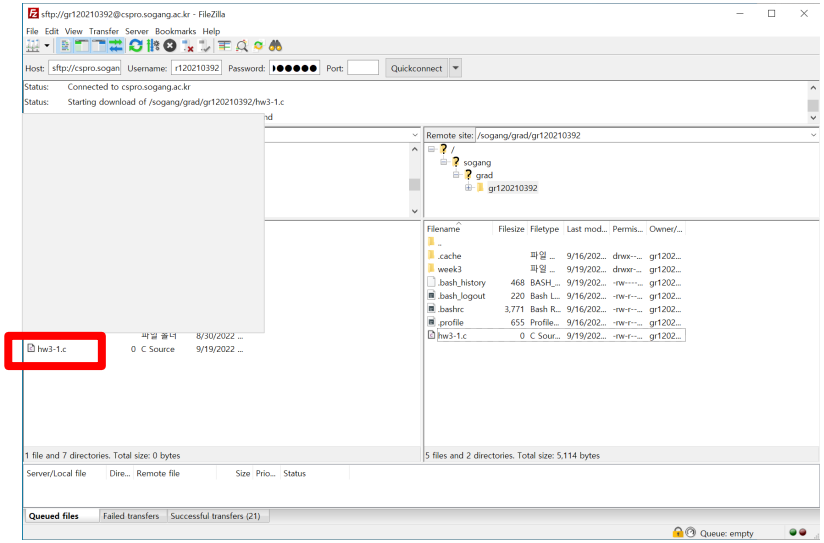
- **Now you can work with your file on server**



download file from FileZilla (For Windows)

- To download the file from server to your pc:
- it is simple, just drag & drop Filezilla to your pc





Connecting to CSPRO (in Mac)

You can use built-in terminal in Mac

서강대학교

- In mac OS, you don't need PuTTY.
- You can connect to cspro by just opening built-in Terminal and type as follows:
  - ssh cseStuentID@cspro.sogang.ac.kr (ex) cse20xx1234@cspro.sogang.ac.kr
  - Are you sure you want to continue connection (yes/no)? -> yes
- Next, enter your password to log in
  - Default password is given in page 10
- After logging in, change your password
  - See page 11

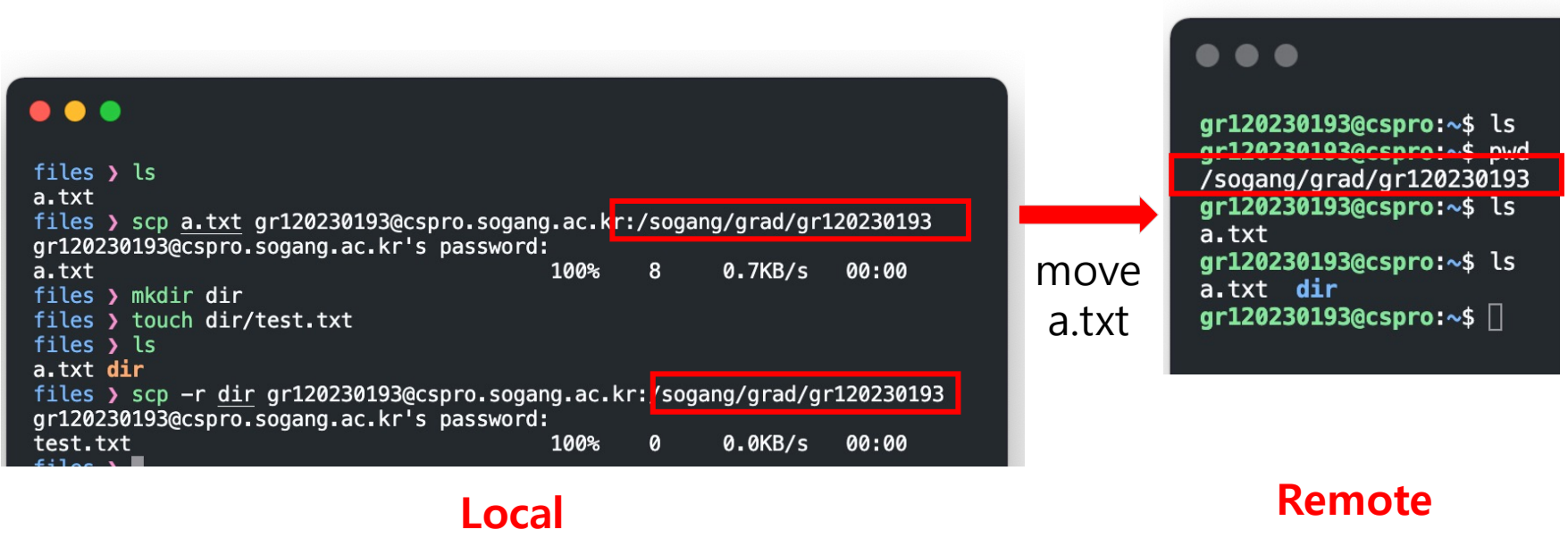
You can use built-in SCP in Mac

- **I recommend to use scp to move files/directories from local to remote server and vice versa, instead of Filezilla**
- **How to use**
  - **From local to remote**

✓ Be careful not to miss the slash!

scp **[local filename] [your id]@[cspro1~10].**sogang.ac.kr:**[remote path to locate file]**
scp –r **[local directory name] [your id]@[cspro1~10].**sogang.ac.kr:**[remote path to locate file]**

ex) scp a.txt cse20220123@cspro8.sogang.ac.kr:/sogang/....

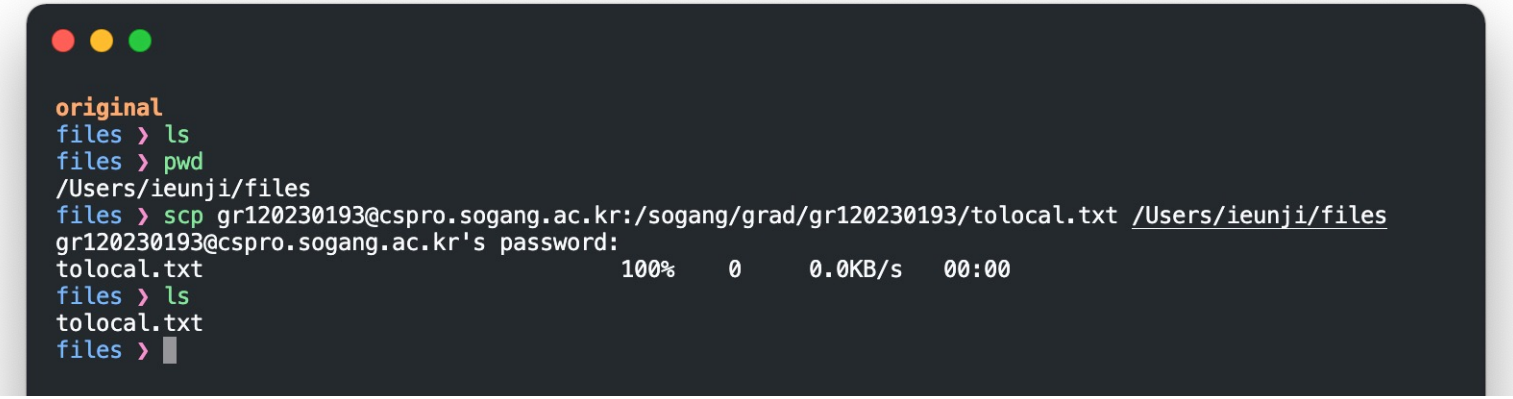


- **How to use**
  - **From remote to local**

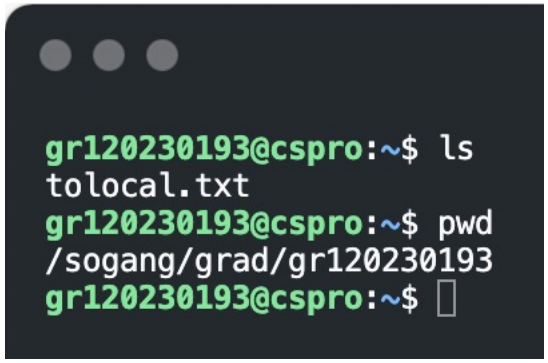
scp **[your id]@[cspro1~10].**sogang.ac.kr:**[remote path the file located] [local path to locate file]**
scp –r **[your id]@[cspro1~10].**sogang.ac.kr:**[remote path the dir located] [local path to locate dir]**

ex) scp cse20220123@cspro8.sogang.ac.kr:/sogang/....

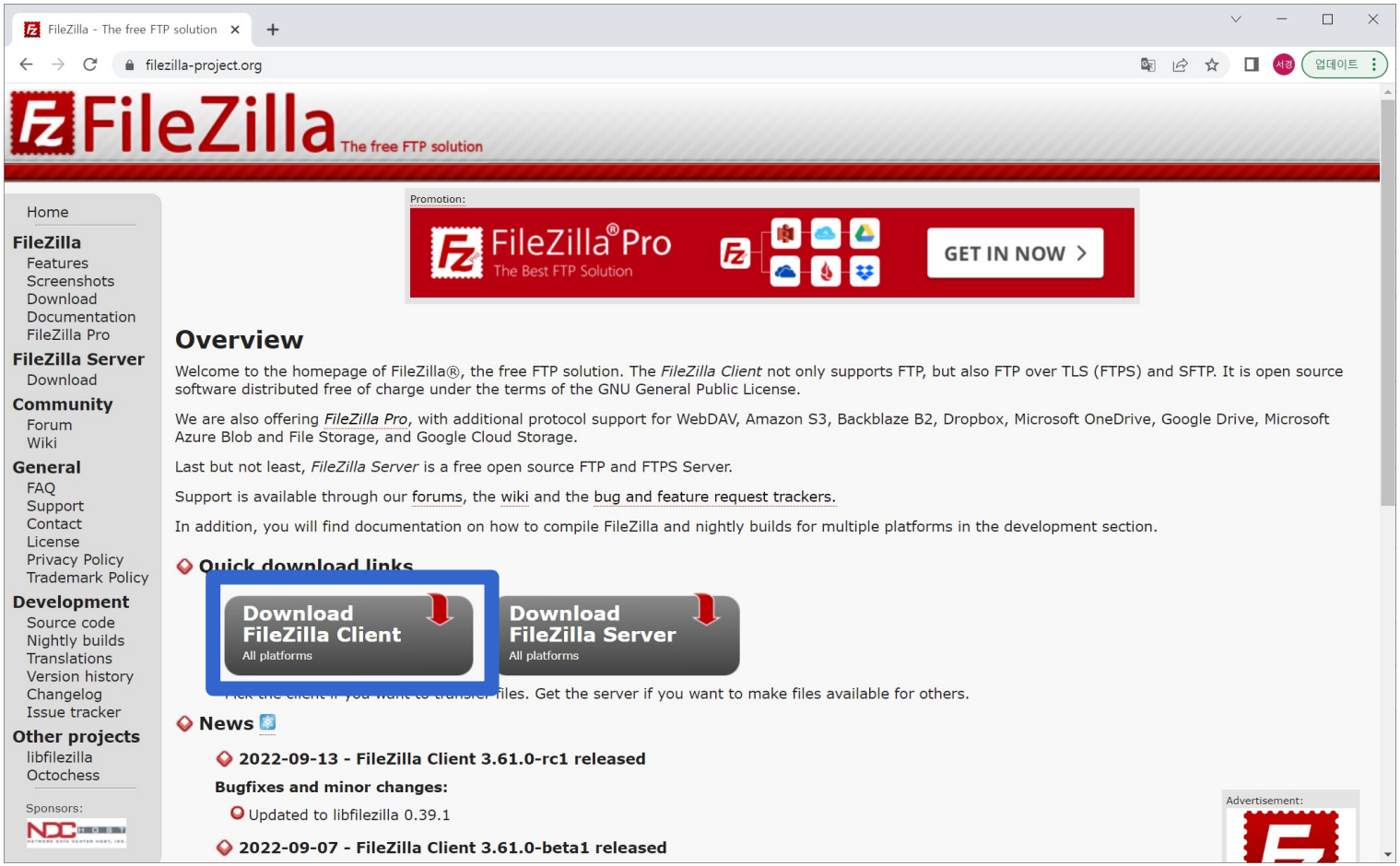
Local



Remote

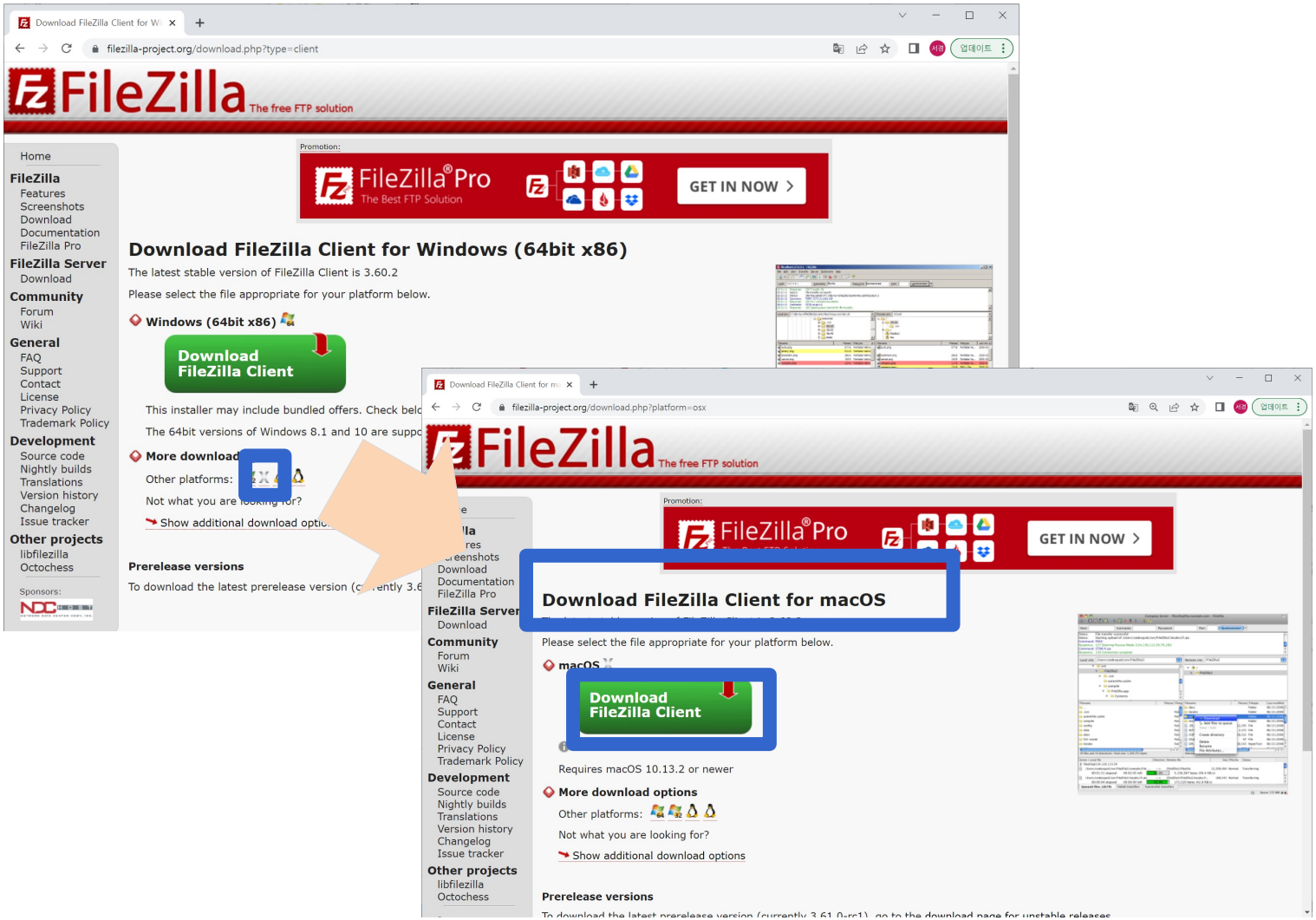


- FileZilla is a FTP solution that can manage the files which is on server
- go to ‘https://filezilla-project.org/’ and click ‘Download FileZilla Client’

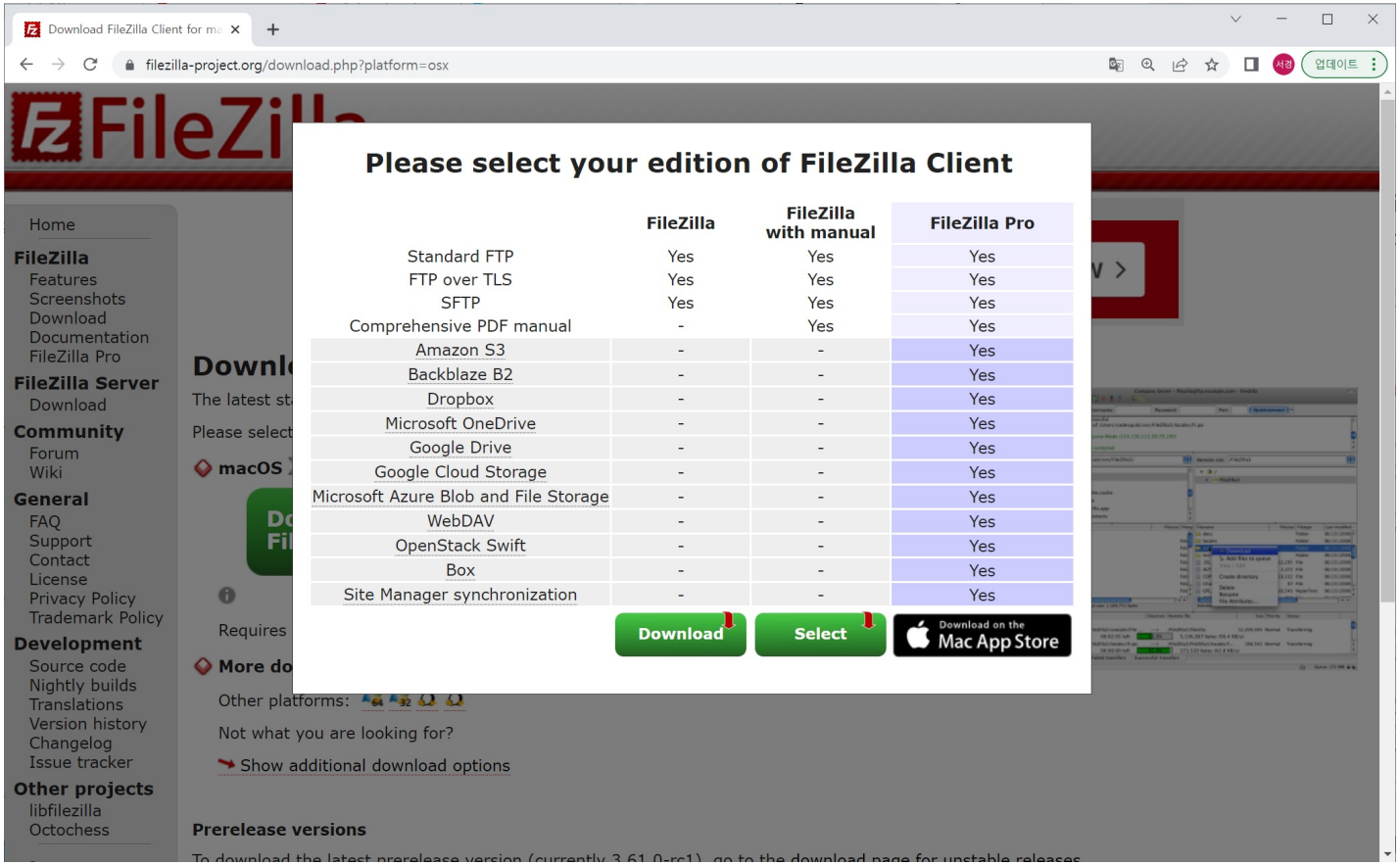


install FileZilla (For Mac)

- Click ‘X’ Icon (blue boxed) and redirect to download for mac page
- And click ‘Download FileZilla Client’ button
- After downloading the FileZila, execute the FileZilla



- click once more ‘Download’ button



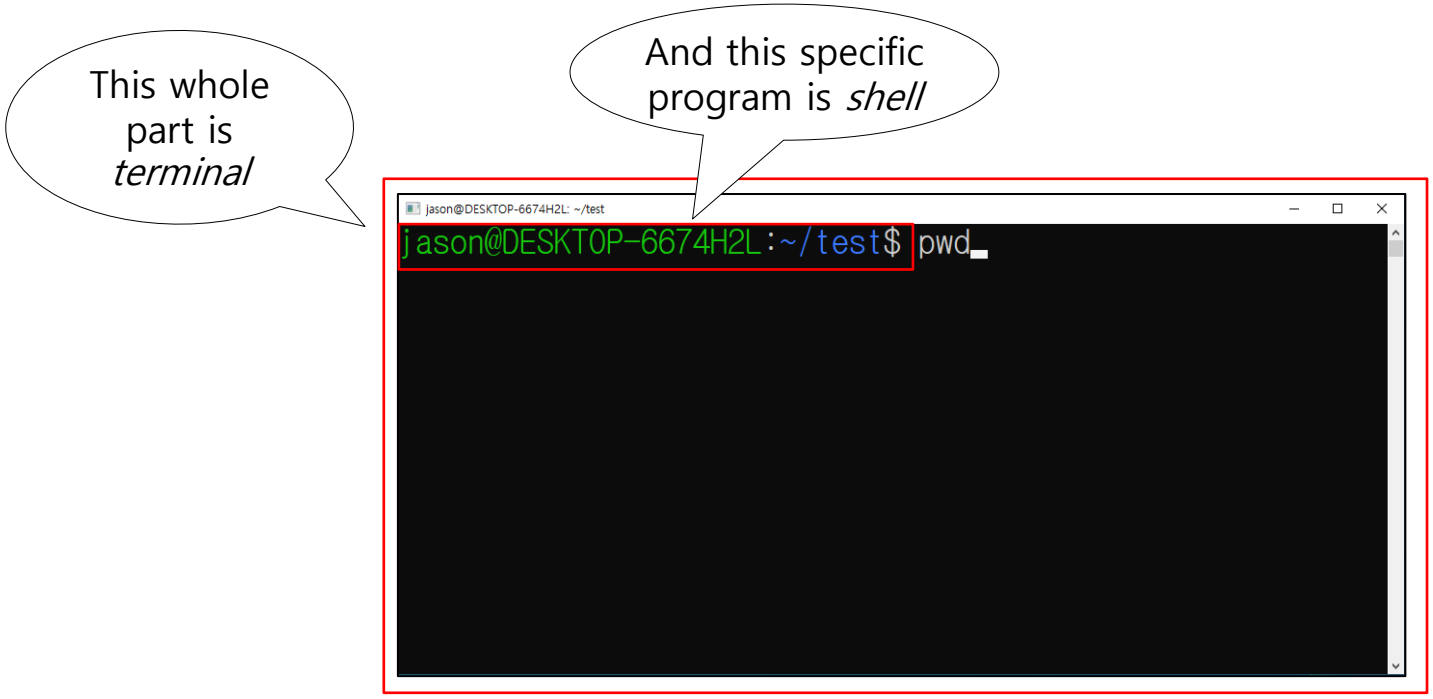
- **Next steps to connect to cspro by FileZilla is almost the same with Windows (page 14 ~)**

Basic Linux commands and Usages

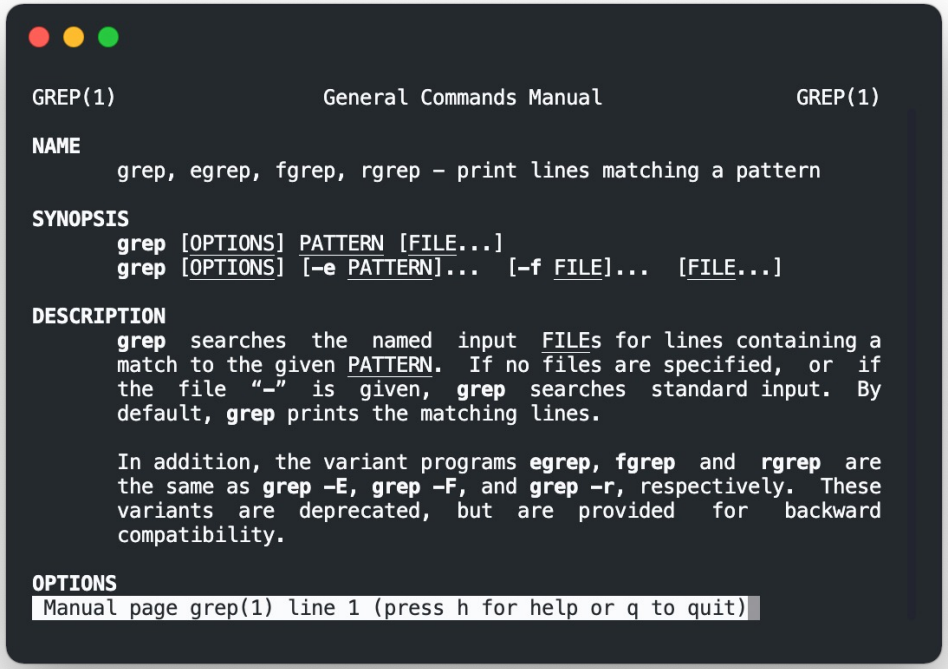
- man
- mkdir/rmdir
- cp
- cd
- mv
- ls
- rm
- cat
- echo
- grep
- ps
- kill
- pwd
- su/passwd
- tar
- chmod

What is shell?

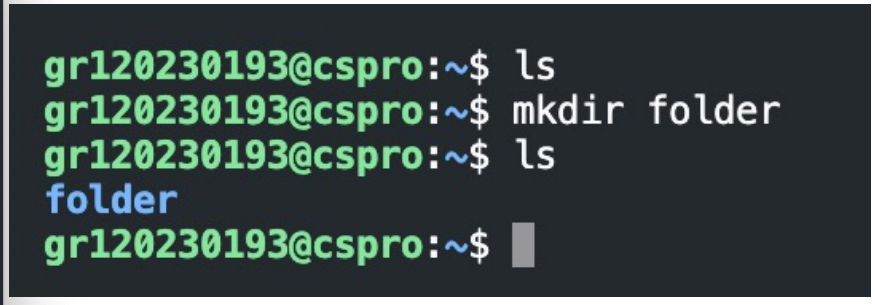
- **Terminal is an environment (interface) where a user can type text commands**
- **Shell is a program that interacts with you: it takes in a command from a user and passes it to the operating system (Linux here) to perform some task**
- So, roughly speaking:



- **man: manual for specific instruction**
  - man [instruction]
  - ex. man grep
- **mkdir/rmdir**
  - mkdir: make directory
  - rmdir: remove directory
  - ex. mkdir /temp (absolute path) / mkdir ./temp (relative path)
  - In principle, rmdir is only possible if there is any files in the directory



man grep

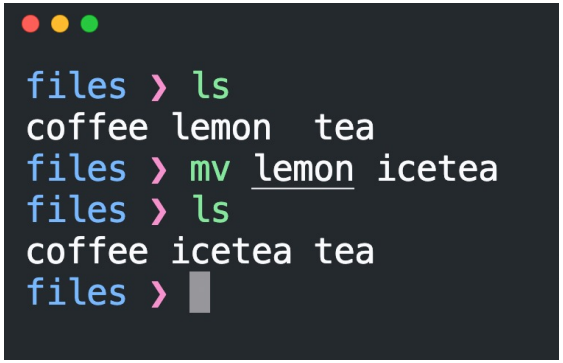


mkdir folder

- **cp: copy file**
  - cp [filename1] [filename2] : copy filename1 to filename2
  - cp [filename1] [dir1/filename2] : copy filename1 to filename2 in the directory dir1
  - ex) cp a.c /temp, cp ./a.c ./temp

- **cd: change directory**
  - cd : change directory to your home directory
  - cd [dir_name] : change directory to directory named “dir_name”
  - cd .. : change directory to parent directory

- **mv: move and rename files**
  - mv [filename] [directory] : move file to directory
  - mv [filename1] [filename2] : rename filename1 as filename2
  - mv [filename] .. : move filename to parent directory
  - mv [filename] . : move filename to current directory
  - mv [file1] [file2] [dir1]: move file1, file2, and dir1 to dir



rename the file with mv

- ls: print file list in the current directory
  - ls –a : print even hidden files (files that begin with .(dot))
  - ls –l : print detail information of files. (type, permission, link, owner, group, size, last modification time)
- rm: remove file or directory
  - rm [option] [filename]
  - options
    - -rf : recursive + force
    - -r: recursive – this option allows you to delete folders and recursively remove their content first
    - -f: force – there is no confirmation prompt and ignores non-existent files
- cat: concatenates inputs and prints on the screen
  - cat [filename] : print the contents of filename
  - cat [filename1] [filename2] [filename3]: concatenate the contents of filenames
  - cat [filename1] [filename2] > [filename3]: concatenate the contents of filename1 and filename2, and save as filename3
- echo
  - print value of variable
  - ex) echo $USER

- grep: search text data sets for lines that match a regex
  - grep [option] pattern [file…]
  - search the row including or matching the word
  - -n: print with line number
  - -i: ignore case
  - ex) grep -n ftp /etc/groupt

- ps: print processes
  - ps 1000: print status of process whose id is 1000
- kill
  - exit program
  - ex) kill 9 pid(force termination)
- pwd: print (current) working directory

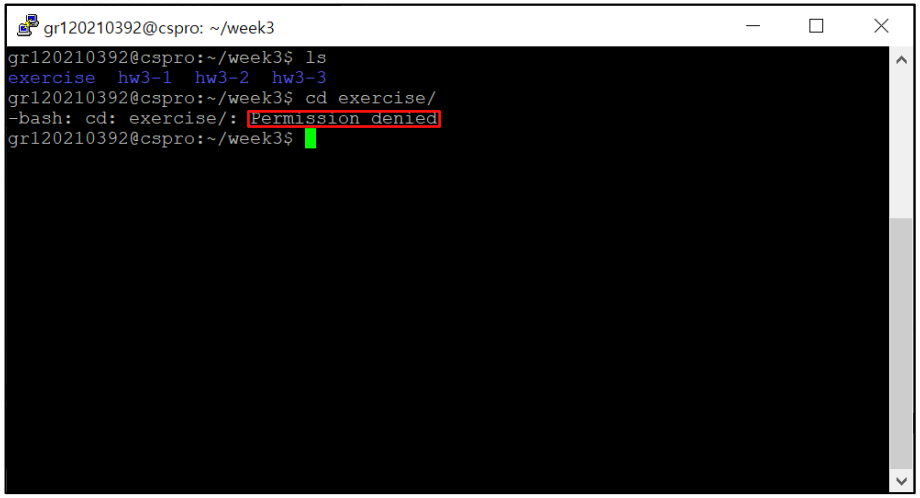
- **su: become a super user**
- **passwd: change password**
- **tar: zip/unzip files**
  - **z: gzip filetype(.tar.gz or .tgz)**
  - **x: unzip**
  - **c: zip**
  - **v: verbose**
  - **f: file name to compress**
  - **ex) tar xvf ../states.tar, tar xzf software.tar.gz / tar cvfz files.tar.gz**

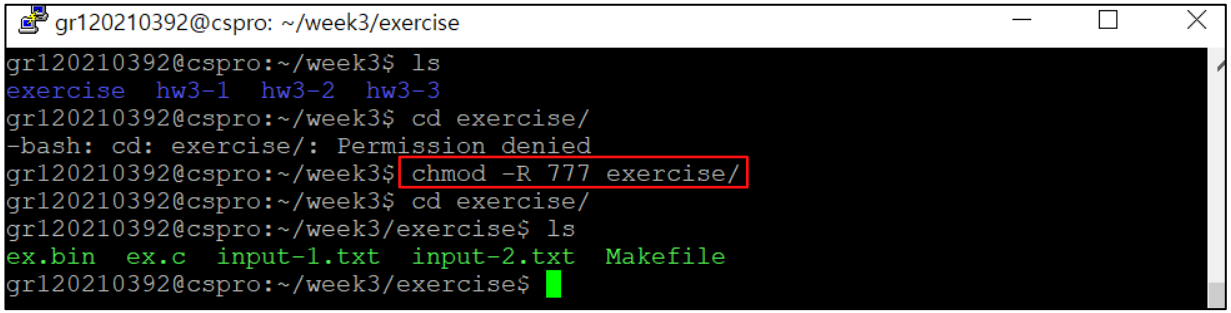
- **chmod: change the access permissions and the special mode flags**

#	Sum	rwx	Permission
7	4(r) + 2(w) + 1(x)	rwx	read, write and execute
6	4(r) + 2(w)	rw-	read and write
5	4(r) + 1(x)	r-x	read and execute
4	4(r)	r--	read only
3	2(w) + 1(x)	-wx	write and execute
2	2(w)	-w-	write only
1	1(x)	--x	execute only
0	0	---	none

For example, 754 would allow:
- "read" (4), "write" (2), and "execute" (1) for the *User* class;
- "read" (4) and "execute" (1) for the *Group* class;
- Only "read" (4) for the *Others* class.

- when permission denied, you can modify permission of the file/directory
- you can use 'chmod –r 777 [directory name]'
  - -r option means apply to every below directory and files in [directory name]
  - 777 option means apply Read/Write/Execute(all) permission for Owner/Group/Pulbic user(all)
  - for more information of chmod, refer https://linuxize.com/post/chmod-command-in-linux/ and https://recipes4dev.tistory.com/175



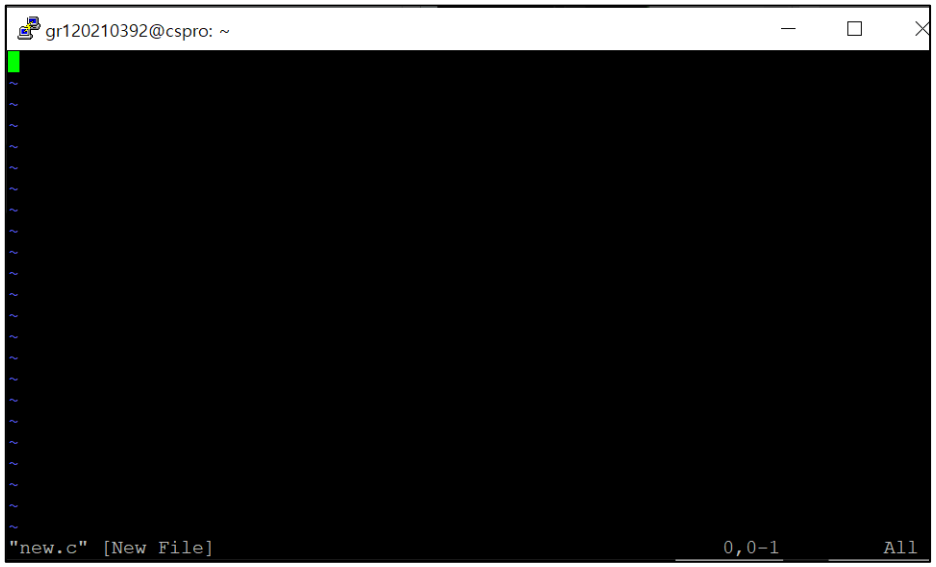


Vim (Vi IMproved)

서강대학교

- Vim is improved version of ‘vi text editor’ and free, open-source
- Vim is included(built-in) in Linux
- We will use Vim on Linux to write our code

- On Linux, command ‘vim [Filename]’ creates a file and then opens it with ‘Normal mode’
  - If the file already exist, vim opens that existing file and lets you edit it
  - Even if you type ‘vi [Filename]’, it is automatically redirected to ‘vim [Filename]’



  - Normal mode. ‘ ~ ’ means there’s nothing in the line.

Vim mode

서강대학교

- Vim has several modes, normal, command, insert, visual
- Normal mode is the first state you create file. Mode conversion should always go through this normal mode
  - To return to normal mode from another mode, press 'ESC' key
- You can edit text in Insert mode
  - To enter to insert mode, press any of 'A', 'a', 'O', 'o', 'Insert' key in normal mode
  - And you can write what you want (code)
- You can save, quit, etc. files in Command mode
  - To enter to command mode, press ':' key in normal mode
  - To quit vim (without save), enter ':q. To save, enter ':w'. To save and quit, enter ':wq'
  - If the file was modified and you wanted to quit without saving(':q'), you would use ':q!' or ':wq!'. '!' tells vim to force the operation
- You can copy and paste in Visual mode
  - To enter to Visual mode, press 'v' key in normal mode
  - use 'arrow' key to highlight a selection, and press 'y' to copy and 'p' to paste

insert mode

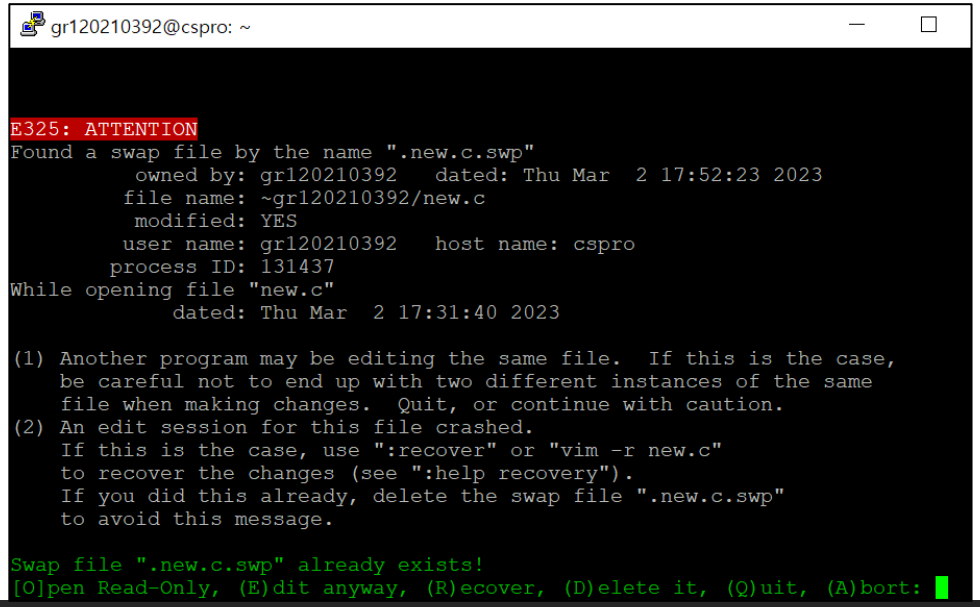
command mode

visual mode

- You can also copy & paste using mouse drag(copy) & right click(paste)

- You can delete one character by press ‘d’ in normal mode or visual mode
  - also you can delete a line by press ‘dd’ in normal mode or visual mode (useful)

- A swp file can be created if:
  - If you are shutting down abnormally after modifying a file. (for example, if terminal shut down)
  - When other people(or you) open a file that you are already working on
  - etc.
- swp(swap) files store changes you’ve made to the files. It can be used when you want to recover the files.
  - if swp file is created and situation like the picture shown below, select an operation you want to do.



Commands

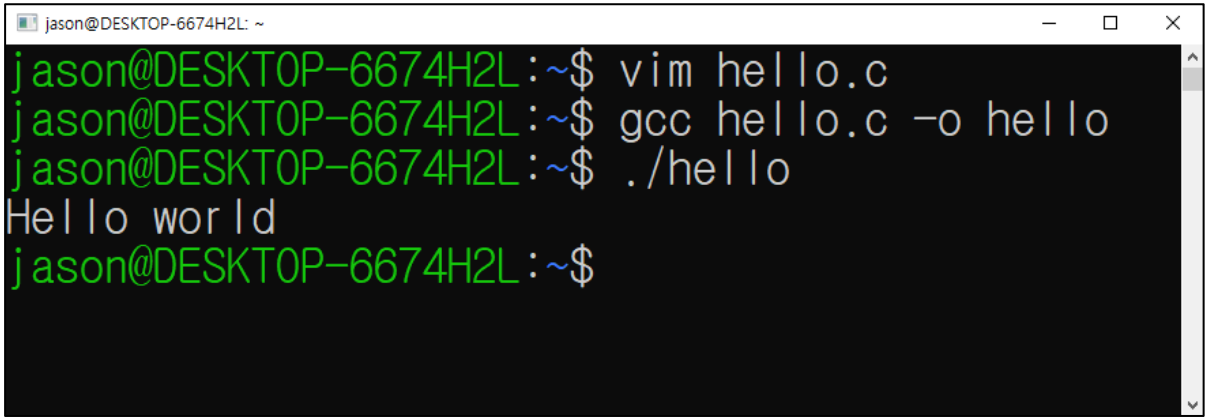
- **insertion**
  - i: insert mode in front of cursor
  - a: insert mode behind cursor
  - o: insert line just below the cursor
- **deletion**
  - dd: delete a line on the cursor
  - x: delete a letter
- **search**
  - /: write the what you want to search after the slash
- **copy & paste**
  - yy: copy(yank) the line on the cursor
  - p: paste the yanked line just on the cursor
  - v: by moving the cursor, you can make a block. And press y, then you yanked the block.

These commands work in only normal mode.

- Once you write a program with an editor, you have to compile it
- "Compile" is the process of translating your source code into an *executable* file
- In Linux, GCC will do this for us
- There are many options in GCC, but for now it is enough to know the following:

```
$ gcc <source file> -o <output executable file>
```

- For example, the following commands compile "hello.c" into an executable file named "hello"



- Now you can work with your works on Linux
- If you want to get more help and know other commands, please refer the pages below

- Linux tutorial
  - https://maker.pro/linux/tutorial/basic-linux-commands-for-beginners
- Linux commands
  - https://personales.unican.es/corcuerp/Linux/commands/Bash%20Command%20Reference.html
- Vim tutorial
  - https://www.freecodecamp.org/news/vim-beginners-guide/
- Vim commands
  - https://www.phcomp.co.uk/Tutorials/Unix-And-Linux/Vi-and-vim-reference-sheet.html