

Systems Programming Lab #0

2021-03-10

SP-TAs

Lab Information

- **TA**

- 302동 319호 (공용연구실)
- 황인휘 / 한형석
- Mail to: sp-tas@dcslab.snu.ac.kr

- **Lecture**

- Wed, 18:30 – 20:20
- Audio on PPT or zoom online class

Lab Session

- **Wed 18:30 - 20:20**
 - eTL (Description): 1st week of lab
 - Zoom Meeting (Q&A): 2nd week
- 302동 311-1호 소프트웨어 실습실
- Assignment description
- Q&A about your assignments
- No PCs in SW Lab
 - Take your laptop.
- Your laptop → Connect to lab server
→ Do your assignments, Q&A

Evaluation

- 출석/태도: 15%
- 과제: 15%
- 중간고사: 15% + 15%
- 기말고사: 20%
- 실습: 20%

- For getting a good grade, you also need to concentrate on labs.
- **Enjoy and have fun!**

Assignment

- **6 programming assignments**
 - Will be announced in eTL
 - about 2 weeks per 1 assignment
- **Submission**
 - Source code: Evaluate by the lab server
 - Report: Description about your source code & execution results.
- **Delay policy**

	+1day	+2days	+3days	+4days	+5days	+6- days
Max. Score	-10%	-20%	-30%	-40%	-50%	0 (-100%)

- **Deduction**
 - Wrong file type and name
 - Missing contents that specified to include in the report
- **Code copy policy**
 - Provider/Copier: **Both will get 0.** (eTL check + manual check)

Tips

- Check the specifications of the assignment carefully
- Check the Q&A board before you ask
- Read manual page of the functions/commands
 - # man [library function or command]
 - <https://linux.die.net/man/>
- Search on Google
 - Google knows everything!
- Check your code and report are updated before submit
- If you have to compress your submission files, do compression on the Ubuntu environment.
 - The compressed file may not decompress well in the evaluation environment.

Announcements

- **Questions**

- Class eTL Q&A Board [HIGHLY RECOMMENDED]
 - Questions on eTL Q&A board are welcome
 - Discussions between students are also encouraged
 - Surely check & update your information(Email, phone num., etc.) in eTL
 - **Do not ask question using private post(비밀글)**
- sp-tas@dcslab.snu.ac.kr
- We will give you an immediate answer, but it may take some time after business hours (11am – 6pm).
 - Start early, be collaborative

- **Questions we can't answer:**

- About your assignment's source code(debugging)
- Private questions about assignment(share answer to all!)
- Problems that occur in non-specified environments

Lab Environment

- Check the spreadsheet file at eTL.
- **SSH Connect to:**
 - sp#.snucse.org (sp1 ~ sp3)
 - Port: 22
- **We added individual accounts for students**
 - Announced in eTL
 - Username : stu#
 - Password : Your student No.

Connect to LAB Server (for Linux user)

- Linux/MacOS User
 - Execute command below:
ssh username@host

- Ex) if your account name is ta,
ssh ta@sp1.snucse.org

③ 계정 password 입력

```
osta@osta-VirtualBox:~$ ssh ta@sp1.snucse.org
The authenticity of host 'sp1.snucse.org (147.46.78.123)' can't be established.
ECDSA key fingerprint is SHA256:80SUN0IC91JL9HPenrIC/m/CM11GdkE2iApozo7g.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'sp1.snucse.org,147.46.78.123' (ECDSA)
ta@sp1.snucse.org's password:
Welcome to Ubuntu 18.04.2 LTS (GNU/Linux 4.15.0-45-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

System information as of Mon Mar  4 14:16:56 KST 2019

System load:  0.0               Processes:    96
Usage of /:   40.5% of 9.78GB   Users logged in:  0
Memory usage: 5%               IP address for eth0: 147.46.78.123
Swap usage:  0%

 * Ubuntu's Kubernetes 1.14 distributions can bypass Docker and use containerd
   directly, see https://bit.ly/ubuntu-containerd or try it now with

   snap install microk8s --channel=1.14/beta --classic

 * Canonical Livepatch is available for installation.
   - Reduce system reboots and improve kernel security. Activate at:
     https://ubuntu.com/livepatch

1 package can be updated.
0 updates are security updates.

Last login: Thu Feb 28 19:20:12 2019 from 175.223.35.254
ta@sp1:~$
```

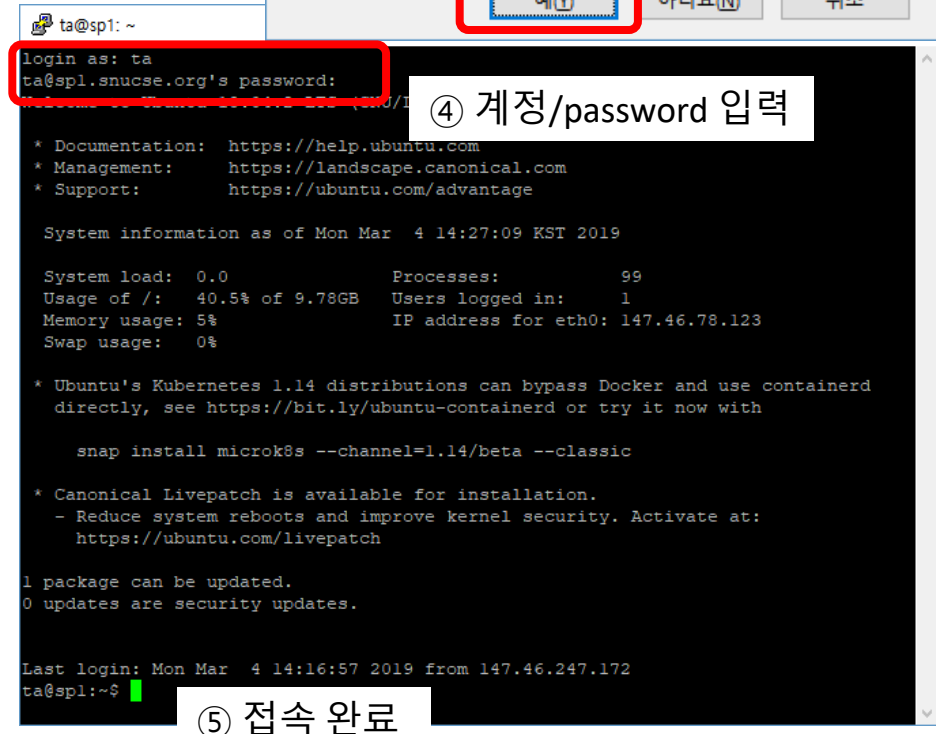
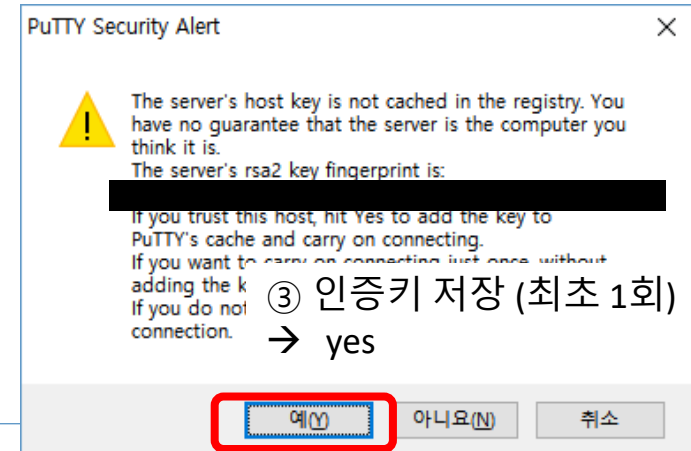
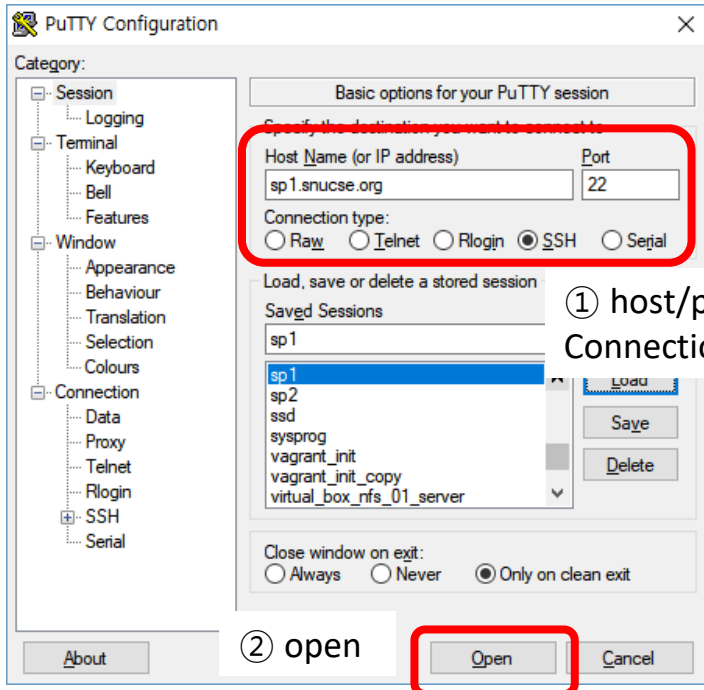
① host 입력

② 인증키 저장 (최초 1회)
→ yes

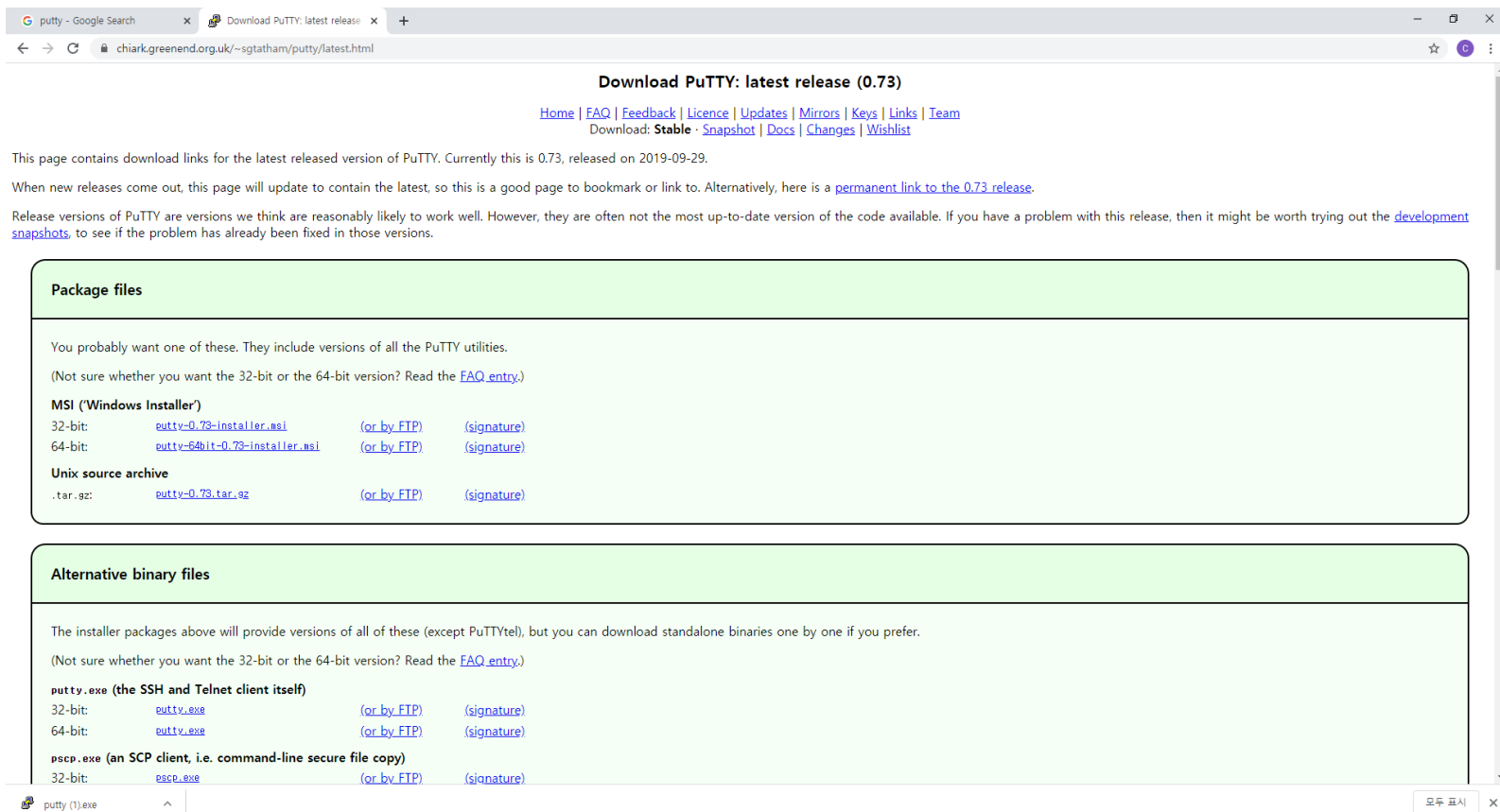
④ 접속 완료

Connect to LAB Server (for Windows user)

- Windows user: connect by SSH client
 - SSH Client: PuTTY, xshell, secureCRT, etc.
 - Search on Google or Naver and install whatever you want.
- Also you can connect on PowerShell with command:
ssh username@host
- Ex) Connect by PuTTY



SSH Client – Windows (PuTTY)



The screenshot shows a web browser window with the address bar displaying `chiark.greenend.org.uk/~sgtatham/putty/latest.html`. The page title is "Download PuTTY: latest release (0.73)". Navigation links include Home, FAQ, Feedback, Licence, Updates, Mirrors, Keys, Links, and Team. Download links are provided for Stable, Snapshot, Docs, Changes, and Wishlist. The page content includes a paragraph about the latest release (0.73, released on 2019-09-29) and a link to a permanent link to the 0.73 release. It also mentions release versions and a link to development snapshots. Two main sections are highlighted with green headers: "Package files" and "Alternative binary files". The "Package files" section lists MSI ("Windows Installer") for 32-bit and 64-bit, and a Unix source archive. The "Alternative binary files" section lists standalone binaries for putty.exe and pscp.exe for 32-bit and 64-bit. A taskbar at the bottom shows a PuTTY window titled "putty (1).exe".

Download PuTTY: latest release (0.73)

[Home](#) | [FAQ](#) | [Feedback](#) | [Licence](#) | [Updates](#) | [Mirrors](#) | [Keys](#) | [Links](#) | [Team](#)
Download: [Stable](#) | [Snapshot](#) | [Docs](#) | [Changes](#) | [Wishlist](#)

This page contains download links for the latest released version of PuTTY. Currently this is 0.73, released on 2019-09-29.

When new releases come out, this page will update to contain the latest, so this is a good page to bookmark or link to. Alternatively, here is a [permanent link to the 0.73 release](#).

Release versions of PuTTY are versions we think are reasonably likely to work well. However, they are often not the most up-to-date version of the code available. If you have a problem with this release, then it might be worth trying out the [development snapshots](#), to see if the problem has already been fixed in those versions.

Package files

You probably want one of these. They include versions of all the PuTTY utilities.

(Not sure whether you want the 32-bit or the 64-bit version? Read the [FAQ entry](#).)

MSI ("Windows Installer")

32-bit:	putty-0.73-installer.nsi	(or by FTP)	(signature)
64-bit:	putty-64bit-0.73-installer.nsi	(or by FTP)	(signature)

Unix source archive

.tar.gz:	putty-0.73.tar.gz	(or by FTP)	(signature)
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Alternative binary files

The installer packages above will provide versions of all of these (except PuTTYtel), but you can download standalone binaries one by one if you prefer.

(Not sure whether you want the 32-bit or the 64-bit version? Read the [FAQ entry](#).)

putty.exe (the SSH and Telnet client itself)

32-bit:	putty.exe	(or by FTP)	(signature)
64-bit:	putty.exe	(or by FTP)	(signature)

pscp.exe (an SCP client, i.e. command-line secure file copy)

32-bit:	pscp.exe	(or by FTP)	(signature)
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- Download .exe file at:

<https://www.chiark.greenend.org.uk/~sgtatham/putty/latest.html>

Alternative binary file – putty.exe

Secure Copy (SCP)

- Secure Copy: Transferring files between servers.

- Linux/MacOS User

Enter commands on terminal:

```
# scp sourceFileName username@host:/some/remote/directory
```

Ex) Copying host machine's /home/sys/a.c file
to directory /home/sysprog/submit/lab0 on server

```
# scp /home/sys/a.c ta@sp1.snucse.org:/home/sysprog/submit/lab0
```

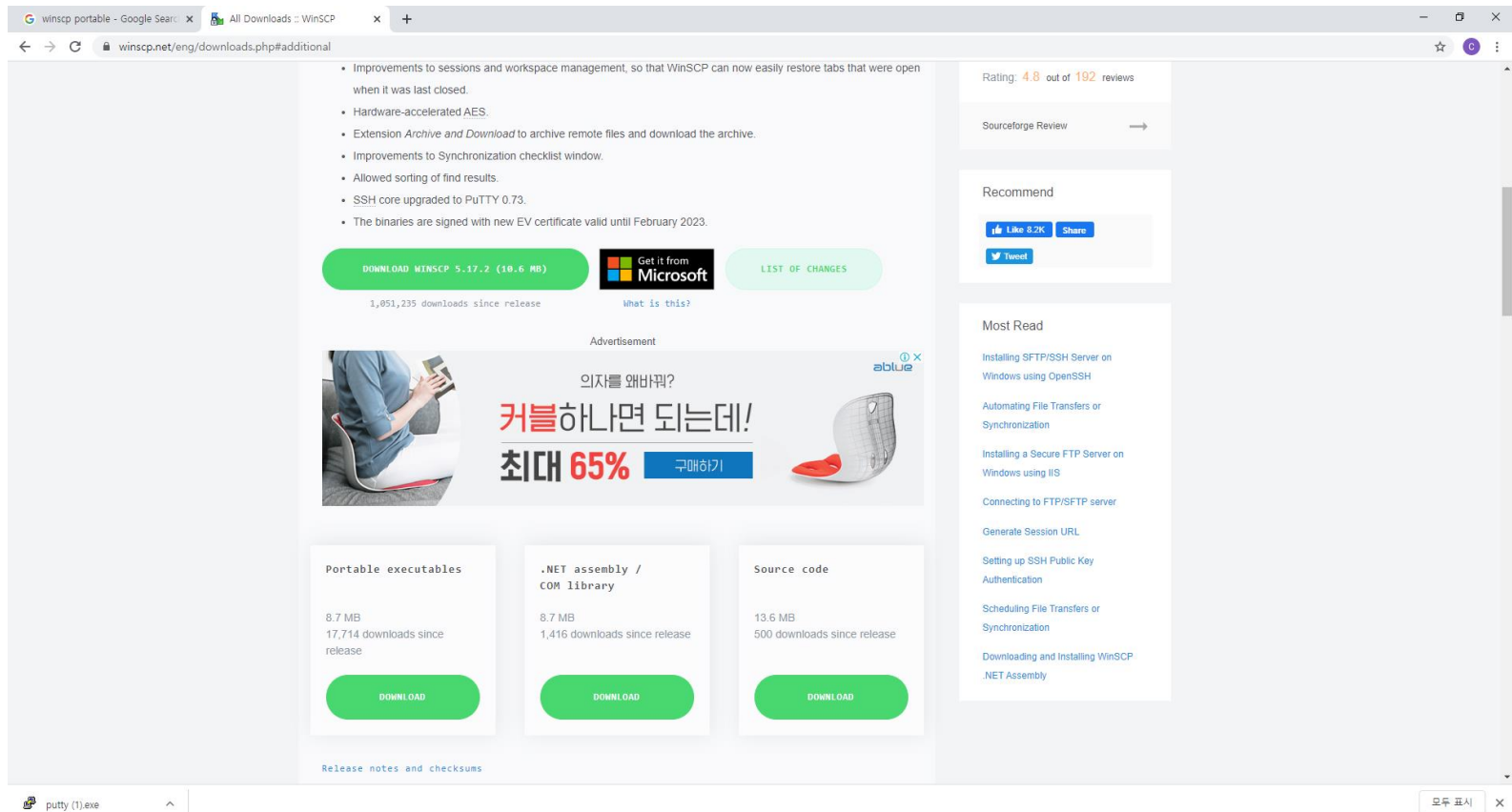
- Windows User

- Transfer with SCP clients
- Ex) WinSCP, FileZilla, etc

- SCP commands notes site:

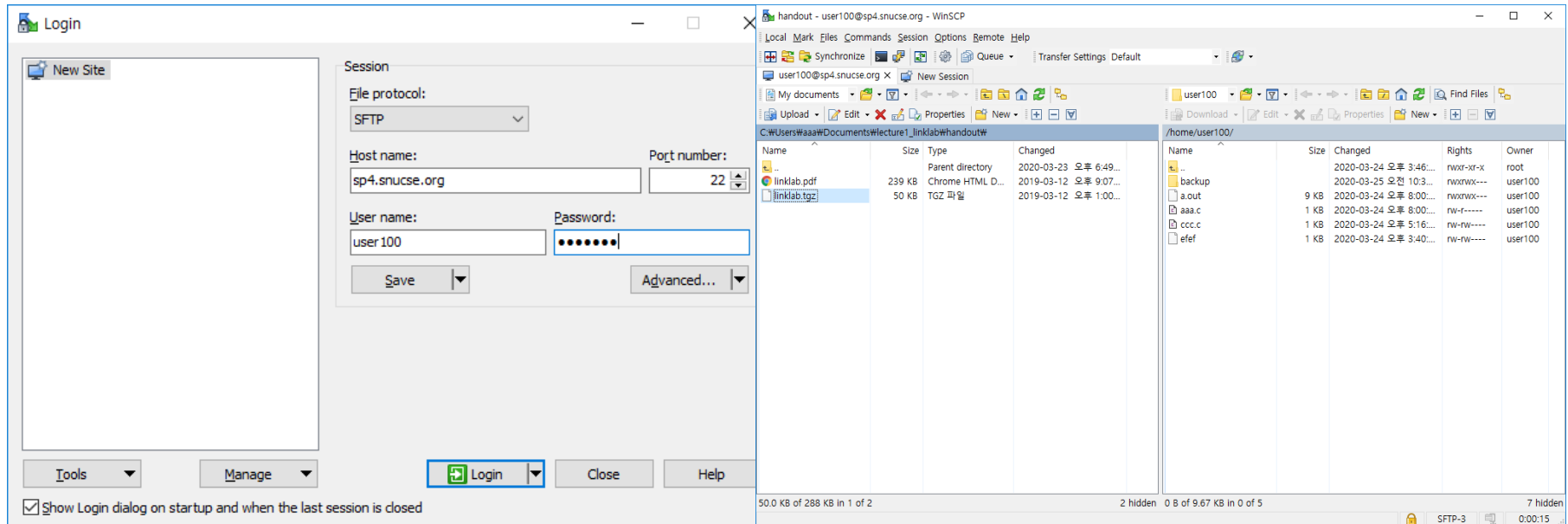
- http://www.hypexr.org/linux_scp_help.php

SCP Client – Windows



- <https://winscp.net/eng/downloads.php#additional>
- Portable executables – Decompression

SCP Client – Windows



- Choose file protocol to SFTP
- Enter host name, user name, password.
- You can use other SFTP Clients. (FileZilla, etc)

Let's try

- 1. Connect to server on your computer
 - # ssh user#@sp#.snucse.org
- 2. **(YOU MUST) Change password of your account(once)**
 - # passwd
- 3. Download assignment files from eTL
- 4. Trasfer your assignment files to server with SCP.
 - # scp linklab.tgz user?@sp?.snucse.org:/home/user?/
- 5. Decompress file
 - # tar xvf linklab.tgz
- 6. Test your assignments

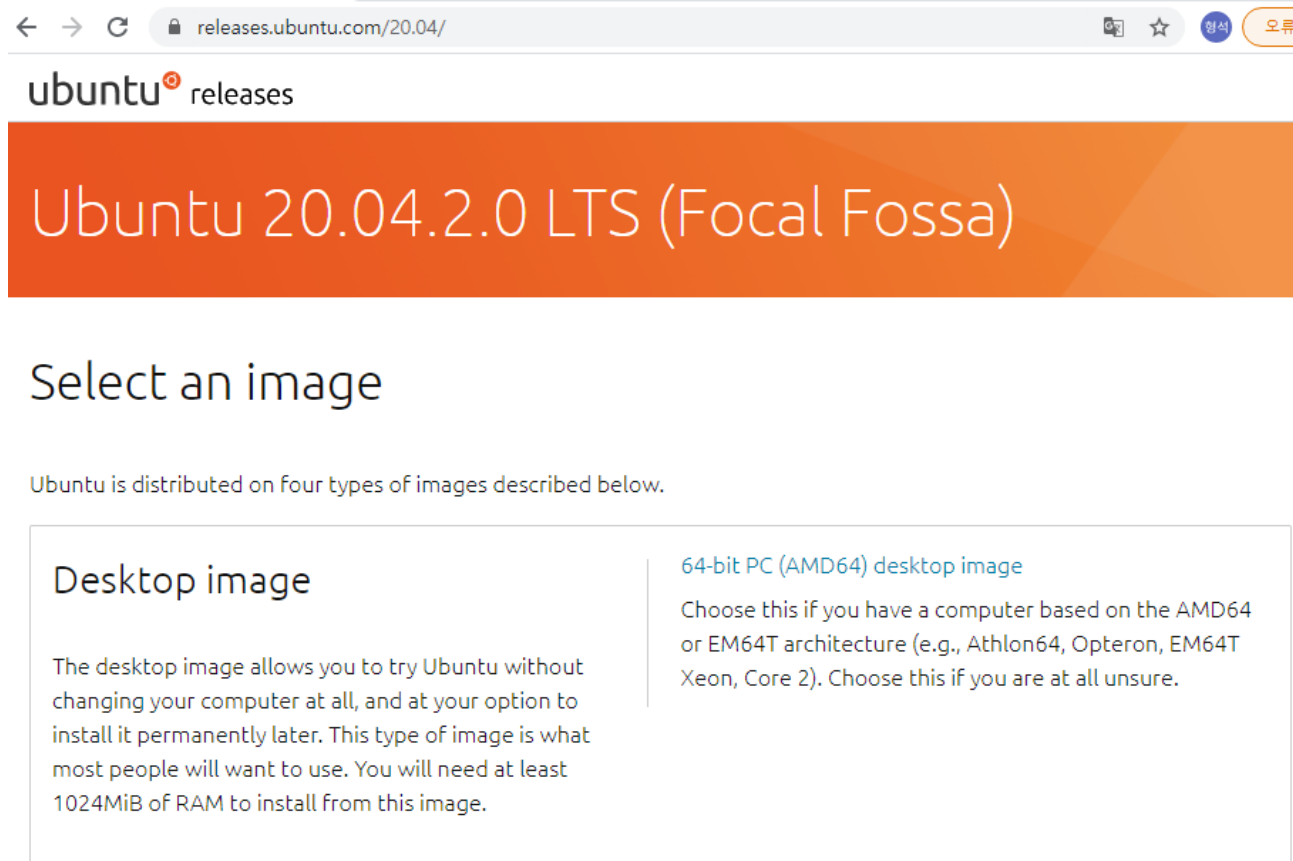
When you do your assignment...

1. Do your assignment on your PC first

- But different environment may cause errors
- Your submitted code will be evaluated on the LAB server
- So do your assignment on your PC, and test it on the server

2. YOU MUST CHANGE YOUR ACCOUNT'S PASSWORD EVEN IF YOU DON'T USE SERVER!

- Security issues may harm your classmates



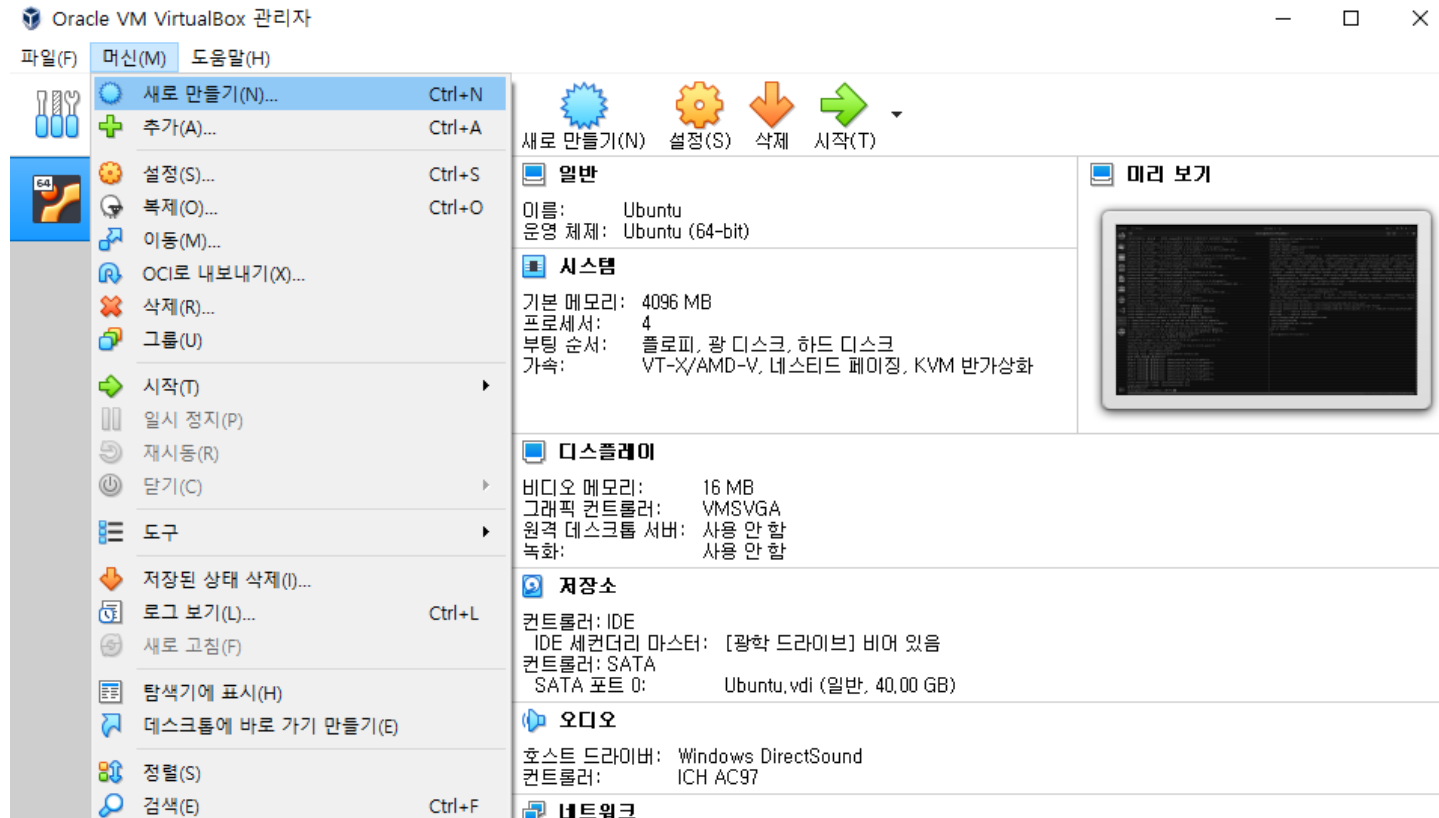
- Linux Kernel v5.4.0-66

VirtualBox 6.1

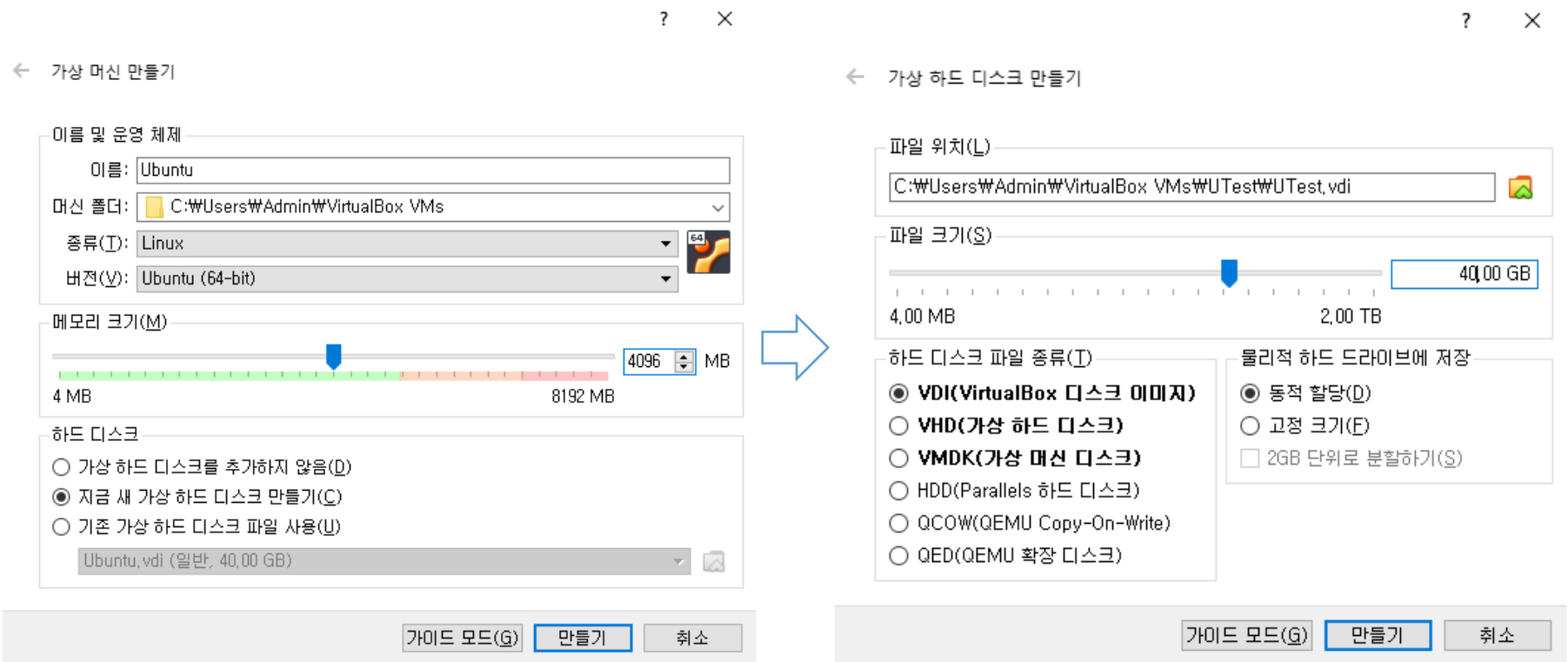


- <https://www.virtualbox.org/wiki/Downloads>
- Choose & install appropriate package for your laptop.

VB Configuration



VB Configuration

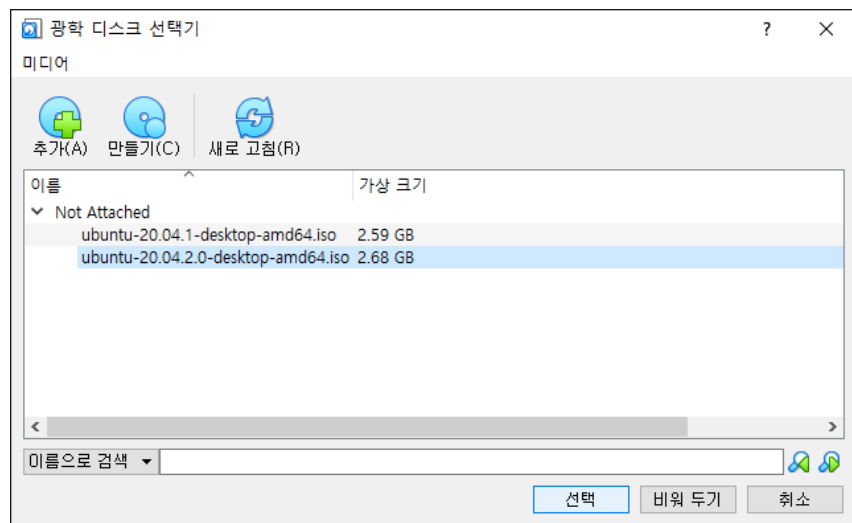
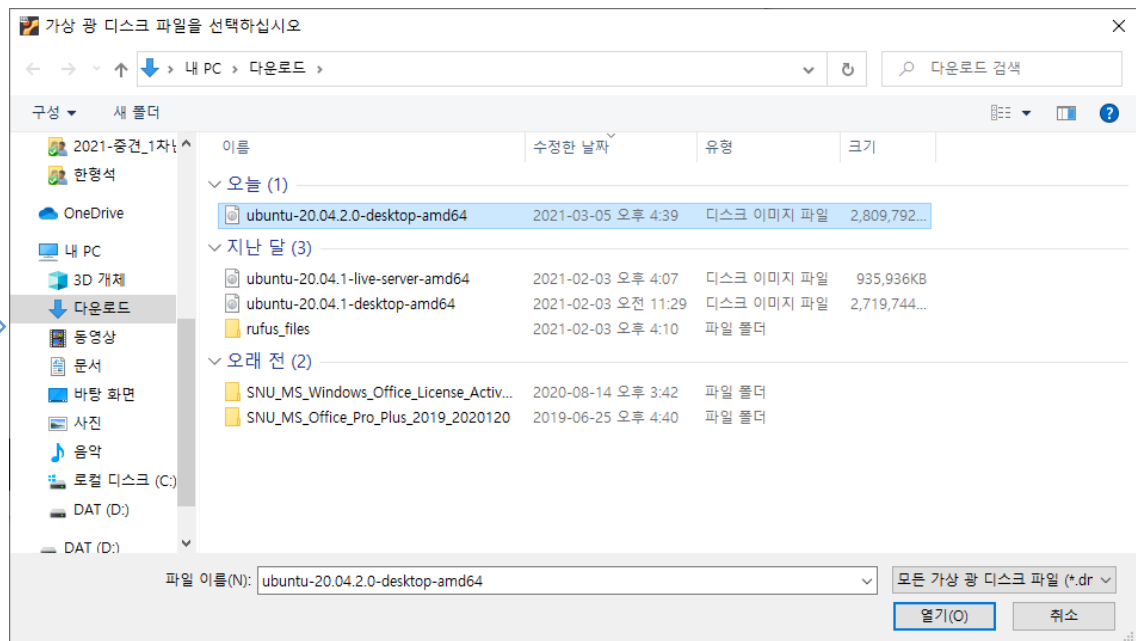
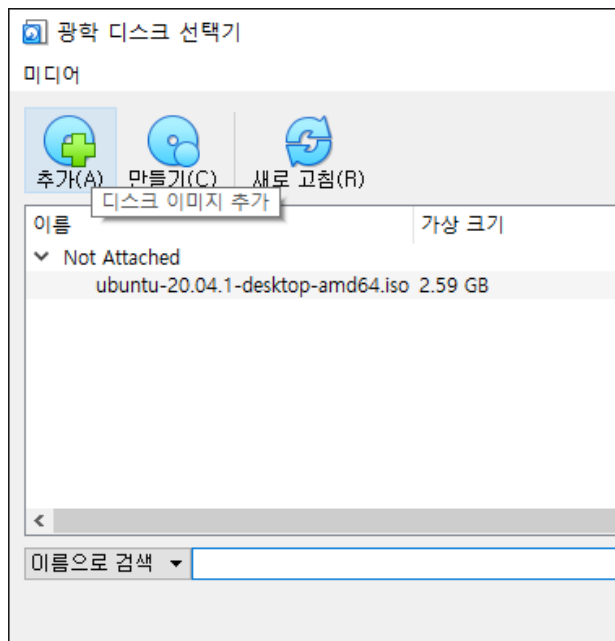


- Modify memory & file size appropriately.
- (RECOMMENDED) Storage: 40-50 GB

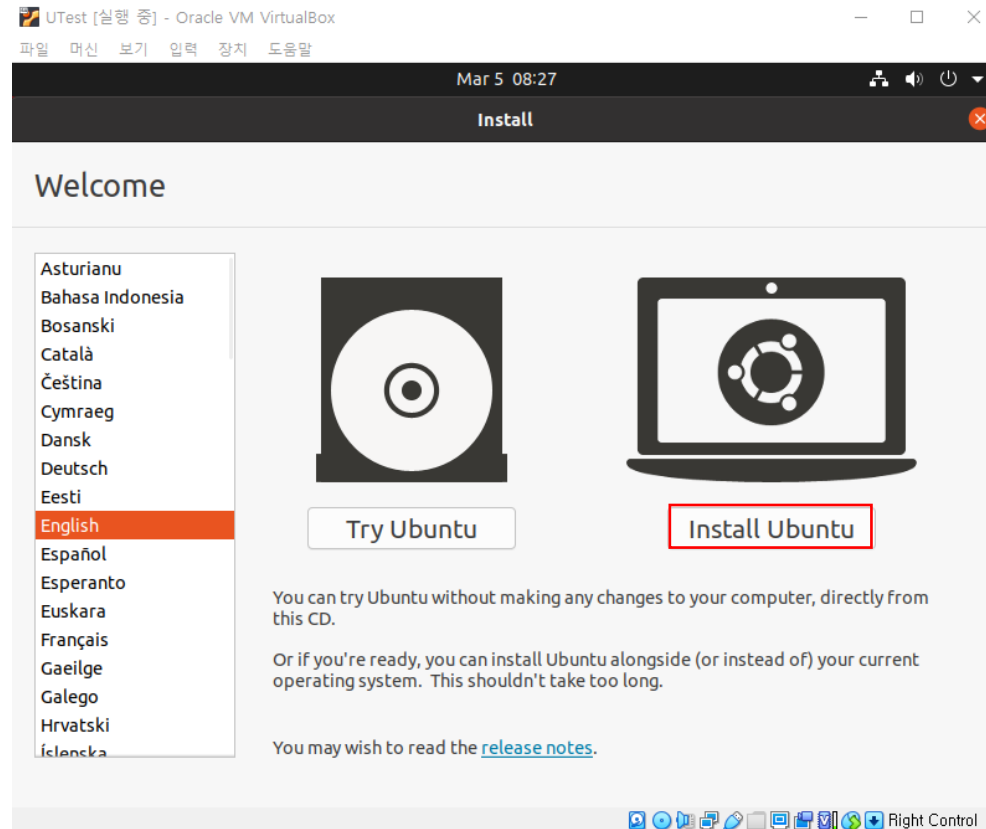
VB Configuration



VB Configuration



VB Configuration



- Install Ubuntu on your VM

VB Configuration

```
user@user-VirtualBox:/boot/grub$ sudo apt-get install linux-image-5.4.0-66-generic
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  linux-modules-5.4.0-66-generic
Suggested packages:
  fdutils linux-doc | linux-source-5.4.0 linux-tools
  linux-headers-5.4.0-66-generic
The following NEW packages will be installed:
  linux-image-5.4.0-66-generic linux-modules-5.4.0-66-generic
0 upgraded, 2 newly installed, 0 to remove and 24 not upgraded.
Need to get 23.4 MB of archives.
After this operation, 85.2 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://kr.archive.ubuntu.com/ubuntu focal-updates/main amd64 linux-modules-5.4.0-66-generic amd64 5.4.0-66.74 [14.5 MB]
Get:2 http://kr.archive.ubuntu.com/ubuntu focal-updates/main amd64 linux-image-5.4.0-66-generic amd64 5.4.0-66.74 [8,891 kB]
Fetched 23.4 MB in 1min 31s (256 kB/s)
Selecting previously unselected package linux-modules-5.4.0-66-generic.
(Reading database ... 182625 files and directories currently installed.)
Preparing to unpack .../linux-modules-5.4.0-66-generic_5.4.0-66.74_amd64.deb ...
Unpacking linux-modules-5.4.0-66-generic (5.4.0-66.74) ...
Selecting previously unselected package linux-image-5.4.0-66-generic.
Preparing to unpack .../linux-image-5.4.0-66-generic_5.4.0-66.74_amd64.deb ...
Unpacking linux-image-5.4.0-66-generic (5.4.0-66.74) ...
```

- After installation, install older linux kernel with command below:
\$ sudo apt-get install linux-image-5.4.0-66-generic

VB Configuration

```
user@user-VirtualBox:~$ sudo grub-mkconfig | grep -E 'submenu |menuentry '
[sudo] password for user:
Sourcing file `/etc/default/grub'
Sourcing file `/etc/default/grub.d/init-select.cfg'
Generating grub configuration file ...
Found linux image: /boot/vmlinuz-5.8.0-44-generic
Found initrd image: /boot/initrd.img-5.8.0-44-generic
menuentry 'Ubuntu' --class ubuntu --class gnu-linux --class gnu --class os $menuentry_id_option 'gnulinux-simple-1528d8df-c5a1-4add-9d58-4795ea95be98' {
  submenu 'Advanced options for Ubuntu' $menuentry_id_option 'gnulinux-advanced-1528d8df-c5a1-4add-9d58-4795ea95be98' {
    menuentry 'Ubuntu, with Linux 5.8.0-44-generic' --class ubuntu --class gnu-linux --class gnu --class os $menuentry_id_option 'gnulinux-5.8.0-44-generic-advanced-1528d8df-c5a1-4add-9d58-4795ea95be98' {
      menuentry 'Ubuntu, with Linux 5.8.0-44-generic (recovery mode)' --class ubuntu --class gnu-linux --class gnu --class os $menuentry_id_option 'gnulinux-5.8.0-44-generic-recovery-1528d8df-c5a1-4add-9d58-4795ea95be98' {
        Found linux image: /boot/vmlinuz-5.8.0-43-generic
        Found initrd image: /boot/initrd.img-5.8.0-43-generic
        menuentry 'Ubuntu, with Linux 5.8.0-43-generic' --class ubuntu --class gnu-linux --class gnu --class os $menuentry_id_option 'gnulinux-5.8.0-43-generic-advanced-1528d8df-c5a1-4add-9d58-4795ea95be98' {
          menuentry 'Ubuntu, with Linux 5.8.0-43-generic (recovery mode)' --class ubuntu --class gnu-linux --class gnu --class os $menuentry_id_option 'gnulinux-5.8.0-43-generic-recovery-1528d8df-c5a1-4add-9d58-4795ea95be98' {
            Found linux image: /boot/vmlinuz-5.4.0-66-generic
            Found initrd image: /boot/initrd.img-5.4.0-66-generic
            menuentry 'Ubuntu, with Linux 5.4.0-66-generic' --class ubuntu --class gnu-linux --class gnu --class os $menuentry_id_option 'gnulinux-5.4.0-66-generic'
```

- Check your linux kernel installed correctly

```
$ sudo grub-mkconfig | grep -E 'submenu |menuentry '
```

VB Configuration

```
GNU nano 4.8 /etc/default/grub
# If you change this file, run 'update-grub' afterwards to update
# /boot/grub/grub.cfg.
# For full documentation of the options in this file, see:
#   info -f grub -n 'Simple configuration'

GRUB_DEFAULT="Advanced options for Ubuntu>Ubuntu, with Linux 5.4.0-66-generic"
GRUB_TIMEOUT_STYLE=menu
GRUB_TIMEOUT=5
GRUB_DISTRIBUTOR=`lsb_release -i -s 2> /dev/null || echo Debian`
GRUB_CMDLINE_LINUX_DEFAULT="quiet splash"
GRUB_CMDLINE_LINUX=""
```

- Edit GRUB configuration:

```
$ sudo vim /etc/default/grub
```

```
GRUB_DEFAULT="Advanced options for Ubuntu>Ubuntu, with Linux 5.4.0-66-generic"
```

```
(or GRUB_DEFAULT="1>[menuentry index]")
```

```
GRUB_TIMEOUT_STYLE=menu
```

```
GRUB_TIMEOUT=5
```

- Save and update GRUB.

```
$ sudo update-grub
```

- reboot your VM.

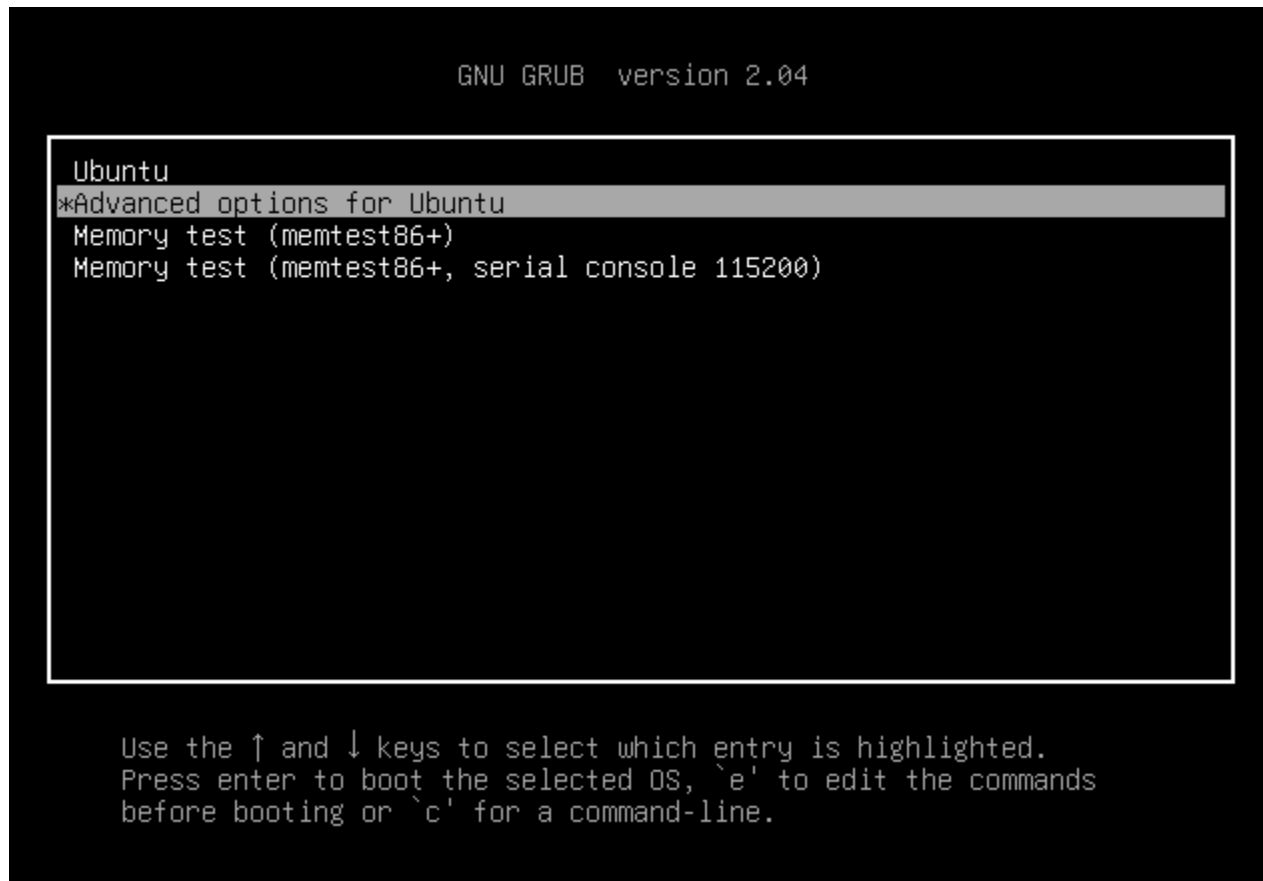
```
$ sudo reboot
```

VB Configuration

```
user@user-VirtualBox:~$ uname -r  
5.4.0-66-generic  
user@user-VirtualBox:~$
```

- Boot your machine and check kernel version
\$ uname -r

VB Configuration



- You can choose which linux kernel to boot in GRUB menu.
- If you have any problem with the kernel, choose other kernel in "Advanced options for Ubuntu"

Next class

- Assignment #1 description
- If you have any questions?
 - Questions on eTL Q&A board are more than welcome