운영체제 실습

[Assignment #1]

Class : 목 3

Professor : 최상호

Student ID : 2020202031

Name : 김재현

Introduction

리눅스를 설치하고, 우분투 내에서 5.4.282 Kernel 을 다운로드 하고 uname -r 명령어를 통해 버전을 확인합니다.

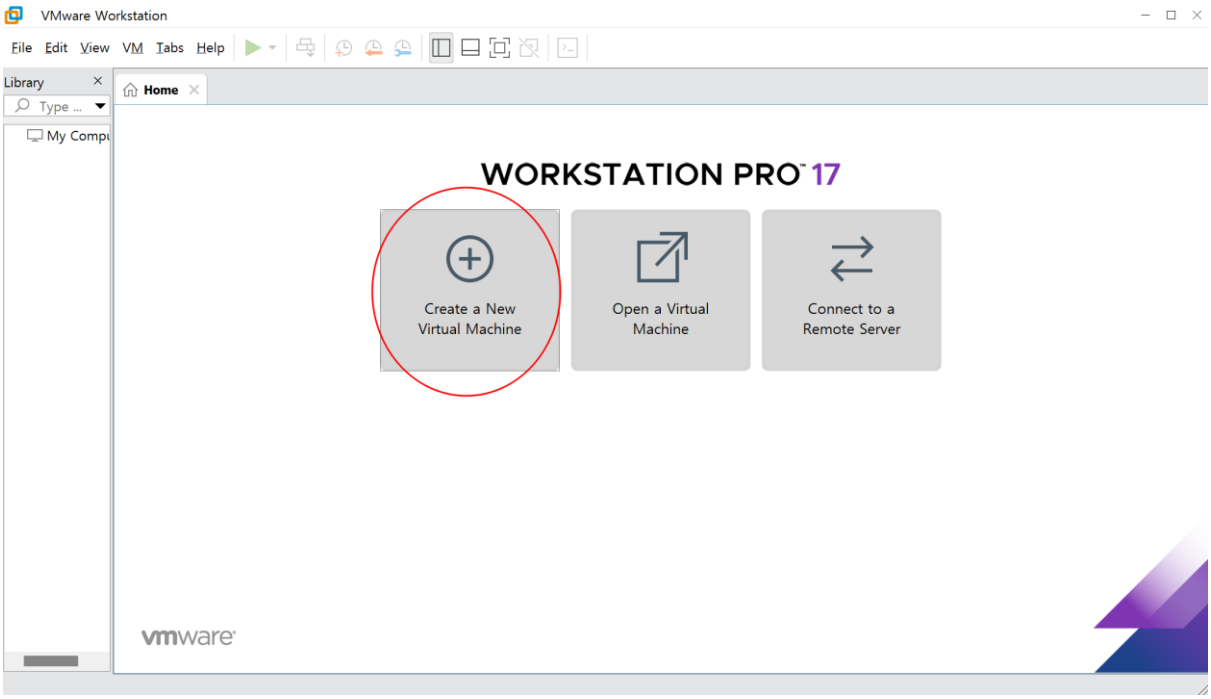
agpgart interface 가 실행되는 지점에서 Linux Kernel Message 출력하도록, Ctags, Cscope 등 programming tools 를 활용하여 Linux 해당 함수 및 파일을 찾아 수정합니다.

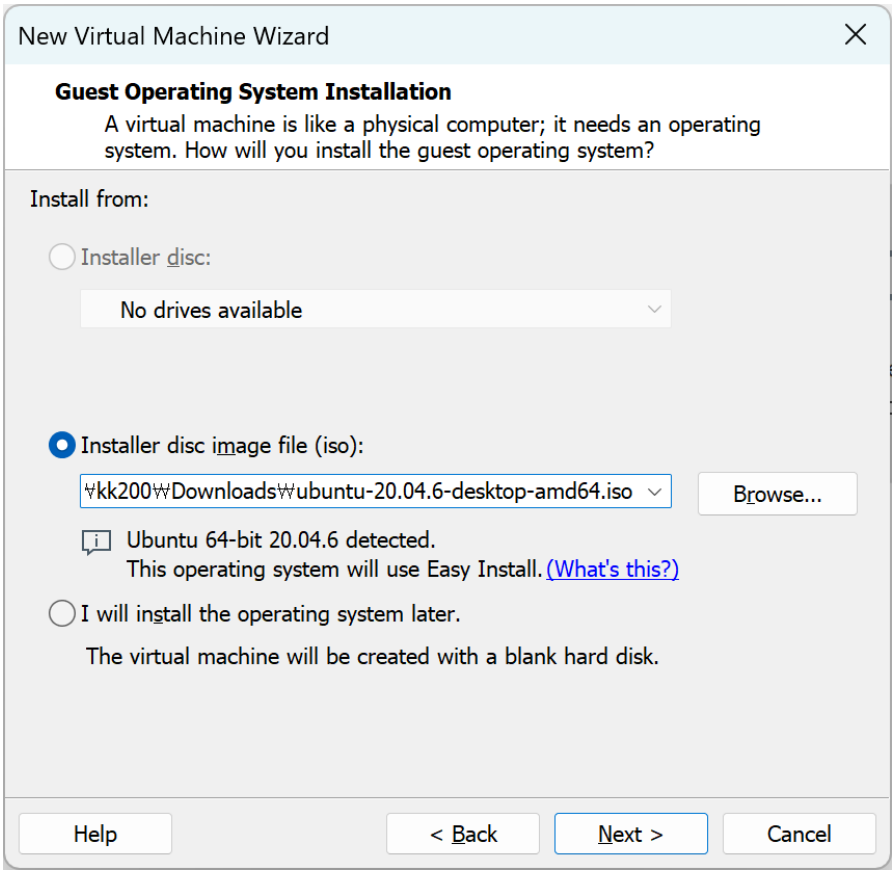
결과화면

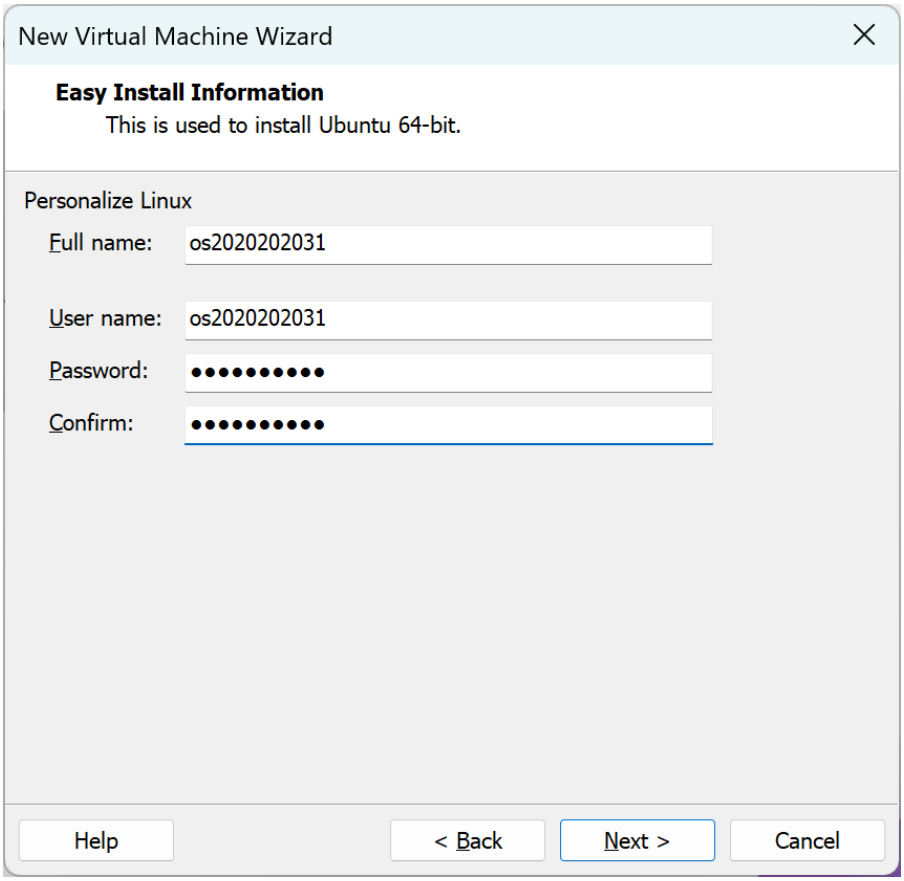
Assignment 1-1

1. Vmware 를 설치합니다.

2. Ubuntu 를 설치합니다.




New Virtual Machine Wizard
Guest Operating System Installation
A virtual machine is like a physical computer; it needs an operating system. How will you install the guest operating system?
Install from:
Installer disc:
No drives available
Installer disc image file (iso):
₩kk200₩Downloads₩ubuntu-20.04.6-desktop-amd64.iso
Browse...
Ubuntu 64-bit 20.04.6 detected.
This operating system will use Easy Install. (What's this?)
I will install the operating system later.
The virtual machine will be created with a blank hard disk.
Help
< Back
Next >
Cancel


New Virtual Machine Wizard
Easy Install Information
This is used to install Ubuntu 64-bit.
Personalize Linux
Full name:
os2020202031
User name:
os2020202031
Password:
Confirm:
Help
< Back
Next >
Cancel

New Virtual Machine Wizard

Specify Disk Capacity

How large do you want this disk to be?

The virtual machine's hard disk is stored as one or more files on the host computer's physical disk. These file(s) start small and become larger as you add applications, files, and data to your virtual machine.

Maximum disk size (GB): 40

Recommended size for Ubuntu 64-bit: 20 GB

- ○ Store virtual disk as a single file
- ◉ Split virtual disk into multiple files

Splitting the disk makes it easier to move the virtual machine to another computer but may reduce performance with very large disks.

Help | < Back | Next > | Cancel

Hardware

Device	Summary
Memory	4 GB
Processors	2
New CD/DVD (SATA)	Using file C:₩Users₩kk200₩D...
Network Adapter	NAT
USB Controller	Present
Sound Card	Auto detect
Display	Auto detect

Add... Remove

Memory

Specify the amount of memory allocated to this virtual machine. The memory size must be a multiple of 4 MB.

Memory for this virtual machine: 4096 MB

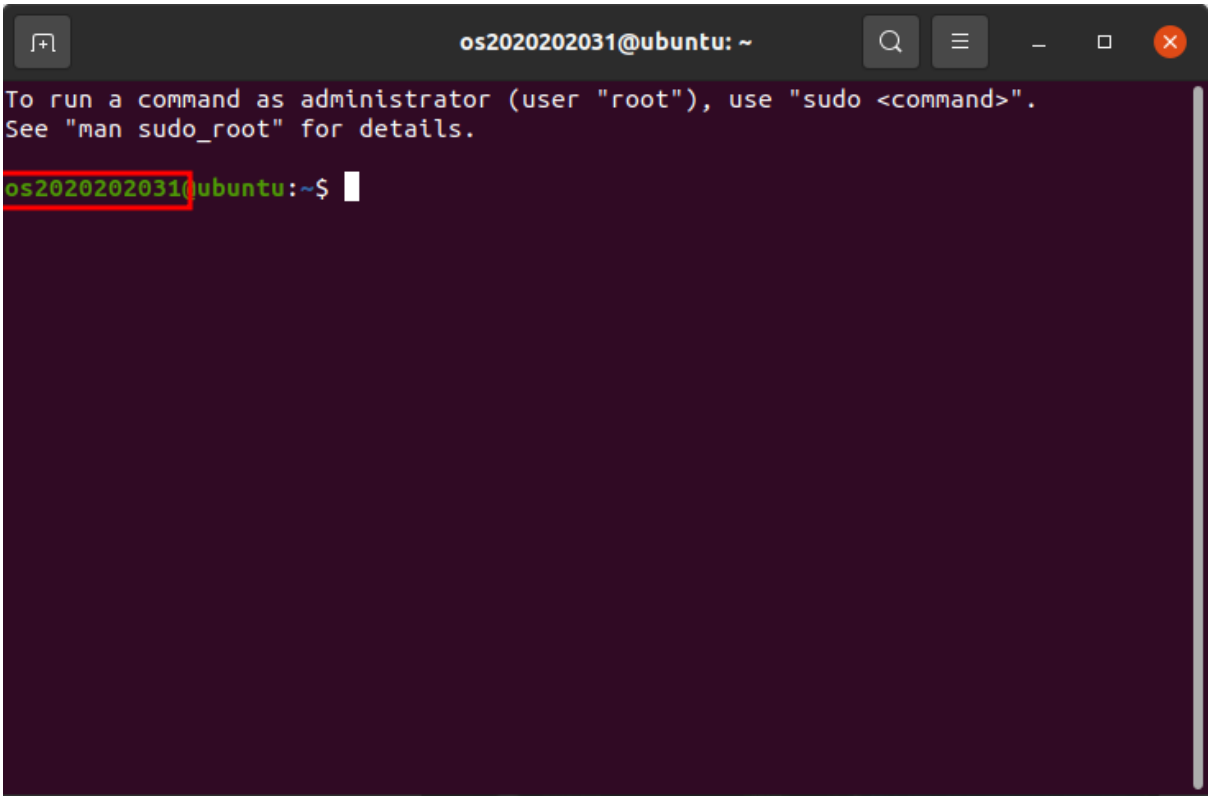
128 GB
64 GB
32 GB
16 GB
8 GB
4 GB
2 GB
1 GB
512 MB
256 MB
128 MB
64 MB
32 MB
16 MB
8 MB
4 MB

Maximum recommended memory
(Memory swapping may occur beyond this size.)
13.1 GB

Recommended memory
4 GB

Guest OS recommended minimum
2 GB

Close Help



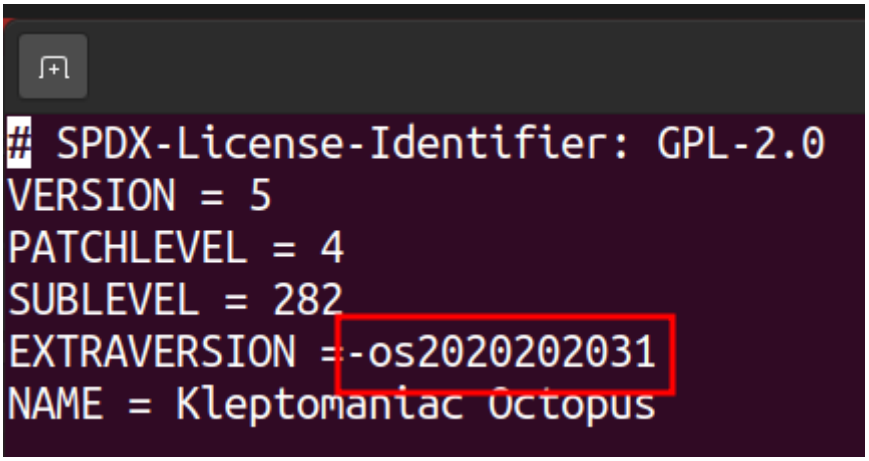
User ID 를 os 학번으로 설정했습니다.

Assignment 1-2

1. sudo apt update 입력

```
os2020202031@ubuntu:~$ sudo apt update
[sudo] password for os2020202031:
Hit:1 http://security.ubuntu.com/ubuntu focal-security InRelease
Hit:2 http://us.archive.ubuntu.com/ubuntu focal InRelease
Hit:3 http://us.archive.ubuntu.com/ubuntu focal-updates InRelease
Hit:4 http://us.archive.ubuntu.com/ubuntu focal-backports InRelease
Reading package lists... Done
Building dependency tree
Reading state information... Done
288 packages can be upgraded. Run 'apt list --upgradable' to see them.
```

2. vi Makefile 입력 후 EXTRAVERSION 에 os 학번 입력

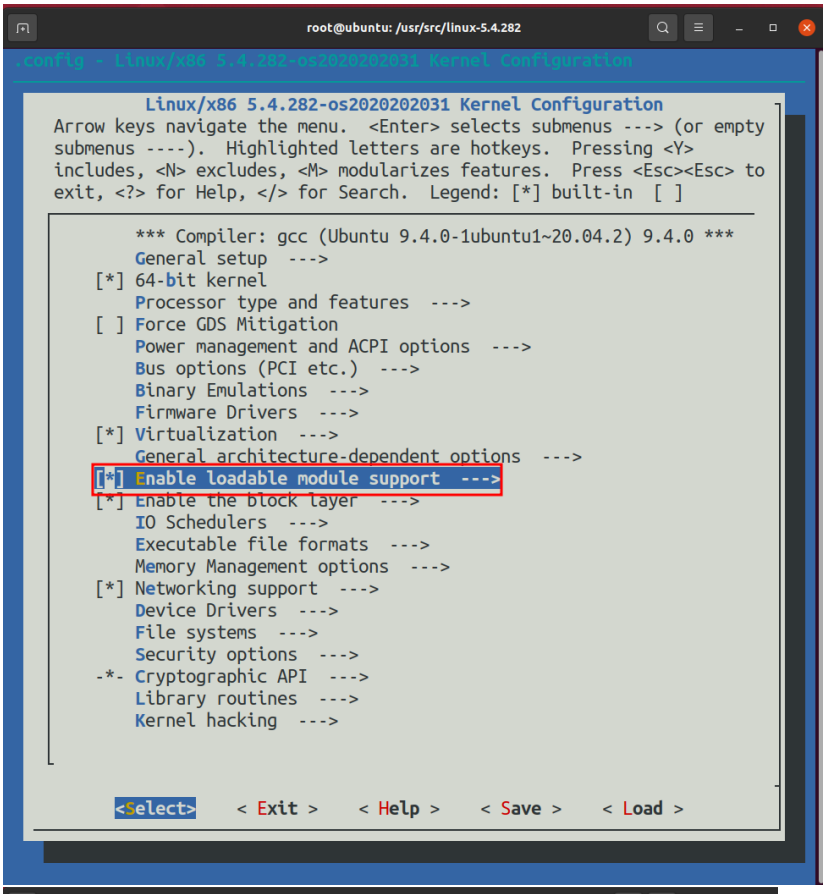


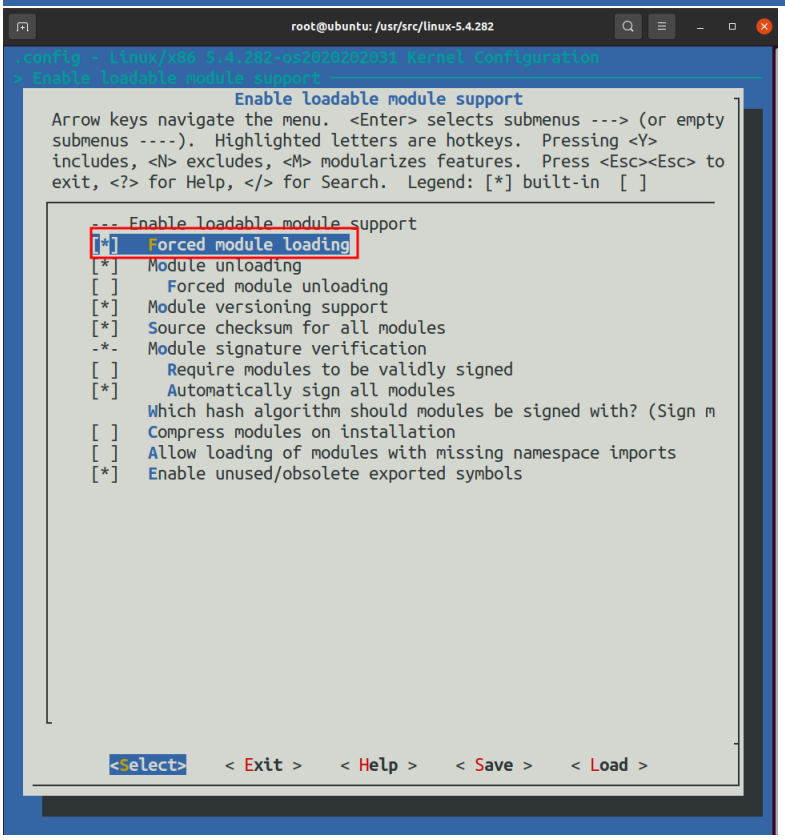
3. sudo apt install build-essential libncurses5-dev bison flex libssl-dev libelf-dev dwarves zstd 입력

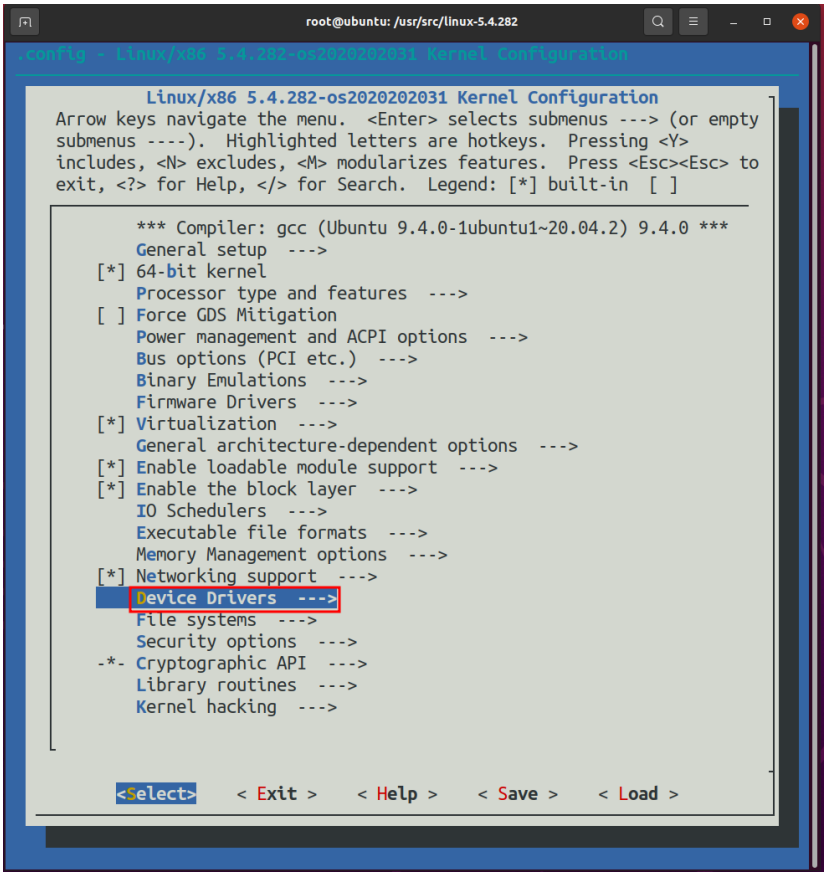
```
root@ubuntu: /usr/src/linux-5.4.282
Setting up binutils-common:amd64 (2.34-6ubuntu1.9) ...
Setting up linux-libc-dev:amd64 (5.4.0-195.215) ...
Setting up libctf-nobfd0:amd64 (2.34-6ubuntu1.9) ...
Setting up libfakeroot:amd64 (1.24-1) ...
Setting up libc6-dbg:amd64 (2.31-0ubuntu9.16) ...
Setting up fakeroot (1.24-1) ...
update-alternatives: using /usr/bin/fakeroot-sysv to provide /usr/bin/fakeroot (fakeroot) in auto mode
Setting up libasan5:amd64 (9.4.0-1ubuntu1~20.04.2) ...
Setting up libsigsegv2:amd64 (2.12-2) ...
Setting up libquadmath0:amd64 (10.5.0-1ubuntu1~20.04) ...
Setting up libssl-dev:amd64 (1.1.1f-1ubuntu2.23) ...
Setting up libfl2:amd64 (2.6.4-6.2) ...
Setting up dwarves (1.21-0ubuntu1~20.04.1) ...
Setting up libubsan1:amd64 (10.5.0-1ubuntu1~20.04) ...
Setting up libcrypt-dev:amd64 (1:4.4.10-10ubuntu4) ...
Setting up libbinutils:amd64 (2.34-6ubuntu1.9) ...
Setting up libc-dev-bin (2.31-0ubuntu9.16) ...
Setting up libalgorithm-diff-xs-perl (0.04-6) ...
Setting up zstd (1.4.4+dfsg-3ubuntu0.1) ...
Setting up liblsan0:amd64 (10.5.0-1ubuntu1~20.04) ...
Setting up libitm1:amd64 (10.5.0-1ubuntu1~20.04) ...
Setting up libalgorithm-merge-perl (0.08-3) ...
Setting up libtsan0:amd64 (10.5.0-1ubuntu1~20.04) ...
Setting up libctf0:amd64 (2.34-6ubuntu1.9) ...
Setting up m4 (1.4.18-4) ...
Setting up libgcc-9-dev:amd64 (9.4.0-1ubuntu1~20.04.2) ...
Setting up bison (2:3.5.1+dfsg-1) ...
update-alternatives: using /usr/bin/bison.yacc to provide /usr/bin/yacc (yacc) in auto mode
Setting up libc6-dev:amd64 (2.31-0ubuntu9.16) ...
Setting up binutils-x86-64-linux-gnu (2.34-6ubuntu1.9) ...
Setting up flex (2.6.4-6.2) ...
Setting up libncurses-dev:amd64 (6.2-0ubuntu2.1) ...
```

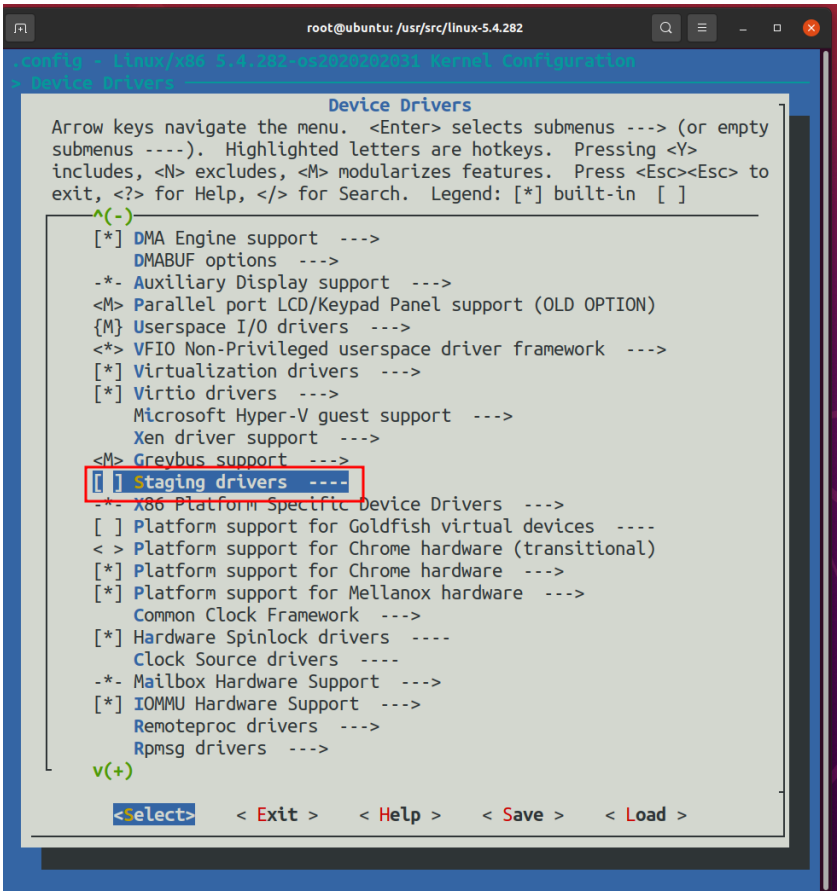
4. sudo make menuconfig 입력

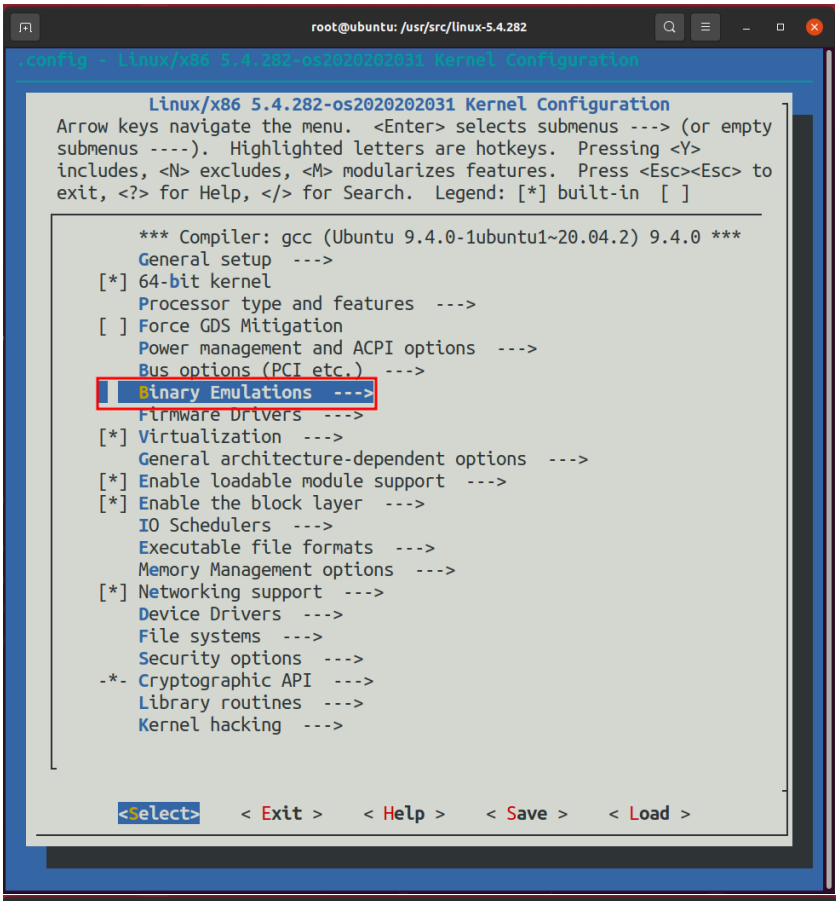
```
root@ubuntu: /usr/src/linux-5.4.282
Setting up libelf-dev:amd64 (0.176-1.1ubuntu0.1) ...
Setting up g++-9 (9.4.0-1ubuntu1~20.04.2) ...
Setting up g++ (4:9.3.0-1ubuntu2) ...
update-alternatives: using /usr/bin/g++ to provide /usr/bin/c++ (c++) in auto mode
Setting up build-essential (12.8ubuntu1.1) ...
Processing triggers for libc-bin (2.31-0ubuntu9.9) ...
Processing triggers for man-db (2.9.1-1) ...
Processing triggers for install-info (6.7.0.dfsg.2-5) ...
root@ubuntu:/usr/src/linux-5.4.282# sudo make menuconfig
  HOSTCC  scripts/basic/fixdep
  UPD     scripts/kconfig/mconf-cfg
  HOSTCC  scripts/kconfig/mconf.o
  HOSTCC  scripts/kconfig/lxdialog/checklist.o
  HOSTCC  scripts/kconfig/lxdialog/inputbox.o
  HOSTCC  scripts/kconfig/lxdialog/menubox.o
  HOSTCC  scripts/kconfig/lxdialog/textbox.o
  HOSTCC  scripts/kconfig/lxdialog/util.o
  HOSTCC  scripts/kconfig/lxdialog/yesno.o
  HOSTCC  scripts/kconfig/confdata.o
  HOSTCC  scripts/kconfig/expr.o
  LEX     scripts/kconfig/lexer.lex.c
  YACC    scripts/kconfig/parser.tab.[ch]
  HOSTCC  scripts/kconfig/lexer.lex.o
  HOSTCC  scripts/kconfig/parser.tab.o
  HOSTCC  scripts/kconfig/preprocess.o
  HOSTCC  scripts/kconfig/symbol.o
  HOSTLD  scripts/kconfig/mconf
scripts/kconfig/mconf  Kconfig
#
# using defaults found in /boot/config-5.15.0-119-generic
#
/boot/config-5.15.0-119-generic:3290:warning: symbol value 'm' invalid for CHELSIO_IPSEC_INLINE
/boot/config-5.15.0-119-generic:3968:warning: symbol value 'm' invalid for RTW88_8822BE
/boot/config-5.15.0-119-generic:3969:warning: symbol value 'm' invalid for RTW88_8822CE
/boot/config-5.15.0-119-generic:4470:warning: symbol value 'm' invalid for SERIAL_LANTIQ
/boot/config-5.15.0-119-generic:5325:warning: symbol value 'm' invalid for PROC_THERMAL_MMIO_RAPL
/boot/config-5.15.0-119-generic:5557:warning: symbol value 'm' invalid for MFD_ARIZONA
/boot/config-5.15.0-119-generic:6812:warning: symbol value 'm' invalid for FB_SIMPLE
/boot/config-5.15.0-119-generic:8873:warning: symbol value 'm' invalid for ASHMEM
/boot/config-5.15.0-119-generic:9958:warning: symbol value 'm' invalid for ANDROID_BINDER_IPC
/boot/config-5.15.0-119-generic:9959:warning: symbol value 'm' invalid for ANDROID_BINDERFS


*** End of the configuration.
*** Execute 'make' to start the build or try 'make help'.
```

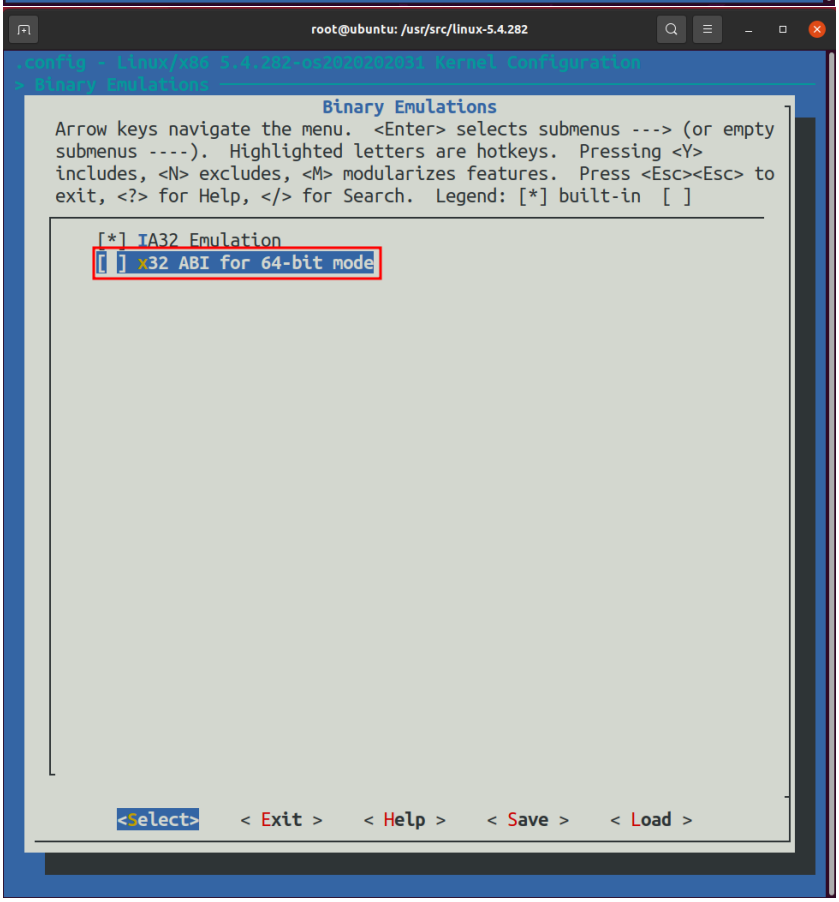

root@ubuntu: /usr/src/linux-5.4.282
.config - Linux/x86 5.4.282-os2020202031 Kernel Configuration
Linux/x86 5.4.282-os2020202031 Kernel Configuration
Arrow keys navigate the menu. <Enter> selects submenus ---> (or empty submenus ----). Highlighted letters are hotkeys. Pressing <Y> includes, <N> excludes, <M> modularizes features. Press <Esc><Esc> to exit, <?> for Help, </> for Search. Legend: [*] built-in [ ]
*** Compiler: gcc (Ubuntu 9.4.0-1ubuntu1~20.04.2) 9.4.0 ***
General setup --->
[*] 64-bit kernel
Processor type and features --->
[ ] Force GDS Mitigation
Power management and ACPI options --->
Bus options (PCI etc.) --->
Binary Emulations --->
Firmware Drivers --->
[*] Virtualization --->
General architecture-dependent options --->
[*] Enable loadable module support --->
[*] Enable the block layer --->
IO Schedulers --->
Executable file formats --->
Memory Management options --->
[*] Networking support --->
Device Drivers --->
File systems --->
Security options --->
-*- Cryptographic API --->
Library routines --->
Kernel hacking --->
<Select> < Exit > < Help > < Save > < Load >

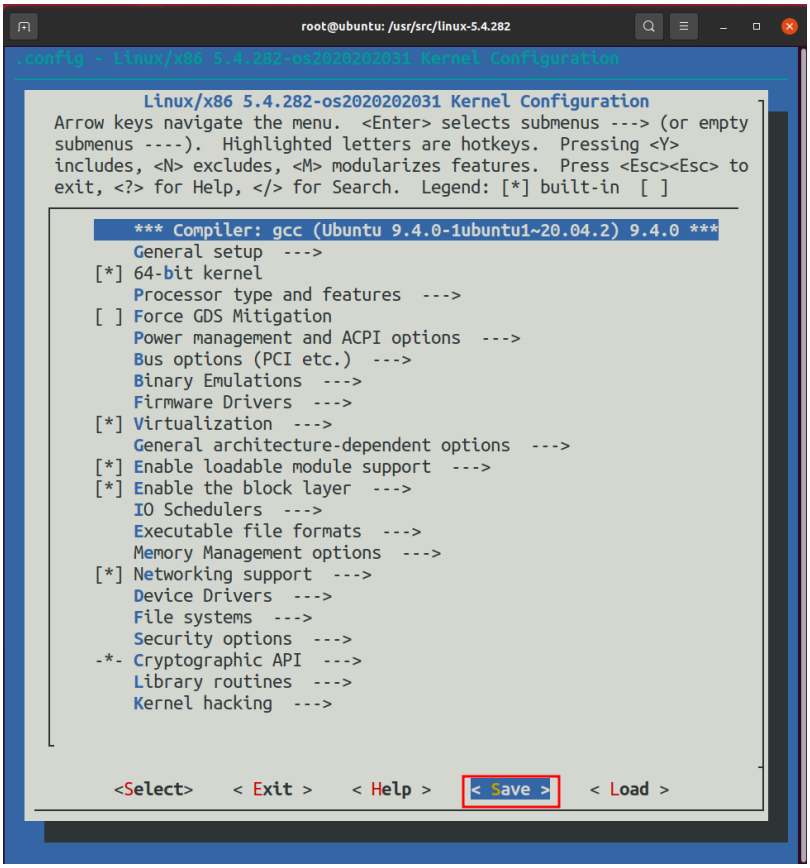

root@ubuntu: /usr/src/linux-5.4.282
.config - Linux/x86 5.4.282-os2020202031 Kernel Configuration
> Enable loadable module support
Enable loadable module support
Arrow keys navigate the menu. <Enter> selects submenus ---> (or empty submenus ----). Highlighted letters are hotkeys. Pressing <Y> includes, <N> excludes, <M> modularizes features. Press <Esc><Esc> to exit, <?> for Help, </> for Search. Legend: [*] built-in [ ]
--- Enable loadable module support
[*] Forced module loading
[*] Module unloading
[ ] Forced module unloading
[*] Module versioning support
[*] Source checksum for all modules
-*- Module signature verification
[ ] Require modules to be validly signed
[*] Automatically sign all modules
Which hash algorithm should modules be signed with? (Sign m
[ ] Compress modules on installation
[ ] Allow loading of modules with missing namespace imports
[*] Enable unused/obsolete exported symbols
<Select> < Exit > < Help > < Save > < Load >

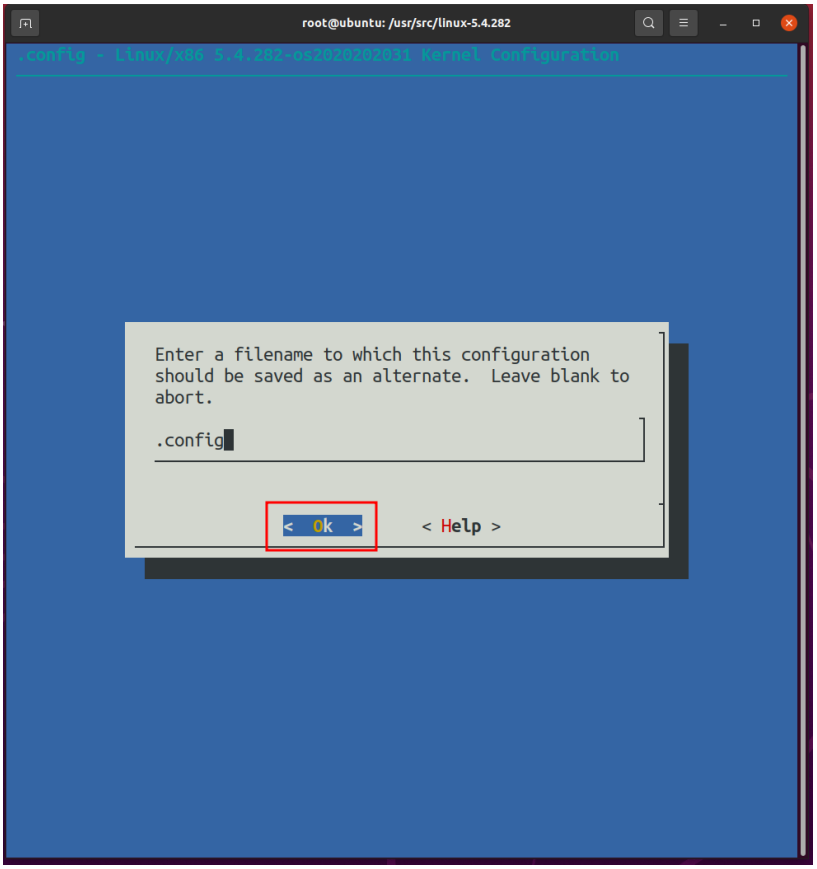

root@ubuntu: /usr/src/linux-5.4.282
.config - Linux/x86 5.4.282-os2020202031 Kernel Configuration
Linux/x86 5.4.282-os2020202031 Kernel Configuration
Arrow keys navigate the menu. <Enter> selects submenus ---> (or empty submenus ----). Highlighted letters are hotkeys. Pressing <Y> includes, <N> excludes, <M> modularizes features. Press <Esc><Esc> to exit, <?> for Help, </> for Search. Legend: [*] built-in [ ]
*** Compiler: gcc (Ubuntu 9.4.0-1ubuntu1~20.04.2) 9.4.0 ***
General setup --->
[*] 64-bit kernel
Processor type and features --->
[ ] Force GDS Mitigation
Power management and ACPI options --->
Bus options (PCI etc.) --->
Binary Emulations --->
Firmware Drivers --->
[*] Virtualization --->
General architecture-dependent options --->
[*] Enable loadable module support --->
[*] Enable the block layer --->
IO Schedulers --->
Executable file formats --->
Memory Management options --->
[*] Networking support --->
Device Drivers --->
File systems --->
Security options --->
-*- Cryptographic API --->
Library routines --->
Kernel hacking --->
<Select> < Exit > < Help > < Save > < Load >

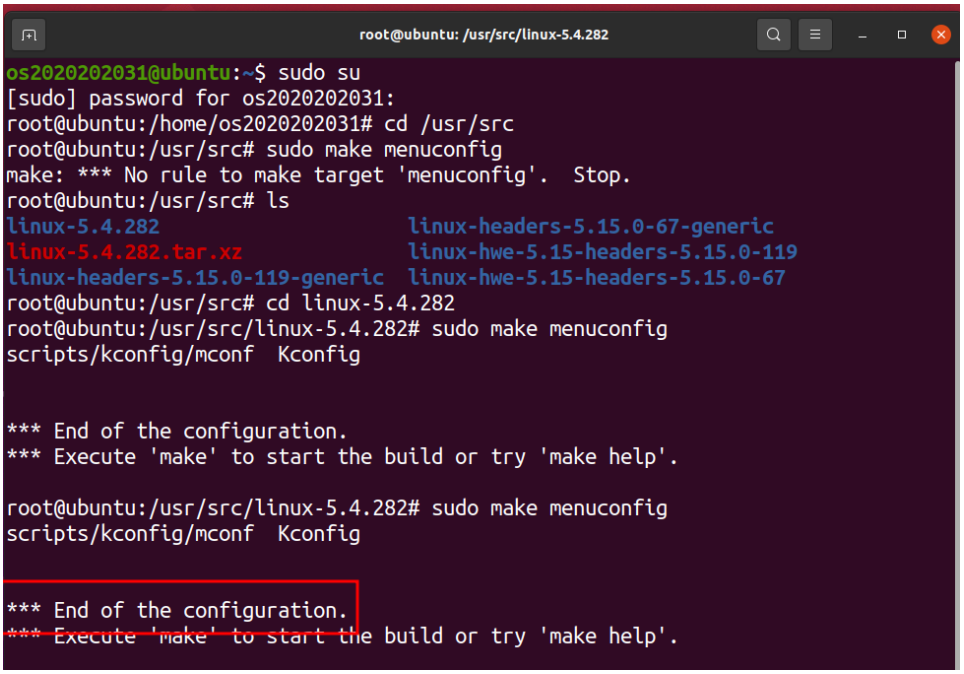

root@ubuntu: /usr/src/linux-5.4.282
.config - Linux/x86 5.4.282-os2020202031 Kernel Configuration
> Device Drivers
Device Drivers
Arrow keys navigate the menu. <Enter> selects submenus ---> (or empty submenus ----). Highlighted letters are hotkeys. Pressing <Y> includes, <N> excludes, <M> modularizes features. Press <Esc><Esc> to exit, <?> for Help, </> for Search. Legend: [*] built-in [ ]
^(-)
[*] DMA Engine support --->
DMABUF options --->
-*- Auxiliary Display support --->
<M> Parallel port LCD/Keypad Panel support (OLD OPTION)
{M} Userspace I/O drivers --->
<*> VFIO Non-Privileged userspace driver framework --->
[*] Virtualization drivers --->
[*] Virtio drivers --->
Microsoft Hyper-V guest support --->
Xen driver support --->
<M> Greybus support --->
[ ] Staging drivers ----
-*- X86 Platform Specific Device Drivers --->
[ ] Platform support for Goldfish virtual devices ----
< > Platform support for Chrome hardware (transitional)
[*] Platform support for Chrome hardware --->
[*] Platform support for Mellanox hardware --->
Common Clock Framework --->
[*] Hardware Spinlock drivers ----
Clock Source drivers ----
-*- Mailbox Hardware Support --->
[*] IOMMU Hardware Support --->
Remoteproc drivers --->
Rpmsg drivers --->
v(+)
<Select> < Exit > < Help > < Save > < Load >


root@ubuntu: /usr/src/linux-5.4.282
.config - Linux/x86 5.4.282-os2020202031 Kernel Configuration
Linux/x86 5.4.282-os2020202031 Kernel Configuration
Arrow keys navigate the menu. <Enter> selects submenus ---> (or empty submenus ----). Highlighted letters are hotkeys. Pressing <Y> includes, <N> excludes, <M> modularizes features. Press <Esc><Esc> to exit, <?> for Help, </> for Search. Legend: [*] built-in [ ]
*** Compiler: gcc (Ubuntu 9.4.0-1ubuntu1~20.04.2) 9.4.0 ***
General setup --->
[*] 64-bit kernel
Processor type and features --->
[ ] Force GDS Mitigation
Power management and ACPI options --->
Bus options (PCI etc.) --->
Binary Emulations --->
Firmware Drivers --->
[*] Virtualization --->
General architecture-dependent options --->
[*] Enable loadable module support --->
[*] Enable the block layer --->
IO Schedulers --->
Executable file formats --->
Memory Management options --->
[*] Networking support --->
Device Drivers --->
File systems --->
Security options --->
-*- Cryptographic API --->
Library routines --->
Kernel hacking --->
<Select> < Exit > < Help > < Save > < Load >


root@ubuntu: /usr/src/linux-5.4.282
.config - Linux/x86 5.4.282-os2020202031 Kernel Configuration
> Binary Emulations
Binary Emulations
Arrow keys navigate the menu. <Enter> selects submenus ---> (or empty submenus ----). Highlighted letters are hotkeys. Pressing <Y> includes, <N> excludes, <M> modularizes features. Press <Esc><Esc> to exit, <?> for Help, </> for Search. Legend: [*] built-in [ ]
[*] IA32 Emulation
[ ] x32 ABI for 64-bit mode
<Select> < Exit > < Help > < Save > < Load >

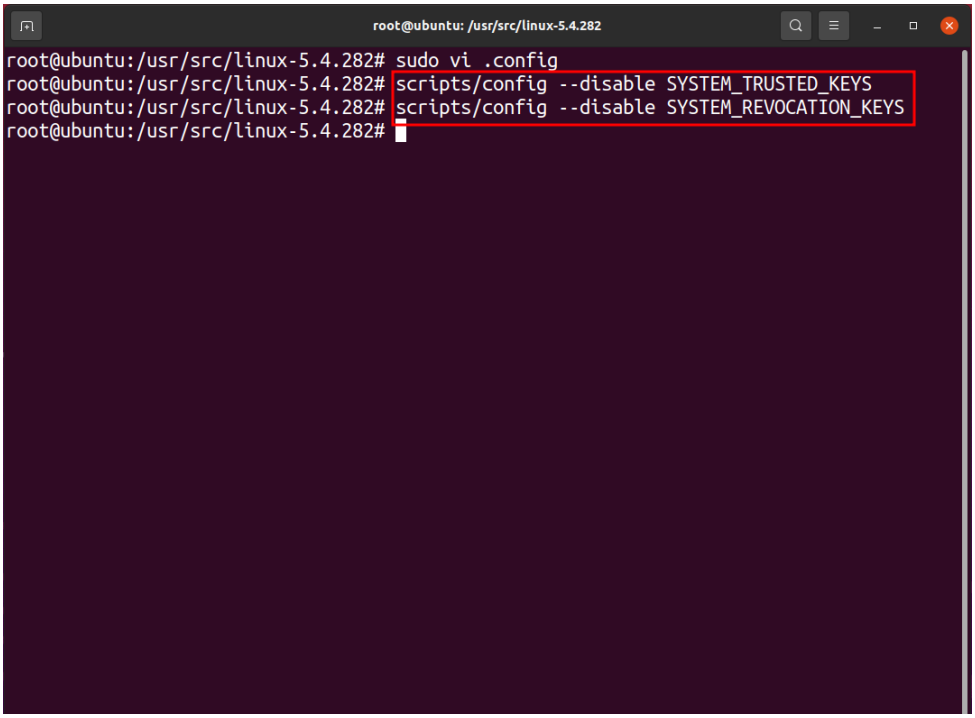

root@ubuntu: /usr/src/linux-5.4.282
.config - Linux/x86 5.4.282-os2020202031 Kernel Configuration
Linux/x86 5.4.282-os2020202031 Kernel Configuration
Arrow keys navigate the menu. <Enter> selects submenus ---> (or empty submenus ----). Highlighted letters are hotkeys. Pressing <Y> includes, <N> excludes, <M> modularizes features. Press <Esc><Esc> to exit, <?> for Help, </> for Search. Legend: [*] built-in [ ]
*** Compiler: gcc (Ubuntu 9.4.0-1ubuntu1~20.04.2) 9.4.0 ***
General setup --->
[*] 64-bit kernel
Processor type and features --->
[ ] Force GDS Mitigation
Power management and ACPI options --->
Bus options (PCI etc.) --->
Binary Emulations --->
Firmware Drivers --->
[*] Virtualization --->
General architecture-dependent options --->
[*] Enable loadable module support --->
[*] Enable the block layer --->
IO Schedulers --->
Executable file formats --->
Memory Management options --->
[*] Networking support --->
Device Drivers --->
File systems --->
Security options --->
-*- Cryptographic API --->
Library routines --->
Kernel hacking --->
<Select> < Exit > < Help > < Save > < Load >


root@ubuntu: /usr/src/linux-5.4.282
.config - Linux/x86 5.4.282-os2020202031 Kernel Configuration
Enter a filename to which this configuration should be saved as an alternate. Leave blank to abort.
.config
< Ok >
< Help >



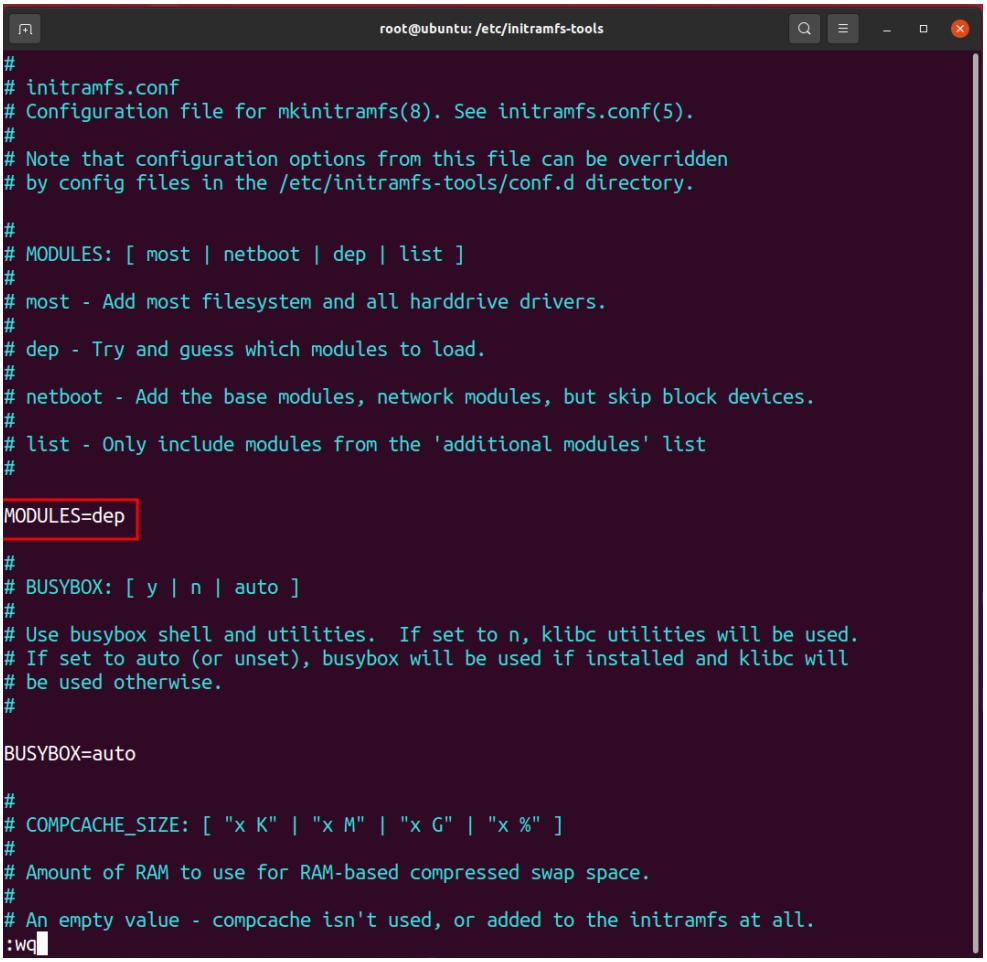
5. scripts/config --disable SYSTEM_TRUSTED_KEYS 입력

   scripts/config --disable SYSTEM_REVOCATION_KEYS 입력

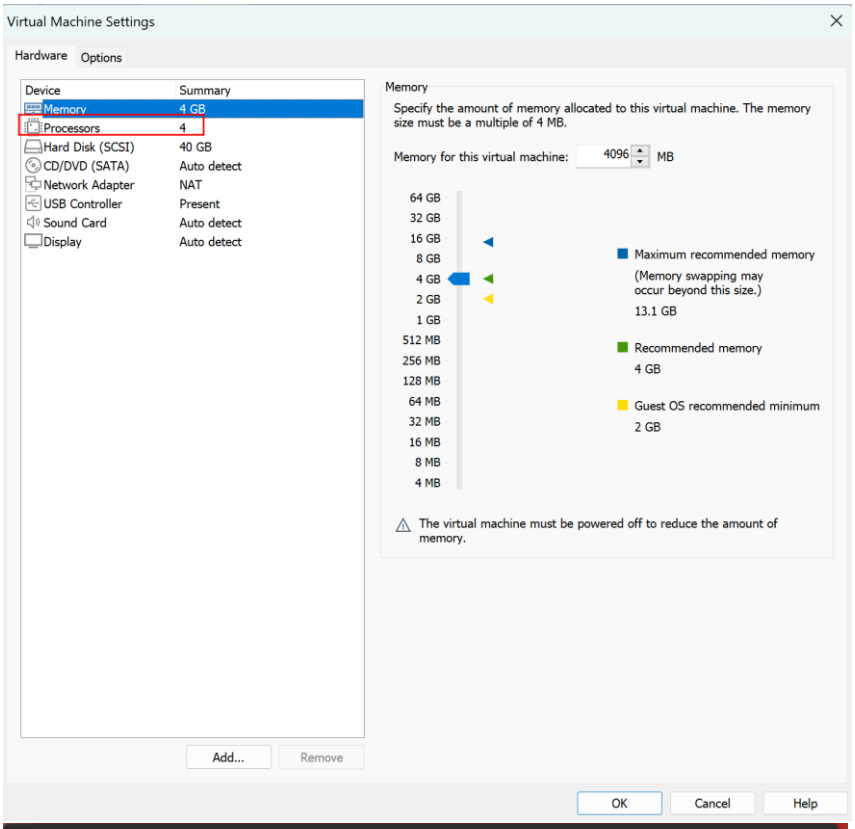


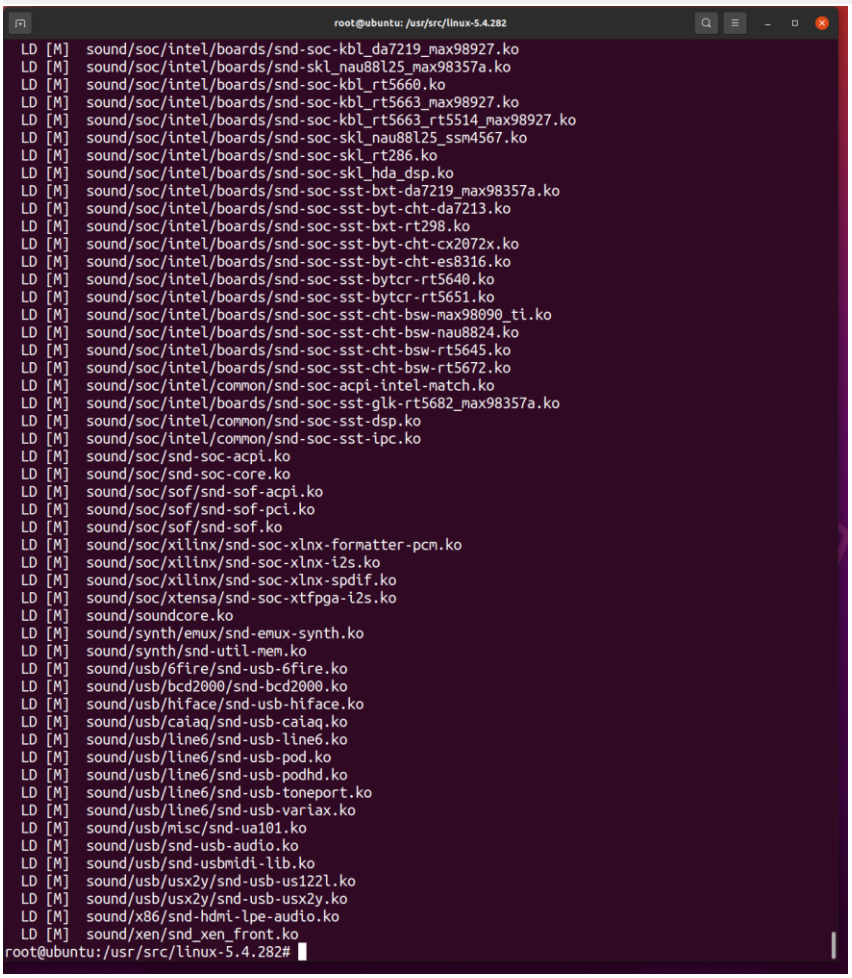
6. cd /etc/initramfs-tools 입력

   vi initramfs.conf 입력

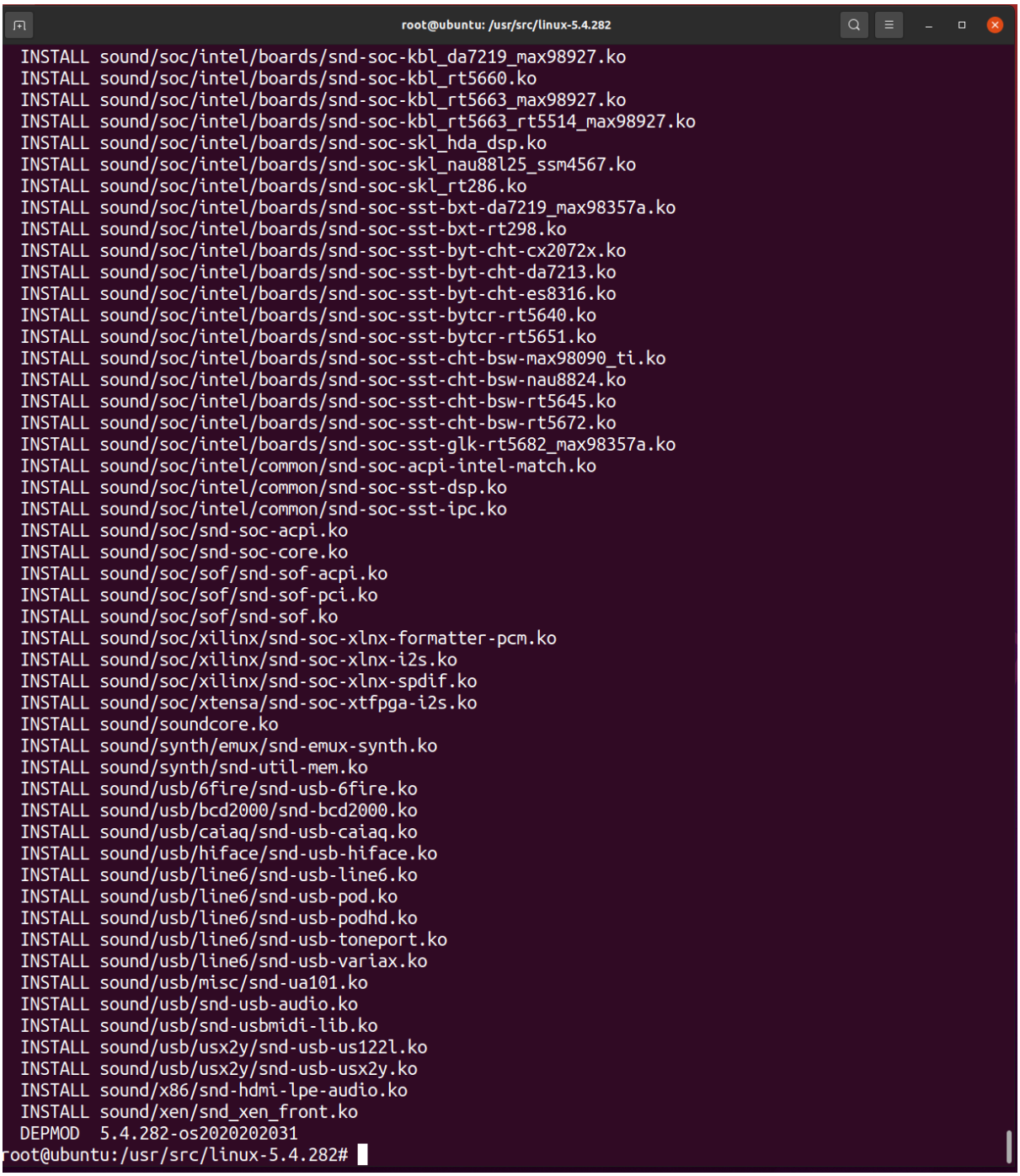


7. make -j8 입력


Virtual Machine Settings
Hardware
Options
Device
Summary
Memory
4 GB
Processors
4
Hard Disk (SCSI)
40 GB
CD/DVD (SATA)
Auto detect
Network Adapter
NAT
USB Controller
Present
Sound Card
Auto detect
Display
Auto detect
Add...
Remove
Memory
Specify the amount of memory allocated to this virtual machine. The memory size must be a multiple of 4 MB.
Memory for this virtual machine:
4096
MB
64 GB
32 GB
16 GB
8 GB
4 GB
2 GB
1 GB
512 MB
256 MB
128 MB
64 MB
32 MB
16 MB
8 MB
4 MB
Maximum recommended memory
(Memory swapping may occur beyond this size.)
13.1 GB
Recommended memory
4 GB
Guest OS recommended minimum
2 GB
The virtual machine must be powered off to reduce the amount of memory.
OK
Cancel
Help


root@ubuntu: /usr/src/linux-5.4.282
LD [M] sound/soc/intel/boards/snd-soc-kbl_da7219_max98927.ko
LD [M] sound/soc/intel/boards/snd-soc-skl_nau88l25_max98357a.ko
LD [M] sound/soc/intel/boards/snd-soc-kbl_rt5660.ko
LD [M] sound/soc/intel/boards/snd-soc-kbl_rt5663_max98927.ko
LD [M] sound/soc/intel/boards/snd-soc-kbl_rt5663_rt5514_max98927.ko
LD [M] sound/soc/intel/boards/snd-soc-skl_nau88l25_ssm4567.ko
LD [M] sound/soc/intel/boards/snd-soc-skl_rt286.ko
LD [M] sound/soc/intel/boards/snd-soc-skl_hda_dsp.ko
LD [M] sound/soc/intel/boards/snd-soc-sst-bxt-da7219_max98357a.ko
LD [M] sound/soc/intel/boards/snd-soc-sst-byt-cht-da7213.ko
LD [M] sound/soc/intel/boards/snd-soc-sst-bxt-rt298.ko
LD [M] sound/soc/intel/boards/snd-soc-sst-byt-cht-cx2072x.ko
LD [M] sound/soc/intel/boards/snd-soc-sst-byt-cht-es8316.ko
LD [M] sound/soc/intel/boards/snd-soc-sst-bytcr-rt5640.ko
LD [M] sound/soc/intel/boards/snd-soc-sst-bytcr-rt5651.ko
LD [M] sound/soc/intel/boards/snd-soc-sst-cht-bsw-max98090_ti.ko
LD [M] sound/soc/intel/boards/snd-soc-sst-cht-bsw-nau8824.ko
LD [M] sound/soc/intel/boards/snd-soc-sst-cht-bsw-rt5645.ko
LD [M] sound/soc/intel/boards/snd-soc-sst-cht-bsw-rt5672.ko
LD [M] sound/soc/intel/common/snd-soc-acpi-intel-match.ko
LD [M] sound/soc/intel/boards/snd-soc-sst-glk-rt5682_max98357a.ko
LD [M] sound/soc/intel/common/snd-soc-sst-dsp.ko
LD [M] sound/soc/intel/common/snd-soc-sst-ipc.ko
LD [M] sound/soc/snd-soc-acpi.ko
LD [M] sound/soc/snd-soc-core.ko
LD [M] sound/soc/sof/snd-sof-acpi.ko
LD [M] sound/soc/sof/snd-sof-pci.ko
LD [M] sound/soc/sof/snd-sof.ko
LD [M] sound/soc/xilinx/snd-soc-xlnx-formatter-pcm.ko
LD [M] sound/soc/xilinx/snd-soc-xlnx-i2s.ko
LD [M] sound/soc/xilinx/snd-soc-xlnx-spdif.ko
LD [M] sound/soc/xtensa/snd-soc-xtfpga-i2s.ko
LD [M] sound/soundcore.ko
LD [M] sound/synth/emux/snd-emux-synth.ko
LD [M] sound/synth/snd-util-mem.ko
LD [M] sound/usb/6fire/snd-usb-6fire.ko
LD [M] sound/usb/bcd2000/snd-bcd2000.ko
LD [M] sound/usb/hiface/snd-usb-hiface.ko
LD [M] sound/usb/caiaq/snd-usb-caiaq.ko
LD [M] sound/usb/line6/snd-usb-line6.ko
LD [M] sound/usb/line6/snd-usb-pod.ko
LD [M] sound/usb/line6/snd-usb-podhd.ko
LD [M] sound/usb/line6/snd-usb-toneport.ko
LD [M] sound/usb/line6/snd-usb-variax.ko
LD [M] sound/usb/misc/snd-ua101.ko
LD [M] sound/usb/snd-usb-audio.ko
LD [M] sound/usb/snd-usbmidi-lib.ko
LD [M] sound/usb/usx2y/snd-usb-us122l.ko
LD [M] sound/usb/usx2y/snd-usb-usx2y.ko
LD [M] sound/x86/snd-hdmi-lpe-audio.ko
LD [M] sound/xen/snd_xen_front.ko
root@ubuntu:/usr/src/linux-5.4.282#

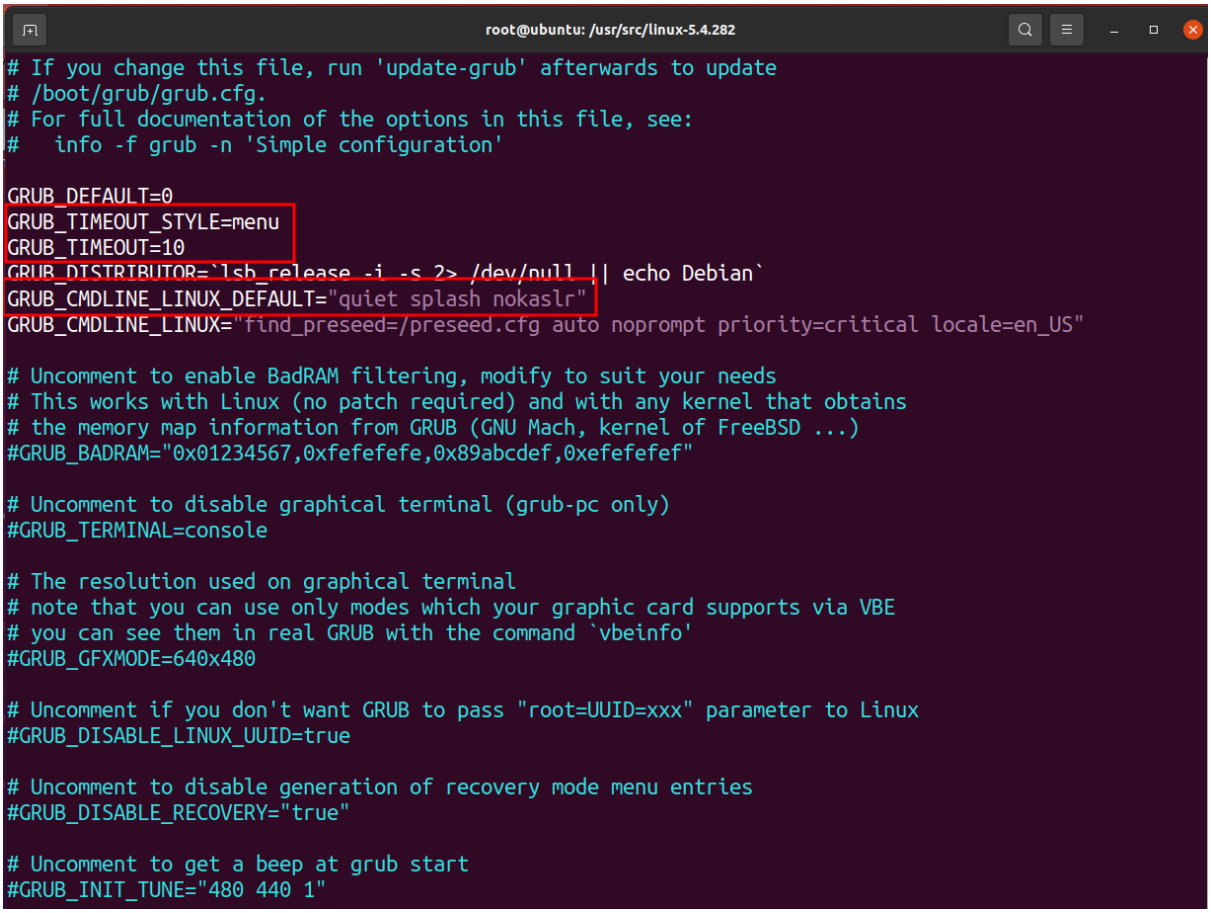
8. make modules_install 입력



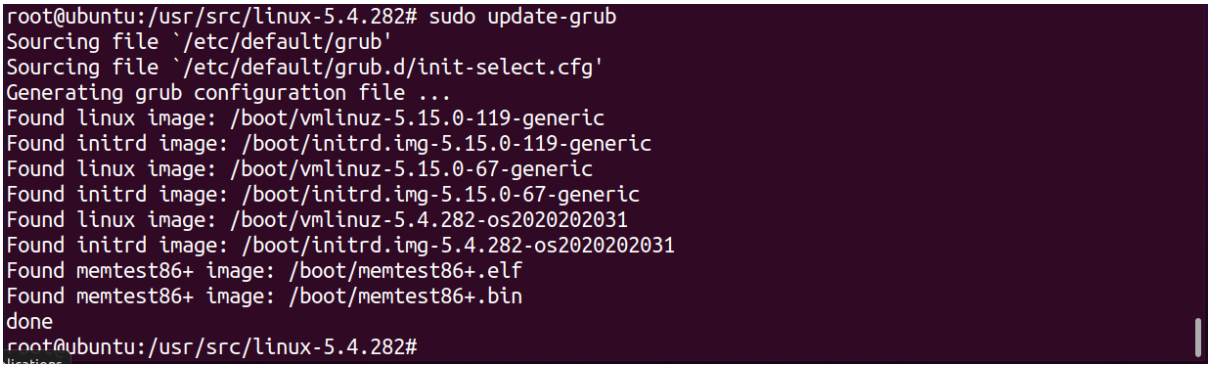
9. make install 입력

```
root@ubuntu:/usr/src/linux-5.4.282# make install
sh ./arch/x86/boot/install.sh 5.4.282-os2020202031 arch/x86/boot/bzImage \
        System.map "/boot"
run-parts: executing /etc/kernel/postinst.d/initramfs-tools 5.4.282-os2020202031 /boot/vmlinuz-5.4.28
2-os2020202031
update-initramfs: Generating /boot/initrd.img-5.4.282-os2020202031
run-parts: executing /etc/kernel/postinst.d/unattended-upgrades 5.4.282-os2020202031 /boot/vmlinuz-5.
4.282-os2020202031
run-parts: executing /etc/kernel/postinst.d/update-notifier 5.4.282-os2020202031 /boot/vmlinuz-5.4.28
2-os2020202031
run-parts: executing /etc/kernel/postinst.d/xx-update-initrd-links 5.4.282-os2020202031 /boot/vmlinuz
-5.4.282-os2020202031
I: /boot/initrd.img.old is now a symlink to initrd.img-5.15.0-119-generic
I: /boot/initrd.img is now a symlink to initrd.img-5.4.282-os2020202031
run-parts: executing /etc/kernel/postinst.d/zz-update-grub 5.4.282-os2020202031 /boot/vmlinuz-5.4.282
-os2020202031
Sourcing file `/etc/default/grub'
Sourcing file `/etc/default/grub.d/init-select.cfg'
Generating grub configuration file ...
Found linux image: /boot/vmlinuz-5.15.0-119-generic
Found initrd image: /boot/initrd.img-5.15.0-119-generic
Found linux image: /boot/vmlinuz-5.15.0-67-generic
Found initrd image: /boot/initrd.img-5.15.0-67-generic
Found linux image: /boot/vmlinuz-5.4.282-os2020202031
Found initrd image: /boot/initrd.img-5.4.282-os2020202031
Found memtest86+ image: /boot/memtest86+.elf
Found memtest86+ image: /boot/memtest86+.bin
done
root@ubuntu:/usr/src/linux-5.4.282#
```

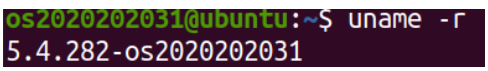
10. vi /etc/default/grub 입력 및 수정



11. sudo update-grub 입력

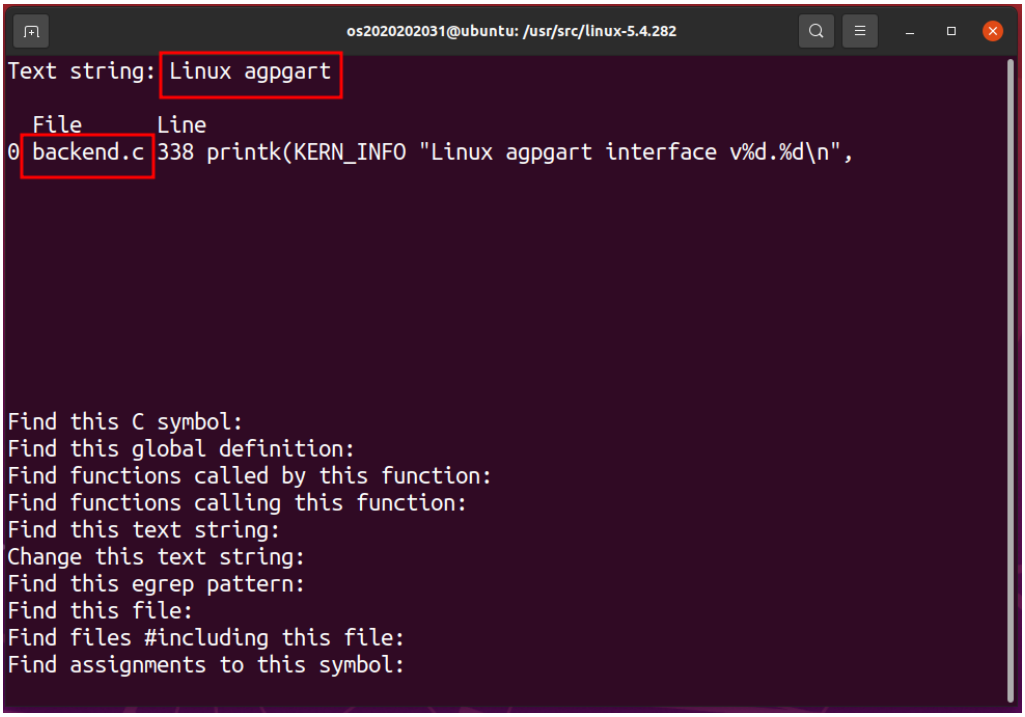


12. 커널 버전 확인



Assignment 1-3

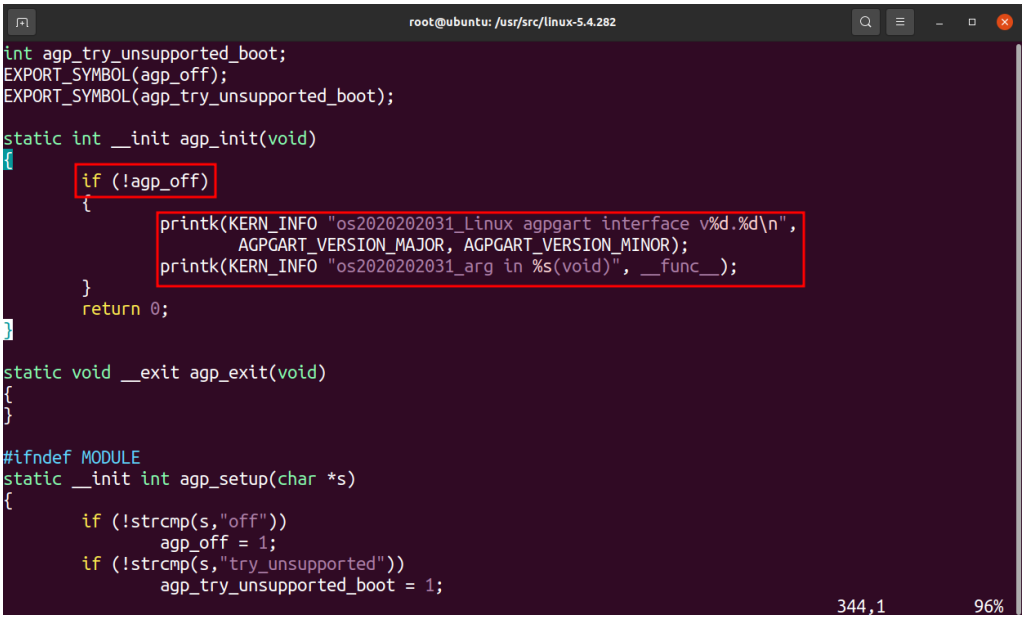
1. cscope 에서 Find this text string:에 "Linux agpgart" text 를 검색



2. Linux agpgart interface 가 실행되는 지점에서

   2020202031_Linux agpgart interface v0.103

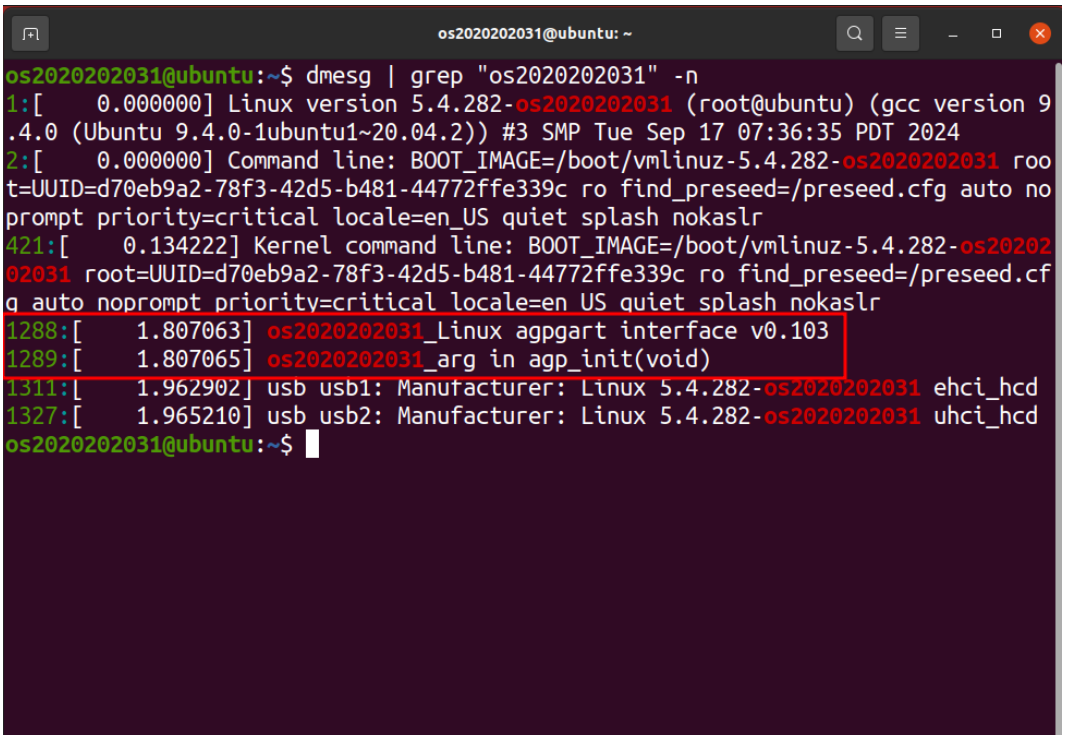
   2020202031_arg in 이 출력되도록 수정



drivers/char/agp/backend.c 파일을 수정했습니다.

!agp_off 는 곧 agp on 을 의미하며, 이는 init 에서 한 번만 실행되므로, Linux agpgart interface 가 실행되는 지점에서 printk 가 한 번만 출력됩니다.

3. dmesg | grep "os2020202031" -n 실행결과 printk 가 잘 수행됐음을 알 수 있습니다.



고찰

cscope -R 을 통해 Linux agpgart text 를 포함하는 파일을 찾고, 수정하는 과정에서 readonly 형식으로 open 됐다는 오류문구가 계속해서 등장했습니다. 이에 권한문제라고 생각하고 sudo cscope -R 로 실행했더니 잘 수정됐습니다.

Reference

수업자료 참고