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```
Lab 2 — ssh - scp h192h407@cycle3.eecs.ku.edu:/srv/EECS_678/eecs678_base.qcow . – 110x34

commit      Record changes to the repository
merge       Join two or more development histories together
rebase      Reapply commits on top of another base tip
reset       Reset current HEAD to the specified state
switch     Switch branches
tag        Create, list, delete or verify a tag object signed with GPG

collaborate (see also: git help workflows)
  fetch      Download objects and refs from another repository
  pull       Fetch from and integrate with another repository or a local branch
  push       Update remote refs along with associated objects

'git help -a' and 'git help -g' list available subcommands and some
concept guides. See 'git help <command>' or 'git help <concept>'
to read about a specific subcommand or concept.
See 'git help git' for an overview of the system.

[icicle@Haonans-MBP ~ % cd /Users/icicle/Desktop/EECS678/Lab\ 2
[icicle@Haonans-MBP Lab 2 % scp h192h407@cycle1.eecs.ku.edu:/srv/EECS_678/eecs678_base.qcow .
@@@@@@@@@@@WARNING: REMOTE HOST IDENTIFICATION HAS CHANGED! @
@@@@@@@@@@@SHA256:q0zOpvN/9UOpkRlKv4lrJpjL/uSjy05WTat2ZCmsno.
IT IS POSSIBLE THAT SOMEONE IS DOING SOMETHING NASTY!
Someone could be eavesdropping on you right now (man-in-the-middle attack)!

It is also possible that a host key has just been changed.
The fingerprint for the ECDSA key sent by the remote host is
SHA256:q0zOpvN/9UOpkRlKv4lrJpjL/uSjy05WTat2ZCmsno.

Please contact your system administrator.
Add correct host key in /Users/icicle/.ssh/known_hosts to get rid of this message.
Offending ECDSA key in /Users/icicle/.ssh/known_hosts:1
ECDSA host key for cycle1.eecs.ku.edu has changed and you have requested strict checking.
Host key verification failed.

[icicle@Haonans-MBP Lab 2 % scp h192h407@cycle3.eecs.ku.edu:/srv/EECS_678/eecs678_base.qcow .
[h192h407@cycle3.eecs.ku.edu's password: eecs678_base.qcow
27% 610MB 17.6MB/s 01:31 ETA]
```

Use scp command download image from the cycle server, however, cycle1 didn't work for me, so I just switched to the cycle3 server.

```
Lab 2 — -zsh — 110x34

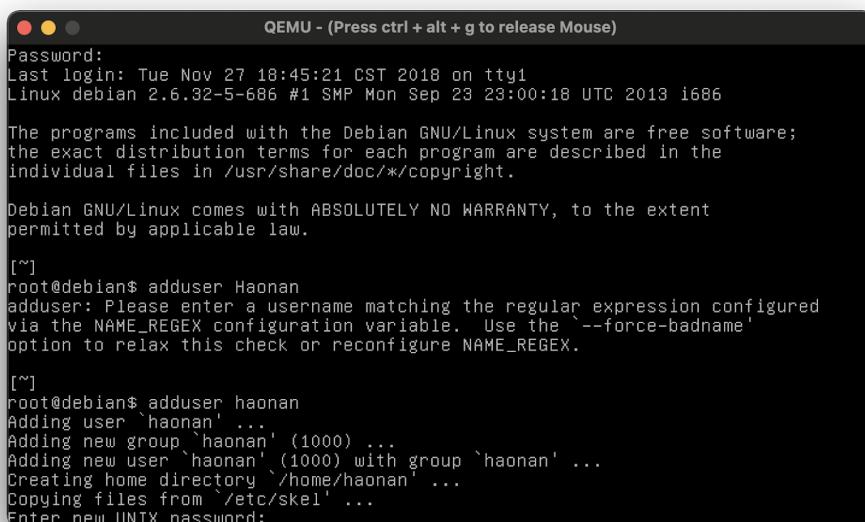
[icicle@Haonans-MBP Lab 2 % ls
eecs678_base.qcow
[icicle@Haonans-MBP Lab 2 % qemu-img create -f qcow2 -b eecs678_base.qcow Haonan.qcow
```

This will create a copy of the base image and the new image is in my first name



```
[icicle@Haonans-MBP Lab 2 % ls
eecs678_base.qcow
[icicle@Haonans-MBP Lab 2 % qemu-img create -f qcow2 -b eecs678_base.qcow Haonan.qcow
qemu-img: warning: Deprecated use of backing file without explicit backing format (detected format of qcow2)
Formatting 'Haonan.qcow', fmt=qcow2 cluster_size=65536 compression_type=zlib size=21474836480 backing_file=eec
s678_base.qcow backing_fmt=qcow2 lazy_refcounts=off refcount_bits=16
[icicle@Haonans-MBP Lab 2 % qemu-system-x86_64 -hda Haonan.qcow -smp 2 -m 1024M -redir tcp:12345::22]
```

The command will open up a GUI for booting the image, however, my MacOS said -redir option is not valid for my qemu, so I got rid off everything after -m 1024M and it worked



```
QEMU - (Press ctrl + alt + g to release Mouse)
Password:
Last login: Tue Nov 27 18:45:21 CST 2018 on ttys000
Linux debian 2.6.32-5-686 #1 SMP Mon Sep 23 23:00:18 UTC 2013 i686

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/*copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.

[~]
root@debian$ adduser Haonan
adduser: Please enter a username matching the regular expression configured
via the NAME_REGEX configuration variable. Use the '--force-badname'
option to relax this check or reconfigure NAME_REGEX.

[~]
root@debian$ adduser haonan
Adding user `haonan' ...
Adding new group `haonan' (1000) ...
Adding new user `haonan' (1000) with group `haonan' ...
Creating home directory `/home/haonan' ...
Copying files from `/etc/skel' ...
Enter new UNIX password:
```

After booting into system, add new user (me) to the system from root

The screenshot shows a QEMU terminal window titled "QEMU - (Press ctrl + alt + g to release Mouse)". The terminal is displaying the contents of the /etc/sudoers file in Vim. The file contains three entries:

```
1 #User privilege specification
2 root ALL=(ALL) ALL
3 haonan ALL=(ALL) ALL
```

The cursor is positioned at the end of the third line. The status bar at the bottom left shows "-- INSERT --". The status bar at the bottom right shows the current file position as "3,21" and the total file size as "A11".

Add user to the sudoers file through vim, save and quite by :wq

The screenshot shows a QEMU terminal window titled "QEMU - (Press ctrl + alt + g to release Mouse)". The terminal is displaying the contents of the /etc/sudoers file in Vim. The file has been modified and saved. The status bar at the bottom left shows "[~]". The status bar at the bottom right shows the current file position as "3,21" and the total file size as "A11".

```
"/etc/sudoers" [New] 3L, 70C written
```

After saving, the terminal prompt changes to "root@debian\$". The user then runs the command "usermod -a -G sudo haonan".

Add user to the sudo group

```
[~]
root@debian$ mkdir /home/haonan/kernel

[~]
root@debian$ mv ~/linux-2.6.32.60/home/haonan/kernel/
mv: missing destination file operand after `~/root/linux-2.6.32.60/home/haonan/ke
rnel'
Try 'mv --help' for more information.

[~]
root@debian$ mv ~/linux-2.6.32.60 /home/haonan/kernel/

[~]
root@debian$ chown -R haonan:haonan /home/haonan/kernel/
[~]
root@debian$ _
```

Move the kernel source and the config file to user's directory and change the ownership to myself

```
[~]
root@debian$ mkdir /home/haonan/kernel

[~]
root@debian$ mv ~/linux-2.6.32.60/home/haonan/kernel/
mv: missing destination file operand after `~/root/linux-2.6.32.60/home/haonan/ke
rnel'
Try 'mv --help' for more information.

[~]
root@debian$ mv ~/linux-2.6.32.60 /home/haonan/kernel/

[~]
root@debian$ chown -R haonan:haonan /home/haonan/kernel/
[~]
root@debian$ apt-get install sudo_
```

install sudo on kernel in order to grant user right to execute some command

```
[~]
root@debian$ apt-get install sudo
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following NEW packages will be installed:
  sudo
0 upgraded, 1 newly installed, 0 to remove and 7 not upgraded.
Need to get 593 kB of archives.
After this operation, 942 kB of additional disk space will be used.
WARNING: The following packages cannot be authenticated!
  sudo
Install these packages without verification [y/N]? y
Get:1 http://archive.debian.org/debian/ squeeze/main sudo i386 1.7.4p4-2.squeeze
.4 [593 kB]
Fetched 593 kB in 1s (529 kB/s)
Selecting previously deselected package sudo.
(Reading database ... 23840 files and directories currently installed.)
Unpacking sudo (from .../sudo_1.7.4p4-2.squeeze.4_i386.deb) ...
Processing triggers for man-db ...
Setting up sudo (1.7.4p4-2.squeeze.4) ...

[~]
root@debian$ su haonan_
```

Switch user from root to the new user(me)

```
[~] root@debian$ apt-get install sudo
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following NEW packages will be installed:
  sudo
0 upgraded, 1 newly installed, 0 to remove and 7 not upgraded.
Need to get 593 kB of archives.
After this operation, 942 kB of additional disk space will be used.
WARNING: The following packages cannot be authenticated!
  sudo
Install these packages without verification [y/N]? y
Get:1 http://archive.debian.org/debian/ squeeze/main sudo i386 1.7.4p4-2.squeeze
.4 [593 kB]
Fetched 593 kB in 1s (529 kB/s)
Selecting previously deselected package sudo.
(Reading database ... 23840 files and directories currently installed.)
Unpacking sudo (from .../sudo_1.7.4p4-2.squeeze.4_i386.deb) ...
Processing triggers for man-db ...
Setting up sudo (1.7.4p4-2.squeeze.4) ...

[~]
root@debian$ su haonan
haonan@debian:/root$ sudo apt-get install libz-dev
```

install libz-dev by sudo command, however, I messed up here because I forgot my user password (Yes, only 10 minutes later). So I have to go back to the root user and change the password by using the command: password user\_name. Then switch back to the new user

```
[~]
root@debian$ su haonan
haonan@debian:/root$ sudo apt-get install libz-dev
[sudo] password for haonan:
Reading package lists... Done
Building dependency tree
Reading state information... Done
Note, selecting 'zlib1g-dev' instead of 'libz-dev'
The following NEW packages will be installed:
  zlib1g-dev
0 upgraded, 1 newly installed, 0 to remove and 7 not upgraded.
Need to get 186 kB of archives.
After this operation, 418 kB of additional disk space will be used.
WARNING: The following packages cannot be authenticated!
  zlib1g-dev
Install these packages without verification [y/N]? y
Get:1 http://archive.debian.org/debian/ squeeze/main zlib1g-dev i386 1:1.2.3.4.dfsg-3 [186 kB]
Fetched 186 kB in 1s (160 kB/s)
Selecting previously deselected package zlib1g-dev.
(Reading database ... 23875 files and directories currently installed.)
Unpacking zlib1g-dev (from .../zlib1g-dev_1%3a1.2.3.4.dfsg-3_i386.deb) ...
Processing triggers for man-db ...
Setting up zlib1g-dev (1:1.2.3.4.dfsg-3) ...
haonan@debian:/root$ vi /usr/bin/kvm-kernel-build
```

From here, we are going to start build kernel, first, we add some level of concurrency.

```
#!/bin/sh
rev=$1
if [ -z "$rev" ]; then
    echo "Usage: build64 <revision>"
    exit 1
fi
make-kpkg -j 2 --rootcmd fakeroot --initrd --revision=$rev kernel_image 2>&1 | tee build.log
~
```

-- INSERT -- W10: Warning: Changing a readonly file

We used vim to open up the file again and add -j flag with value 2. Since this is a read-only file, we should do : sudo wq to force change and save the file

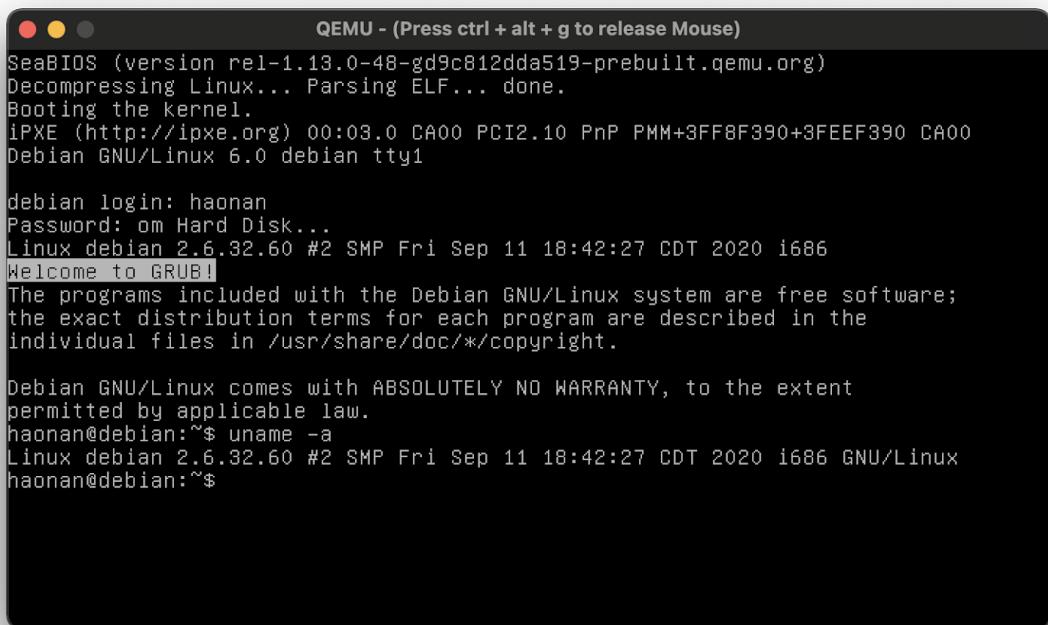
Now we are good to build, it is gonna take forever to build tbh.

```
QEMU - (Press ctrl + alt + g to release Mouse)

chown -R root:root          /home/haonan/kernel/linux-2.6.32.60/debian/linux-
image-2.6.32.60
dpkg --build                 /home/haonan/kernel/linux-2.6.32.60/debian/linux-
image-2.6.32.60 ..
dpkg-deb: building package `linux-image-2.6.32.60' in `../linux-image-2.6.32.60_1_i386.deb'.
make[2]: Leaving directory `/home/haonan/kernel/linux-2.6.32.60'
make[1]: Leaving directory `/home/haonan/kernel/linux-2.6.32.60'
haonan@debian:~/kernel/linux-2.6.32.60$ ls
arch      drivers  kvm-kernel.config  README      usr
block     firmware lib                  REPORTING-BUGS virt
build.log   fs       MAINTAINERS      samples    vmlinux
COPYING   include  Makefile          security  vmlinuz.o
CREDITS   init     mm                sound
crypto     ipc      modules.order    System.map
debian     Kbuild  Module.symvers  Documentation tools
Documentation kernel net
haonan@debian:~/kernel/linux-2.6.32.60$ cd ..
haonan@debian:~/kernel$ ls
linux-2.6.32.60  linux-image-2.6.32.60_1_i386.deb
haonan@debian:~/kernel$ su
Password:

[/home/haonan/kernel]
root@debian$ dkpg -i linux-image-2.6.32.60_1_i386.deb
```

Now just hit the command to install linux image



The screenshot shows a terminal window titled "QEMU - (Press ctrl + alt + g to release Mouse)". The window displays the boot logs of a Debian 6.0 system. The logs include:

- SeaBIOS (version rel-1.13.0-48-gd9c812dda519-prebuilt.qemu.org)
- Decompressing Linux... Parsing ELF... done.
- Booting the kernel.
- iPXE (http://ipxe.org) 00:03.0 CA00 PCI2.10 PnP PMM+3FF8F390+3FEEF390 CA00
- Debian GNU/Linux 6.0 debian tty1
- debian login: haonan
- Password: om Hard Disk...
- Linux debian 2.6.32.60 #2 SMP Fri Sep 11 18:42:27 CDT 2020 i686
- Welcome to GRUB!
- The programs included with the Debian GNU/Linux system are free software; the exact distribution terms for each program are described in the individual files in /usr/share/doc/\*copyright.
- Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent permitted by applicable law.
- haonan@debian:~\$ uname -a
- Linux debian 2.6.32.60 #2 SMP Fri Sep 11 18:42:27 CDT 2020 i686 GNU/Linux
- haonan@debian:~\$

After everything is done, this is how it looks like.