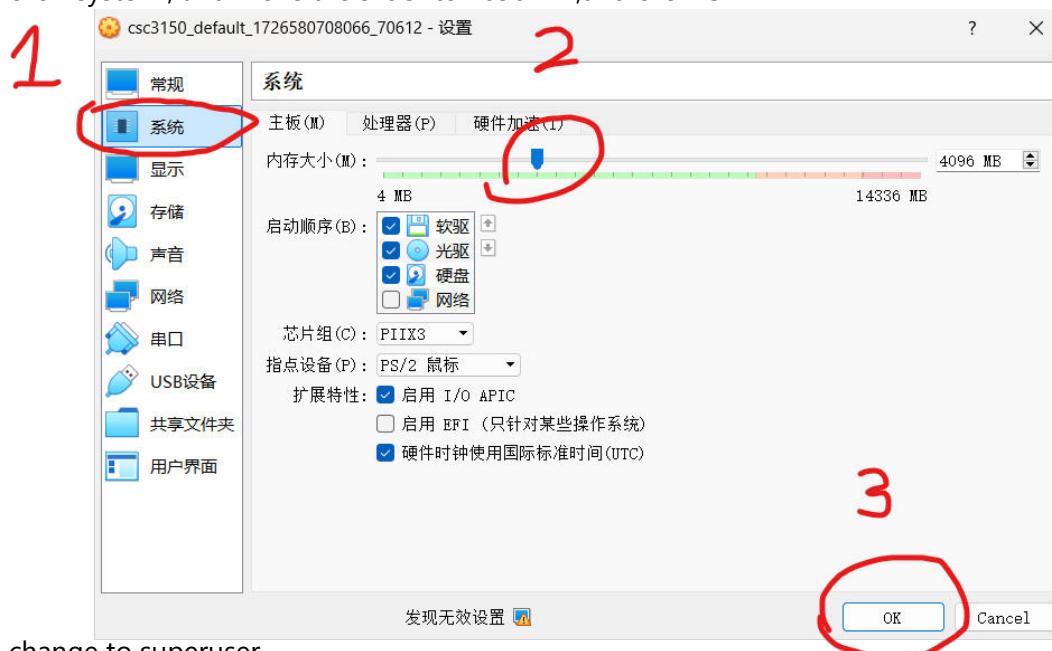


## Allocate more storage to the virtual machine

make sure your virtual machine is down. click 'setting'



click 'system', and move the slider to 4096 MB, and click 'OK'



change to superuser

```
vagrant@csc3150:/home$ sudo su
root@csc3150:/home/vagrant/csc3150# cd /home/vagrant/csc3150
```

download the kernel package

```
root@csc3150:/home/vagrant/csc3150# wget {url}
```

url = <https://cdn.kernel.org/pub/linux/kernel/v5.x/linux-5.15.10.tar.xz>  
if this doesn't work, use

```
url = wget https://mirror.tuna.tsinghua.edu.cn/kernel/v5.x/linux-5.15.10.tar.xz
```

install all the essentials

```
root@csc3150:/home/vagrant/csc3150# apt-get install libncurses-dev gawk flex bison  
openssl libssl-dev dkms libelf-dev libudev-dev libpci-dev libiberty-dev autoconf  
llvm dwarves
```

unpack the kernel

```
root@csc3150:/home/vagrant/csc3150# tar xvf linux-5.10.1.tar.xz
```

now you have a new folder named {linux-xxx} in the current directory move this folder to /home/seed/work folder

```
cd /home  
root@csc3150:/home# mkdir ./seed  
root@csc3150:/home# cd seed  
root@csc3150:/home/seed# mkdir ./work  
root@csc3150:/home/seed# cd work  
root@csc3150:/home/seed/work# mv /home/vagrant/csc3150/linux-5.15.10  
/home/seed/work  
root@csc3150:/home/seed/work# cd ./linux-5.15.10/  
root@csc3150:/home/seed/work/linux-5.15.10#
```

compile the kernel

```
root@csc3150:/home/seed/work/linux-5.15.10# make mrproper  
root@csc3150:/home/seed/work/linux-5.15.10# make clean  
root@csc3150:/home/seed/work/linux-5.15.10# make menuconfig  
# make your terminal size big enough, otherwise the menu won't pop up
```

a menu will pop up, '->' to 'save', press 'enter', press 'enter' to save the config, '<->' to 'exit', press 'enter'

install another package

```
root@csc3150:/home/seed/work/linux-5.15.10# sudo apt-get install bc
```

start compiling (it takes 30 minutes)

```
root@csc3150:/home/seed/work/linux-5.15.10# make -j$(nproc)
```

## Install kernel modules

```
root@csc3150:/home/seed/work/linux-5.15.10# make modules_install
```

## Install kernel

```
root@csc3150:/home/seed/work/linux-5.15.10# make install
```

## Reboot to load new kernel

```
$ reboot
```

Reconnect to the virtual machine. After reboot, you can select the updated kernel. (If you can't select version, that's because grub selects the latest version by default)

## Check current kernel version

```
vagrant@csc3150:/home$ uname -r  
5.15.10
```