

《Linux 系统应用与开发》

课堂作业报告

课程名称 Linux 系统应用与开发

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学生班级 191181

日期： 2020 年 12 月 20 日

一、题目

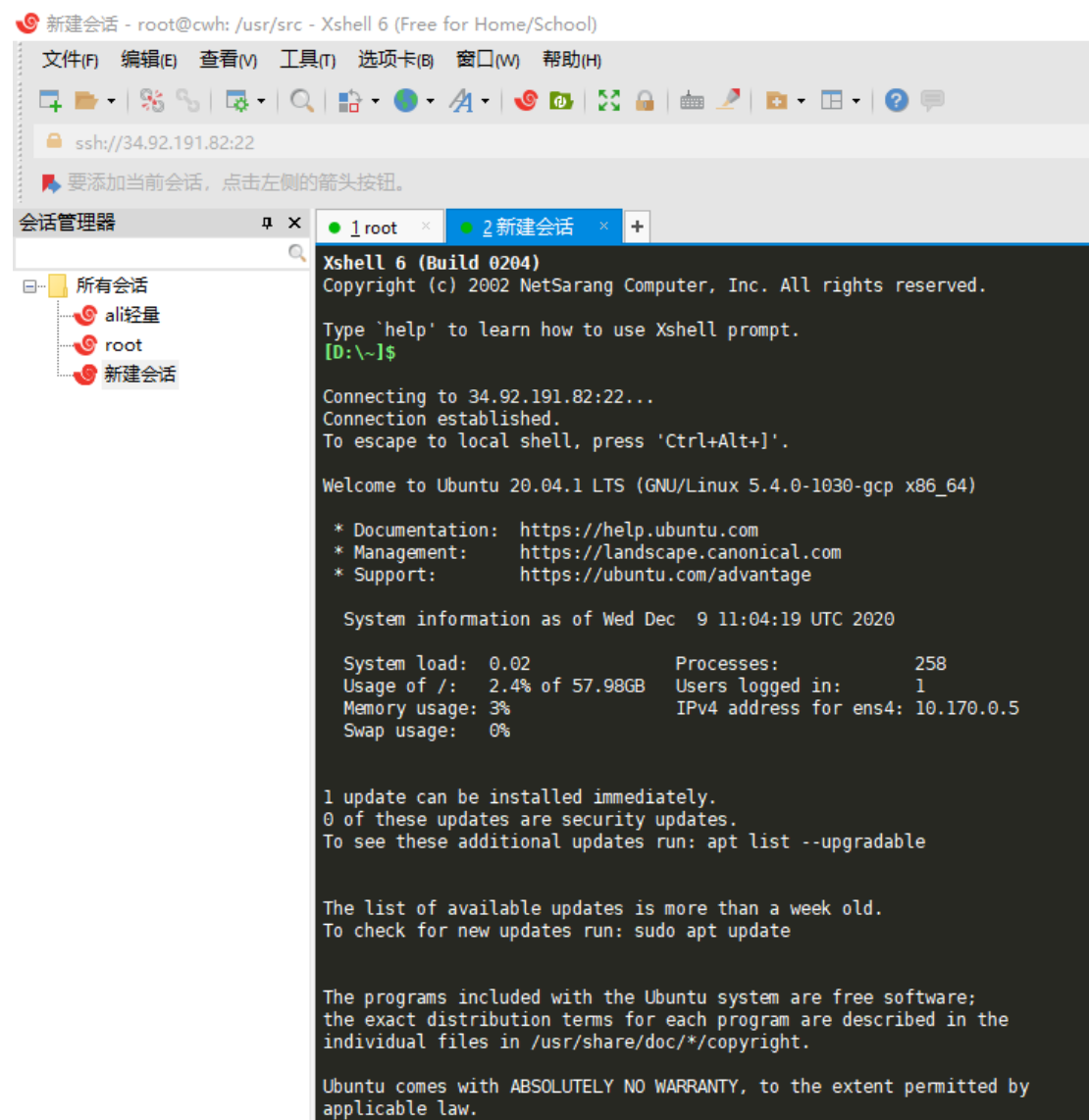
题目：编译 Linux 内核，并添加函数

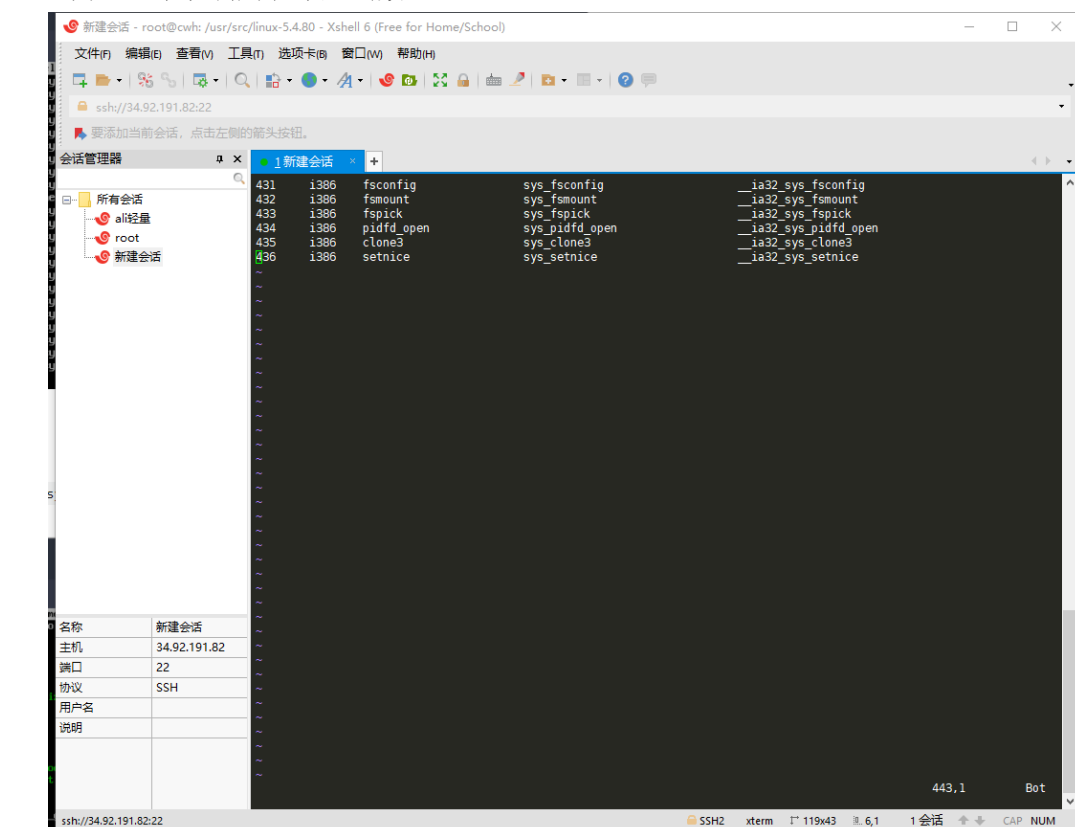
二、操作环境

1. 操作系统版本：Ubuntu 20.04
2. 计算机形式：谷歌云服务器

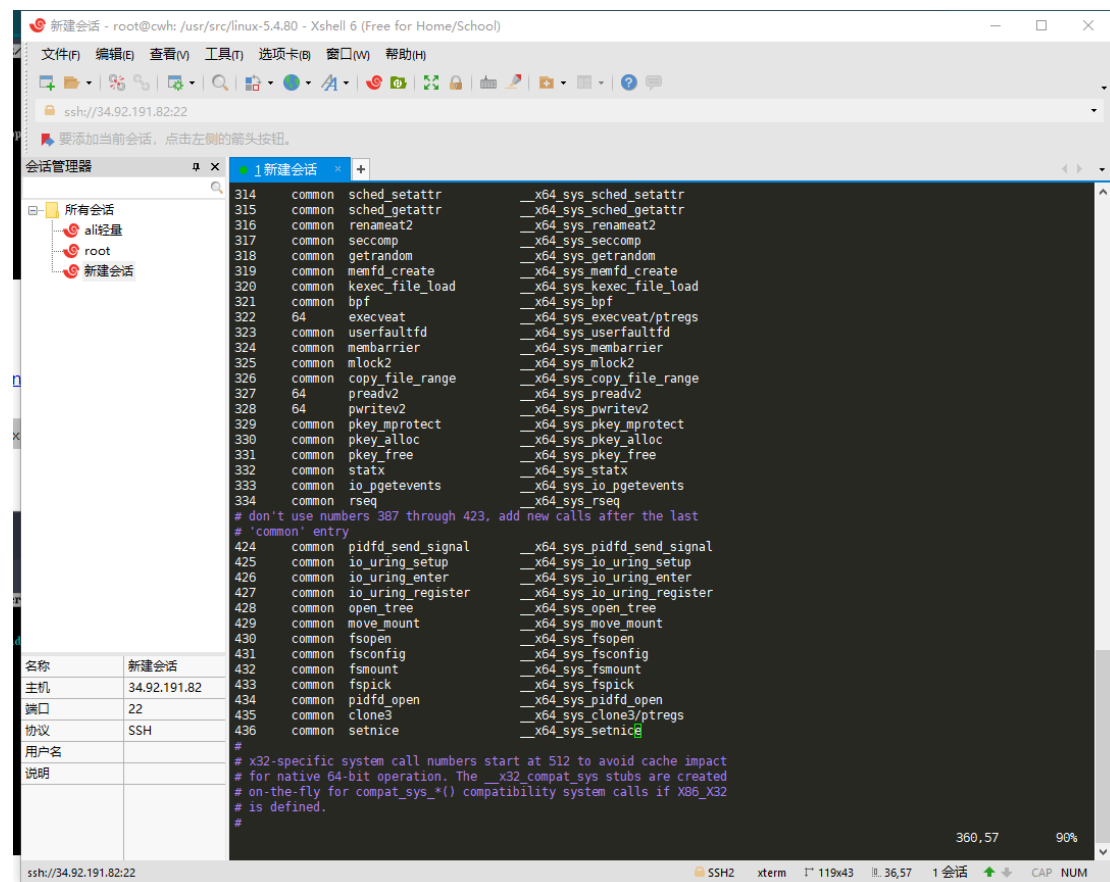
三、操作步骤

1. 查看初始化界面和当前内核编号

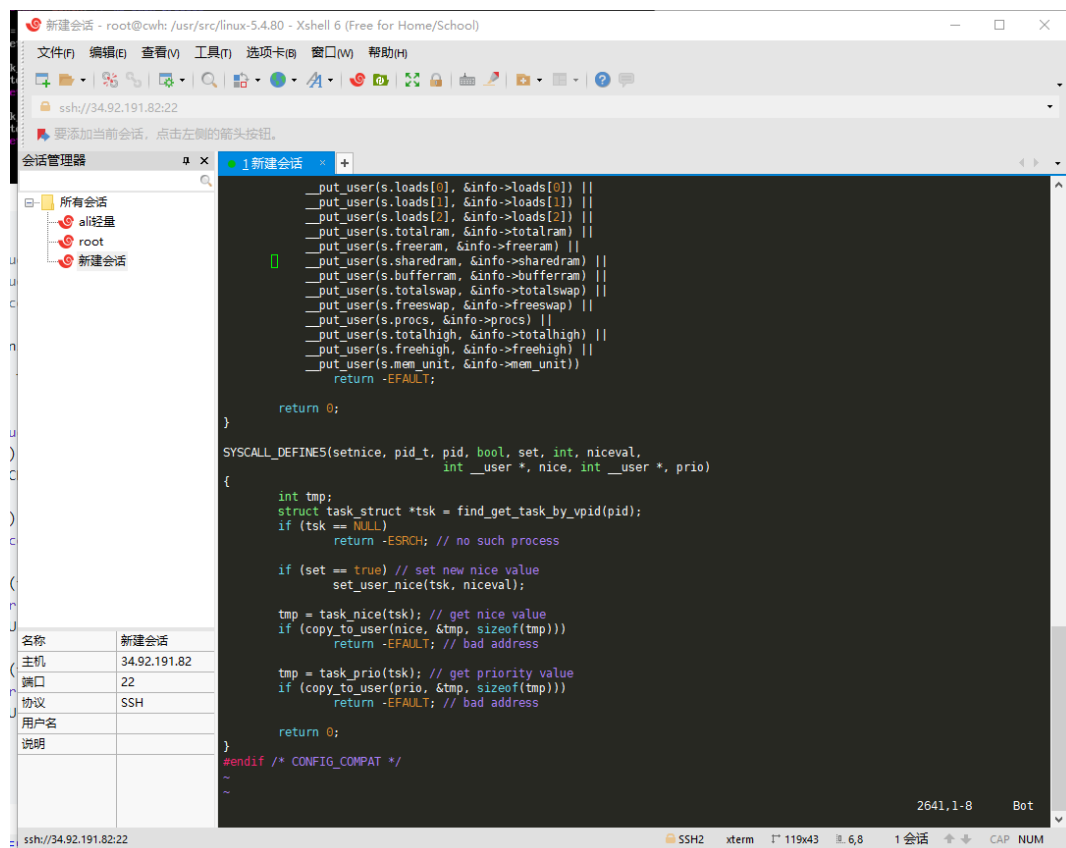




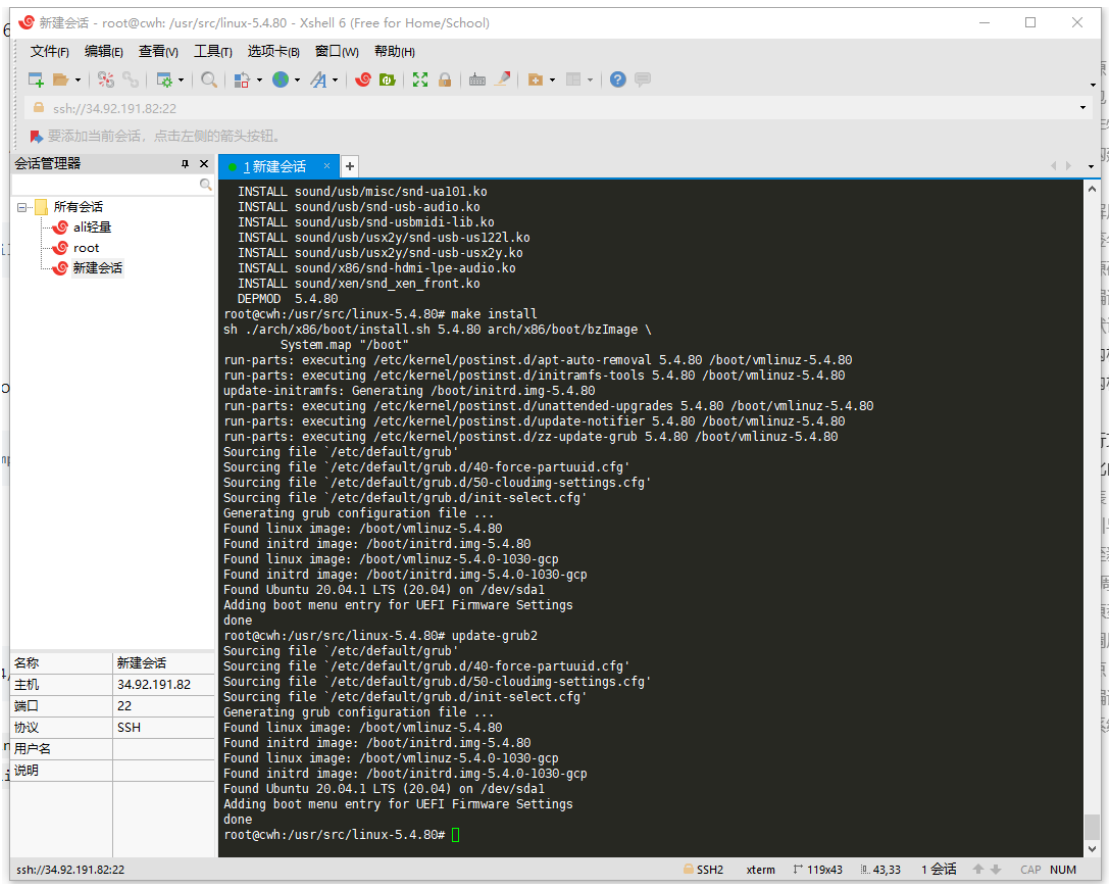
4. 向 64 位系统调用表添加函数



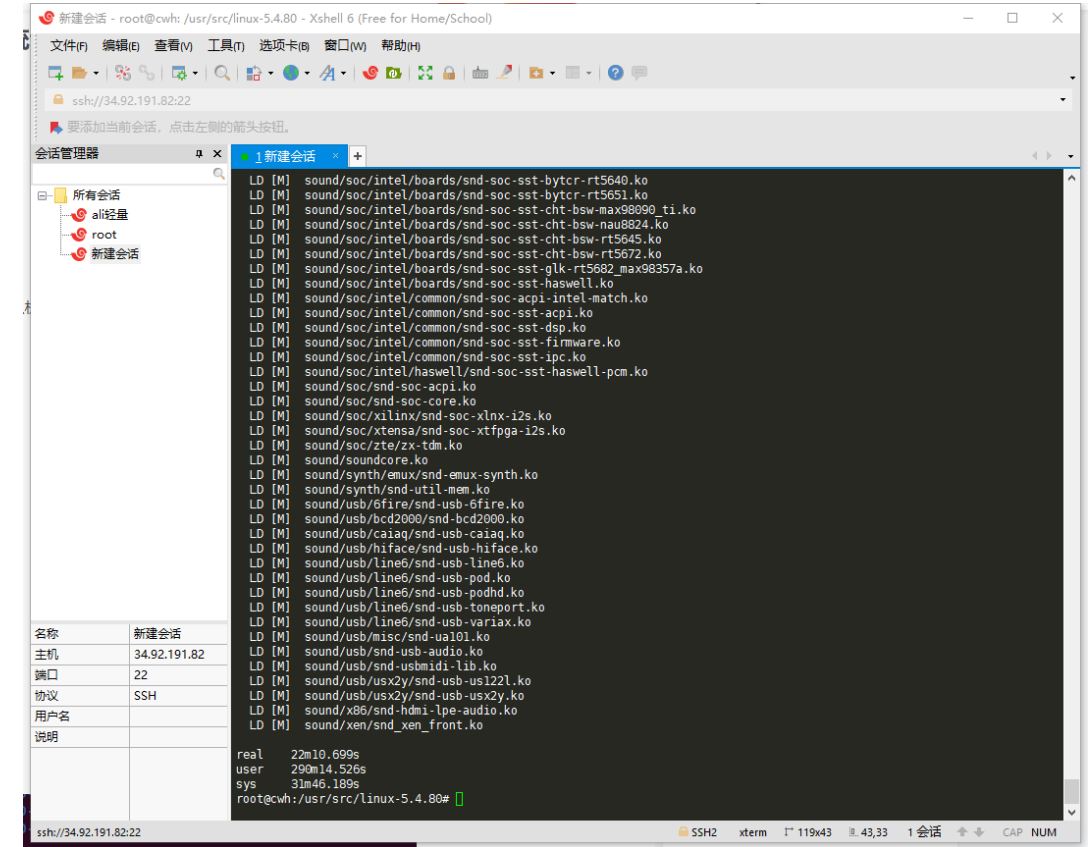
5. 编写函数



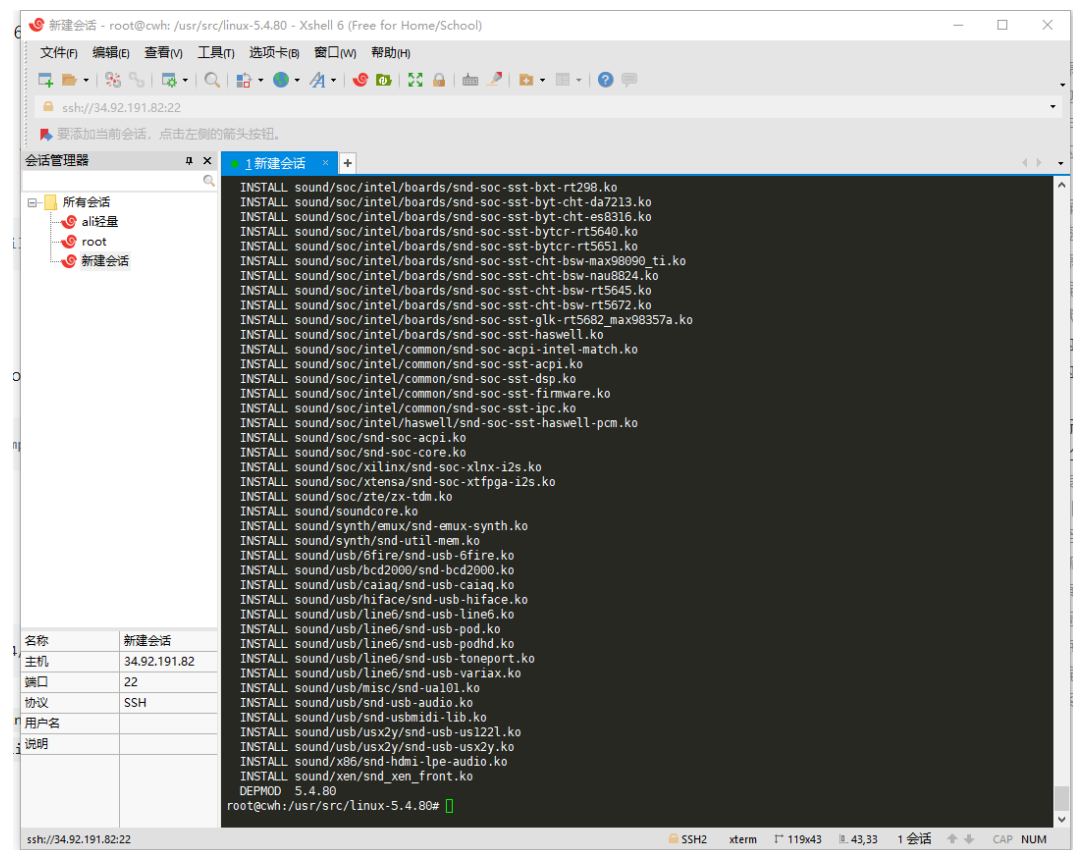
6. 更新引导



7. 编译内核结束

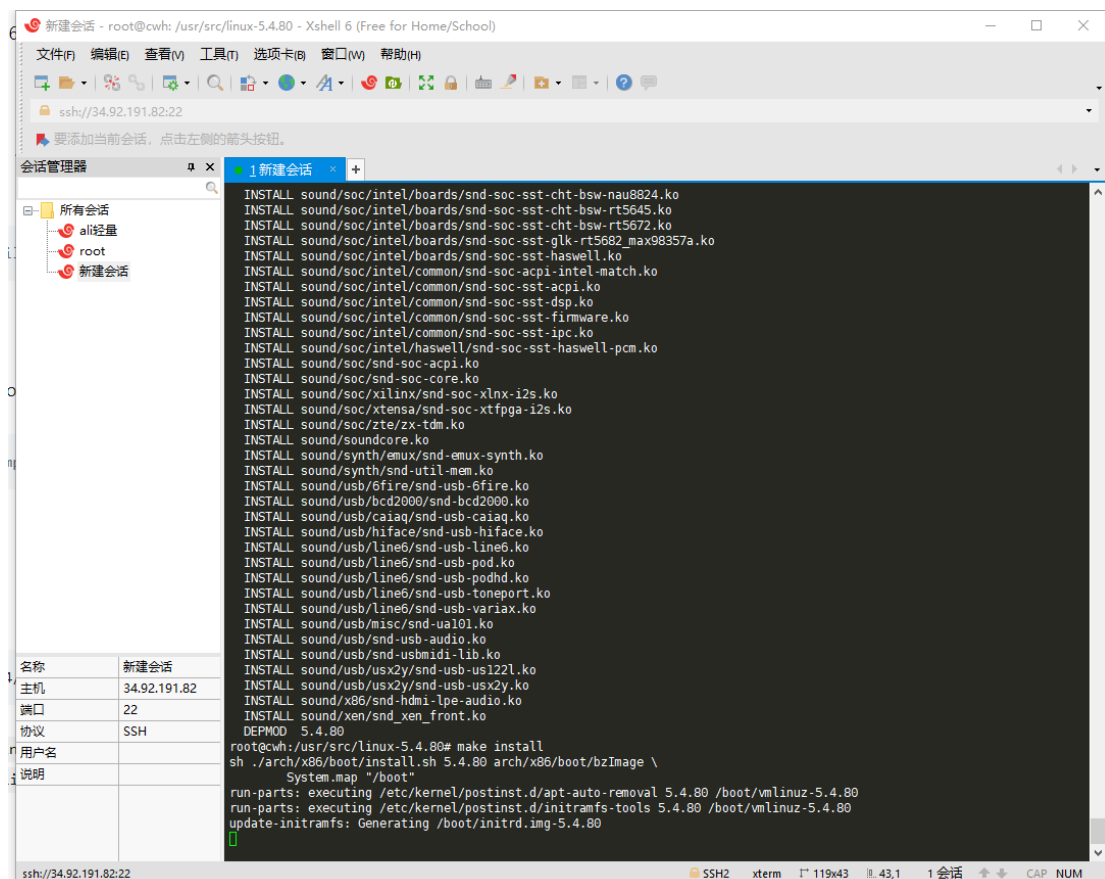


8. 编译内核及模块



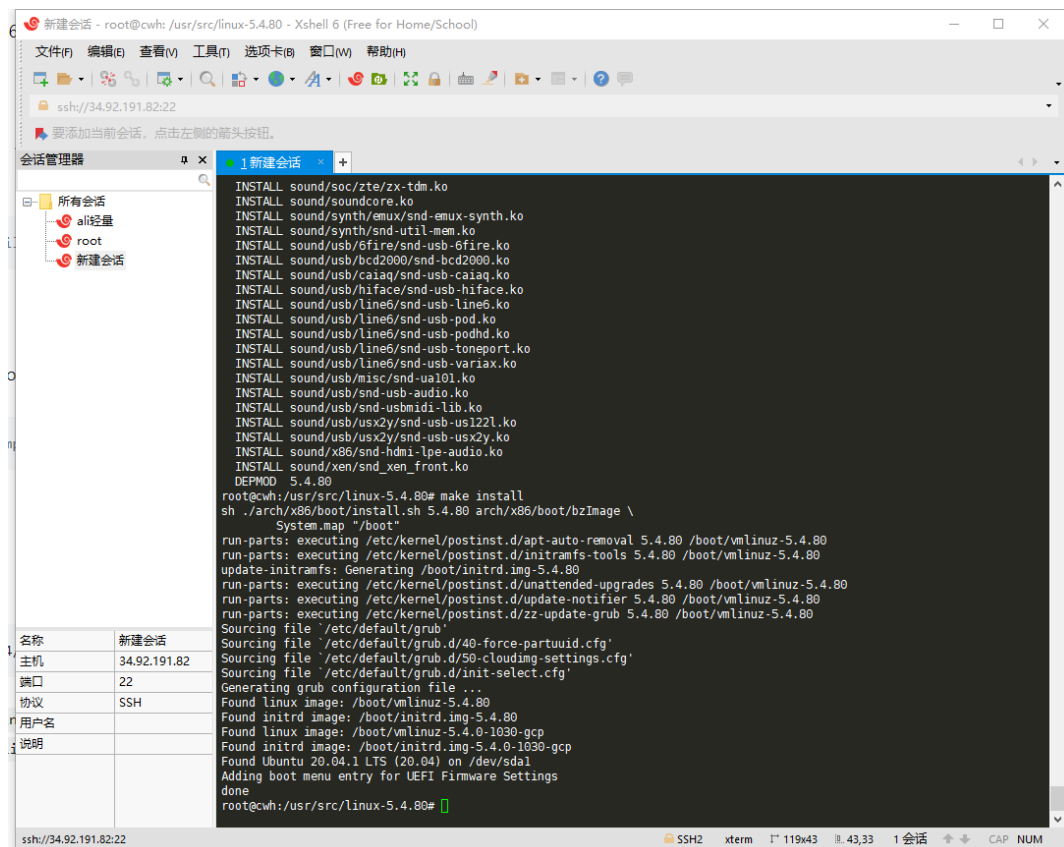
```
INSTALL sound/soc/intel/boards/snd-soc-sst-bxt-rt298.ko
INSTALL sound/soc/intel/boards/snd-soc-sst-byt-cht-da7213.ko
INSTALL sound/soc/intel/boards/snd-soc-sst-byt-cht-es8316.ko
INSTALL sound/soc/intel/boards/snd-soc-sst-bytcr-rt5640.ko
INSTALL sound/soc/intel/boards/snd-soc-sst-bytcr-rt5651.ko
INSTALL sound/soc/intel/boards/snd-soc-sst-cht-bsw-max98090_ti.ko
INSTALL sound/soc/intel/boards/snd-soc-sst-cht-bsw-nau8824.ko
INSTALL sound/soc/intel/boards/snd-soc-sst-cht-bsw-rt5645.ko
INSTALL sound/soc/intel/boards/snd-soc-sst-cht-bsw-rt5672.ko
INSTALL sound/soc/intel/boards/snd-soc-sst-glk-rt5682_max98357a.ko
INSTALL sound/soc/intel/boards/snd-soc-sst-haswell.ko
INSTALL sound/soc/intel/common/snd-soc-acpi-intel-match.ko
INSTALL sound/soc/intel/common/snd-soc-sst-acpi.ko
INSTALL sound/soc/intel/common/snd-soc-sst-dsp.ko
INSTALL sound/soc/intel/common/snd-soc-sst-firmware.ko
INSTALL sound/soc/intel/common/snd-soc-sst-ipc.ko
INSTALL sound/soc/intel/haswell/snd-soc-sst-haswell-pcm.ko
INSTALL sound/soc/snd-soc-acpi.ko
INSTALL sound/soc/snd-soc-core.ko
INSTALL sound/soc/xilinx/snd-soc-xlnx-i2s.ko
INSTALL sound/soc/xtensa/snd-soc-xtfpga-i2s.ko
INSTALL sound/soc/zte/zx-tdm.ko
INSTALL sound/soundcore.ko
INSTALL sound/synth/emux/snd-emux-synth.ko
INSTALL sound/synth/snd-util-mem.ko
INSTALL sound/usb/6fire/snd-usb-6fire.ko
INSTALL sound/usb/bcd2000/snd-bcd2000.ko
INSTALL sound/usb/caiaq/snd-usb-caiaq.ko
INSTALL sound/usb/hiface/snd-usb-hiface.ko
INSTALL sound/usb/line6/snd-usb-line6.ko
INSTALL sound/usb/line6/snd-usb-pod.ko
INSTALL sound/usb/line6/snd-usb-podhd.ko
INSTALL sound/usb/line6/snd-usb-toneport.ko
INSTALL sound/usb/line6/snd-usb-variax.ko
INSTALL sound/usb/misc/snd-ua101.ko
INSTALL sound/usb/snd-usb-audio.ko
INSTALL sound/usb/snd-usbmidi-lib.ko
INSTALL sound/usb/usx2y/snd-usb-us122l.ko
INSTALL sound/usb/usx2y/snd-usb-usx2y.ko
INSTALL sound/x86/snd-hdmi-lpe-audio.ko
INSTALL sound/xen/snd_xen_front.ko
DEPMOD 5.4.80
root@cw: /usr/src/linux-5.4.80#
```

9. 安装内核



```
INSTALL sound/soc/intel/boards/snd-soc-sst-cht-bsw-nau8824.ko
INSTALL sound/soc/intel/boards/snd-soc-sst-cht-bsw-rt5645.ko
INSTALL sound/soc/intel/boards/snd-soc-sst-cht-bsw-rt5672.ko
INSTALL sound/soc/intel/boards/snd-soc-sst-glk-rt5682_max98357a.ko
INSTALL sound/soc/intel/boards/snd-soc-sst-haswell.ko
INSTALL sound/soc/intel/common/snd-soc-acpi-intel-match.ko
INSTALL sound/soc/intel/common/snd-soc-sst-acpi.ko
INSTALL sound/soc/intel/common/snd-soc-sst-dsp.ko
INSTALL sound/soc/intel/common/snd-soc-sst-firmware.ko
INSTALL sound/soc/intel/common/snd-soc-sst-ipc.ko
INSTALL sound/soc/intel/haswell/snd-soc-sst-haswell-pcm.ko
INSTALL sound/soc/snd-soc-acpi.ko
INSTALL sound/soc/snd-soc-core.ko
INSTALL sound/soc/xilinx/snd-soc-xlnx-i2s.ko
INSTALL sound/soc/xtensa/snd-soc-xtfpga-i2s.ko
INSTALL sound/soc/zte/zx-tdm.ko
INSTALL sound/soundcore.ko
INSTALL sound/synth/emux/snd-emux-synth.ko
INSTALL sound/synth/snd-util-mem.ko
INSTALL sound/usb/6fire/snd-usb-6fire.ko
INSTALL sound/usb/bcd2000/snd-bcd2000.ko
INSTALL sound/usb/caiaq/snd-usb-caiaq.ko
INSTALL sound/usb/hiface/snd-usb-hiface.ko
INSTALL sound/usb/line6/snd-usb-line6.ko
INSTALL sound/usb/line6/snd-usb-pod.ko
INSTALL sound/usb/line6/snd-usb-podhd.ko
INSTALL sound/usb/line6/snd-usb-toneport.ko
INSTALL sound/usb/line6/snd-usb-variax.ko
INSTALL sound/usb/misc/snd-ua101.ko
INSTALL sound/usb/snd-usb-audio.ko
INSTALL sound/usb/snd-usbmidi-lib.ko
INSTALL sound/usb/usx2y/snd-usb-us122l.ko
INSTALL sound/usb/usx2y/snd-usb-usx2y.ko
INSTALL sound/x86/snd-hdmi-lpe-audio.ko
INSTALL sound/xen/snd_xen_front.ko
DEPMOD 5.4.80
root@cw: /usr/src/linux-5.4.80# make install
sh ./arch/x86/boot/install.sh 5.4.80 arch/x86/boot/bzImage \
System.map "/boot"
run-parts: executing /etc/kernel/postinst.d/apt-auto-removal 5.4.80 /boot/vmlinuz-5.4.80
run-parts: executing /etc/kernel/postinst.d/initramfs-tools 5.4.80 /boot/vmlinuz-5.4.80
update-initramfs: Generating /boot/initrd.img-5.4.80
root@cw: /usr/src/linux-5.4.80#
```

10. 安装内核完成



```
root@cwh: /usr/src/linux-5.4.80 - Xshell 6 (Free for Home/School)
文件(F) 编辑(E) 查看(V) 工具(T) 选项卡(O) 窗口(W) 帮助(H)
ssh://34.92.191.82:22
会话管理器
1 新建会话
所有会话
all轻量
root
新建会话
INSTALL sound/soc/zte/zx-tdm.ko
INSTALL sound/soundcore.ko
INSTALL sound/synth/emux/snd-emux-synth.ko
INSTALL sound/synth/snd-util-mem.ko
INSTALL sound/usb/gfire/snd-usb-gfire.ko
INSTALL sound/usb/bcd2000/snd-bcd2000.ko
INSTALL sound/usb/caiaq/snd-usb-caiaq.ko
INSTALL sound/usb/hiface/snd-usb-hiface.ko
INSTALL sound/usb/line6/snd-usb-line6.ko
INSTALL sound/usb/line6/snd-usb-pod.ko
INSTALL sound/usb/line6/snd-usb-podhd.ko
INSTALL sound/usb/line6/snd-usb-toneport.ko
INSTALL sound/usb/line6/snd-usb-variax.ko
INSTALL sound/usb/misc/snd-ua101.ko
INSTALL sound/usb/snd-usb-audio.ko
INSTALL sound/usb/snd-usbmidi-lib.ko
INSTALL sound/usb/usx2y/snd-usb-us122l.ko
INSTALL sound/usb/usx2y/snd-usb-usx2y.ko
INSTALL sound/x86/snd-hdmi-lpe-audio.ko
INSTALL sound/xen/snd_xen_front.ko
DEPMOD 5.4.80
root@cwh:/usr/src/linux-5.4.80# make install
sh ./arch/x86/boot/install.sh 5.4.80 arch/x86/boot/bzImage \
    System.map "/boot"
run-parts: executing /etc/kernel/postinst.d/apt-auto-removal 5.4.80 /boot/vmlinuz-5.4.80
run-parts: executing /etc/kernel/postinst.d/initramfs-tools 5.4.80 /boot/vmlinuz-5.4.80
update-initramfs: Generating /boot/initrd.img-5.4.80
run-parts: executing /etc/kernel/postinst.d/unattended-upgrades 5.4.80 /boot/vmlinuz-5.4.80
run-parts: executing /etc/kernel/postinst.d/update-notifier 5.4.80 /boot/vmlinuz-5.4.80
run-parts: executing /etc/kernel/postinst.d/zz-update-grub 5.4.80 /boot/vmlinuz-5.4.80
Sourcing file /etc/default/grub
Sourcing file /etc/default/grub.d/40-force-partuuid.cfg
Sourcing file /etc/default/grub.d/50-cloudimg-settings.cfg
Sourcing file /etc/default/grub.d/init-select.cfg
Generating grub configuration file ...
Found linux image: /boot/vmlinuz-5.4.80
Found initrd image: /boot/initrd.img-5.4.80
Found linux image: /boot/vmlinuz-5.4.0-1030-gcp
Found initrd image: /boot/initrd.img-5.4.0-1030-gcp
Found Ubuntu 20.04.1 LTS (20.04) on /dev/sda1
Adding boot menu entry for UEFI Firmware Settings
done
root@cwh:/usr/src/linux-5.4.80#
```

名称	新建会话
主机	34.92.191.82
端口	22
协议	SSH
用户名	
说明	

ssh://34.92.191.82:22 SSH2 xterm 119x43 43,33 1 会话 CAP NUM

四、结果

1. 安装结果

```
Connecting to 34.92.191.82:22...
Connection established.
To escape to local shell, press 'Ctrl+Alt+J'.

Welcome to Ubuntu 20.04.1 LTS (GNU/Linux 5.4.80 x86_64)

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

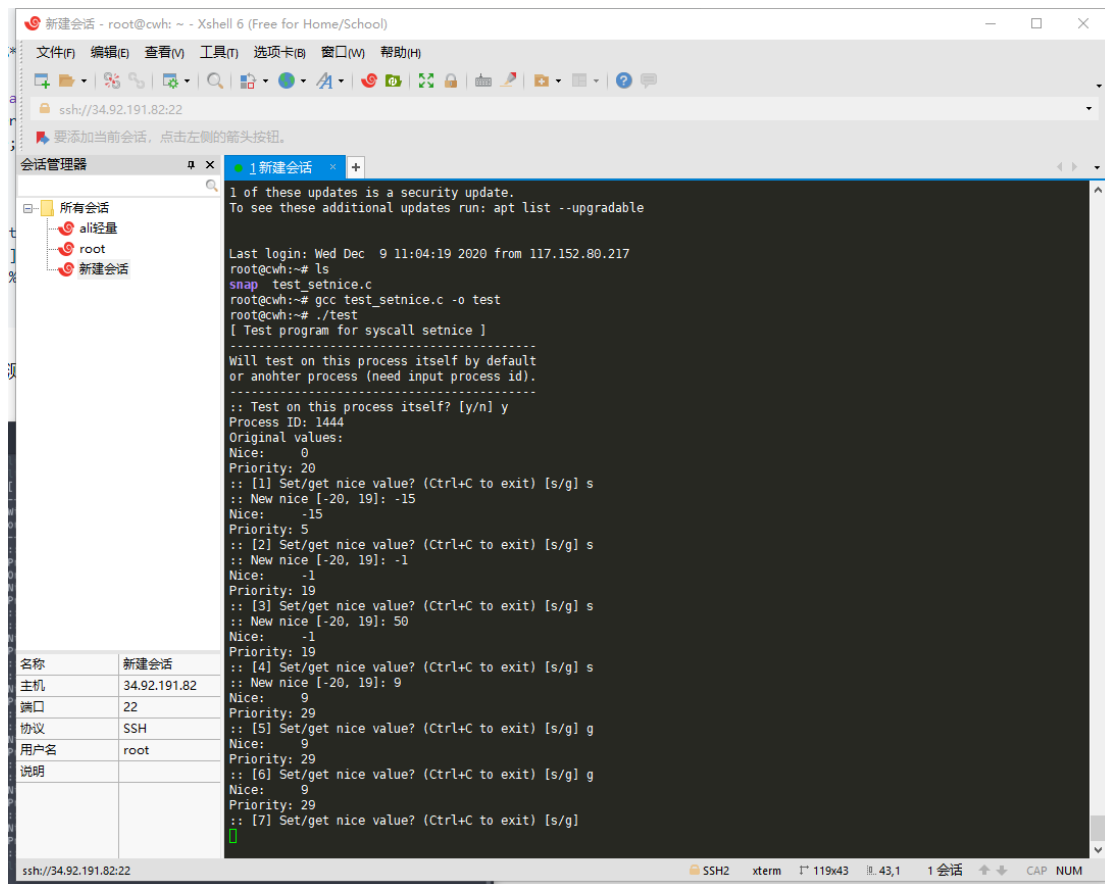
System information as of Wed Dec  9 12:32:10 UTC 2020

System load:  1.96           Processes:            246
Usage of /:   46.1% of 57.98GB Users logged in:       0
Memory usage: 2%            IPv4 address for ens4: 10.170.0.5
Swap usage:   0%

4 updates can be installed immediately.
1 of these updates is a security update.
To see these additional updates run: apt list --upgradable

Last login: Wed Dec  9 11:04:19 2020 from 117.152.80.217
root@cwh:~#
```

2. 自定义函数测试



```
1 of these updates is a security update.
To see these additional updates run: apt list --upgradable

Last login: Wed Dec  9 11:04:19 2020 from 117.152.80.217
root@cw:~# ls
snap test_setnice.c
root@cw:~# gcc test_setnice.c -o test
root@cw:~# ./test
[ Test program for syscall setnice ]
.....
Will test on this process itself by default
or another process (need input process id).
.....
:: Test on this process itself? [y/n] y
Process ID: 1444
Original values:
Nice: 0
Priority: 20
:: [1] Set/get nice value? (Ctrl+C to exit) [s/g] s
:: New nice [-20, 19]: -15
Nice: -15
Priority: 5
:: [2] Set/get nice value? (Ctrl+C to exit) [s/g] s
:: New nice [-20, 19]: -1
Nice: -1
Priority: 19
:: [3] Set/get nice value? (Ctrl+C to exit) [s/g] s
:: New nice [-20, 19]: 50
Nice: -1
Priority: 19
:: [4] Set/get nice value? (Ctrl+C to exit) [s/g] s
:: New nice [-20, 19]: 9
Nice: 9
Priority: 29
:: [5] Set/get nice value? (Ctrl+C to exit) [s/g] g
Nice: 9
Priority: 29
:: [6] Set/get nice value? (Ctrl+C to exit) [s/g] g
Nice: 9
Priority: 29
:: [7] Set/get nice value? (Ctrl+C to exit) [s/g]
```

名称	新建会话
主机	34.92.191.82
端口	22
协议	SSH
用户名	root
说明	