



دانشکده مهندسی کامپیوتر

آزمایشگاه سیستم عامل

تمرین جلسه یازدهم

استاد : دکتر شیخی

پوریا رحیمی (۹۹۵۲۱۲۸۹)

```
rahimi_99521289@99521289: /lib/modules
rahimi_99521289@99521289:/lib/modules$ sudo touch cloner.c
rahimi_99521289@99521289:/lib/modules$ cat > cloner.c
#include<linux/init.h>
#include<linux/kernel.h>
#include<linux/module.h>

int simple_init(void)
{
    printk(KERN_INFO "Loading Module\n");
    return 0;
}

void simple_exit(void)
{
    printk(KERN_INFO "Removing Module\n");
}

module_init(simple_init);
module_exit(simple_exit);
MODULE_LICENSE("GPL");
MODULE_DESCRIPTION("Simple Module");
MODULE_AUTHOR("SGG");
^C
rahimi_99521289@99521289:/lib/modules$ cat cloner.c
#include<linux/init.h>
#include<linux/kernel.h>
#include<linux/module.h>

int simple_init(void)
{
    printk(KERN_INFO "Loading Module\n");
    return 0;
}

void simple_exit(void)
{
    printk(KERN_INFO "Removing Module\n");
}

module_init(simple_init);
module_exit(simple_exit);
MODULE_LICENSE("GPL");
MODULE_DESCRIPTION("Simple Module");
MODULE_AUTHOR("SGG");
rahimi_99521289@99521289:/lib/modules$ sudo touch Makefile
rahimi_99521289@99521289:/lib/modules$ cat > Makefile
obj-m += cloner.o
all:
    make -C /lib/modules/$(shell uname -r)/build M=$(shell pwd) modules
clean:
    make -C /lib/modules/$(shell uname -r)/build M=$(shell pwd) clean
```

```
MODULE_LICENSE("GPL");
MODULE_DESCRIPTION("Simple Module");
MODULE_AUTHOR("SGG");
rahimi_99521289@99521289:/lib/modules$ sudo touch Makefile
rahimi_99521289@99521289:/lib/modules$ cat > Makefile
obj-m += cloner.o
all:
    make -C /lib/modules/$(shell uname -r)/build M=$(shell pwd) modules
clean:
    make -C /lib/modules/$(shell uname -r)/build M=$(shell pwd) clean
^C
rahimi_99521289@99521289:/lib/modules$ cat Makefile
obj-m += cloner.o
all:
    make -C /lib/modules/$(shell uname -r)/build M=$(shell pwd) modules
clean:
    make -C /lib/modules/$(shell uname -r)/build M=$(shell pwd) clean
rahimi_99521289@99521289:/lib/modules$ sudo make
Makefile:3: *** missing separator.  Stop.
rahimi_99521289@99521289:/lib/modules$ ls
5.15.0-43-generic 5.19.0-32-generic 5.19.0-35-generic 5.19.0-41-generic 5.19.0-42-generic 5.19.0-43-generic cloner.c Makefile
rahimi_99521289@99521289:/lib/modules$ sudo make
Makefile:3: *** missing separator.  Stop.
rahimi_99521289@99521289:/lib/modules$ sudo chmod 777 Makefile
rahimi_99521289@99521289:/lib/modules$ sudo chmod 777 cloner.c
rahimi_99521289@99521289:/lib/modules$ sudo make
Makefile:3: *** missing separator.  Stop.
rahimi_99521289@99521289:/lib/modules$ sudo apt install make
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
make is already the newest version (4.3-4.1build1).
The following packages were automatically installed and are no longer required:
  chromium-codecs-ffmpeg-extra gstreamer1.0-vaapi i965-va-driver intel-media-va-driver libaacs0 libaom3 libass9 libavcodec58 libavformat58 libavutil56 libbdplus0 libbluray2 libbs2b0
  libchromaprint1 libcodec2-1.0 libdav1d5 libflite1 libgme0 libgsm1 libgstreamer-plugins-bad1.0-0 libigdgmm12 liblilv-0-0 libllvm15 libmfx1 libmysofa1 libnorm1 libopenmpt0
  libpgm-5.3-0 libpostproc55 librabbitmq4 librubberband2 libserd-0-0 libshine3 libsnappy1v5 libsord-0-0 libsratom-0-0 libsrtp1.4-gnutls libssh-gcrypt-4 libswresample3 libswscale5
  libudfread0 libva-drm2 libva-wayland2 libva-x11-2 libva2 libvdpau libvidstab1.1 libx265-199 libxvidcore4 libzimg2 libzmq5 libzvbi-common libzvbi0 mesa-va-drivers
  mesa-vdpau-drivers pocketsphinx-en-us va-driver-all vdpau-driver-all
Use 'sudo apt autoremove' to remove them.
0 upgraded, 0 newly installed, 0 to remove and 240 not upgraded.
rahimi_99521289@99521289:/lib/modules$ sudo make
Makefile:3: *** missing separator.  Stop.
rahimi_99521289@99521289:/lib/modules$ sudo cat Makefile
obj-m += cloner.o
all:
    make -C /lib/modules/$(shell uname -r)/build M=$(shell pwd) modules
clean:
    make -C /lib/modules/$(shell uname -r)/build M=$(shell pwd) clean
rahimi_99521289@99521289:/lib/modules$ ls
5.15.0-43-generic 5.19.0-32-generic 5.19.0-35-generic 5.19.0-41-generic 5.19.0-42-generic 5.19.0-43-generic cloner.c Makefile
rahimi_99521289@99521289:/lib/modules$ sudo make
Makefile:3: *** missing separator.  Stop.
rahimi_99521289@99521289:/lib/modules$ sudo nano Makefile
```

```

rahimi_99521289@99521289: /lib/modules
rahimi_99521289@99521289:/lib/modules$ ls
5.15.0-43-generic 5.19.0-32-generic 5.19.0-35-generic 5.19.0-41-generic 5.19.0-42-generic 5.19.0-43-generic cloner.c Makefile
rahimi_99521289@99521289:/lib/modules$ sudo make
Makefile:3: *** missing separator. Stop.
rahimi_99521289@99521289:/lib/modules$ sudo nano Makefile
rahimi_99521289@99521289:/lib/modules$ sudo make
Makefile:2: *** missing separator. Stop.
rahimi_99521289@99521289:/lib/modules$ sudo cat Makefile
obj-m += cloner.o
make -C /lib/modules/$(shell uname -r)/build M=$(shell pwd) modules
rahimi_99521289@99521289:/lib/modules$ sudo nano Makefile
rahimi_99521289@99521289:/lib/modules$ sudo make
make -C /lib/modules/5.19.0-43-generic/build M=/usr/lib/modules modules
make[1]: Entering directory '/usr/src/linux-headers-5.19.0-43-generic'
warning: the compiler differs from the one used to build the kernel
The kernel was built by: x86_64-linux-gnu-gcc (Ubuntu 11.3.0-1ubuntu1~22.04.1) 11.3.0
You are using: gcc (Ubuntu 11.3.0-1ubuntu1~22.04.1) 11.3.0
CC [M] /usr/lib/modules/cloner.o
MODPOST /usr/lib/modules/Module.symvers
CC [M] /usr/lib/modules/cloner.mod.o
LD [M] /usr/lib/modules/cloner.ko
BTF [M] /usr/lib/modules/cloner.ko
Skipping BTF generation for /usr/lib/modules/cloner.ko due to unavailability of vmlinux
make[1]: Leaving directory '/usr/src/linux-headers-5.19.0-43-generic'
rahimi_99521289@99521289:/lib/modules$ ls
5.15.0-43-generic 5.19.0-35-generic 5.19.0-42-generic cloner.c cloner.mod cloner.mod.o Makefile Module.symvers
5.19.0-32-generic 5.19.0-41-generic 5.19.0-43-generic cloner.ko cloner.mod.c cloner.o modules.order
rahimi_99521289@99521289:/lib/modules$ sudo dmesg
[ 0.000000] Linux version 5.19.0-43-generic (build@lcy02-amd64-028) (x86_64-linux-gnu-gcc (Ubuntu 11.3.0-1ubuntu1~22.04.1) 11.3.0, GNU ld (GNU Binutils for Ubuntu) 2.38) #44~22.04.1-Ubuntu SMP PREEMPT_DYNAMIC Mon May 22 13:39:36 UTC 2 (Ubuntu 5.19.0-43.44~22.04.1-generic 5.19.17)
[ 0.000000] Command line: BOOT_IMAGE=/boot/vmlinuz-5.19.0-43-generic root=UUID=36c3622f-3546-4ee3-98f4-5679c87715e1 ro quiet splash
[ 0.000000] KERNEL supported cpus:
[ 0.000000] Intel GenuineIntel
[ 0.000000] AMD AuthenticAMD
[ 0.000000] Hygon HygonGenuine
[ 0.000000] Centaur CentaurHauls
[ 0.000000] zhaoxin Shanghai
[ 0.000000] Disabled fast string operations
[ 0.000000] x86/fpu: Supporting XSAVE feature 0x001: 'x87 floating point registers'
[ 0.000000] x86/fpu: Supporting XSAVE feature 0x002: 'SSE registers'
[ 0.000000] x86/fpu: Supporting XSAVE feature 0x004: 'AVX registers'
[ 0.000000] x86/fpu: xstate_offset[2]: 576, xstate_sizes[2]: 256
[ 0.000000] x86/fpu: Enabled xstate features 0x7, context size is 832 bytes, using 'compacted' format.
[ 0.000000] signal: max sigframe size: 1776
[ 0.000000] BIOS-provided physical RAM map:
[ 0.000000] BIOS-e820: [mem 0x0000000000000000-0x00000000000009e7ff] usable
[ 0.000000] BIOS-e820: [mem 0x00000000000009e800-0x00000000000009ffff] reserved
[ 0.000000] BIOS-e820: [mem 0x0000000000000dc000-0x0000000000000fffff] reserved
[ 0.000000] BIOS-e820: [mem 0x0000000000100000-0x000000000bfecfffff] usable
[ 0.000000] BIOS-e820: [mem 0x000000000bfed0000-0x000000000bfefeffff] ACPI data
[ 0.000000] BIOS-e820: [mem 0x000000000bfeff000-0x000000000bfeffffff] ACPI NVS
[ 0.000000] BIOS-e820: [mem 0x000000000bff00000-0x000000000bfffffff] usable
[ 0.000000] BIOS-e820: [mem 0x000000000f0000000-0x000000000f7fffffff] reserved

```

Q1)

rahimi_99521289@99521289: /lib/modules

```

[ 2170.13300] audit: type=1400 audit(1608101700.000:73): apparmor=STATUS operation=profile_replace profile=unconfined name=/snap/sharps-desktop-integration/sharps-desktop-integration pid=4390 comm="apparmor_parser"
rahimi_99521289@99521289: /lib/modules$ sudo dmesg
rahimi_99521289@99521289: /lib/modules$ sudo dmesg -c
rahimi_99521289@99521289: /lib/modules$ ls
5.15.0-43-generic 5.19.0-35-generic 5.19.0-42-generic cloner.c      cloner.mod      cloner.mod.o    Makefile      Module.symvers
5.19.0-32-generic 5.19.0-41-generic 5.19.0-43-generic cloner.ko     cloner.mod.c    cloner.o        modules.order
rahimi_99521289@99521289: /lib/modules$ sudo insmod cloner.ko
rahimi_99521289@99521289: /lib/modules$ lsmod
Module                Size  Used by
cloner                 16384  0
isofs                  53248  1
vsock_loopback        16384  0
vmw_vsock_virtio_transport_common  45056  1 vsock_loopback
vmw_vsock_vmci_transport 32768  2
vsock                  49152  7 vmw_vsock_virtio_transport_common,vsock_loopback,vmw_vsock_vmci_transport
binfmt_misc           24576  1
intel_rapl_msr         20480  0
intel_rapl_common     40960  1 intel_rapl_msr
snd_ens1371            28672  2
crct10dif_pclmul       16384  1
snd_ac97_codec         176128  1 snd_ens1371
ghash_clmulni_intel    16384  0
gameport              24576  1 snd_ens1371
ac97_bus               16384  1 snd_ac97_codec
nls_iso8859_1          16384  1
vmw_balloon            28672  0
snd_pcm               159744  2 snd_ac97_codec,snd_ens1371
aesni_intel           376832  0
crypto_simd            16384  1 aesni_intel
cryptd                 24576  2 crypto_simd,ghash_clmulni_intel
rapl                   20480  0
snd_seq_midi           20480  0
snd_seq_midi_event     16384  1 snd_seq_midi
snd_rawmidi            45056  2 snd_seq_midi,snd_ens1371
snd_seq                77824  2 snd_seq_midi,snd_seq_midi_event
snd_seq_device         16384  3 snd_seq,snd_seq_midi,snd_rawmidi
snd_timer              40960  2 snd_seq,snd_pcm
joydev                 32768  0
input_leds             16384  0
serio_raw              20480  0
snd                    114688  11 snd_seq,snd_seq_device,snd_timer,snd_ac97_codec,snd_pcm,snd_rawmidi,snd_ens1371
vmw_vmci               90112  2 vmw_balloon,vmw_vsock_vmci_transport
soundcore              16384  1 snd
mac_hid                16384  0
sch_fq_codel           24576  2
vmwgfx                 372736  11
drm_ttm_helper         16384  1 vmwgfx
ttm                    98304  2 vmwgfx,drm_ttm_helper
drm_kms_helper         200704  1 vmwgfx
fb_sys_fops            16384  1 drm_kms_helper
syscopyarea            16384  1 drm_kms_helper
sysfillrect            20480  1 drm_kms_helper
sysimgblt              20480  1 drm_kms_helper

```

```
rahimi_99521289@99521289:/lib/modules$
rahimi_99521289@99521289:/lib/modules$ sudo dmesg
[ 5217.492063] cloner: loading out-of-tree module taints kernel.
[ 5217.492163] cloner: module verification failed: signature and/or required key missing - tainting kernel
[ 5217.492707] Loading Module
rahimi_99521289@99521289:/lib/modules$ sudo rmmod cloner
rahimi_99521289@99521289:/lib/modules$ lsmod
Module                  Size  Used by
isofs                   53248  1
vsock_loopback         16384  0
vmw_vsock_virtio_transport_common 45056  1 vsock_loopback
vmw_vsock_vmci_transport 32768  2
vsock                   49152  7 vmw_vsock_virtio_transport_common,vsock_loopback,vmw_vsock_vmci_transport
binfmt_misc            24576  1
intel_rapl_msr         20480  0
intel_rapl_common      40960  1 intel_rapl_msr
snd_ens1371            28672  2
crc10dif_pclmul        16384  1
snd_ac97_codec         176128  1 snd_ens1371
ghash_clmulni_intel    16384  0
gameport               24576  1 snd_ens1371
ac97_bus               16384  1 snd_ac97_codec
nls_iso8859_1          16384  1
vmw_balloon            28672  0
snd_pcm                159744  2 snd_ac97_codec,snd_ens1371
aesni_intel            376832  0
crypto_simd            16384  1 aesni_intel
cryptd                 24576  2 crypto_simd,ghash_clmulni_intel
rapl                   20480  0
snd_seq_midi           20480  0
snd_seq_midi_event     16384  1 snd_seq_midi
snd_rawmidi            45056  2 snd_seq_midi,snd_ens1371
snd_seq                77824  2 snd_seq_midi,snd_seq_midi_event
snd_seq_device         16384  3 snd_seq,snd_seq_midi,snd_rawmidi
snd_timer              40960  2 snd_seq,snd_pcm
joydev                 32768  0
input_leds             16384  0
serio_raw              20480  0
snd                    114688  11 snd_seq,snd_seq_device,snd_timer,snd_ac97_codec,snd_pcm,snd_rawmidi,snd_ens1371
vmw_vmci               90112  2 vmw_balloon,vmw_vsock_vmci_transport
soundcore              16384  1 snd
mac_hid               16384  0
sch_fq_codel           24576  2
vmwgfx                 372736  11
drm_ttm_helper         16384  1 vmwgfx
ttm                    98304  2 vmwgfx,drm_ttm_helper
drm_kms_helper         200704  1 vmwgfx
fb_sys_fops            16384  1 drm_kms_helper
syscopyarea            16384  1 drm_kms_helper
sysfillrect            20480  1 drm_kms_helper
sysimgblt              20480  1 drm_kms_helper
ipmi_devintf           20480  0
ipmi_msg_handler       77824  1 ipmi_devintf
```

Q2)

rahimi_99521289@99521289: /lib/modules

```
rahimi_99521289@99521289:/lib/modules$ sudo make
make -C /lib/modules/5.19.0-43-generic/build M=/usr/lib/modules modules
make[1]: Entering directory '/usr/src/linux-headers-5.19.0-43-generic'
warning: the compiler differs from the one used to build the kernel
  The kernel was built by: x86_64-linux-gnu-gcc (Ubuntu 11.3.0-1ubuntu1~22.04.1) 11.3.0
  You are using:          gcc (Ubuntu 11.3.0-1ubuntu1~22.04.1) 11.3.0
  CC [M] /usr/lib/modules/cloner2.o
  MODPOST /usr/lib/modules/Module.symvers
  CC [M] /usr/lib/modules/cloner2.mod.o
  LD [M] /usr/lib/modules/cloner2.ko
  BTF [M] /usr/lib/modules/cloner2.ko
Skipping BTF generation for /usr/lib/modules/cloner2.ko due to unavailability of vmlinux
make[1]: Leaving directory '/usr/src/linux-headers-5.19.0-43-generic'
rahimi_99521289@99521289:/lib/modules$ dmesg -c
dmesg: read kernel buffer failed: Operation not permitted
rahimi_99521289@99521289:/lib/modules$ sudo insmod cloner2.ko
rahimi_99521289@99521289:/lib/modules$ lsmod
Module                  Size  Used by
cloner2                  16384  0
isofs                    53248  1
vsock_loopback          16384  0
vmw_vsock_virtio_transport_common 45056  1 vsock_loopback
vmw_vsock_vmci_transport 32768  2
vsock                    49152  7 vmw_vsock_virtio_transport_common,vsock_loopback,vmw_vsock_vmci_transport
binfmt_misc             24576  1
intel_rapl_msr          20480  0
intel_rapl_common       40960  1 intel_rapl_msr
snd_ens1371              28672  2
crc10dif_pclmul         16384  1
snd_ac97_codec          176128  1 snd_ens1371
ghash_clmulni_intel     16384  0
gameport                24576  1 snd_ens1371
ac97_bus                 16384  1 snd_ac97_codec
nls_iso8859_1           16384  1
vmw_balloon             28672  0
snd_pcm                 159744  2 snd_ac97_codec,snd_ens1371
aesni_intel             376832  0
crypto_simd             16384  1 aesni_intel
cryptd                   24576  2 crypto_simd,ghash_clmulni_intel
rapl                    20480  0
snd_seq_midi            20480  0
snd_seq_midi_event      16384  1 snd_seq_midi
snd_rawmidi             45056  2 snd_seq_midi,snd_ens1371
snd_seq                 77824  2 snd_seq_midi,snd_seq_midi_event
snd_seq_device          16384  3 snd_seq,snd_seq_midi,snd_rawmidi
snd_timer               40960  2 snd_seq,snd_pcm
joydev                  32768  0
input_leds              16384  0
serio_raw               20480  0
snd                     114688  11 snd_seq,snd_seq_device,snd_timer,snd_ac97_codec,snd_pcm,snd_rawmidi,snd_ens1371
vmw_vmci                90112  2 vmw_balloon,vmw_vsock_vmci_transport
soundcore               16384  1 snd
mac_hid                 16384  0
```

Q2)

rahimi_99521289@99521289: /lib/modules

```
sysfillrect      20480 1 drm_kms_helper
sysimgblt        20480 1 drm_kms_helper
ipmi_devintf     20480 0
ipmi_msghandler  77824 1 ipmi_devintf
msr              16384 0
parport_pc      53248 0
ppdev           24576 0
lp              28672 0
parport         73728 3 parport_pc,lp,ppdev
ramoops         32768 0
pstore_blk      16384 0
reed_solomon    28672 1 ramoops
pstore_zone     32768 1 pstore_blk
efi_pstore      16384 0
drm             581632 13 vmwgfx,drm_kms_helper,drm_ttm_helper,ttm
ip_tables       32768 0
x_tables        57344 1 ip_tables
autofs4         45056 2
hid_generic     16384 0
usbhid          65536 0
el1000         159744 0
hid             159744 2 usbhid,hid_generic
ahci            49152 1
libahci         49152 1 ahci
crc32_pclmul    16384 0
psmouse        180224 0
mptspi          24576 2
mptscsih        49152 1 mptspi
mptbase         106496 2 mptspi,mptscsih
i2c_piix4       32768 0
scsi_transport_spi 32768 1 mptspi
pata_acpi       16384 0
```

```
rahimi_99521289@99521289:/lib/modules$ sudo dmesg
```

```
[ 7286.951403] Loading Module Birthday
[ 7286.951406] Birthday: 7/6/1381
[ 7286.951407] Birthday: 8/9/1380
[ 7286.951408] Birthday: 9/9/1385
[ 7286.951409] Birthday: 3/2/1380
[ 7286.951409] Birthday: 4/10/1370
[ 7333.061167] Removing Module Birthday
[ 7333.061170] Removing Birthday: 7/6/1381
[ 7333.061171] Removing Birthday: 8/9/1380
[ 7333.061172] Removing Birthday: 9/9/1385
[ 7333.061172] Removing Birthday: 3/2/1380
[ 7333.061173] Removing Birthday: 4/10/1370
[ 7751.848350] Loading Module Birthday
[ 7751.848352] Birthday: 1/12/1380
[ 7751.848353] Birthday: 2/11/1381
[ 7751.848354] Birthday: 3/10/1382
[ 7751.848354] Birthday: 4/9/1383
[ 7751.848355] Birthday: 5/8/1384
```

```
rahimi_99521289@99521289:/lib/modules$ sudo rmmod cloner2
```

```
rahimi_99521289@99521289:/lib/modules$ lsmod
```


Q2)

rahimi_99521289@99521289: /lib/modules

```
[ 7751.848352] Birthday: 1/12/1380
[ 7751.848353] Birthday: 2/11/1381
[ 7751.848354] Birthday: 3/10/1382
[ 7751.848354] Birthday: 4/9/1383
[ 7751.848355] Birthday: 5/8/1384
```

```
rahimi_99521289@99521289:/lib/modules$ sudo rmmod cloner2
```

```
rahimi_99521289@99521289:/lib/modules$ lsmod
```

Module	Size	Used by
isofs	53248	1
vsock_loopback	16384	0
vmw_vsock_virtio_transport_common	45056	1 vsock_loopback
vmw_vsock_vmci_transport	32768	2
vsock	49152	7 vmw_vsock_virtio_transport_common,vsock_loopback,vmw_vsock_vmci_transport
binfmt_misc	24576	1
intel_rapl_msr	20480	0
intel_rapl_common	40960	1 intel_rapl_msr
snd_ens1371	28672	2
crct10dif_pclmul	16384	1
snd_ac97_codec	176128	1 snd_ens1371
ghash_clmulni_intel	16384	0
gameport	24576	1 snd_ens1371
ac97_bus	16384	1 snd_ac97_codec
nls_iso8859_1	16384	1
vmw_balloon	28672	0
snd_pcm	159744	2 snd_ac97_codec,snd_ens1371
aesni_intel	376832	0
crypto_simd	16384	1 aesni_intel
cryptd	24576	2 crypto_simd,ghash_clmulni_intel
rapl	20480	0
snd_seq_midi	20480	0
snd_seq_midi_event	16384	1 snd_seq_midi
snd_rawmidi	45056	2 snd_seq_midi,snd_ens1371
snd_seq	77824	2 snd_seq_midi,snd_seq_midi_event
snd_seq_device	16384	3 snd_seq,snd_seq_midi,snd_rawmidi
snd_timer	40960	2 snd_seq,snd_pcm
joydev	32768	0
input_leds	16384	0
serio_raw	20480	0
snd	114688	11 snd_seq,snd_seq_device,snd_timer,snd_ac97_codec,snd_pcm,snd_rawmidi,snd_ens1371
vmw_vmci	90112	2 vmw_balloon,vmw_vsock_vmci_transport
soundcore	16384	1 snd
mac_hid	16384	0
sch_fq_codel	24576	2
vmwgfx	372736	11
drm_ttm_helper	16384	1 vmwgfx
ttm	98304	2 vmwgfx,drm_ttm_helper
drm_kms_helper	200704	1 vmwgfx
fb_sys_fops	16384	1 drm_kms_helper
syscopyarea	16384	1 drm_kms_helper
sysfillrect	20480	1 drm_kms_helper
sysimgblt	20480	1 drm_kms_helper
ipmi_devintf	20480	0
ipmi_msghandler	77824	1 ipmi_devintf

Q2)

rahimi_99521289@99521289: /lib/modules

```
ppdev          24576  0
lp             28672  0
parport        73728  3 parport_pc,lp,ppdev
ramoops        32768  0
pstore_blk     16384  0
reed_solomon   28672  1 ramoops
pstore_zone    32768  1 pstore_blk
efi_pstore     16384  0
drm            581632 13 vmwgfx,drm_kms_helper,drm_ttm_helper,ttm
ip_tables      32768  0
x_tables       57344  1 ip_tables
autofs4        45056  2
hid_generic    16384  0
usbhid         65536  0
e1000          159744  0
hid            159744  2 usbhid,hid_generic
ahci           49152  1
libahci        49152  1 ahci
crc32_pclmul   16384  0
psmouse       180224  0
mptspi         24576  2
mptscsih       49152  1 mptspi
mptbase        106496  2 mptspi,mptscsih
i2c_piix4      32768  0
scsi_transport_spi 32768  1 mptspi
pata_acpi      16384  0
```

```
rahimi_99521289@99521289:/lib/modules$ sudo dmesg
```

```
[ 7286.951403] Loading Module Birthday
[ 7286.951406] Birthday: 7/6/1381
[ 7286.951407] Birthday: 8/9/1380
[ 7286.951408] Birthday: 9/9/1385
[ 7286.951409] Birthday: 3/2/1380
[ 7286.951409] Birthday: 4/10/1370
[ 7333.061167] Removing Module Birthday
[ 7333.061170] Removing Birthday: 7/6/1381
[ 7333.061171] Removing Birthday: 8/9/1380
[ 7333.061172] Removing Birthday: 9/9/1385
[ 7333.061172] Removing Birthday: 3/2/1380
[ 7333.061173] Removing Birthday: 4/10/1370
[ 7751.848350] Loading Module Birthday
[ 7751.848352] Birthday: 1/12/1380
[ 7751.848353] Birthday: 2/11/1381
[ 7751.848354] Birthday: 3/10/1382
[ 7751.848354] Birthday: 4/9/1383
[ 7751.848355] Birthday: 5/8/1384
[ 7807.055046] Removing Module Birthday
[ 7807.055049] Removing Birthday: 1/12/1380
[ 7807.055050] Removing Birthday: 2/11/1381
[ 7807.055051] Removing Birthday: 3/10/1382
[ 7807.055052] Removing Birthday: 4/9/1383
[ 7807.055053] Removing Birthday: 5/8/1384
```

```
rahimi_99521289@99521289:/lib/modules$
```