

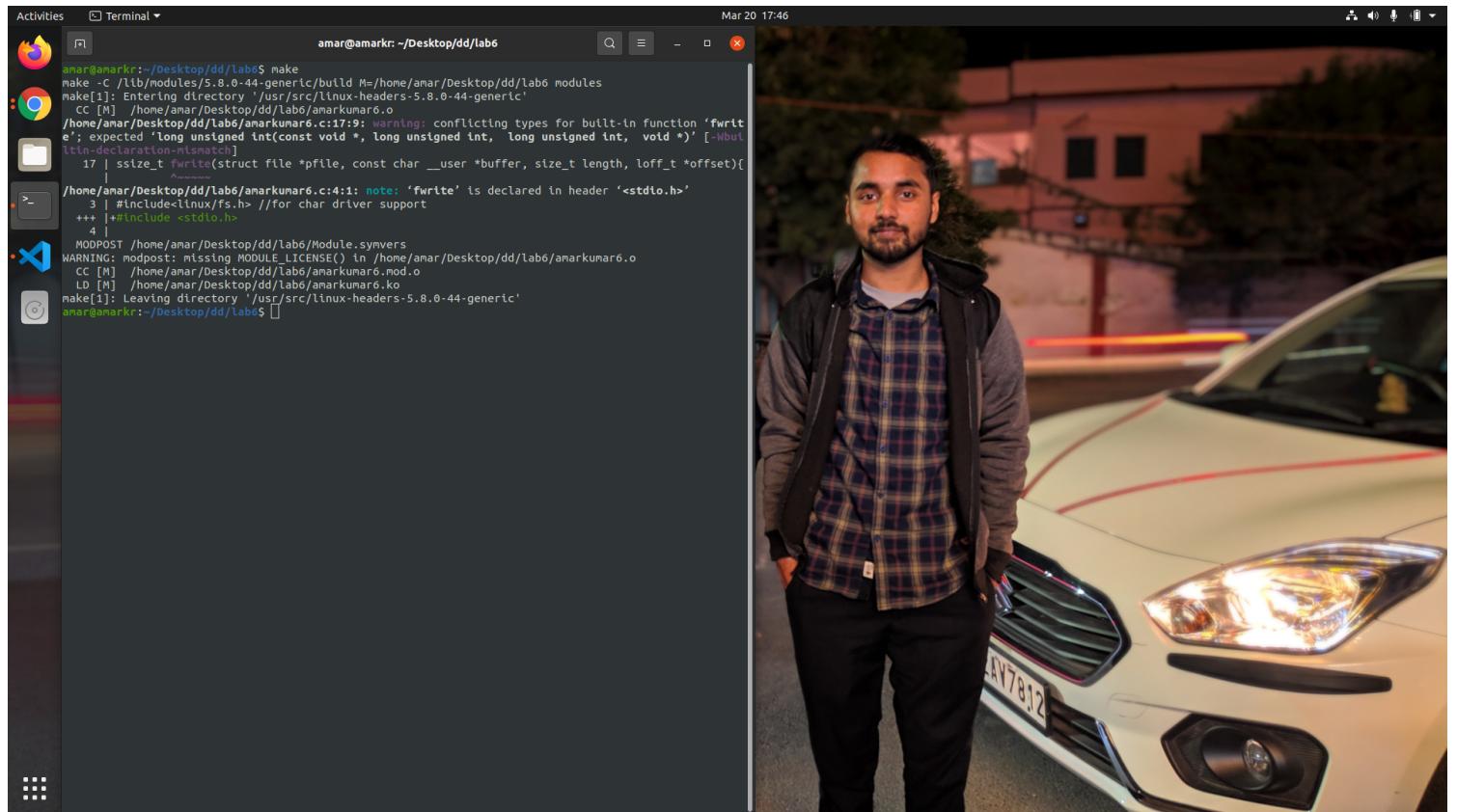


INDIAN INSTITUTE OF INFORMATION TECHNOLOGY DESIGN AND MANUFACTURING KANCHEEPURAM

REPORT ON

**Write a simple Char Device Driver. Test it by using passing
on data.**

**SUBMITTED BY
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TO
DR. SANKARAN VAIDYANATHAN**



Making the kernel object file using **make** command

Activities Terminal Mar 20 17:47

```
amar@amarkr:~/Desktop/dd/lab6$ make
make -C /lib/modules/5.8.0-44-generic/build M=/home/amar/Desktop/dd/lab6 modules
make[1]: Entering directory '/usr/src/linux-headers-5.8.0-44-generic'
  CC [M] /home/amar/Desktop/dd/lab6/amarkumar6.o
/home/amar/Desktop/dd/lab6/amarkumar6.c:17:9: warning: conflicting types for built-in function 'fwrite'
  e'; expected 'long unsigned int(const void *, long unsigned int, long unsigned int, void *)' [-Wbuiltin-declaration-mismatch]
  17 | ssize_t fwrite(struct file *file, const char __user *buffer, size_t length, loff_t *offset){
      | ~~~~~
/home/amar/Desktop/dd/lab6/amarkumar6.c:4:1: note: 'fwrite' is declared in header '<stdio.h>'
  3 | #include<linux/fs.h> //for char driver support
  +++ |#include <stdio.h>
  4 |
MODPOST /home/amar/Desktop/dd/lab6/Module.symvers
WARNING: modpost: missing MODULE_LICENSE() in /home/amar/Desktop/dd/lab6/amarkumar6.o
  CC [M] /home/amar/Desktop/dd/lab6/amarkumar6.mod.o
  LD [M] /home/amar/Desktop/dd/lab6/amarkumar6.ko
make[1]: Leaving directory '/usr/src/linux-headers-5.8.0-44-generic'
amar@amarkr:~/Desktop/dd/lab6$ lsmod
Module           Size Used by
rfcomm            81920  4
usbhid            57344  0
ccm               20480  3
cnac              16384  3
algif_hash        16384  1
algif_skcipher   16384  1
af_alg             28672  6 algif_hash,algif_skcipher
bnef              24576  2
nls_iso8859_1    16384  1
snd_sof_pci       24576  0
snd_sof_intel_byt 20480  1 snd_sof_pci
uvctveo            98304  0
snd_soc_intel_ipc 20480  1 snd_sof_intel_byt
snd_soc_intel_hda_common 77824  1 snd_sof_pci
snd_soc_hdac_hda  24576  1 snd_soc_intel_hda_common
snd_soc_xtensa_dsp 16384  2 snd_soc_intel_hda_common,snd_sof_intel_byt
snd_soc_intel_hda  20480  1 snd_soc_intel_hda_common
snd_soc           122880  4 snd_sof_pci,snd_sof_intel_hda_common,snd_sof_intel_byt,snd_sof_intel_ipc
snd_hda_ext_core  32768  3 snd_soc_intel_hda_common,snd_soc_hdac_hda,snd_sof_intel_hda
snd_soc_acpi_intel_match 45056  2 snd_sof_pci,snd_sof_intel_hda_common
snd_soc_acpi        16384  3 snd_soc_acpi_intel_match,snd_soc_intel_hda_common,snd_sof_intel_byt
nvidia_uvm        1011712  0
snd_soc_core       270336  3 snd_sof,snd_sof_intel_hda_common,snd_soc_hdac_hda
nvidia_drm         49152  10
nvidia_modeset    1183744  14 nvidia_drm
snd_hda_codec_realtek 128976  1
snd_hda_codec_generic 81920  1 snd_hda_codec_realtek
snd_compress        28672  1 snd_soc_core
ac97_bus            16384  1 snd_soc_core
led_igc_audio       16384  2 snd_hda_codec_generic,snd_sof
snd_pcm_dmaengine  16384  1 snd_soc_core
nvidia             1974816  652 nvidia_uvm,nvidia_modeset
i915              2195456  6
x86_pkg_temp_thermal 20480  0
intel_powerclamp   20480  0
```



Listing modules before inserting

Activities Terminal Mar 20 17:48
amar@amarkr: ~/Desktop/dd/lab6

```
i2c_hid      28672  0
libahc      36864  1 ahci
virt_dma    20480  1 idma64
xhci_pci_renesas  20480  1 xhci_pci
hid        135168  4 i2c_hid,usbhid,hid_generic,hid_rmi
wmi        32768  3 intel_wmi_thunderbolt,wmi_bmof,ideapad_laptop
video       49152  2 ideapad_laptop,t915
pinctrl_cannonlake  36864  0
pinctrl_intel   28672  1 pinctrl_cannonlake
amar@amarkr:~/Desktop/dd/lab6$ sudo insmod amarkumar6.ko
[sudo] password for amar:
amar@amarkr:~/Desktop/dd/lab6$ lsmod
Module           SSize  Used by
anarkumar6        16384  0
rfcomm            81920  4
usbhid            57344  0
ccm              20480  3
cnac             16384  3
algif_hash        16384  1
algif_skcipher   16384  2
af_alg            28672  6 algif_hash,algif_skcipher
bnef             24576  2
nls_iso8859_1   16384  1
snd_soc_pci      24576  0
snd_soc_intel_byt  20480  1 snd_soc_pci
uvccvideo        98364  0
snd_soc_intel_ipc 20480  1 snd_soc_intel_byt
snd_soc_intel_hda_common 77824  1 snd_soc_pci
snd_soc_hdac_hda 24576  1 snd_soc_intel_hda_common
snd_soc_xtensa_dsp 16384  2 snd_soc_intel_hda_common,snd_soc_intel_byt
snd_soc_intel_hda 20480  1 snd_soc_intel_hda_common
snd_soc           122880  4 snd_soc_pci,snd_soc_intel_hda_common,snd_soc_intel_byt,snd_soc_intel_ipc
snd_hda_ext_core 32768  3 snd_soc_intel_hda_common,snd_soc_hdac_hda,snd_soc_intel_hda
snd_soc_acpi_intel_match 45056  2 snd_soc_pci,snd_soc_intel_hda_common
snd_soc_acpi     16384  3 snd_soc_acpi_intel_match,snd_soc_intel_hda_common,snd_soc_intel_byt
nvidia          1011712  0
snd_soc_core    270336  3 snd_soc,snd_soc_intel_hda_common,snd_soc_hdac_hda
nvidia_drm      49152  10
nvidia_modeset 1183744  14 nvidia_drm
snd_hda_codec_realtek 126976  1
snd_hda_codec_generic 81920  1 snd_hda.codec_realtek
snd_compress     28672  1 snd_soc_core
ac97_bus         16384  1 snd_soc_core
ledtrig_audio   16384  2 snd_hda.codec_generic,snd_soc
snd_pcm_dmaengine 16384  1 snd_soc_core
nvidia          19746816  652 nvidia_uvm,nvidia_modeset
i915          2195456  6
x86_pkg_temp_thermal 29480  0
intel_powerclamp 20480  0
coretemp        20480  0
iwlmmw        393216  0
kvm_intel      286720  0
snd_hda_codec_hdmi 61440  2
drm_kms_helper 217088  2 nvidia_drm,i915
i2c_algo_bit    16384  1 i915
```



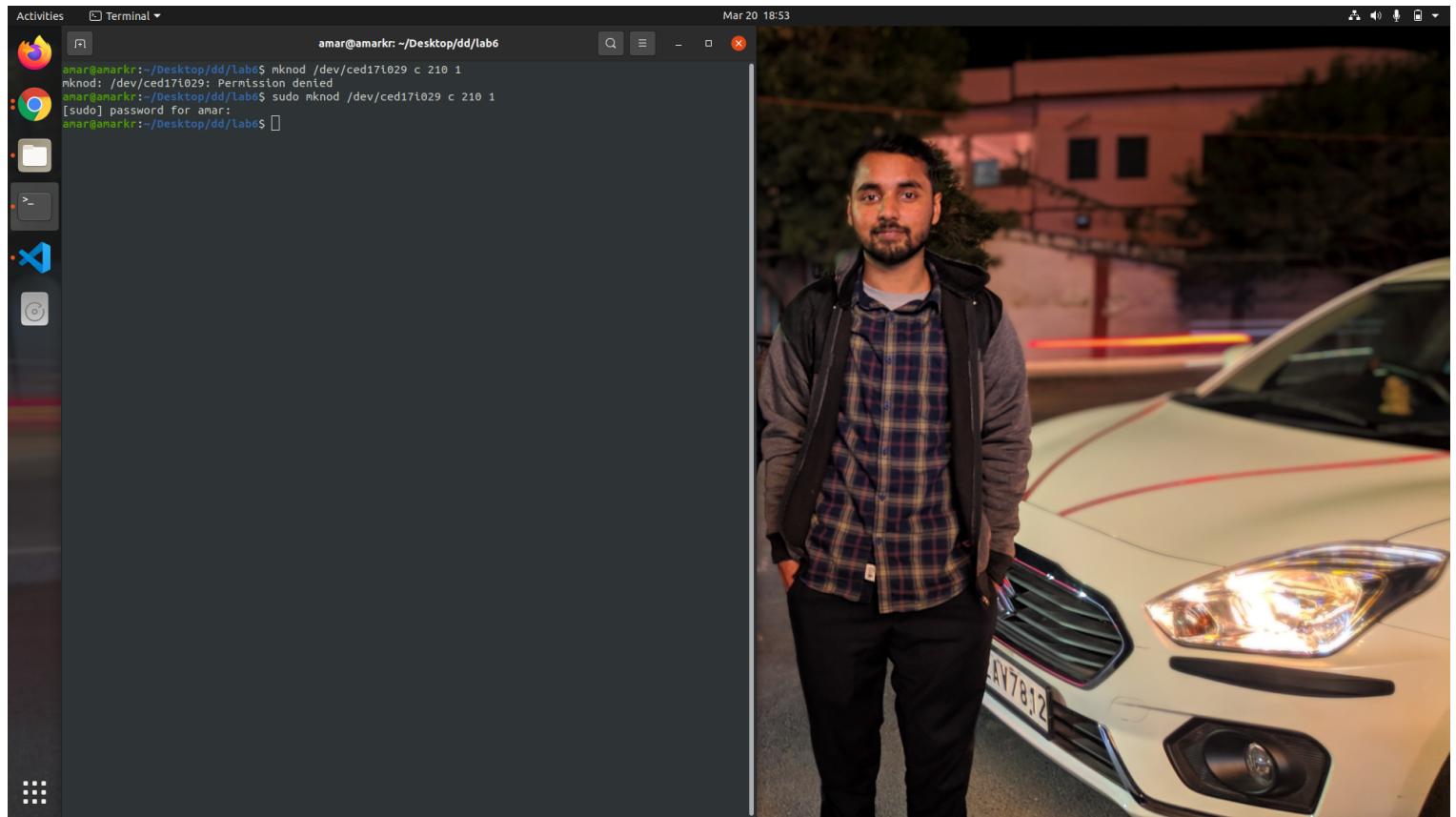
Inserting module and then listing module

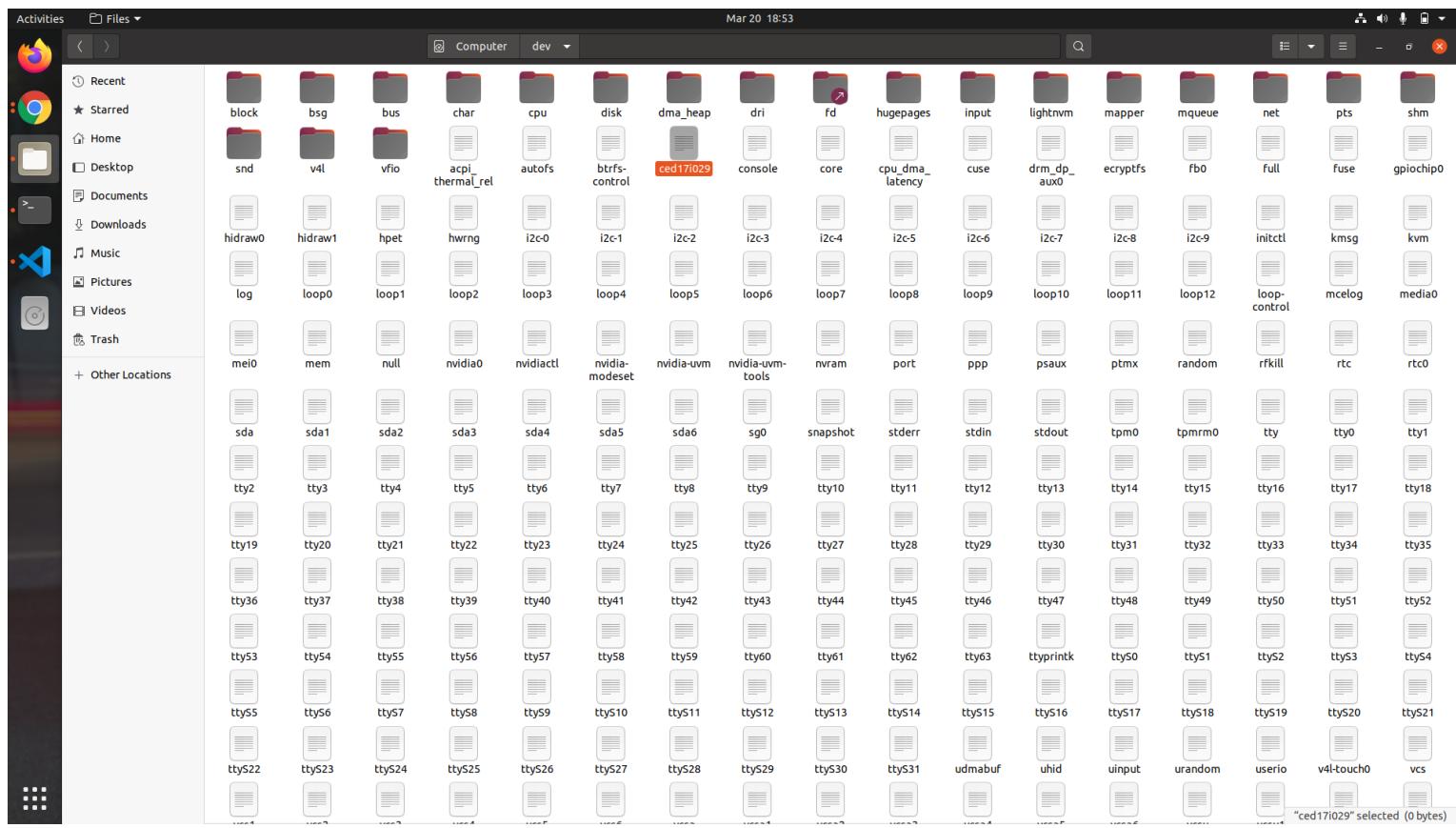
Activities Terminal Mar 20 18:11

```
amar@amarkr: ~/Desktop/dd/lab6
pinctrl_intel      28672  1 pinctrl_cannonlake
amar@amarkr:~/Desktop/dd/lab6$ cat /proc/devices
Character devices:
 1 mem
 4 /dev/vc/0
 4 tty
 4 ttys
 5 /dev/ttys
 5 /dev/console
 5 /dev/ptmx
 5 ttypunkt
 6 lp
 7 vcs
10 misc
13 input
21 sg
29 fb
81 video4linux
89 i2c
99 ppdev
108 ppp
116 alsas
128 ptm
136 pts
180 usb
189 usb_device
195 nvidia-frontend
204 ttymAX
210 lab6 Amar Kumar - ced17i029
216 rfcomm
226 drm
234 nvidia-nvlink
235 nvidia-caps
236 aux
237 cec
238 BaseRemoteCtl
239 mel
240 media
241 ttynBC
242 hidraw
243 vfio
244 bsg
245 watchdog
246 ptp
247 pps
248 ttc
249 dma_heap
250 dax
251 dimwctl
252 ndctl
253 tpm
254 gpiochip
510 nvidia-uvm
511 nvidia-nvswitch
Block devices:
```

A photograph of a man with dark hair and a beard, wearing a blue and red plaid shirt under a grey hoodie, standing next to a white car. The car's headlights are on, and the background shows a blurred building and streetlights, indicating it's nighttime.

Listing out devices char devices and block devices





Activities Terminal amar@amarikr: ~/Desktop/dd/lab6 Mar 20 18:55



```
amar@amarikr:~/Desktop/dd/lab6
mknod: /dev/ced17i029: Permission denied
amar@amarikr:~/Desktop/dd/lab6$ sudo mknod /dev/ced17i029 c 210 1
[sudo] password for amar:
amar@amarikr:~/Desktop/dd/lab6$ echo "i am amar kumar" > /dev/ced17i029
bash: /dev/ced17i029: Permission denied
amar@amarikr:~/Desktop/dd/lab6$ sudo echo "i am amar kumar" > /dev/ced17i029
bash: /dev/ced17i029: Permission denied
amar@amarikr:~/Desktop/dd/lab6$ chmod a+r+w /dev/ced17i029
chmod: changing permissions of '/dev/ced17i029': Operation not permitted
amar@amarikr:~/Desktop/dd/lab6$ sudo chmod a+r+w /dev/ced17i029
amar@amarikr:~/Desktop/dd/lab6$ echo "i am amar kumar" > /dev/ced17i029
amar@amarikr:~/Desktop/dd/lab6$ 
```

String **i am amar kumar** has been passed as data to character driver

Activities Terminal Mar 20 18:56

```
amar@amarkr:~/Desktop/dd/lab6
amar@amarkr:~/Desktop/dd/lab6$ sudo rmmod amarkumar6
amar@amarkr:~/Desktop/dd/lab6$ lsmod
Module           Size  Used by
rfcomm            81920  4
usbhid            57344  0
ccm              20480  3
cmac              16384  3
algif_hash        16384  1
algif_skcipher   16384  1
af_alg             28672  6 algif_hash,algif_skcipher
bnep              24576  2
nls_iso8859_1    16384  1
snd_sof_pci       24576  0
snd_sof_intel_byt 28480  1 snd_sof_pci
snd_sof_intel_ipc 28480  1 snd_sof_intel_byt
snd_sof_intel_hda_common 77824  1 snd_sof_pci
snd_soc_hdac_hda 24576  1 snd_sof_intel_hda_common
snd_soc_xtensa_dsp 16384  2 snd_sof_intel_hda_common,snd_sof_intel_byt
snd_sof_intel_hda 28480  1 snd_sof_intel_hda_common
snd_sof            122880  4 snd_sof_pci,snd_sof_intel_hda_common,snd_sof_intel_byt,snd_sof_intel_ipc
snd_hda_ext_core  32768  3 snd_sof_intel_hda_common,snd_soc_hdac_hda,snd_sof_intel_hda
snd_soc_apl_intel_match 45856  2 snd_sof_pci,snd_sof_intel_hda_common
snd_soc_apl         16384  3 snd_soc_apl_intel_match,snd_sof_intel_hda_common,snd_sof_intel_byt
nvidia_uvm        1811712  6
snd_soc_core       270336  3 snd_sof,snd_sof_intel_hda_common,snd_soc_hdac_hda
nvidia_drm         49152  10
nvidia_modeset     1183744  14 nvidia_drm
snd_hda_codec_realtek 128976  1
snd_hda_codec_generic 81920  1 snd_hda_codec_realtek
snd_compress        28672  1 snd_soc_core
ac97_bus            16384  1 snd_soc_core
ledtrig_audio       16384  2 snd_hda_codec_generic,snd_sof
snd_pcm_maengine   16384  1 snd_soc_core
nvidia             19746816  655 nvidia_uvm,nvidia_modeset
i915              2195456  6
x86_pkg_temp_thermal 20480  0
intel_powerclamp    26480  0
coretemp            20480  0
iwlwifi            393216  0
kvm_intel          286720  0
snd_hda_codec_hdmi 61440  2
drm_kms_helper     217888  2 nvidia_drm,i915
i2c_algo_bit        16384  1 i915
mac80211          985216  1 iwlwifi
libarc4            16384  1 mac80211
cec                53248  2 drm_kms_helper,i915
kvm                712764  1 kvm_intel
mel_hdcp            24576  0
rc_core             57344  1 cec
snd_hda_intel       53248  11
fb_sys_fops         16384  2 drm_kms_helper
syscopyarea        16384  1 drm_kms_helper
sysfillrect        16384  1 drm_kms_helper
sysimghit          16384  1 drm_kms_helper
```



Removing module