Linux Kernel Module Guide

# Kernel modules that come with your linux distro

1. To look up the loaded kernel modules:  
    lsmod  
   To find out whether a specific kernel module is loaded:  
    lsmod | grep module\_name
2. To load a system built-in kernel module (eg. a driver):  
    sudo modprobe module\_name
3. To unload a system built-in kernel module:  
    sudo modprobe -r module\_name

# Writing and running a self-built kernel module

1. Before you move on, make sure you have installed the required components:  
    sudo apt-get install build-essential
2. Write a kernel module. Normally, a kernel module is written as a c program. There are several essential stuffs in the code:  
   (1) You have to include three basic libraries:  
    #include <linux/module.h>  
    #include <linux/init.h>  
    #include <linux/kernel.h>  
     
   (2) There should be an initialization function and an exit function. Then use module\_init() and module\_exit() to register them. Eg:  
    static int hi(void)  
    {  
    // In kernel space, printk is used instead of printf. The printed info can be looked up in syslog or using “dmesg” from a terminal.  
    printk(KERN\_INFO "My module is loaded.\n");  
    return 0;  
    }  
     
    static void bye(void)   
    {  
    printk(KERN\_INFO "My module is unloaded.\n");  
    }  
     
    module\_init(hi);  
    module\_exit(bye);  
     
   (3) Some module info can be added at the end with specific functions. Eg:  
    MODULE\_AUTHOR("My name");  
    MODULE\_LICENSE("GPL v2");  
    MODULE\_DESCRIPTION("My first module.");
3. After the kernel module is written and saved (let’s suppose the name is “module.c”), you need a Makefile along with it. A template is already given to you. Make sure the obj-m name in the Makefile matches your module’s filename. Here, it should be  
    obj-m := module.o
4. Simply use “make” to compile your kernel module into an .ko file. “ko” means kernel object.
5. Load your kernel module:  
    sudo insmod module.ko  
   After that, your can use “lsmod” to see whether it is really loaded.
6. Unload your kernel module:  
    sudo rmmod module.ko

* Useful reference if you want to learn more: http://www.crashcourse.ca/introduction-linux-kernel-programming/lesson-4-writing-and-running-your-first-kernel-module