New York University
Tandon School of Engineering
Department of Electrical & Computer Engineering

Introduction to Operating Systems (CS-GY6233)
Spring 2021

Assignment 2

In this assignment, you shall develop a very simple Linux kernel module that runs on your virtual machine.

Please consult the freely available O'Reilly book "Linux Device Drivers, 3rd Edition" (https://lwn.net/Kernel/LDD3/), in particular p.16, as well as your text book p.96 to get you started. Note that even though the book is written for kernel version 2.6, most mechanisms are applicable with minor or no changes. The relevant function is copied below as a starting point.

```
#include <linux/init.h>
#include <linux/module.h>
MODULE_LICENSE("Dual BSD/GPL");
static int hello_init(void)
{
printk(KERN_ALERT "Hello, world\n");
return 0;
}
static void hello_exit(void)
{
printk(KERN_ALERT "Goodbye, cruel world\n");
}
module_init(hello_init);
module_exit(hello_exit);
```

The hello_init function is invoked when you insert your module, whereas the hello_exit is invoked when you unload your module.

Modify this module and have it print the hello message followed by the system's uptime in hour/minutes/seconds in hh:mm:ss format, when the module is loaded and also when it exits. You shall test your code using the "insmod" and "rmmod" utilities.

Submission file structure:

Please submit a **single .zip file** named **[Your Netid]_lab#.zip**. It shall have the following structure (replace # with the actual assignment number):

└── [Your Netid] hw# (Single folder includes all your submissions)

- ├── lab#_1.c (Source code for problem 1)
- ├── lab#_2a.c (Source code for problem 2a, and so on)
- ├── lab#_1.h (Source code header file, if any)
- ├── Makefile (makefile used to build your program, if any)
- ├── lab#.pdf (images + Report/answers to short-answer questions)

What to hand in (using NYU Classes):

- A source file named **"lab2.c"** (with appropriate comments). Do not attach project or make files.
- Your Makefile
- A .pdf file named **"lab2.pdf"**, containing:
    - Screen shot(**s**) of your terminal window showing the current directory, the command used to compile your program, the command used to run your program and the output of your program.

RULES:

- You shall **use kernel version 4.x.x or above**. You shall not use kernel version 3.x.x.
- You may consult with other students about GENERAL concepts or methods but copying code (or code fragments) or algorithms is NOT ALLOWED and is considered cheating (whether copied form other students, the internet or any other source).
- If you are having trouble, please ask your teaching assistant for help.
- You must submit your assignment prior to the deadline.