

Assignment 1

CS-370 (Operating Systems)

Roll No:

Part I (simple.c):

[screenshot of dmesg command after adding and removing simple.ko. Should show the golden ratio, gcd values, jiffies, and HZ value]



Adding simple.ko

```
Activities Terminal Thu 10:56
oscreader@OSC: ~/Documents/final-src-osc10e/ch2

File Edit View Search Terminal Help

oscreader@OSC:~/Documents/final-src-osc10e/ch2$ make clean
make -C /lib/modules/3.16.0-11-686-pae/build M=/home/oscreader/Documents/final-src-osc10e/ch2 clean
make[1]: Entering directory '/usr/src/linux-headers-3.16.0-11-686-pae'
make[1]: Entering directory '/usr/src/linux-headers-3.16.0-11-686-pae'
CLEAN /home/oscreader/Documents/final-src-osc10e/ch2/.tmp_versions
CLEAN /home/oscreader/Documents/final-src-osc10e/ch2/Module.symvers
make[1]: Leaving directory '/usr/src/linux-headers-3.16.0-11-686-pae'
oscreader@OSC:~/Documents/final-src-osc10e/ch2$ make
make -C /lib/modules/3.16.0-11-686-pae/build M=/home/oscreader/Documents/final-src-osc10e/ch2 modules
make[1]: Entering directory '/usr/src/linux-headers-3.16.0-11-686-pae'
make[1]: Entering directory '/usr/src/linux-headers-3.16.0-11-686-pae'
CC [M] /home/oscreader/Documents/final-src-osc10e/ch2/simple.o
Building modules, stage 2.
MODPOST 1 modules
CC /home/oscreader/Documents/final-src-osc10e/ch2/simple.mod.o
LD [M] /home/oscreader/Documents/final-src-osc10e/ch2/simple.ko
make[1]: Leaving directory '/usr/src/linux-headers-3.16.0-11-686-pae'
oscreader@OSC:~/Documents/final-src-osc10e/ch2$ sudo insmod simple.ko
oscreader@OSC:~/Documents/final-src-osc10e/ch2$ dmesg
[ 3932.962646] Loading Module
[ 3932.962650] Value of Golden Ratio: 2654404609
[ 3932.962653] Value of HZ: 250
[ 3932.962655] Value of jiffies when inserting module: 905814
oscreader@OSC:~/Documents/final-src-osc10e/ch2$
```



Removing simple.ko

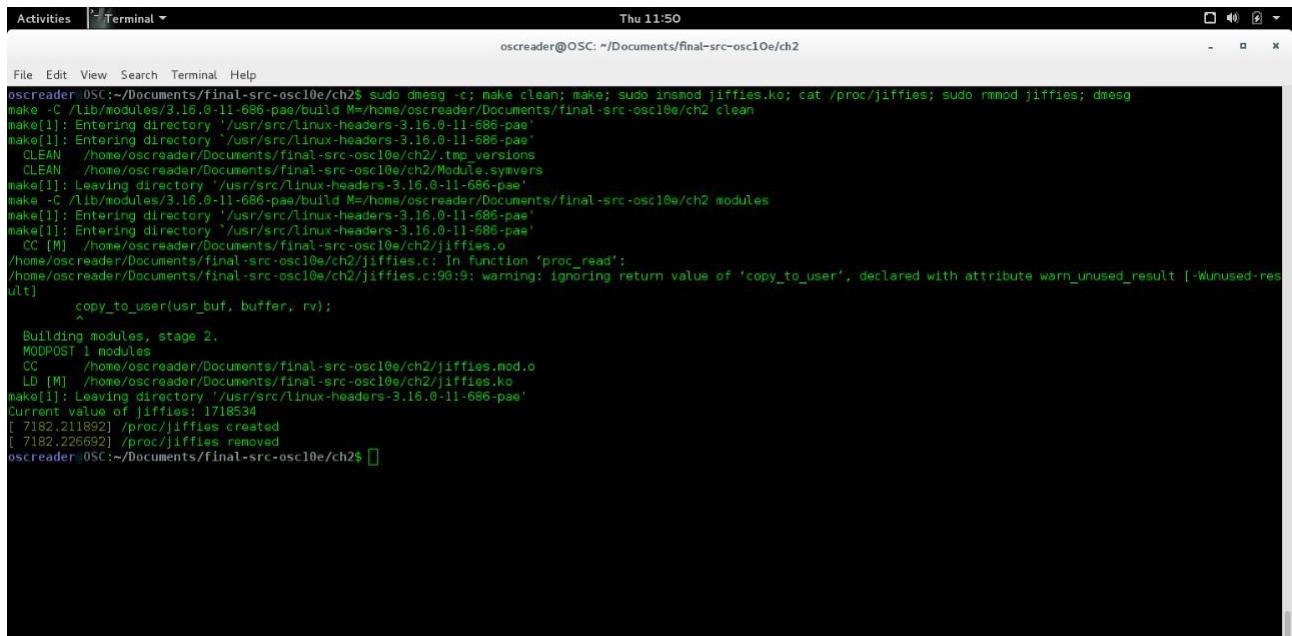
```
Activities Terminal Thu 10:57
oscreader@OSC: ~/Documents/final-src-osc10e/ch2

File Edit View Search Terminal Help

oscreader@OSC:~/Documents/final-src-osc10e/ch2$ make clean
make -C /lib/modules/3.16.0-11-686-pae/build M=/home/oscreader/Documents/final-src-osc10e/ch2 clean
make[1]: Entering directory '/usr/src/linux-headers-3.16.0-11-686-pae'
make[1]: Entering directory '/usr/src/linux-headers-3.16.0-11-686-pae'
CLEAN /home/oscreader/Documents/final-src-osc10e/ch2/.tmp_versions
CLEAN /home/oscreader/Documents/final-src-osc10e/ch2/Module.symvers
make[1]: Leaving directory '/usr/src/linux-headers-3.16.0-11-686-pae'
oscreader@OSC:~/Documents/final-src-osc10e/ch2$ make
make -C /lib/modules/3.16.0-11-686-pae/build M=/home/oscreader/Documents/final-src-osc10e/ch2 modules
make[1]: Entering directory '/usr/src/linux-headers-3.16.0-11-686-pae'
make[1]: Entering directory '/usr/src/linux-headers-3.16.0-11-686-pae'
CC [M] /home/oscreader/Documents/final-src-osc10e/ch2/simple.o
Building modules, stage 2.
MODPOST 1 modules
CC /home/oscreader/Documents/final-src-osc10e/ch2/simple.mod.o
LD [M] /home/oscreader/Documents/final-src-osc10e/ch2/simple.ko
make[1]: Leaving directory '/usr/src/linux-headers-3.16.0-11-686-pae'
oscreader@OSC:~/Documents/final-src-osc10e/ch2$ sudo insmod simple.ko
oscreader@OSC:~/Documents/final-src-osc10e/ch2$ dmesg
[ 3932.962646] Loading Module
[ 3932.962650] Value of Golden Ratio: 2654404609
[ 3932.962653] Value of HZ: 250
[ 3932.962655] Value of jiffies when inserting module: 905814
oscreader@OSC:~/Documents/final-src-osc10e/ch2$ sudo dmesg -c
[ 3932.962646] Loading Module
[ 3932.962650] Value of Golden Ratio: 2654404609
[ 3932.962653] Value of HZ: 250
[ 3932.962655] Value of jiffies when inserting module: 905814
oscreader@OSC:~/Documents/final-src-osc10e/ch2$ sudo dmesg -c
oscreader@OSC:~/Documents/final-src-osc10e/ch2$ sudo rmmod simple
oscreader@OSC:~/Documents/final-src-osc10e/ch2$ dmesg
[ 4046.476830] Removing Module
[ 4046.476834] Value of GCD of 3300 and 24: 12
[ 4046.476837] Value of jiffies at module removal: 934287
oscreader@OSC:~/Documents/final-src-osc10e/ch2$
```

Part II (jiffies.c):

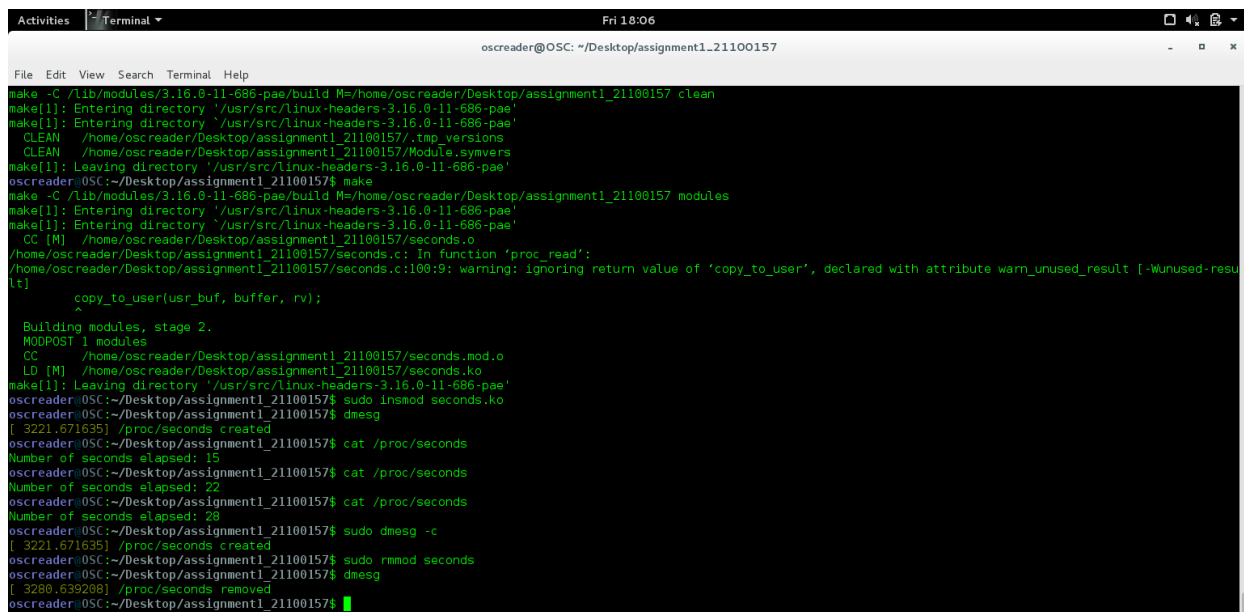
[screenshot of `cat /proc/jiffies` command (after loading jiffies module in the kernel) followed by `dmesg` command after removing jiffies.ko]



```
oscreader@OSC: ~/Documents/final-src-osc10e/ch2
File Edit View Search Terminal Help
oscreader@OSC:~/Documents/final-src-osc10e/ch2$ sudo dmesg -c; make clean; make; sudo insmod jiffies.ko; cat /proc/jiffies; sudo rmmod jiffies; dmesg
make -C /lib/modules/3.16.0-11-686-pae/build M=/home/oscreader/Documents/final-src-osc10e/ch2 clean
make[1]: Entering directory '/usr/src/linux-headers-3.16.0-11-686-pae'
make[1]: Entering directory '/usr/src/linux-headers-3.16.0-11-686-pae'
CLEAN /home/oscreader/Documents/final-src-osc10e/ch2/.tmp_versions
CLEAN /home/oscreader/Documents/final-src-osc10e/ch2/Module.symvers
make[1]: Leaving directory '/usr/src/linux-headers-3.16.0-11-686-pae'
make -C /lib/modules/3.16.0-11-686-pae/build M=/home/oscreader/Documents/final-src-osc10e/ch2 modules
make[1]: Entering directory '/usr/src/linux-headers-3.16.0-11-686-pae'
make[1]: Entering directory '/usr/src/linux-headers-3.16.0-11-686-pae'
CC [M] /home/oscreader/Documents/final-src-osc10e/ch2/jiffies.o
/home/oscreader/Documents/final-src-osc10e/ch2/jiffies.c: In function 'proc_read':
/home/oscreader/Documents/final-src-osc10e/ch2/jiffies.c:90:9: warning: ignoring return value of 'copy_to_user', declared with attribute warn_unused_result [-Wunused-result]
    copy_to_user(user_buf, buffer, rv);
    ^
Building modules, stage 2.
MODPOST 1 modules
CC /home/oscreader/Documents/final-src-osc10e/ch2/jiffies.mod.o
LD [M] /home/oscreader/Documents/final-src-osc10e/ch2/jiffies.ko
make[1]: Leaving directory '/usr/src/linux-headers-3.16.0-11-686-pae'
Current value of jiffies: 1718534
[ 7182.211892] /proc/jiffies created
[ 7182.226692] /proc/jiffies removed
oscreader@OSC:~/Documents/final-src-osc10e/ch2$
```

Part III (seconds.c):

[screenshot of at least 3 calls to `cat /proc/seconds` command (after loading seconds module in the kernel) followed by `dmesg` command after removing seconds.ko]



```
oscreader@OSC: ~/Desktop/assignment1_21100157
File Edit View Search Terminal Help
oscreader@OSC:~/Desktop/assignment1_21100157$ make clean
make -C /lib/modules/3.16.0-11-686-pae/build M=/home/oscreader/Desktop/assignment1_21100157 clean
make[1]: Entering directory '/usr/src/linux-headers-3.16.0-11-686-pae'
make[1]: Entering directory '/usr/src/linux-headers-3.16.0-11-686-pae'
CLEAN /home/oscreader/Desktop/assignment1_21100157/.tmp_versions
CLEAN /home/oscreader/Desktop/assignment1_21100157/Module.symvers
make[1]: Leaving directory '/usr/src/linux-headers-3.16.0-11-686-pae'
oscreader@OSC:~/Desktop/assignment1_21100157$ make
make -C /lib/modules/3.16.0-11-686-pae/build M=/home/oscreader/Desktop/assignment1_21100157 modules
make[1]: Entering directory '/usr/src/linux-headers-3.16.0-11-686-pae'
make[1]: Entering directory '/usr/src/linux-headers-3.16.0-11-686-pae'
CC [M] /home/oscreader/Desktop/assignment1_21100157/seconds.o
/home/oscreader/Desktop/assignment1_21100157/seconds.c: In function 'proc_read':
/home/oscreader/Desktop/assignment1_21100157/seconds.c:100:9: warning: ignoring return value of 'copy_to_user', declared with attribute warn_unused_result [-Wunused-result]
    copy_to_user(user_buf, buffer, rv);
    ^
Building modules, stage 2.
MODPOST 1 modules
CC /home/oscreader/Desktop/assignment1_21100157/seconds.mod.o
LD [M] /home/oscreader/Desktop/assignment1_21100157/seconds.ko
make[1]: Leaving directory '/usr/src/linux-headers-3.16.0-11-686-pae'
oscreader@OSC:~/Desktop/assignment1_21100157$ sudo insmod seconds.ko
oscreader@OSC:~/Desktop/assignment1_21100157$ cat /proc/seconds
Number of seconds elapsed: 15
oscreader@OSC:~/Desktop/assignment1_21100157$ cat /proc/seconds
Number of seconds elapsed: 22
oscreader@OSC:~/Desktop/assignment1_21100157$ cat /proc/seconds
Number of seconds elapsed: 28
oscreader@OSC:~/Desktop/assignment1_21100157$ sudo dmesg -c
[ 3221.671635] /proc/seconds created
oscreader@OSC:~/Desktop/assignment1_21100157$ sudo rmmod seconds
oscreader@OSC:~/Desktop/assignment1_21100157$ dmesg
[ 3280.639208] /proc/seconds removed
oscreader@OSC:~/Desktop/assignment1_21100157$
```