

Test case 1: Compile the Module

simple.ko -

```
[grant@HongOS] - [2026-01-27 08:20:26] - [~/src/repos/graknow/eecs-university/eecs-3540/hw1/problem-1]
[0] make
make -C /lib/modules/6.18.2-arch2-1/build M="/home/grant/src/repos/graknow/eecs-university/eecs-3540/hw1/problem-1" modules
make[1]: Entering directory '/usr/lib/modules/6.18.2-arch2-1/build'
make[2]: Entering directory '/home/grant/src/repos/graknow/eecs-university/eecs-3540/hw1/problem-1'
CC [M] simple.o
simple.c:15:5: warning: no previous prototype for 'simple_init' [-Wmissing-prototypes]
  15 | int simple_init(void)
      | ^~~~~~
simple.c:26:6: warning: no previous prototype for 'simple_exit' [-Wmissing-prototypes]
  26 | void simple_exit(void) {
      | ^~~~~~
MODPOST Module.symvers
CC [M] simple.mod.o
CC [M] .module-common.o
LD [M] simple.ko
BTF [M] simple.ko
make[2]: Leaving directory '/home/grant/src/repos/graknow/eecs-university/eecs-3540/hw1/problem-1'
make[1]: Leaving directory '/usr/lib/modules/6.18.2-arch2-1/build'
```

seconds.ko -

```
[grant@HongOS] - [2026-01-27 08:21:06] - [~/src/repos/graknow/eecs-university/eecs-3540/hw1/problem-2]
[0] make
make -C /lib/modules/6.18.2-arch2-1/build M="/home/grant/src/repos/graknow/eecs-university/eecs-3540/hw1/problem-2" modules
make[1]: Entering directory '/usr/lib/modules/6.18.2-arch2-1/build'
make[2]: Entering directory '/home/grant/src/repos/graknow/eecs-university/eecs-3540/hw1/problem-2'
CC [M] seconds.o
seconds.c:31:5: warning: no previous prototype for 'proc_init' [-Wmissing-prototypes]
  31 | int proc_init(void)
      | ^~~~~~
seconds.c:46:6: warning: no previous prototype for 'proc_exit' [-Wmissing-prototypes]
  46 | void proc_exit(void) {
      | ^~~~~~
seconds.c: In function 'proc_read':
seconds.c:87:5: warning: ignoring return value of 'copy_to_user' declared with attribute 'warn_unused_result' [-Wunused-result]
  87 |     copy_to_user(usr_buf, buffer, rv);
      |     ^~~~~~
MODPOST Module.symvers
CC [M] seconds.mod.o
CC [M] .module-common.o
LD [M] seconds.ko
BTF [M] seconds.ko
make[2]: Leaving directory '/home/grant/src/repos/graknow/eecs-university/eecs-3540/hw1/problem-2'
make[1]: Leaving directory '/usr/lib/modules/6.18.2-arch2-1/build'
```

Test case 2: Load the Kernel Module

simple.ko -

```
[grant@HongOS] - [2026-01-27 08:24:16] - [~/src/repos/graknow/eecs-university/eecs-3540/hw1/problem-1]
[0] sudo insmod simple.ko
[grant@HongOS] - [2026-01-27 08:24:20] - [~/src/repos/graknow/eecs-university/eecs-3540/hw1/problem-1]
[0] sudo dmesg | tail -4
[12422.586217] Removing Module
[12427.028430] Loading Module
[12427.028432] jiffies = 4307094200
[12427.028433] HZ = 1000
```

Test case 2: Load the Kernel Module

seconds.ko -

```
[grant@HongOS] - [2026-01-27 08:25:30] - [~/src/repos/graknow/eecs-university/eecs-3540/hw1/problem-2]
[0] sudo insmod seconds.ko
[grant@HongOS] - [2026-01-27 08:25:33] - [~/src/repos/graknow/eecs-university/eecs-3540/hw1/problem-2]
[0] sudo dmesg | tail -1
[12500.237671] /proc/seconds created
```

Test case 3: Verify /proc/seconds

```
[grant@HongOS] - [2026-01-27 08:26:36] - [~/src/repos/graknow/eecs-university/eecs-3540/hw1/problem-2]
[0] ls /proc | grep seconds
seconds
```

Test case 4: Read /proc/seconds

```
[grant@HongOS] - [2026-01-27 08:27:41] - [~/src/repos/graknow/eecs-university/eecs-3540/hw1/problem-2]
[0] sudo insmod seconds.ko

[grant@HongOS] - [2026-01-27 08:27:46] - [~/src/repos/graknow/eecs-university/eecs-3540/hw1/problem-2]
[0] cat /proc/seconds
seconds = 54

[grant@HongOS] - [2026-01-27 08:28:40] - [~/src/repos/graknow/eecs-university/eecs-3540/hw1/problem-2]
[0]
```

Math - Elapsed time from 08:27:46 to 08:28:40 is 54 seconds.

Test case 5: Remove the Kernel Modules

simple.ko -

```
[grant@HongOS] - [2026-01-27 08:32:11] - [~/src/repos/graknow/eecs-university/eecs-3540/hw1/problem-1]
[0] sudo rmmod simple

[grant@HongOS] - [2026-01-27 08:32:13] - [~/src/repos/graknow/eecs-university/eecs-3540/hw1/problem-1]
[0] sudo dmesg | tail -3
[12900.611708] Removing Module
[12900.611711] jiffies = 4307567783
[12900.611712] gcd = 12

[grant@HongOS] - [2026-01-27 08:32:16] - [~/src/repos/graknow/eecs-university/eecs-3540/hw1/problem-1]
[0]
```

seconds.ko -

```
[grant@HongOS] - [2026-01-27 08:32:54] - [~/src/repos/graknow/eecs-university/eecs-3540/hw1/problem-2]
[1] sudo rmmod seconds

[grant@HongOS] - [2026-01-27 08:32:58] - [~/src/repos/graknow/eecs-university/eecs-3540/hw1/problem-2]
[0] sudo dmesg | tail -1
[12945.328623] /proc/seconds removed
```