ES_HW01_109598085
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Part 1：


```makefile
HW1 > hello_world > M Makefile
1  PWD := $(shell pwd)
2  KVERSION := $(shell uname -r)
3  KERNEL_DIR = /usr/src/linux-headers-$(KVERSION)/
4
5  MODULE_NAME = hello_world
6  obj-m := $(MODULE_NAME).o
7
8  all:
9      make -C $(KERNEL_DIR) M=$(PWD) modules
10 clean:
11     make -C $(KERNEL_DIR) M=$(PWD) clean
12
13
```

```c
HW1 > hello_world > C hello_world.c > ...
1  // kernel_world/hello_world.c
2
3  #include <linux/init.h>
4  #include <linux/module.h>
5
6  MODULE_DESCRIPTION("hello_world");
7  MODULE_LICENSE("GPL");
8
9  static int hello_init(void)
10 {
11     printk(KERN_INFO "Hello world !\n");
12     return 0;
13 }
14
15 static void hello_exit(void)
16 {
17     printk(KERN_INFO "Bye !\n");
18 }
19
20 module_init(hello_init);
21 module_exit(hello_exit);
22
```

```
user@ubuntu:~/Github/Embedded_System/HW1$ cd hello_world/
user@ubuntu:~/Github/Embedded_System/HW1/hello_world$ ls
hello_world.c      hello_world.mod.c  Makefile
hello_world.ko     hello_world.mod.o  modules.order
hello_world.mod    hello_world.o      Module.symvers
user@ubuntu:~/Github/Embedded_System/HW1/hello_world$ sudo insmod hello_world.ko
[sudo] password for user:
user@ubuntu:~/Github/Embedded_System/HW1/hello_world$ sudo lsmod | grep "hello_world"
hello_world            16384  0
```

```
[ 6584.208023] fs = get_fs OK
[ 6584.208031] set_fs(KERNEL_DS) OK
[ 6584.209379] buf:abcdefghijklmnopqrstuvwxyzabcdefghijklmnopqrstu
vwxyzabcdefghijklmnopqrstuvwxyzabcdefghijklmnopqrstuvwxyzabcdefghi
[ 6584.209391] strlen(buf):260
[ 6584.209398] strlen reversebuf:260
[ 6584.209478] reversebuf:zyxwvutsrqponmlkjihgfedcbazyxwvutsrqponm
lkjihgfedcbazyxwvutsrqponmlkjihgfedcbazyxwvutsrqponmlkjihgfedcbazy
[ 6584.212711] set_fs(fs) OK
[ 6584.212717] filp_close OK
[ 6591.238482] fileIO Bye !
[ 6647.353070] hrtimer: interrupt took 685206 ns
[ 8276.550528] Hello world !
[ 8445.866171] Bye !
user@ubuntu:~/Github/Embedded_System/HW1/hello_world$
```

Part 2：


```
HW1 > fileIO > ≡ output.txt
1  zyxwvutsrqponmlkjihgfedcbazyxwvutsrqponmlkjihgfedcbazyxwvutsrqponmlkjihgfedcbazyxwvutsrqponmlkjihgfedcbazyxwvutsrqponmlkjihgfedcbazy
   xwvutsrqponmlkjihgfedcbazyxwvutsrqponmlkjihgfedcbazyxwvutsrqponmlkjihgfedcbazyxwvutsrqponmlkjihgfedcba
```