ملیکا محمدی فخار 99522086 – گزارش‌کار جلسه یازدهم آزمایشگاه سیستم عامل

(1

Makefile [Read-Only] (/lib/modules) - gedit

```
obj-m += HW11.o
all:
        make -C /lib/modules/$(shell uname -r)/build M=$(shell pwd) modules
clean:
        make -C /lib/modules/$(shell uname -r)/build M=$(shell pwd) clean
```

HW11.c [Read-Only] (/lib/modules) - gedit

```c
#include <linux/init.h>
#include <linux/module.h>
#include <linux/kernel.h>

int simple_init(void)
{
        printk(KERN_INFO "Loading Module\n");
        return 0;
}

void simple_exit(void)
{
        printk(KERN_INFO "Removing Module");
}
module_init(simple_init);
module_exit(simple_exit);
MODULE_LICENSE("GPL");
MODULE_DESCRIPTION("simple module");
MODULE_AUTHOR("SGG");
```

melikamohammadi-99552086@ubuntu: /lib/modules

```
melikamohammadi-99552086@ubuntu:/lib/modules$ sudo make
make -C /lib/modules/4.15.0-45-generic/build M=/lib/modules modules
make[1]: Entering directory '/usr/src/linux-headers-4.15.0-45-generic'
  CC [M]  /lib/modules/HW11.o
  Building modules, stage 2.
  MODPOST 1 modules
  CC      /lib/modules/HW11.mod.o
  LD [M]  /lib/modules/HW11.ko
make[1]: Leaving directory '/usr/src/linux-headers-4.15.0-45-generic'
melikamohammadi-99552086@ubuntu:/lib/modules$
```

```
melikamohammadi-99522086@ubuntu:/lib/modules$ sudo insmod HW11.ko
insmod: ERROR: could not insert module HW11.ko: File exists
melikamohammadi-99522086@ubuntu:/lib/modules$ sudo dmesg
[    0.000000] gran_size: 256M        chunk_size: 1G  num_reg: 7      lose cover
RAM: 200M
[    0.000000] gran_size: 256M        chunk_size: 2G  num_reg: 7      lose cover
RAM: 200M
[    0.000000] gran_size: 512M        chunk_size: 512M         num_reg: 6      lose
 cover RAM: 456M
[    0.000000] gran_size: 512M        chunk_size: 1G  num_reg: 7      lose cover
RAM: 456M
[    0.000000] gran_size: 512M        chunk_size: 2G  num_reg: 7      lose cover
RAM: 456M
[    0.000000] gran_size: 1G   chunk_size: 1G  num_reg: 5       lose cover RAM: 968
M
[    0.000000] gran_size: 1G   chunk_size: 2G  num_reg: 5       lose cover RAM: 968
M
[    0.000000] gran_size: 2G   chunk_size: 2G  num_reg: 5       lose cover RAM: 968
M
[    0.000000] mtrr_cleanup: can not find optimal value
[    0.000000] please specify mtrr_gran_size/mtrr_chunk_size
[    0.000000] e820: update [mem 0xbc800000-0xffffffff] usable ==> reserved
[    0.000000] found SMP MP-table at [mem 0x000f6a70-0x000f6a7f] mapped at [(ptrval
)]
[    0.000000] Scanning 1 areas for low memory corruption
[    0.000000] initial memory mapped: [mem 0x00000000-0x163fffff]
[    0.000000] Base memory trampoline at [(ptrval)] 9a000 size 16384
[    0.000000] BRK [0x15fa5000, 0x15fa5fff] PGTABLE
[    0.000000] BRK [0x15fa6000, 0x15fa6fff] PGTABLE
[    0.000000] RAMDISK: [mem 0x31e50000-0x34f1ffff]
[    0.000000] ACPI: Early table checksum verification disabled
[    0.000000] ACPI: RSDP 0x00000000000F6A00 000024 (v02 PTLTD )
[    0.000000] ACPI: XSDT 0x00000000BC6E865B 00005C (v01 INTEL   440BX    06040000 V
MW  01324272)
[    0.000000] ACPI: FACP 0x00000000BC6FEE73 0000F4 (v04 INTEL   440BX    06040000 P
TL  000F4240)
[    0.000000] ACPI: DSDT 0x00000000BC6E9CD4 01519F (v01 PTLTD   Custom   06040000 M
SFT 03000001)
[    0.000000] ACPI: FACS 0x00000000BC6FFFC0 000040
[    0.000000] ACPI: FACS 0x00000000BC6FFFC0 000040
[    0.000000] ACPI: BOOT 0x00000000BC6E9CAC 000028 (v01 PTLTD   $SBFTBL$ 06040000
LTP 00000001)
[    0.000000] ACPI: APIC 0x00000000BC6E956A 000742 (v01 PTLTD   ? APIC   06040000
LTP 00000000)
[    0.000000] ACPI: MCFG 0x00000000BC6E952E 00003C (v01 PTLTD   $PCITBL$ 06040000
LTP 00000001)
[    0.000000] ACPI: SRAT 0x00000000BC6E8757 0008A8 (v02 VMWARE MEMPLUG  06040000 V
```

```
[   58.877778] psmouse serio1: VMMouse at isa0060/serio1/input0 lost synchroniza
tion, throwing 2 bytes away.
[   59.510166] psmouse serio1: resync failed, issuing reconnect request
[   59.823939] Bluetooth: RFCOMM TTY layer initialized
[   59.823949] Bluetooth: RFCOMM socket layer initialized
[   59.823957] Bluetooth: RFCOMM ver 1.11
[   71.936944] pmd_set_huge: Cannot satisfy [mem 0xe8000000-0xe8200000] with a h
uge-page mapping due to MTRR override.
[ 1805.747466] HW11: loading out-of-tree module taints kernel.
[ 1805.747573] HW11: module verification failed: signature and/or required key m
issing - tainting kernel
[ 1805.749267] Loading Module
melikamohammadi-99522086@ubuntu:/lib/modules$
```

```
melikamohammadi-99522086@ubuntu:/lib/modules$ sudo rmmod HW11
melikamohammadi-99522086@ubuntu:/lib/modules$ sudo dmesg -c
[ 2807.870165] Removing Module
```

```c
#include<linux/init.h>
#include<linux/kernel.h>
#include<linux/module.h>
#include<linux/list.h>
#include<linux/types.h>
#include<linux/slab.h>

struct birthday {
        int day;
        int month;
        int year;
        struct list_head list;
};

int simple_init(void)
{
        static LIST_HEAD(birthday_list);
        struct birthday *person1;
        struct birthday *person2;
        struct birthday *person3;
        struct birthday *person4;
        struct birthday *person5;
        struct birthday *ptr;
        printk(KERN_INFO "Loading Module\n");

        person1 = kmalloc(sizeof(person1), GFP_KERNEL);
        person1->day = 1;
        person1->month = 1;
        person1->year = 1;
        INIT_LIST_HEAD(&person1->list);
        list_add_tain(&person1->list, &birthday_list);

        person2 = kmalloc(sizeof(person2), GFP_KERNEL);
        person2->day = 2;
        person2->month = 2;
        person2->year = 2;
        INIT_LIST_HEAD(&person2->list);
        list_add_tain(&person2->list, &birthday_list);

        person3 = kmalloc(sizeof(person3), GFP_KERNEL);
        person3->day = 3;
        person3->month = 3;
        person3->year = 3;
        INIT_LIST_HEAD(&person3->list);
        list_add_tain(&person3->list, &birthday_list);
```

```c
        person4 = kmalloc(sizeof(person4), GFP_KERNEL);
        person4->day = 4;
        person4->month = 4;
        person4->year = 4;
        INIT_LIST_HEAD(&person4->list);
        list_add_tail(&person4->list, &birthday_list);

        person5 = kmalloc(sizeof(person5), GFP_KERNEL);
        person5->day = 5;
        person5->month = 5;
        person5->year = 5;
        INIT_LIST_HEAD(&person5->list);
        list_add_tail(&person5->list, &birthday_list);

        list_for_each_entry(ptr, &birthday_list, list) {
                printk("day: %d\n", ptr->day);
                printk("month: %d\n", ptr->month);
                printk("year: %d\n", ptr->year);
        }

        return 0;

}

void simple_exit(void) {
        printk(KERN_INFO "Removing Module\n");
}
module_init(simple_init);
module_exit(simple_exit);
MODULE_LICENSE("GPL");
MODULE_DESCRIPTION("simple module");
MODULE_AUTHOR("SGG");
```

```
melikamohammadi-99522086@ubuntu: /lib/modules
melikamohammadi-99522086@ubuntu:/lib/modules$ sudo insmod HW11.ko
melikamohammadi-99522086@ubuntu:/lib/modules$
```

```
melikamohammadi-99522086@ubuntu:/lib/modules$ sudo dmesg
```

```
[    6.648543] pcnet32 0000:02:01.0 ens33: link up
[   10.052172] Bluetooth: RFCOMM TTY layer initialized
[   10.052187] Bluetooth: RFCOMM socket layer initialized
[   10.052200] Bluetooth: RFCOMM ver 1.11
[   84.761261] HW11: loading out-of-tree module taints kernel.
[   84.761300] HW11: module verification failed: signature and/or required key m
issing - tainting kernel
[   84.761811] Loading Module
[   84.761811] day: 1
[   84.761812] month: 1
[   84.761812] year: 1
[   84.761812] day: 2
[   84.761813] month: 2
[   84.761813] year: 2
[   84.761814] day: 3
[   84.761814] month: 3
[   84.761814] year: 3
[   84.761814] day: 4
[   84.761815] month: 4
[   84.761815] year: 4
[   84.761815] day: 5
[   84.761816] month: 5
[   84.761816] year: 5
```