

Міністерство освіти і науки України
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ЛАБОРАТОРНА РОБОТА № 5

з дисципліни «АК» на тему

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```
[ 67.160800] Run /init as init process
```

```
Please press Enter to activate this console.
```

```
/ # modinfo lab5.ko
```

```
filename:      lab5.ko
author:        Alex Gryshyn IV-91
description:    Lab5
license:       Dual BSD/GPL
parm:          amount:Amount Hello worlds
depends:
vermagic:      4.19.220 SMP mod_unload ARMv7 p2v8
/ #
```

```
Please press Enter to activate this console.
```

```
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parm:          amount:Amount Hello worlds
depends:
vermagic:      4.19.220 SMP mod_unload ARMv7 p2v8
```

```
/ # rmmod lab5.ko
```

```
rmmod: remove 'lab5': No such file or directory
```

```
/ # insmod lab5.ko
```

```
[ 67.152737] lab5: loading out-of-tree module taints kernel.
```

```
[ 67.160764] Hello World!
```

```
[ 67.160800] Amount: 1
```

```
/ # rmmod lab5.ko
```

```
[ 69.332979] Time: 67147254480
```

```
/ # insmod lab5.ko amount=0
```

```
[ 80.188421] Entered parameter equals 0
```

```
[ 80.188461] Amount: 0
```

```
/ # rmmod lab5.ko
```

```
/ # insmod lab5.ko amount=5
```

```
[ 87.725065] Entered parameter is between 5 and 10
```

```
[ 87.725133] Hello World!
```

```
[ 87.725335] Hello World!
```

```
[ 87.725428] Hello World!
```

```
[ 87.725498] Hello World!
```

```
[ 87.725594] Hello World!
```

```
[ 87.725712] Amount: 5
```

```
/ # rmmod lab5.ko
```

```
[ 90.047485] Time: 87711622560
```

```
[ 90.047518] Time: 87711833936
```

```
[ 90.047668] Time: 87711928640
```

```
[ 90.047745] Time: 87712000768
```

```
[ 90.047831] Time: 87712094784
```

```
/ # insmod lab5.ko amount=15
```

```
insmod: can't insert 'lab5.ko': invalid parameter
```

```
/ # rmmod lab5.ko
```

```
rmmod: remove 'lab5': No such file or directory
```

```
/ #
```

```

/ # insmod lab5.ko amount=3
[ 261.900730] Hello World!
[ 261.900750] Hello World!
[ 261.900888] Hello World!
[ 261.901047] Amount: 3
/ # cat /sys/module/lab5/parameters/amount
3
/ # rmmod lab5.ko
[ 266.987315] Time: 261887216544
[ 266.987402] Time: 261887247376
[ 266.987583] Time: 261887389424
/ # █

```

```

root@KepAlexHP:/home/kepalex/Study/ak5# ll
итого 96
drwxrwxr-x 3 kepalex kepalex 4096 Dec  8 22:36 ./
drwxrwxr-x 7 kepalex kepalex 4096 Dec  8 22:29 ../
-rw-rw-r-- 1 kepalex kepalex 1364 Dec  8 22:31 lab5.c
-rw-r--r-- 1 root    root    5224 Dec  8 22:36 lab5.ko
-rw-r--r-- 1 root    root     262 Dec  8 22:36 .lab5.ko.cmd
-rw-r--r-- 1 root    root     593 Dec  8 22:36 lab5.mod.c
-rw-r--r-- 1 root    root    2036 Dec  8 22:36 lab5.mod.o
-rw-r--r-- 1 root    root   22844 Dec  8 22:36 .lab5.mod.o.cmd
-rw-r--r-- 1 root    root    3788 Dec  8 22:36 lab5.o
-rw-r--r-- 1 root    root   23067 Dec  8 22:36 .lab5.o.cmd
-rw-rw-r-- 1 kepalex kepalex  216 Dec  8 22:31 Makefile
-rw-r--r-- 1 root    root     39 Dec  8 22:36 modules.order
-rw-r--r-- 1 root    root      0 Dec  8 22:36 Module.symvers
drwxr-xr-x 2 root    root    4096 Dec  8 22:36 .tmp_versions/
root@KepAlexHP:/home/kepalex/Study/ak5# █

```

КОД

```

#include <linux/init.h>
#include <linux/module.h>
#include <linux/printk.h>
#include <linux/ktime.h>
#include <linux/slab.h>

struct head_list {
    struct head_list *next;
    ktime_t time;
};

MODULE_AUTHOR("Alex Gryshyn IV-91");
MODULE_DESCRIPTION("Lab5");
MODULE_LICENSE("Dual BSD/GPL");

static struct head_list *head;

static int amount = 1;
module_param(amount, uint, 0444);
MODULE_PARM_DESC(amount, "Amount Hello worlds");

static int __init helloinit(void)

```

```

{
uint i;

struct head_list *var_1, *var_2;

head = kmalloc(sizeof(struct head_list *), GFP_KERNEL);

var_1 = head;
if (amount == 0) {
    pr_warn("Entered parameter equals 0");
} else if (amount >= 5 && amount <= 10) {
    pr_warn("Entered parameter is between 5 and 10");
} else if (amount > 10) {
    pr_warn("Entered parameter is bigger than 10");
}
return -EINVAL;
}

for (i = 0; i < amount; i++) {
    var_1->next = kmalloc(sizeof(struct head_list), GFP_KERNEL);
    var_1->time = ktime_get();
    pr_info("Hello World!");
    var_2 = var_1;
    var_1 = var_1->next;
}

if (amount != 0) {
    kfree(var_2->next);
    var_2->next = NULL;
}

pr_info("Amount: %d\n", amount);

return 0;
}

static void __exit helloexit(void)
{
struct head_list *var;

while (head != NULL && amount != 0) {
    var = head;
    pr_info("Time: %lld", var->time);
    head = var->next;
    kfree(var);
}
pr_info("");
}

module_init(helloinit);
module_exit(helloexit);

```