

LINUX PROGRAMMING WEEK 8

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SLOT : B1 + TB1
COURSE CODE : SWE4009

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1. With the help of UCK produce your own kernel and perform installation on a laptop/desktop

AIM: To perform kernel modification using the LKM module, and display hello world.

PROCEDURE :

- Install the build libraries
- Write the code for hello world as follows

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

```
MODULE_LICENSE("GPL");
```

```
MODULE_AUTHOR("Kailash 18MIS1074");
```

```
MODULE_DESCRIPTION("hello world first kernel program");
```

```
MODULE_VERSION("0.1");
```

```
static int __init hello_start(void)
```

```
{
    printk(KERN_INFO "Loading hello module...\n");
    printk(KERN_INFO "Hello world! \n");
    printk(KERN_INFO "Kailash 18MIS1074\n");
    return 0;
}
```

```
static void __exit hello_end(void)
```

```
{
    printk(KERN_INFO "Goodbye! This was expt for week 8\n");
}
```

```
}
```

```
module_init(hello_start);
```

```
module_exit(hello_end);
```

- Write code for Makefile as follows:

```
obj-m = hello.o
```

```
all:
```

```
make -C /lib/modules/$(shell uname -r)/build/ M=$(PWD) modules
```

```
clean:
```

```
make -C /lib/modules/$(shell uname -r)/build M=$(PWD) clean
```

- Run the program by running make command
- Use insmod to show hello.ko (ko for kernel object) file
- Run modinfo hello.ko to describe the program
- Navigate to /var/log/kern.log file, at the time where we executed the file we can see what we intended to display.

OUTPUT:

Make command

```
kailash@18mis1074: ~/Linux/Week7
kailash@18mis1074:~/Linux/Week7$ make
make -C /lib/modules/5.8.0-49-generic/build/ M=/home/kailash/Linux/Week7 modules
make[1]: Entering directory '/usr/src/linux-headers-5.8.0-49-generic'
make[1]: Leaving directory '/usr/src/linux-headers-5.8.0-49-generic'
kailash@18mis1074:~/Linux/Week7$
```

```
kailash@18mis1074: ~/Linux/Week7
kailash@18mis1074:~/Linux/Week7$ sudo insmod hello.ko
insmod: ERROR: could not insert module hello.ko: File exists
kailash@18mis1074:~/Linux/Week7$ modinfo hello.ko
filename:       /home/kailash/Linux/Week7/hello.ko
version:        0.1
description:     hello world first kernel program
author:         Kailash 18MIS1074
license:        GPL
srcversion:     A061E209ECB81F745A9D2EA
depends:
retpoline:      Y
name:           hello
vermagic:       5.8.0-49-generic SMP mod_unload modversions
kailash@18mis1074:~/Linux/Week7$
```

Our statements being logged in /var/log/kern.log

```
May  9 19:57:41 18mis1074 kernel: [ 1800.560830] Loading hello module...  
May  9 19:57:41 18mis1074 kernel: [ 1800.560833] Hello world!  
May  9 19:57:41 18mis1074 kernel: [ 1800.560833] Kailash 18MIS1074
```

RESULT:

Thus, we have successfully written hello world program at kernel level, using the printk() command