Operating system project

Add system call the Linux OS kernel

System description :

CPU cores	2
RAM capacity	5 Gaige
kernel version	v5.x/linux-5.12.9

First, what is meaning of system call ?

System call is a function call into OS code that runs at a higher privilege level of the CPU.

step1:preparation

we write the this set of commend sequentially

```
saad@VB:~$ sudo apt update && sudo apt upgrade -y
```

```
saad@VB:~$ sudo apt install build-essential libncurses-dev libssl-dev libelf-de
v bison flex -y
```

```
saad@VB:~$ sudo apt clean && sudo apt autoremove -y
```

```
saad@VB:~$ wget -P ~/ https://cdn.kernel.org/pub/linux/kernel/v5.x/linux-5.12.9
.tar.xz
```

```
saad@VB:~$ tar -xvf ~/linux-5.12.9.tar.xz -C ~/
```

```
saad@VB:~$ reboot
```

Step2: creation

```
saad@saad-VB:~$ uname -r
5.12.9
```

```
saad@Ubuntu-Saad:~$ cd ~/linux-5.12.9/
```

```
saad@Ubuntu-Saad:~/linux-5.12.9$ mkdir developers
```

```c
#include <linux/kernel.h>
#include <linux/syscalls.h>

SYSCALL_DEFINE0(developers)

{
    printk("Hello world,Team of developers.\n");
    return 0;
}
```

```
obj-y := developers.o
```

Step2: creation

```
saad@Ubuntu-Saad:~/linux-5.12.9$ nano developers/developers.c
```

```
core-y          += kernel/ certs/ mm/ fs/ ipc/ security/ crypto/ block/ develop>
```

```
asmlinkage long sys_developers(void);
```

```
443     common  developers              sys_developers
```

Step3: installation

```
saad@saad-VB:~$ make menuconfig
```

```
saad@saad-VB:~$ nproc
2
```

```
saad@saad-VB:~$ make -j2
```

```
saad@saad-VB:~$ sudo make modules_install -j2
```

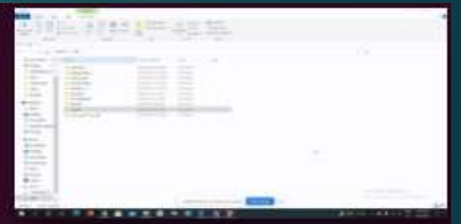
```
saad@saad-VB:~$ sudo make install -j2
```

```
saad@saad-VB:~$ sudo update-grub
```

Step4:Results

```
saad@saad-VB:~$ uname -r
5.12.9
```

```
saad@saad-VB:~$ cd ~
saad@saad-VB:~$ nano report.c
```



```c
#include <linux/kernel.h>
#include <sys/syscall.h>
#include <stdio.h>
#include <unistd.h>
#include <string.h>
#include <errno.h>

#define __NR_developers 443

long developers_syscall(void)
{
    return syscall(__NR_developers);
}

int main(int argc, char *argv[])
{
    long activity;
    activity = developers_syscall();

    if(activity < 0)
    {
        perror("Sorry, Team of developers. Your system call appears to have failed.");
    }

    else
    {
        printf("Congratulations, Team of developers! Your system call is functional. Run the command dmesg in the terminal and find out!\n");
    }
```

Step4:Results

```
saad@saad-VB:~$ gcc -o report report.c
```

```
saad@saad-VB:~$ ./report
```

```
saad@saad-VB:~$ ./report
Congratulations, Team of developers! Your system call is functional. Run the com
mand dmesg in the terminal and find out!
```

```
[  952.504934] Hello world,Team of developers.
saad@saad-VB:~$
```

References

- https://wiki.archlinux.org/title/Kernel/Traditional_compilation#Install_the_modules
- https://dev.to/jasper/adding-a-system-call-to-the-linux-kernel-5-8-1-in-ubuntu-20-04-lts-2ga8