Add a New System Call to say hello

Target

1. Add a new system call into the linux kernel
2. Test the new system call in user model

Tools

Install GCC Software Colletion

```
sudo apt-get install build-essential
```

How to use GCC

- gcc and make

How to do

Step0

- new customized kernel config:6.10.10
    1. linux-6.10.10.tar.xz
    2. https://cdn.kernel.org/pub/linux/kernel/v6.x/linux-6.10.10.tar.xz

Step1 (Linux kernel 6.2+)

在文件 include/linux/syscalls.h (第1176行)

```
#endif /* CONFIG_ARCH_HAS_SYSCALL_WRAPPER */之前，添加一行:

asmlinkage long sys_schello(void);
```

Step2 (Linux kernel 6.2+)

kernel/sys.c 在文件SYSCALL_DEFINE0(gettid)函数之后（第958行 ），添加如下行:

```
SYSCALL_DEFINE0(schello)
{
printk("Hello new system call schello!Your ID\n');
print('Hello new system call schello! hello 学号\n');
return 0;
}
```

Step3 (Linux kernel 6.2+)

针对64位OS
arch/x86/entry/syscalls/syscall_64.tbl
在文件334 common memfd_secret sys_memfd_secret 行之后，添加如下行：

335 common schello sys_schello

Step4

```
make clean
make -j5
sudo make modules_install
sudo make install
```

Step 5

重新启动:

reboot

确认新内核是否成功运行：

```
uname -a
// 注：显示和编译版本一致才为正确
```

```
hxusr@hxhost:~$ uname -a
Linux hxhost 6.5.72110731 #2 SMP PREEMPT_DYNAMIC Thu Oct 26 03:14:20 CST 2023 x8
6_64 x86_64 x86_64 GNU/Linux
```

Step 6

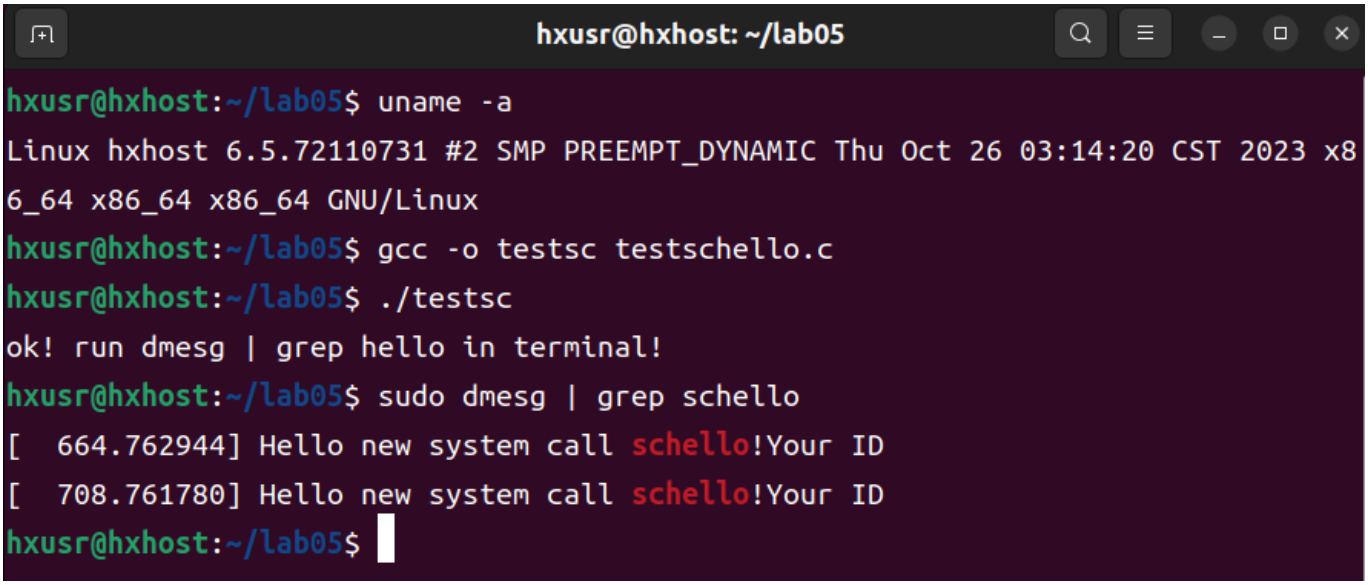
编写用户态测试程序testschello.c

```
#include <unistd.h>
#include <sys/syscall.h>
#include <sys/types.h>
#include <stdio.h>
#define __NR_schello 336
int main(int argc, char *argv[])
{
 syscall(_NR_schell0);
 printf("ok! run the cmd in terminal: sudo dmesg | grep schello\n");
 return 0;
}
```

Step 7

编译用户态测试程序testschello.c，并执行

```
# 编译
gcc -o testsc testschello.c
# 运行
./testsc
sudo dmesg | grep schello
```



Task (lab05)

- 实现上述实例，并输出linux kernel版本号和你的“学号”
- 撰写实验报告

End.