# Operating System Homework 1

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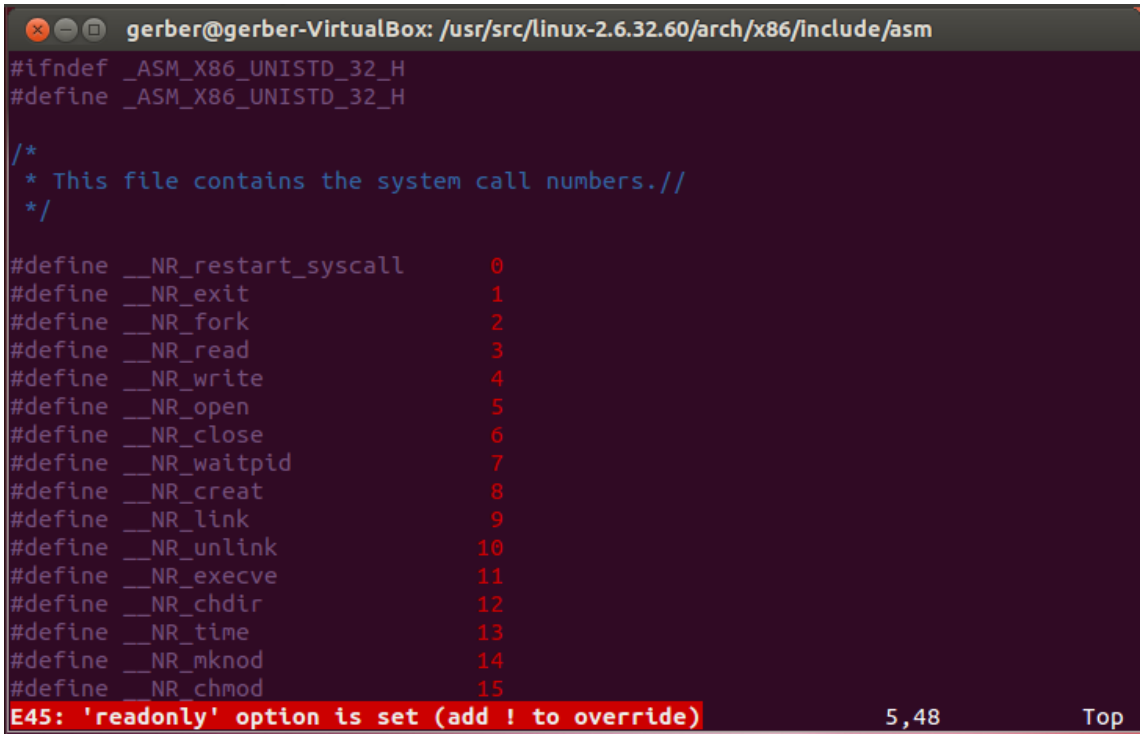
## Implementing details and faced difficulties

- This homework is done on my virtual box of my Macbook Pro.
- There are some steps that requires editing the header files. I used vim and got the result below. This is because you need the root permission to do so. Hence, you should use **sudo vim filename**.




- I was figuring out how to send the variables a and b into sys_multiply and sys_min. I tried using **syscall(337(a,b))**, **syscall(337)(a,b)** and they didn't work apparently. Finally, I realized the only thing I had to do was **syscall(337,a,b)**.
- In the file linux-2.6.32.60/arch/x86/kernel/syscall_table_32.S, I added **.long sys_min** and **.long sys_multiply** .
- Define the macros in the file linux-2.6.32.60/arch/x86/include/asm/unistd_32.h , and increment the value of the macro NR_SYSCALLS.
- In the file linux-2.6.32.60/arch/x86/include/asm/syscalls.h, add the prototypes:
  **asmlinkagelong sys_hello(void);**
  **asmlinkage long sys_min(long,long);**
  **asmlinkage long sys_multiply(long,long);**
- Under the directory linux-2.6.32.60/kernel/, create the files **hello.c**, **multiply.c** and **min.c**.

- Modify the Makefile(linux-2.6.32.60/kernel/Makefile), add **hello.o**, **min.o** and **multiply.o** to **“ obj-y ”**

## results

- After installing Ubuntu, uname -a:

```
gerber@gerber-VirtualBox:~$ uname -a
Linux gerber-VirtualBox 3.13.0-32-generic #57~precise1-Ubuntu SMP Tue Jul 15 03:
50:54 UTC 2014 i686 i686 i386 GNU/Linux
```

- After building kernel, uname -a::

```
gerber@gerber-VirtualBox:~/Documents/OS_hw1$ uname -a
Linux gerber-VirtualBox 2.6.32.60 #5 SMP Fri Mar 30 15:16:00 CST 2018 i686 i686
i386 GNU/Linux
```

- sys_hello:

```
[    9.792343] intel8x0: white list rate for 1028:0177 is 48000
[   10.262084] hrtimer: interrupt took 135018913 ns
[   15.349607] eth0: no IPv6 routers present
[   42.095524] HELLO SYSTEM CALL B05902121 B05902019
```

- sys_multiply and sys_min:

```
gerber@gerber-VirtualBox:~/Documents/OS_hw1$ ./test_program
Insert a and b:
5 6
multiply: 5 x 6 = 30
min: 5
```