1) Hello World

```
student@ubuntu-lab-server:~$ echo Hello from Brandon
Hello from Brandon
student@ubuntu-lab-server:~$ _
```

2) Version = 5.15.0-79-generic

```
student@ubuntu-lab-server:~$ echo Hello from Brandon
Hello from Brandon
student@ubuntu-lab-server:~$ uname -r
5.15.0-79-generic
student@ubuntu-lab-server:~$
```

3) System Calls

```
#define __NR_connect 42
#define __NR_accept 43
#define __NR_sendto 44
#define __NR_recvfrom 45
#define __NR_sendmsg 46
#define __NR_recvmsg 47
#define __NR_shutdown 48
#define __NR_bind 49
#define __NR_listen 50
#define __NR_getsockname 51
#define __NR_getpeername 52
#define __NR_socketpair 53
#define __NR_setsockopt 54
#define __NR_getsockopt 55
#define __NR_clone 56
#define __NR_fork 57
#define __NR_vfork 58
#define __NR_execve 59
#define __NR_exit 60
#define __NR_wait4 61
#define __NR_kill 62
#define __NR_uname 63
#define __NR_semget 64
#define __NR_semop 65
#define __NR_semctl 66
#define __NR_shmdt 67
#define __NR_msgget 68
#define __NR_msgsnd 69
#define __NR_msgrcv 70
#define __NR_msgctl 71
#define __NR_fcntl 72
#define __NR_flock 73
#define __NR_fsync 74
#define __NR_fdatasync 75
#define __NR_truncate 76
#define __NR_ftruncate 77
#define __NR_getdents 78
#define __NR_getcwd 79
#define __NR_chdir 80
#define __NR_fchdir 81
#define __NR_rename 82
#define __NR_mkdir 83
#define __NR_rmdir 84
#define __NR_creat 85
#define __NR_link 86
#define __NR_unlink 87
#define __NR_symlink 88
```

4) Explosion syscall code

```
GNU nano 6.2
#include <linux/kernel.h>
#include <linux/syscalls.h>

SYSCALL_DEFINE0(explosion){
        printk("Brandon Vo just exploded");
        return 0;
```

5) Modified Makefile

```
export MODULES_NSDEPS := $(extmod_prefix)modules.nsdeps

ifeq ($(KBUILD_EXTMOD),)
core-y                  += kernel/ certs/ mm/ fs/ ipc/ security/ crypto/ explosion/
core-$(CONFIG_BLOCK)    += block/

vmlinux-dirs    := $(patsubst %/,%,$(filter %/, \
                     $(core-y) $(core-m) $(drivers-y) $(drivers-m) \
                     $(libs-y) $(libs-m)))
```

6) Syscall_64.tbl

```
538     x32     sendmmsg                compat_sys_sendmmsg
539     x32     process_vm_readv        sys_process_vm_readv
540     x32     process_vm_writev       sys_process_vm_writev
541     x32     setsockopt              sys_setsockopt
542     x32     getsockopt              sys_getsockopt
543     x32     io_setup                compat_sys_io_setup
544     x32     io_submit               compat_sys_io_submit
545     x32     execveat                compat_sys_execveat
546     x32     preadv2                 compat_sys_preadv64v2
547     x32     pwritev2                compat_sys_pwritev64v2
# This is the end of the legacy x32 range.  Numbers 548 and above are
# not special and are not to be used for x32-specific syscalls.
548     64      explosion               sys_explosion




^G Help         ^O Write Out    ^W Where Is     ^K Cut          ^T Execute
^X Exit         ^R Read File    ^\ Replace      ^U Paste        ^J Justify
```

7) Boot directory

```
Check GRUB_DISABLE_OS_PROBER documentation entry.
done
student@ubuntu-lab-server:~/linux-5.16.13$ ls /boot/
config-5.15.0-46-generic  initrd.img-5.15.0-46-generic  System.map-5.15.0-46-generic  vmlinuz-5.15.0-79-generic
config-5.15.0-79-generic  initrd.img-5.15.0-79-generic  System.map-5.15.0-79-generic  vmlinuz-5.16.13
config-5.16.13            initrd.img-5.16.13            System.map-5.16.13            vmlinuz.old
grub                     initrd.img.old               vmlinuz
initrd.img               lost+found                   vmlinuz-5.15.0-46-generic
student@ubuntu-lab-server:~/linux-5.16.13$
```

8) Kernel version

```
[  312.334300] loop0: detected capacity change fr
student@ubuntu-lab-server:~$ uname -r
5.16.13
student@ubuntu-lab-server:~$
```

9) Testing $dmesg - Brandon Vo just exploded

```
(null). Quota mode: none.
[   11.342788] grub-editenv (576) used greatest stack depth: 12952 bytes left
[   12.315991] loop0: detected capacity change from 0 to 8
[  304.676166] Brandon Vo just exploded
[  312.334300] loop0: detected capacity change from 0 to 8
student@ubuntu-lab-server:~$ _
```