

## CS342 Report

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Section 2

1) I installed Ubuntu 16.04.3 in Oracle VM VirtualBox. It was a pretty smooth process for me, since I already use Ubuntu 17.04 as my primary OS. So, I am used to dealing with it.

The 10 commands which I learned are as following:

1. ls: Lists the files in current working directory
2. cd: Changes the current working directory
3. sudo-apt get update: updates the list of current packages
4. sudo-apt get upgrade: upgrades the software repositories to their newer versions
5. mv: allows the user to move a file from one directory to another
6. mkdir: makes a new directory
7. rmdir: removes an existing file
8. clear: clears the terminal
9. tar: archives files
10. pwd: prints the path of the current working directory

2) Kernel Executable Path: /boot/vmlinuz-4.10.0-28-generic  
Kernel version: 4.10.0-28-generic

3)	arch	Documentation	ipc	Makefile	scripts
	block	drivers	Kbuild	mm	security
	certs	firmware	Kconfig	net	sound
	COPYING	fs	kernel	README	tools
	CREDITS	include	lib	REPORTING-BUGS	usr
	crypto	init	MAINTAINERS	samples	virt

4) **strace cp:**

```
execve("/bin/cp", ["cp"], [/ * 70 vars */]) = 0
brk(NULL) = 0x106f000
access("/etc/ld.so.nohwcap", F_OK) = -1 ENOENT (No such file or directory)
mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) =
0x7fa302672000
access("/etc/ld.so.preload", R_OK) = -1 ENOENT (No such file or directory)
open("/etc/ld.so.cache", O_RDONLY|O_CLOEXEC) = 3
fstat(3, {st_mode=S_IFREG|0644, st_size=100115, ...}) = 0
mmap(NULL, 100115, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7fa302659000
close(3) = 0
access("/etc/ld.so.nohwcap", F_OK) = -1 ENOENT (No such file or directory)
open("/lib/x86_64-linux-gnu/libselinux.so.1", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\260Z\0\0\0\0\0"... , 832) = 832
fstat(3, {st_mode=S_IFREG|0644, st_size=130224, ...}) = 0
mmap(NULL, 2234080, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7fa30222d000
mprotect(0x7fa30222c000, 2093056, PROT_NONE) = 0
```

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mmap(0x7fa30244b000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x1e000) = 0x7fa30244b000
mmap(0x7fa30244d000, 5856, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_ANONYMOUS, -1, 0) = 0x7fa30244d000
close(3) = 0
access("/etc/ld.so.nohwcap", F_OK) = -1 ENOENT (No such file or directory)
open("/lib/x86_64-linux-gnu/libacl.so.1", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\20\34\0\0\0\0\0"..., 832) = 832
fstat(3, {st_mode=S_IFREG|0644, st_size=31232, ...}) = 0
mmap(NULL, 2126336, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7fa302025000
mprotect(0x7fa30202c000, 2093056, PROT_NONE) = 0
mmap(0x7fa30222b000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x6000) = 0x7fa30222b000
close(3) = 0
access("/etc/ld.so.nohwcap", F_OK) = -1 ENOENT (No such file or directory)
open("/lib/x86_64-linux-gnu/libattr.so.1", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\300\20\0\0\0\0\0"..., 832) = 832
fstat(3, {st_mode=S_IFREG|0644, st_size=18624, ...}) = 0
mmap(NULL, 4096, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) =
0x7fa302658000
mmap(NULL, 2113760, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7fa301e20000
mprotect(0x7fa301e24000, 2093056, PROT_NONE) = 0
mmap(0x7fa302023000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x3000) = 0x7fa302023000
close(3) = 0
access("/etc/ld.so.nohwcap", F_OK) = -1 ENOENT (No such file or directory)
open("/lib/x86_64-linux-gnu/libc.so.6", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\3\0>\0\1\0\0\0P\t2\0\0\0\0\0"..., 832) = 832
fstat(3, {st_mode=S_IFREG|0755, st_size=1868984, ...}) = 0
mmap(NULL, 3971488, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7fa301a56000
mprotect(0x7fa301c16000, 2097152, PROT_NONE) = 0
mmap(0x7fa301e16000, 24576, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x1c0000) = 0x7fa301e16000
mmap(0x7fa301e1c000, 14752, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_ANONYMOUS, -1, 0) = 0x7fa301e1c000
close(3) = 0
access("/etc/ld.so.nohwcap", F_OK) = -1 ENOENT (No such file or directory)
open("/lib/x86_64-linux-gnu/libpcr.so.3", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0000\25\0\0\0\0\0"..., 832) = 832
fstat(3, {st_mode=S_IFREG|0644, st_size=456632, ...}) = 0
mmap(NULL, 2552072, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7fa3017e6000
mprotect(0x7fa301854000, 2097152, PROT_NONE) = 0
mmap(0x7fa301a54000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x6e000) = 0x7fa301a54000
close(3) = 0

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access("/etc/ld.so.nohwcap", F_OK) = -1 ENOENT (No such file or directory)
open("/lib/x86_64-linux-gnu/libdl.so.2", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\240\r\0\0\0\0\0"..., 832) = 832
fstat(3, {st_mode=S_IFREG|0644, st_size=14608, ...}) = 0
mmap(NULL, 4096, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) =
0x7fa302657000
mmap(NULL, 2109680, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7fa3015e2000
mprotect(0x7fa3015e5000, 2093056, PROT_NONE) = 0
mmap(0x7fa3017e4000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x2000) = 0x7fa3017e4000
close(3) = 0
access("/etc/ld.so.nohwcap", F_OK) = -1 ENOENT (No such file or directory)
open("/lib/x86_64-linux-gnu/libpthread.so.0", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\260`\0\0\0\0\0"..., 832) = 832
fstat(3, {st_mode=S_IFREG|0755, st_size=138696, ...}) = 0
mmap(NULL, 2212904, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7fa3013c5000
mprotect(0x7fa3013dd000, 2093056, PROT_NONE) = 0
mmap(0x7fa3015dc000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x17000) = 0x7fa3015dc000
mmap(0x7fa3015de000, 13352, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_ANONYMOUS, -1, 0) = 0x7fa3015de000
close(3) = 0
mmap(NULL, 4096, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) =
0x7fa302656000
mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) =
0x7fa302654000
arch_prctl(ARCH_SET_FS, 0x7fa302654800) = 0
mprotect(0x7fa301e16000, 16384, PROT_READ) = 0
mprotect(0x7fa3015dc000, 4096, PROT_READ) = 0
mprotect(0x7fa3017e4000, 4096, PROT_READ) = 0
mprotect(0x7fa301a54000, 4096, PROT_READ) = 0
mprotect(0x7fa302023000, 4096, PROT_READ) = 0
mprotect(0x7fa30222b000, 4096, PROT_READ) = 0
mprotect(0x7fa30244b000, 4096, PROT_READ) = 0
mprotect(0x623000, 4096, PROT_READ) = 0
mprotect(0x7fa302674000, 4096, PROT_READ) = 0
munmap(0x7fa302659000, 100115) = 0
set_tid_address(0x7fa302654ad0) = 4666
set_robust_list(0x7fa302654ae0, 24) = 0
rt_sigaction(SIGRTMIN, {0x7fa3013cab50, [], SA_RESTORER|SA_SIGINFO, 0x7fa3013d6390},
NULL, 8) = 0
rt_sigaction(SIGRT_1, {0x7fa3013cabe0, [], SA_RESTORER|SA_RESTART|SA_SIGINFO,
0x7fa3013d6390}, NULL, 8) = 0
rt_sigprocmask(SIG_UNBLOCK, [RTMIN RT_1], NULL, 8) = 0
getrlimit(RLIMIT_STACK, {rlim_cur=8192*1024, rlim_max=RLIM64_INFINITY}) = 0
statfs("/sys/fs/selinux", 0x7ffe6aaaf130) = -1 ENOENT (No such file or directory)
statfs("/selinux", 0x7ffe6aaaf130) = -1 ENOENT (No such file or directory)

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brk(NULL) = 0x106f000
brk(0x1090000) = 0x1090000
open("/proc/filesystems", O_RDONLY) = 3
fstat(3, {st_mode=S_IFREG|0444, st_size=0, ...}) = 0
read(3, "nodev\tsysfs\nnodev\trootfs\nnodev\ttr"..., 1024) = 380
read(3, "", 1024) = 0
close(3) = 0
open("/usr/lib/locale/locale-archive", O_RDONLY|O_CLOEXEC) = 3
fstat(3, {st_mode=S_IFREG|0644, st_size=11654992, ...}) = 0
mmap(NULL, 11654992, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7fa3008a7000
close(3) = 0
geteuid() = 1000
open("/usr/share/locale/locale.alias", O_RDONLY|O_CLOEXEC) = 3
fstat(3, {st_mode=S_IFREG|0644, st_size=2995, ...}) = 0
read(3, "# Locale name alias data base.\n#"..., 4096) = 2995
read(3, "", 4096) = 0
close(3) = 0
open("/usr/share/locale/en_US/LC_MESSAGES/coreutils.mo", O_RDONLY) = -1 ENOENT (No such
file or directory)
open("/usr/share/locale/en/LC_MESSAGES/coreutils.mo", O_RDONLY) = -1 ENOENT (No such file
or directory)
open("/usr/share/locale-langpack/en_US/LC_MESSAGES/coreutils.mo", O_RDONLY) = -1 ENOENT
(No such file or directory)
open("/usr/share/locale-langpack/en/LC_MESSAGES/coreutils.mo", O_RDONLY) = 3
fstat(3, {st_mode=S_IFREG|0644, st_size=619, ...}) = 0
mmap(NULL, 619, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7fa302671000
close(3) = 0
write(2, "cp: ", 4cp: ) = 4
write(2, "missing file operand", 20missing file operand) = 20
write(2, "\n", 1
) = 1
write(2, "Try 'cp --help' for more informa"..., 38Try 'cp --help' for more information.
) = 38
lseek(0, 0, SEEK_CUR) = -1 ESPIPE (Illegal seek)
close(0) = 0
close(1) = 0
close(2) = 0
exit_group(1) = ?
+++ exited with 1 +++

```

### strace ls:

```

execve("/bin/ls", ["ls"], [/ 70 vars *]) = 0
brk(NULL) = 0x17bb000
access("/etc/ld.so.nohwcap", F_OK) = -1 ENOENT (No such file or directory)
mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) =
0x7f1752a25000
access("/etc/ld.so.preload", R_OK) = -1 ENOENT (No such file or directory)
open("/etc/ld.so.cache", O_RDONLY|O_CLOEXEC) = 3

```

```

fstat(3, {st_mode=S_IFREG|0644, st_size=100115, ...}) = 0
mmap(NULL, 100115, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7f1752a0c000
close(3) = 0
access("/etc/ld.so.nohwcap", F_OK) = -1 ENOENT (No such file or directory)
open("/lib/x86_64-linux-gnu/libselinux.so.1", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\260Z\0\0\0\0\0"..., 832) = 832
fstat(3, {st_mode=S_IFREG|0644, st_size=130224, ...}) = 0
mmap(NULL, 2234080, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f17525e0000
mprotect(0x7f17525ff000, 2093056, PROT_NONE) = 0
mmap(0x7f17527fe000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x1e000) = 0x7f17527fe000
mmap(0x7f1752800000, 5856, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_ANONYMOUS, -1, 0) = 0x7f1752800000
close(3) = 0
access("/etc/ld.so.nohwcap", F_OK) = -1 ENOENT (No such file or directory)
open("/lib/x86_64-linux-gnu/libc.so.6", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\3\0>\0\1\0\0\0P\t\2\0\0\0\0"..., 832) = 832
fstat(3, {st_mode=S_IFREG|0755, st_size=1868984, ...}) = 0
mmap(NULL, 3971488, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f1752216000
mprotect(0x7f17523d6000, 2097152, PROT_NONE) = 0
mmap(0x7f17525d6000, 24576, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x1c0000) = 0x7f17525d6000
mmap(0x7f17525dc000, 14752, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_ANONYMOUS, -1, 0) = 0x7f17525dc000
close(3) = 0
access("/etc/ld.so.nohwcap", F_OK) = -1 ENOENT (No such file or directory)
open("/lib/x86_64-linux-gnu/libpcrc.so.3", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\3\0>\0\1\0\0\0000\25\0\0\0\0\0"..., 832) = 832
fstat(3, {st_mode=S_IFREG|0644, st_size=456632, ...}) = 0
mmap(NULL, 4096, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) =
0x7f1752a0b000
mmap(NULL, 2552072, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f1751fa6000
mprotect(0x7f1752014000, 2097152, PROT_NONE) = 0
mmap(0x7f1752214000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x6e000) = 0x7f1752214000
close(3) = 0
access("/etc/ld.so.nohwcap", F_OK) = -1 ENOENT (No such file or directory)
open("/lib/x86_64-linux-gnu/libdl.so.2", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\240r\0\0\0\0\0"..., 832) = 832
fstat(3, {st_mode=S_IFREG|0644, st_size=14608, ...}) = 0
mmap(NULL, 2109680, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f1751da2000
mprotect(0x7f1751da5000, 2093056, PROT_NONE) = 0
mmap(0x7f1751fa4000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x2000) = 0x7f1751fa4000
close(3) = 0

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access("/etc/ld.so.nohwcap", F_OK) = -1 ENOENT (No such file or directory)
open("/lib/x86_64-linux-gnu/libpthread.so.0", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\260`\0\0\0\0\0"... , 832) = 832
fstat(3, {st_mode=S_IFREG|0755, st_size=138696, ...}) = 0
mmap(NULL, 2212904, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f1751b85000
mprotect(0x7f1751b9d000, 2093056, PROT_NONE) = 0
mmap(0x7f1751d9c000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x17000) = 0x7f1751d9c000
mmap(0x7f1751d9e000, 13352, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_ANONYMOUS, -1, 0) = 0x7f1751d9e000
close(3) = 0
mmap(NULL, 4096, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) =
0x7f1752a0a000
mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) =
0x7f1752a08000
arch_prctl(ARCH_SET_FS, 0x7f1752a08800) = 0
mprotect(0x7f17525d6000, 16384, PROT_READ) = 0
mprotect(0x7f1751d9c000, 4096, PROT_READ) = 0
mprotect(0x7f1751fa4000, 4096, PROT_READ) = 0
mprotect(0x7f1752214000, 4096, PROT_READ) = 0
mprotect(0x7f17527fe000, 4096, PROT_READ) = 0
mprotect(0x61d000, 4096, PROT_READ) = 0
mprotect(0x7f1752a27000, 4096, PROT_READ) = 0
munmap(0x7f1752a0c000, 100115) = 0
set_tid_address(0x7f1752a08ad0) = 4672
set_robust_list(0x7f1752a08ae0, 24) = 0
rt_sigaction(SIGRTMIN, {0x7f1751b8ab50, [], SA_RESTORER|SA_SIGINFO, 0x7f1751b96390},
NULL, 8) = 0
rt_sigaction(SIGRT_1, {0x7f1751b8abe0, [], SA_RESTORER|SA_RESTART|SA_SIGINFO,
0x7f1751b96390}, NULL, 8) = 0
rt_sigprocmask(SIG_UNBLOCK, [RTMIN RT_1], NULL, 8) = 0
getrlimit(RLIMIT_STACK, {rlim_cur=8192*1024, rlim_max=RLIM64_INFINITY}) = 0
statfs("/sys/fs/selinux", 0x7ffe956e3400) = -1 ENOENT (No such file or directory)
statfs("/selinux", 0x7ffe956e3400) = -1 ENOENT (No such file or directory)
brk(NULL) = 0x17bb000
brk(0x17dc000) = 0x17dc000
open("/proc/filesystems", O_RDONLY) = 3
fstat(3, {st_mode=S_IFREG|0444, st_size=0, ...}) = 0
read(3, "nodev\tsysfs\nnodev\trootfs\nnodev\ttr"... , 1024) = 380
read(3, "", 1024) = 0
close(3) = 0
open("/usr/lib/locale/locale-archive", O_RDONLY|O_CLOEXEC) = 3
fstat(3, {st_mode=S_IFREG|0644, st_size=11654992, ...}) = 0
mmap(NULL, 11654992, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7f1751067000
close(3) = 0
ioctl(1, TCGETS, {B38400 opost isig icanon echo ...}) = 0
ioctl(1, TIOCGWINSZ, {ws_row=38, ws_col=68, ws_xpixel=0, ws_ypixel=0}) = 0
open(".", O_RDONLY|O_NONBLOCK|O_DIRECTORY|O_CLOEXEC) = 3

```

```

fstat(3, {st_mode=S_IFDIR|0755, st_size=4096, ...}) = 0
getdents(3, /* 37 entries */, 32768) = 1296
getdents(3, /* 0 entries */, 32768) = 0
close(3) = 0
fstat(1, {st_mode=S_IFCHR|0620, st_rdev=makedev(136, 17), ...}) = 0
write(1, "Desktop Downloads examples.d"..., 59Desktop Downloads examples.desktop
Pictures Templates
) = 59
write(1, "Documents Dropbox Music\t\tPub"..., 45Documents Dropbox Music Public
Videos
) = 45
close(1) = 0
close(2) = 0
exit_group(0) = ?
+++ exited with 0 +++

```

##### 5)Source Code:

```

#include <stdio.h>
#include <time.h>
#include <sys/types.h>
#include <unistd.h>

void pro()
{

}

int main()
{
    // Measuring Time cost for System Call
    clock_t sTimeSys;
    clock_t eTimeSys;
    double timeElapsedSys;

    sTimeSys = clock();

    getpid();

    eTimeSys = clock();

    timeElapsedSys = (eTimeSys - sTimeSys) / (CLOCKS_PER_SEC/1000000);

    printf("\nTime Cost for System Call: ");
    printf("%lf", timeElapsedSys);

    // Measuring Time cost for Procedural Call
    clock_t sTimePro;
    clock_t eTimePro;
    double timeElapsedPro;

```

```

sTimePro = clock();

pro();

eTimePro = clock();

timeElapsedPro = (eTimePro - sTimePro) / (CLOCKS_PER_SEC/1000000);

printf("\nTime Cost for Procedural Call: ");
printf("%lf", timeElapsedPro);


printf("\n");
return 0;
}

```

Explanation: Time Cost for a System call is much higher than that of Procedural call. This is because every time a system call is made, the mode needs to be switched from user to kernel and then back to the user.

Results:

Experiment No.	Time Cost of System Call / micro sec	Time Cost of Procedural Call / micro sec
1	6	1
2	10	1
3	4	1
4	7	1
5	6	0
6	8	1
7	3	0
8	29	1
9	8	1
10	6	1
11	5	1
12	3	0
13	5	1

Mean Time Cost of System Call: 7.692 micro sec

Mean Time Cost of Procedural Call: 0.769 micro sec

Standard deviation of System Call: 6.713 micro sec

Standard deviation of Procedural Call: 0.439 micro sec