

ECE-357 Assignment #7 Program Running Samples

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- Program Running Environment

MacOS 10.10.2, X86-64

- Program File Name

“helloworld.s”

- Assembly and Link Build Process

```
$ nasm -f macho64 helloworld.s -o helloworld.o
$ ld -macosx_version_min 10.10.2 -lSystem -o helloworld
helloworld.o
```

- Standard Output & Echo

```
MeidideMacBook-Pro:os_assignment7 meidi$ nasm -f macho64 helloworld.s -o helloworld.o
MeidideMacBook-Pro:os_assignment7 meidi$ ld -macosx_version_min 10.10.2 -lSystem -o helloworld helloworld.o
MeidideMacBook-Pro:os_assignment7 meidi$ ./helloworld
Hello, World!
MeidideMacBook-Pro:os_assignment7 meidi$ echo $?
14
```

stdout: “Hello, World!”

echo \$?: 14

- Output Trace

In MacOS, the command “strace” cannot be used; instead, “dtruss” (DTrace), which has the same function as “strace”, is used here. (output shown in the next page)

```

SYSCALL(args)          = return
Hello, World!
open("/dev/dtracehelper\0", 0x2, 0xFFFFFFFFFBFEF70)          = 3 0
ioctl(0x3, 0x80086804, 0x7FFEEFBFEE80)                      = 0 0
close(0x3)              = 0 0
access("/AppleInternal/XBS/.isChrooted\0", 0x0, 0x0)        = -1 Err#2
bsdthread_register(0x7FFF70EE25C8, 0x7FFF70EE25B4, 0x2000)    = 1073742047 0
sysctlbyname(kern.bootargs, 0xD, 0x7FFEEFBFE050, 0x7FFEEFBFE040, 0x0) = 0 0
issetugid(0x0, 0x0, 0x0)                                    = 0 0
ioctl(0x2, 0x4004667A, 0x7FFEEFBFE394)                      = 0 0
mprotect(0x100007000, 0x1000, 0x0)                          = 0 0
mprotect(0x100011000, 0x1000, 0x0)                          = 0 0
mprotect(0x100012000, 0x1000, 0x0)                          = 0 0
mprotect(0x10001C000, 0x1000, 0x0)                          = 0 0
mprotect(0x100005000, 0x90, 0x1)                            = 0 0
mprotect(0x10001D000, 0x1000, 0x1)                          = 0 0
mprotect(0x100005000, 0x90, 0x3)                            = 0 0
mprotect(0x100005000, 0x90, 0x1)                            = 0 0
getentropy(0x7FFEEFBFD8B0, 0x20, 0x0)                      = 0 0
getentropy(0x7FFEEFBFD900, 0x40, 0x0)                      = 0 0
getpid(0x0, 0x0, 0x0)                                       = 19103 0
stat64("/AppleInternal\0", 0x7FFEEFBFE4C0, 0x0)            = -1 Err#2
csops_audittoken(0x4A9F, 0x7, 0x7FFEEFBFE010)              = -1 Err#22
proc_info(0x2, 0x4A9F, 0xD)                                = 64 0
csops_audittoken(0x4A9F, 0x7, 0x7FFEEFBFD890)              = -1 Err#22
write(0x1, "Hello, World!\n\0", 0xE)                       = 14 0

```