

## Problem 1

=====

#include &lt;stdio.h&gt;

```
int main(int argc, char **argv){
    printf("Hello world");
}
```

binyamin@BenjaminButtox:~/Documents/Project 7\$ gcc problem2.c

gcc: error: problem2.c: No such file or directory

gcc: fatal error: no input files

compilation terminated.

binyamin@BenjaminButtox:~/Documents/Project 7\$ gcc problem1.c

binyamin@BenjaminButtox:~/Documents/Project 7\$ strace ./a.out

execve("./a.out", ["/a.out"], [/\* 37 vars \*/]) = 0

brk(0) = 0x8a91000

access("/etc/ld.so.nohwcap", F\_OK) = -1 ENOENT (No such file or directory)

mmap2(NULL, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_ANONYMOUS, -1, 0) = 0xb7769000

access("/etc/ld.so.preload", R\_OK) = -1 ENOENT (No such file or directory)

open("/etc/ld.so.cache", O\_RDONLY|O\_CLOEXEC) = 3

```
...
write(1, "Hello world", 11Hello world) = 11
```

exit\_group(11) = ?

## Problem 2

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binyamin@BenjaminButtox:as --64 problem-2.S

binyamin@BenjaminButtox:ld -m elf\_x86\_64 problem-2.o

binyamin@BenjaminButtox:~/Documents/Project 7\$ strace ./problem-2.out

execve("./a.out", ["/a.out"], [/\* 37 vars \*/]) = 0

brk(0) = 0x8f3c000

access("/etc/ld.so.nohwcap", F\_OK) = -1 ENOENT (No such file or directory)

mmap2(NULL, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_ANONYMOUS, -1, 0) = 0xb779a000

access("/etc/ld.so.preload", R\_OK) = -1 ENOENT (No such file or directory)

open("/etc/ld.so.cache", O\_RDONLY|O\_CLOEXEC) = 3

```
...
mprotect(0xb77bd000, 4096, PROT_READ) = 0
munmap(0xb7789000, 69264) = 0
write(1, "Hello world!", 12Hello world!) = 12
_exit(0) = ?
```

## Problem 3

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binyamin@BenjaminButtox:~/Documents/Project 7\$ strace ./a.out

execve("./a.out", ["/a.out"], [/\* 37 vars \*/]) = 0

brk(0) = 0x9c42000

access("/etc/ld.so.nohwcap", F\_OK) = -1 ENOENT (No such file or directory)

mmap2(NULL, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_ANONYMOUS, -1, 0) = 0xb772b000

```
...
write(1, "Hello world!", 12Hello world!) = 12
_exit(50) = ?
```

binyamin@BenjaminButtox:~/Documents/Project 7\$ echo \$?

50

## Problem 4

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The system call for write (which is normally 4) was change to 100000. strace shows that errno is set to 38, FUNCTION NOT IMPLEMENTED, and the \_exit(50) call has no return value because the program terminated in error.

```

binyamin@BenjaminButtox:~/Documents/Project 7$ strace ./a.out
execve("./a.out", ["/a.out"], [/* 37 vars */]) = 0
brk(0) = 0x8983000
access("/etc/ld.so.nohwcap", F_OK) = -1 ENOENT (No such file or directory)
mmap2(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0xb772c000
access("/etc/ld.so.preload", R_OK) = -1 ENOENT (No such file or directory)
open("/etc/ld.so.cache", O_RDONLY|O_CLOEXEC) = 3
...
syscall_100000(0x1, 0x804a010, 0xc, 0, 0, 0, 0xffffffffda, 0x7b, 0x7b, 0, 0x33, 0x186a0, 0x80483cb, 0x73,
0x246, 0xbfcfa44c, 0x7b, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0) = -1 (errno 38)
_exit(50) = ?

```

## problem-2.5

```
=====
```

```

.section .text
.global _start
_start:
    mov $4,%eax
    mov $1,%ebx
    mov $message,%ecx
    mov msglength,%edx
    int $0x80

    ;mov $1, %eax
    ;mov $50, %ebx
    ;int $0x80
.section .data
    message: .ascii "Hello world!"
    msglength: .word 12

```

## Problem 3 Writeup

```
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```

Because there was no explicit exit call in the previous problem's assembly code, the kernel called `_exit` (0) which has an unknown return address (as is shown in the last line ending with '?'). In this problem, an explicit exit code of 50 stated, which can be seen in strace and the `sehll` variable \$?