

File command:

```
sam@LAPTOP-02DLLHMF:/mnt/c/Users/shmue/Documents/Git/OS_Task1/task_a$ file libHello.so
libHello.so: ELF 64-bit LSB shared object, x86-64, version 1 (SYSV), dynamically linked, BuildID[sha1]=48c49cad6489b69b2dfae06b9978fc5d7bce6ae2, not stripped
```

NM command:

```
sam@LAPTOP-02DLLHMF:/mnt/c/Users/shmue/Documents/Git/OS_Task1/task_a$ nm libHello.so
00000000000003e20 d _DYNAMIC
00000000000004000 d _GLOBAL_OFFSET_TABLE_
                 w _ITM_deregisterTMCloneTable
                 w _ITM_registerTMCloneTable
000000000000020c8 r __FRAME_END__
0000000000000200c r __GNU_EH_FRAME_HDR
00000000000004028 d __TMC_END__
                 w __cxa_finalize@@GLIBC_2.2.5
000000000000010d0 t __do_global_dtors_aux
00000000000003e18 d __do_global_dtors_aux_fini_array_entry
00000000000004020 d __dso_handle
00000000000003e10 d __frame_dummy_init_array_entry
                 w __gmon_start__
00000000000001144 t _fini
00000000000001000 t _init
00000000000004028 b completed.8060
00000000000001060 t deregister_tm_clones
00000000000001110 t frame_dummy
00000000000001119 T hello_ariel
                 U printf@@GLIBC_2.2.5
00000000000001090 t register_tm_clones
```

Ldd:

```
sam@LAPTOP-02DLLHMF:/mnt/c/Users/shmue/Documents/Git/OS_Task1/task_a$ ldd main1_1
linux-vdso.so.1 (0x00007ffe307b3000)
libc.so.6 => /lib/x86_64-linux-gnu/libc.so.6 (0x00007f7a31116000)
/lib64/ld-linux-x86-64.so.2 (0x00007f7a3131a000)
sam@LAPTOP-02DLLHMF:/mnt/c/Users/shmue/Documents/Git/OS_Task1/task_a$ ldd main1_2
linux-vdso.so.1 (0x00007ffec2bfb000)
libHello.so => not found
libc.so.6 => /lib/x86_64-linux-gnu/libc.so.6 (0x00007f035cab5000)
/lib64/ld-linux-x86-64.so.2 (0x00007f035ccb9000)
sam@LAPTOP-02DLLHMF:/mnt/c/Users/shmue/Documents/Git/OS_Task1/task_a$ ldd main1_3
linux-vdso.so.1 (0x00007ffcb7ca1000)
libdl.so.2 => /lib/x86_64-linux-gnu/libdl.so.2 (0x00007fed6296a000)
libc.so.6 => /lib/x86_64-linux-gnu/libc.so.6 (0x00007fed62778000)
/lib64/ld-linux-x86-64.so.2 (0x00007fed62982000)
```

Ltrace:

```
sam@LAPTOP-02DLLHMF:/mnt/c/Users/shmue/Documents/Git/OS_Task1/task_a$ ltrace ./main1_1
Hello: SamSam
+++ exited (status 0) +++
sam@LAPTOP-02DLLHMF:/mnt/c/Users/shmue/Documents/Git/OS_Task1/task_a$ ltrace ./main1_2
Hello: SamSam
+++ exited (status 0) +++
sam@LAPTOP-02DLLHMF:/mnt/c/Users/shmue/Documents/Git/OS_Task1/task_a$ ltrace ./main1_3
Hello: SamSam
+++ exited (status 0) +++
```

Strace:

```
+++ exited (status 0) +++
sam@LAPTOP-02DLLHMF:/mnt/c/Users/shmue/Documents/Git/OS_Task1/task_a$ strace ./main1_1
execve("./main1_1", ["/main1_1"], 0x7ffff7ea28b0 /* 24 vars */) = 0
brk(NULL) = 0x555fe062c000
arch_prctl(0x3001 /* ARCH_??? */, 0x7ffe6e04b400) = -1 EINVAL (Invalid argument)
access("/etc/ld.so.preload", R_OK) = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/tls/haswell/x86_64/libc.so.6", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/tls/haswell/libc.so.6", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/tls/x86_64/libc.so.6", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/tls/libc.so.6", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/haswell/x86_64/libc.so.6", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/haswell/libc.so.6", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/x86_64/libc.so.6", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/libc.so.6", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXEC) = 3
fstat(3, {st_mode=S_IFREG|0644, st_size=44352, ...}) = 0
mmap(NULL, 44352, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7f393268c000
close(3) = 0
openat(AT_FDCWD, "/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\0\0\0\0\0>\0\1\0\0\0\360q\2\0\0\0\0\0"... , 832) = 832
pread64(3, "\6\0\0\0\4\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0"... , 784, 64) = 784
pread64(3, "\4\0\0\0\20\0\0\0\5\0\0\0GNU\0\2\0\0\300\4\0\0\0\3\0\0\0\0\0\0\0\0"... , 32, 848) = 32
pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\t\233\222%\274\260\320\31\331\326\10\204\276X>\263"... , 68, 880) = 68
fstat(3, {st_mode=S_IFREG|0755, st_size=2029224, ...}) = 0
mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7f393268a000
pread64(3, "\6\0\0\0\4\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0"... , 784, 64) = 784
pread64(3, "\4\0\0\0\20\0\0\0\5\0\0\0GNU\0\2\0\0\300\4\0\0\0\3\0\0\0\0\0\0\0\0"... , 32, 848) = 32
pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\t\233\222%\274\260\320\31\331\326\10\204\276X>\263"... , 68, 880) = 68
mmap(NULL, 2036952, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7f3932498000
mprotect(0x7f39324bd000, 1847296, PROT_NONE) = 0
mmap(0x7f39324bd000, 1540096, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x25000) = 0x7f39324bd000
mmap(0x7f3932635000, 303104, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x19d000) = 0x7f3932635000
mmap(0x7f3932680000, 24576, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1e7000) = 0x7f3932680000
mmap(0x7f3932686000, 13528, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7f3932686000
close(3) = 0
arch_prctl(ARCH_SET_FS, 0x7f393268b540) = 0
mprotect(0x7f3932680000, 12288, PROT_READ) = 0
mprotect(0x555fd803000, 4096, PROT_READ) = 0
mprotect(0x7f39326c4000, 4096, PROT_READ) = 0
munmap(0x7f393268c000, 44352) = 0
fstat(1, {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0), ...}) = 0
brk(NULL) = 0x555fe062c000
brk(0x555fe064d000) = 0x555fe064d000
write(1, "Hello: SamSam\n", 14Hello: SamSam
) = 14
exit_group(0) = ?
+++ exited with 0 +++
```



```
sam@LAPTOP-02D2LLMF:/mnt/c/Users/shmue/Documents/Git/OS_Task1/task_a$ strace ./main2
execve("./main_2", ["/main_2"], 0x7ffc609296a0 /* 24 vars */) = 0
brk(NULL) = 0x56073f4cc000
arch_prctl(0x3001 /* ARCH??? */, 0x7ffecel990f0) = -1 EINVAL (Invalid argument)
access("/etc/ld.so.preload", R_OK) = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/tls/haswell/x86_64/libHello.so", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/tls/haswell/libHello.so", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/tls/x86_64/libHello.so", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/tls/libHello.so", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/haswell/x86_64/libHello.so", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/haswell/libHello.so", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/x86_64/libHello.so", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/libHello.so", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\x00\x00\x00\x00\x00\x03>\x01\x00\x00\20\x00\x00\x00"... , 832) = 832
fststat(3, {st_mode=S_IFREG|0777, st_size=16216, ...}) = 0
mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7f0afa923000
getcwd("/mnt/c/Users/shmue/Documents/Git/OS_Task1/task_a", 128) = 49
mmap(NULL, 16432, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7f0afa91e000
mmap(0x7f0afa91f000, 4096, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1000) = 0x7f0afa91f000
mmap(0x7f0afa920000, 4096, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x2000) = 0x7f0afa920000
mmap(0x7f0afa921000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x2000) = 0x7f0afa921000
close(3) = 0
openat(AT_FDCWD, "/tls/haswell/x86_64/libc.so.6", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/tls/haswell/libc.so.6", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/tls/x86_64/libc.so.6", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/tls/libc.so.6", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/haswell/x86_64/libc.so.6", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/haswell/libc.so.6", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/x86_64/libc.so.6", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/libc.so.6", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXEC) = 3
fststat(3, {st_mode=S_IFREG|0644, st_size=44352, ...}) = 0
mmap(NULL, 44352, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7f0afa913000
close(3) = 0
openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libc.so.6", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\x00\x00\x00\x00\x03>\x01\x00\x00\360q\2\0\x00\x00"... , 832) = 832
pread64(3, "\6\x00\x04\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00"... , 784, 64) = 784
pread64(3, "\4\x00\x02\x00\x05\x00\x0GNU\x02\0\x0300\4\0\x03\0\x00\x00\x00"... , 32, 848) = 32
pread64(3, "\4\x00\x024\0\x03\0\x0GNU\x0t\233\222%\274\260\320\31\331\326\10\204\276X>\263"... , 68, 880) = 68
fststat(3, {st_mode=S_IFREG|0755, st_size=2029224, ...}) = 0
pread64(3, "\6\x00\x04\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00"... , 784, 64) = 784
pread64(3, "\4\x00\x020\0\x05\0\x0GNU\x02\0\x0300\4\0\x03\0\x00\x00\x00\x00"... , 32, 848) = 32
pread64(3, "\4\x00\x024\0\x03\0\x0GNU\x0t\233\222%\274\260\320\31\331\326\10\204\276X>\263"... , 68, 880) = 68
mmap(NULL, 2036952, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7f0afa721000
mprotect(0x7f0afa746000, 1847296, PROT_NONE) = 0
mmap(0x7f0afa746000, 1540096, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x25000) = 0x7f0afa746000
mmap(0x7f0afa8be000, 303104, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x19d000) = 0x7f0afa8be000
mmap(0x7f0afa909000, 24576, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1e7000) = 0x7f0afa909000
mmap(0x7f0afa90f000, 13528, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7f0afa90f000
close(3) = 0
mmap(NULL, 12288, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7f0afa71e000
arch_prctl(ARCH_SET_FS, 0x7f0afa71e740) = 0
mprotect(0x7f0afa909000, 12288, PROT_READ) = 0
mprotect(0x7f0afa909000, 12288, PROT_READ) = 0
mprotect(0x7f0afa921000, 4096, PROT_READ) = 0
mprotect(0x56073e5c6000, 4096, PROT_READ) = 0
mprotect(0x7f0afa952000, 4096, PROT_READ) = 0
munmap(0x7f0afa913000, 44352) = 0
fststat(1, {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0), ...}) = 0
brk(NULL) = 0x56073f4cc000
brk(0x56073f4ed000) = 0x56073f4ed000
write(1, "Hello: SamSam\n", 14Hello: SamSam
) = 14
exit_group(0) = ?
+++ exited with 0 +++
```

