Московский Авиационный Институт

(Национальный Исследовательский Университет)

Факультет информационных технологий и прикладной математики

Кафедра вычислительной математики и программирования

**Лабораторная работа №1 по курсу**

**«Операционные системы»**

Студент: Попов Матвей Романович

Группа: М8О-208Б-20

Преподаватель: Миронов Евгений Сергеевич

Оценка: \_\_\_\_\_\_\_\_\_\_\_

Дата: \_\_\_\_\_\_\_\_\_\_\_

Подпись: \_\_\_\_\_\_\_\_\_\_\_

Москва, 2021

**Содержание**

1. Репозиторий
2. Постановка задачи
3. Демонстрация работы strace
4. Вывод

**Репозиторий**

<https://github.com/.../os_lab1>

**Постановка задачи**

Подробно рассказать о каждом системном вызове из утилиты strace на примере лабораторной работы №5.

**Демонстрация работы strace**

execve("./main", ["./main"], 0x7ffffbb25470 /\* 28 vars \*/) = 0

brk(NULL) = 0x7fffbecd1000

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

access("/etc/ld.so.preload", R\_OK) = -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=42278, ...}) = 0

mmap(NULL, 42278, PROT\_READ, MAP\_PRIVATE, 3, 0) = 0x7f0cd1c5d000

close(3) = 0

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

openat(AT\_FDCWD, "/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\0\3\0>\0\1\0\0\0P\16\0\0\0\0\0\0"..., 832) = 832

fstat(3, {st\_mode=S\_IFREG|0644, st\_size=14560, ...}) = 0

mmap(NULL, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_ANONYMOUS, -1, 0) = 0x7f0cd1c50000

mmap(NULL, 2109712, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7f0cd17f0000

mprotect(0x7f0cd17f3000, 2093056, PROT\_NONE) = 0

mmap(0x7f0cd19f2000, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x2000) = 0x7f0cd19f2000

close(3) = 0

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

openat(AT\_FDCWD, "/usr/lib/x86\_64-linux-gnu/libstdc++.so.6", O\_RDONLY|O\_CLOEXEC) = 3

read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\220\304\10\0\0\0\0\0"..., 832) = 832

fstat(3, {st\_mode=S\_IFREG|0644, st\_size=1594864, ...}) = 0

mmap(NULL, 3702848, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7f0cd1460000

mprotect(0x7f0cd15d9000, 2097152, PROT\_NONE) = 0

mmap(0x7f0cd17d9000, 49152, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x179000) = 0x7f0cd17d9000

mmap(0x7f0cd17e5000, 12352, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_ANONYMOUS, -1, 0) = 0x7f0cd17e5000

close(3) = 0

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

openat(AT\_FDCWD, "/lib/x86\_64-linux-gnu/libgcc\_s.so.1", O\_RDONLY|O\_CLOEXEC) = 3

read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\300\*\0\0\0\0\0\0"..., 832) = 832

fstat(3, {st\_mode=S\_IFREG|0644, st\_size=96616, ...}) = 0

mmap(NULL, 2192432, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7f0cd1240000

mprotect(0x7f0cd1257000, 2093056, PROT\_NONE) = 0

mmap(0x7f0cd1456000, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x16000) = 0x7f0cd1456000

close(3) = 0

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

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\3\0>\0\1\0\0\0\20\35\2\0\0\0\0\0"..., 832) = 832

fstat(3, {st\_mode=S\_IFREG|0755, st\_size=2030928, ...}) = 0

mmap(NULL, 4131552, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7f0cd0e40000

mprotect(0x7f0cd1027000, 2097152, PROT\_NONE) = 0

mmap(0x7f0cd1227000, 24576, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x1e7000) = 0x7f0cd1227000

mmap(0x7f0cd122d000, 15072, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_ANONYMOUS, -1, 0) = 0x7f0cd122d000

close(3) = 0

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

openat(AT\_FDCWD, "/lib/x86\_64-linux-gnu/libm.so.6", O\_RDONLY|O\_CLOEXEC) = 3

read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\200\272\0\0\0\0\0\0"..., 832) = 832

fstat(3, {st\_mode=S\_IFREG|0644, st\_size=1700792, ...}) = 0

mmap(NULL, 3789144, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7f0cd0aa0000

mprotect(0x7f0cd0c3d000, 2093056, PROT\_NONE) = 0

mmap(0x7f0cd0e3c000, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x19c000) = 0x7f0cd0e3c000

close(3) = 0

mmap(NULL, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_ANONYMOUS, -1, 0) = 0x7f0cd1c40000

mmap(NULL, 12288, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_ANONYMOUS, -1, 0) = 0x7f0cd1c30000

arch\_prctl(ARCH\_SET\_FS, 0x7f0cd1c30740) = 0

mprotect(0x7f0cd1227000, 16384, PROT\_READ) = 0

mprotect(0x7f0cd0e3c000, 4096, PROT\_READ) = 0

mprotect(0x7f0cd1456000, 4096, PROT\_READ) = 0

mprotect(0x7f0cd17d9000, 40960, PROT\_READ) = 0

mprotect(0x7f0cd19f2000, 4096, PROT\_READ) = 0

mprotect(0x7f0cd2002000, 4096, PROT\_READ) = 0

mprotect(0x7f0cd1c29000, 4096, PROT\_READ) = 0

munmap(0x7f0cd1c5d000, 42278) = 0

brk(NULL) = 0x7fffbecd1000

brk(0x7fffbecf2000) = 0x7fffbecf2000

fstat(1, {st\_mode=S\_IFCHR|0620, st\_rdev=makedev(136, 0), ...}) = 0

write(1, "0 for change libs, 1 for re1.cpp"..., 61) = 61

fstat(0, {st\_mode=S\_IFCHR|0620, st\_rdev=makedev(136, 0), ...}) = 0

read(0, "1\n", 1024) = 2

openat(AT\_FDCWD, "./libd1.so", O\_RDONLY|O\_CLOEXEC) = 3

read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\340\4\0\0\0\0\0\0"..., 832) = 832

fstat(3, {st\_mode=S\_IFREG|0755, st\_size=7568, ...}) = 0

getcwd("/home/papey/Ubuntu/OS/os\_lab5/src", 128) = 34

mmap(NULL, 2101296, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7f0cd0890000

mprotect(0x7f0cd0891000, 2093056, PROT\_NONE) = 0

mmap(0x7f0cd0a90000, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0) = 0x7f0cd0a90000

close(3) = 0

mprotect(0x7f0cd0a90000, 4096, PROT\_READ) = 0

write(1, "1 for GCF, 2 for Sort:\n", 23) = 23

read(0, "1 8 4\n", 1024) = 6

write(1, "4\n", 2) = 2

read(0, "2 1 4 3 2\n", 1024) = 10

write(1, "1 2 3 4 \n", 9) = 9

read(0, "0\n", 1024) = 2

munmap(0x7f0cd0890000, 2101296) = 0

openat(AT\_FDCWD, "./libd2.so", O\_RDONLY|O\_CLOEXEC) = 3

read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0P\5\0\0\0\0\0\0"..., 832) = 832

fstat(3, {st\_mode=S\_IFREG|0755, st\_size=7648, ...}) = 0

getcwd("/home/papey/Ubuntu/OS/os\_lab5/src", 128) = 34

mmap(NULL, 2101304, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7f0cd0890000

mprotect(0x7f0cd0891000, 2093056, PROT\_NONE) = 0

mmap(0x7f0cd0a90000, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0) = 0x7f0cd0a90000

close(3) = 0

mprotect(0x7f0cd0a90000, 4096, PROT\_READ) = 0

write(1, "re1 changed on re2\n", 19) = 19

read(0, "1 8 12\n", 1024) = 7

write(1, "4\n", 2) = 2

read(0, "2 7 6 5 4 3 2 1 -1\n", 1024) = 19

write(1, "-1 1 2 3 4 5 6 7 \n", 18) = 18

read(0, "3\n", 1024) = 2

munmap(0x7f0cd0890000, 2101304) = 0

lseek(0, -1, SEEK\_CUR) = -1 ESPIPE (Illegal seek)

exit\_group(0) = ?

+++ exited with 0 +++

**Вывод**

Проделав лабораторную работу, я приобрёл навыки, необходимые для работы с strace, а также изучил системные вызовы.