Московский Авиационный Институт

(Национальный Исследовательский Университет)

Факультет информационных технологий и прикладной математики

Кафедра вычислительной математики и программирования

**Лабораторная работа №1 по курсу**

**«Операционные системы»**

**Тема работы**

**«Динамические библиотеки»**

Студент: Лютоев Илья Александрович

Группа: М8О-207Б-21

Вариант: 1

Преподаватель: Миронов Евгений Сергеевич

Оценка: \_\_\_\_\_\_\_\_\_\_\_

Дата: \_\_\_\_\_\_\_\_\_\_\_

Подпись: \_\_\_\_\_\_\_\_\_\_\_

Москва, 2022

### Постановка задачи

Подробно рассказать о каждом системном вызове из утилиты strace на примере лабораторной работы №3.

Демонстрация работы strace

lyutoev@lyutoev  ~/workshop/os/OS/lab3/build   main ±✚  strace ./main 2 <1

execve("./main", ["./main", "2"], 0x7ffc413fad08 /\* 92 vars \*/) = 0

brk(NULL)                               = 0x531000

arch\_prctl(0x3001 /\* ARCH\_??? \*/, 0x7fffae7ebf20) = -1 EINVAL (Недопустимый аргумент)

access("/etc/ld.so.preload", R\_OK)      = -1 ENOENT (Нет такого файла или каталога)

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

newfstatat(3, "", {st\_mode=S\_IFREG|0644, st\_size=118659, ...}, AT\_EMPTY\_PATH) = 0

mmap(NULL, 118659, PROT\_READ, MAP\_PRIVATE, 3, 0) = 0x7fe870be7000

close(3)                                = 0

openat(AT\_FDCWD, "/lib64/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\0\0\0\0\0\0\0\0"..., 832) = 832

pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0l\342\244\35\356\211?\236\336<c\371\252\332\323\202"..., 36, 800) = 36

newfstatat(3, "", {st\_mode=S\_IFREG|0755, st\_size=2359992, ...}, AT\_EMPTY\_PATH) = 0

mmap(NULL, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_ANONYMOUS, -1, 0) = 0x7fe870be5000

mmap(NULL, 2308096, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7fe870800000

mprotect(0x7fe87089a000, 1609728, PROT\_NONE) = 0

mmap(0x7fe87089a000, 1118208, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x9a000) = 0x7fe87089a000

mmap(0x7fe8709ab000, 487424, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x1ab000) = 0x7fe8709ab000

mmap(0x7fe870a23000, 57344, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x222000) = 0x7fe870a23000

mmap(0x7fe870a31000, 10240, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_ANONYMOUS, -1, 0) = 0x7fe870a31000

close(3)                                = 0

openat(AT\_FDCWD, "/lib64/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\0\0\0\0\0\0\0\0"..., 832) = 832

newfstatat(3, "", {st\_mode=S\_IFREG|0755, st\_size=919832, ...}, AT\_EMPTY\_PATH) = 0

mmap(NULL, 905480, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7fe870b07000

mmap(0x7fe870b15000, 466944, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0xe000) = 0x7fe870b15000

mmap(0x7fe870b87000, 376832, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x80000) = 0x7fe870b87000

mmap(0x7fe870be3000, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0xdb000) = 0x7fe870be3000

close(3)                                = 0

openat(AT\_FDCWD, "/lib64/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\0\0\0\0\0\0\0\0"..., 832) = 832

newfstatat(3, "", {st\_mode=S\_IFREG|0755, st\_size=128536, ...}, AT\_EMPTY\_PATH) = 0

mmap(NULL, 127272, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7fe870ae7000

mmap(0x7fe870aea000, 94208, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x3000) = 0x7fe870aea000

mmap(0x7fe870b01000, 16384, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x1a000) = 0x7fe870b01000

mmap(0x7fe870b05000, 4096, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x1d000) = 0x7fe870b05000

mmap(0x7fe870b06000, 296, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_ANONYMOUS, -1, 0) = 0x7fe870b06000

close(3)                                = 0

openat(AT\_FDCWD, "/lib64/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\320\226\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"..., 784, 64) = 784

pread64(3, "\4\0\0\0@\0\0\0\5\0\0\0GNU\0\2\0\0\300\4\0\0\0\3\0\0\0\0\0\0\0"..., 80, 848) = 80

pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\205\3048\364\377\223\342\26u\377\27Cq\311\305\203"..., 68, 928) = 68

newfstatat(3, "", {st\_mode=S\_IFREG|0755, st\_size=2375584, ...}, AT\_EMPTY\_PATH) = 0

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"..., 784, 64) = 784

mmap(NULL, 2104720, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7fe870400000

mmap(0x7fe870428000, 1523712, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x28000) = 0x7fe870428000

mmap(0x7fe87059c000, 360448, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x19c000) = 0x7fe87059c000

mmap(0x7fe8705f4000, 24576, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x1f3000) = 0x7fe8705f4000

mmap(0x7fe8705fa000, 32144, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_ANONYMOUS, -1, 0) = 0x7fe8705fa000

close(3)                                = 0

mmap(NULL, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_ANONYMOUS, -1, 0) = 0x7fe870ae5000

arch\_prctl(ARCH\_SET\_FS, 0x7fe870ae6200) = 0

set\_tid\_address(0x7fe870ae64d0)         = 36687

set\_robust\_list(0x7fe870ae64e0, 24)     = 0

rseq(0x7fe870ae6ba0, 0x20, 0, 0x53053053) = 0

mprotect(0x7fe8705f4000, 16384, PROT\_READ) = 0

mprotect(0x7fe870b05000, 4096, PROT\_READ) = 0

mprotect(0x7fe870be3000, 4096, PROT\_READ) = 0

mmap(NULL, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_ANONYMOUS, -1, 0) = 0x7fe870ae3000

mprotect(0x7fe870a23000, 53248, PROT\_READ) = 0

mprotect(0x403000, 4096, PROT\_READ)     = 0

mprotect(0x7fe870c39000, 8192, PROT\_READ) = 0

prlimit64(0, RLIMIT\_STACK, NULL, {rlim\_cur=8192\*1024, rlim\_max=RLIM64\_INFINITY}) = 0

munmap(0x7fe870be7000, 118659)          = 0

getrandom("\xcc\xf0\x97\x3e\xdc\x1c\xa2\x1b", 8, GRND\_NONBLOCK) = 8

brk(NULL)                               = 0x531000

brk(0x552000)                           = 0x552000

futex(0x7fe870a316bc, FUTEX\_WAKE\_PRIVATE, 2147483647) = 0

newfstatat(0, "", {st\_mode=S\_IFREG|0644, st\_size=75, ...}, AT\_EMPTY\_PATH) = 0

read(0, "1 2 3 4 5\n19 9 9 99 239530 3\n3 0"..., 4096) = 75

newfstatat(1, "", {st\_mode=S\_IFCHR|0600, st\_rdev=makedev(0x88, 0x2), ...}, AT\_EMPTY\_PATH) = 0

write(1, "minrun: 1\n", 10minrun: 1

)             = 10

rt\_sigaction(SIGRT\_1, {sa\_handler=0x7fe87048a220, sa\_mask=[], sa\_flags=SA\_RESTORER|SA\_ONSTACK|SA\_RESTART|SA\_SIGINFO, sa\_restorer=0x7fe87043ea30}, NULL, 8) = 0

rt\_sigprocmask(SIG\_UNBLOCK, [RTMIN RT\_1], NULL, 8) = 0

mmap(NULL, 8392704, PROT\_NONE, MAP\_PRIVATE|MAP\_ANONYMOUS|MAP\_STACK, -1, 0) = 0x7fe86fbff000

mprotect(0x7fe86fc00000, 8388608, PROT\_READ|PROT\_WRITE) = 0

rt\_sigprocmask(SIG\_BLOCK, ~[], [], 8)   = 0

clone3({flags=CLONE\_VM|CLONE\_FS|CLONE\_FILES|CLONE\_SIGHAND|CLONE\_THREAD|CLONE\_SYSVSEM|CLONE\_SETTLS|CLONE\_PARENT\_SETTID|CLONE\_CHILD\_CLEARTID, child\_tid=0x7fe8703ff910, parent\_tid=0x7fe8703ff910, exit\_signal=0, stack=0x7fe86fbff000, stack\_

size=0x7fff00, tls=0x7fe8703ff640} => {parent\_tid=[36688]}, 88) = 36688

rt\_sigprocmask(SIG\_SETMASK, [], NULL, 8) = 0

lseek(0, -72, SEEK\_CUR)                 = 3

exit\_group(0)                           = ?

+++ exited with 0 +++

lyutoev@lyutoev  ~/workshop/os/OS/lab3/build   main ±✚ 

### Вывод

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