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**Лабораторная работа №1 по курсу
«Операционные системы»**

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Репозиторий

<https://github.com/molch4nov/OS/>

Постановка задачи

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

Демонстрация работы strace

```

exeve("./main1", ["../main1"], 0x7fffc0b9ee50 /* 18 vars */) = 0
brk(NULL) = 0x7fffdb27a000
arch_prctl(0x3001 /* ARCH_??? */, 0x7fffe2ad47a0) = -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/libd2.so", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such
file or directory)
openat(AT_FDCWD, "./tls/haswell/libd2.so", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or
directory)
openat(AT_FDCWD, "./tls/x86_64/libd2.so", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or
directory)
openat(AT_FDCWD, "./tls/libd2.so", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "./haswell/x86_64/libd2.so", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or
directory)
openat(AT_FDCWD, "./haswell/libd2.so", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or
directory)
openat(AT_FDCWD, "./x86_64/libd2.so", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or
directory)
openat(AT_FDCWD, "./libd2.so", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\2000\0\0\0\0\0"... , 832) = 832
fstat(3, {st_mode=S_IFREG|0777, st_size=51856, ...}) = 0
mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7fa9626f0000
getcwd("/mnt/c/Users/vlad-/Desktop", 128) = 27
mmap(NULL, 41984, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7fa9626f5000
mmap(0x7fa9626f9000, 12288, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3,
0x4000) = 0x7fa9626f9000
mmap(0x7fa9626fc000, 8192, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x7000) =
0x7fa9626fc000
mmap(0x7fa9626fe000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3,
0x8000) = 0x7fa9626fe000
close(3) = 0
openat(AT_FDCWD, "./tls/haswell/x86_64/libstdc++.so.6", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No
such file or directory)
openat(AT_FDCWD, "./tls/haswell/libstdc++.so.6", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file
or directory)

```

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openat(AT_FDCWD, "./tls/x86_64/libstdc++.so.6", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file
or directory)

openat(AT_FDCWD, "./tls/libstdc++.so.6", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or
directory)

openat(AT_FDCWD, "./haswell/x86_64/libstdc++.so.6", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such
file or directory)

openat(AT_FDCWD, "./haswell/libstdc++.so.6", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or
directory)

openat(AT_FDCWD, "./x86_64/libstdc++.so.6", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or
directory)

openat(AT_FDCWD, "./libstdc++.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=33838, ...}) = 0

mmap(NULL, 33838, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7fa9626e7000

close(3) = 0

openat(AT_FDCWD, "/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\3\0>\0\1\0\0\0`\341\t\0\0\0\0"... , 832) = 832

fstat(3, {st_mode=S_IFREG|0644, st_size=1956992, ...}) = 0

mmap(NULL, 1972224, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7fa962500000

mprotect(0x7fa962596000, 1290240, PROT_NONE) = 0

mmap(0x7fa962596000, 987136, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3,
0x96000) = 0x7fa962596000

mmap(0x7fa962687000, 299008, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x187000) =
0x7fa962687000

mmap(0x7fa9626d1000, 57344, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3,
0x1d0000) = 0x7fa9626d1000

mmap(0x7fa9626df000, 10240, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0)
= 0x7fa9626df000

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)

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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\3\0>\0\1\0\0\0\360q\2\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"... , 784, 64) = 784
pread64(3, "\4\0\0\0\2\0\0\0\5\0\0\0GNU\0\2\0\0\300\4\0\0\0\3\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
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"... , 784, 64) = 784
pread64(3, "\4\0\0\0\2\0\0\0\5\0\0\0GNU\0\2\0\0\300\4\0\0\0\3\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) = 0x7fa962300000
mprotect(0x7fa962325000, 1847296, PROT_NONE) = 0
mmap(0x7fa962325000, 1540096, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3,
0x25000) = 0x7fa962325000
mmap(0x7fa96249d000, 303104, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x19d000) =
0x7fa96249d000
mmap(0x7fa9624e8000, 24576, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3,
0x1e7000) = 0x7fa9624e8000
mmap(0x7fa9624ee000, 13528, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0)
= 0x7fa9624ee000
close(3) = 0
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\3\0>\0\1\0\0\0\300\363\0\0\0\0\0\0"... , 832) = 832
fstat(3, {st_mode=S_IFREG|0644, st_size=1369352, ...}) = 0
mmap(NULL, 1368336, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7fa9621b1000
mmap(0x7fa9621c0000, 684032, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3,
0xf000) = 0x7fa9621c0000
mmap(0x7fa962267000, 618496, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0xb6000) =
0x7fa962267000
mmap(0x7fa9622fe000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3,
0x14c000) = 0x7fa9622fe000
close(3) = 0
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\3\0>\0\1\0\0\0\3405\0\0\0\0\0\0"... , 832) = 832
fstat(3, {st_mode=S_IFREG|0644, st_size=104984, ...}) = 0
mmap(NULL, 107592, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7fa962190000
mmap(0x7fa962193000, 73728, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3,
0x3000) = 0x7fa962193000
mmap(0x7fa9621a5000, 16384, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x15000) =
0x7fa9621a5000

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mmap(0x7fa9621a9000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3,
0x18000) = 0x7fa9621a9000

close(3) = 0

mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7fa962180000
mmap(NULL, 12288, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7fa962170000
arch_prctl(ARCH_SET_FS, 0x7fa962170740) = 0
mprotect(0x7fa9624e8000, 12288, PROT_READ) = 0
mprotect(0x7fa9621a9000, 4096, PROT_READ) = 0
mprotect(0x7fa9622fe000, 4096, PROT_READ) = 0
mprotect(0x7fa9626d1000, 45056, PROT_READ) = 0
mprotect(0x7fa9626fe000, 4096, PROT_READ) = 0
mprotect(0x7fa962734000, 4096, PROT_READ) = 0
mprotect(0x7fa96272d000, 4096, PROT_READ) = 0
munmap(0x7fa9626e7000, 33838) = 0
brk(NULL) = 0x7ffffdb27a000
brk(0x7ffffdb29b000) = 0x7ffffdb29b000
fstat(1, {st_mode=S_IFCHR|0660, st_rdev=makedev(0x4, 0x1), ...}) = 0
ioctl(1, TCGETS, {B38400 opost isig icanon echo ...}) = 0
write(1, "Choose a function\n", 18) = 18
fstat(0, {st_mode=S_IFCHR|0660, st_rdev=makedev(0x4, 0x1), ...}) = 0
ioctl(0, TCGETS, {B38400 opost isig icanon echo ...}) = 0
read(0, "1\n", 512) = 2
write(1, "Enter A and B numbers\n", 22) = 22
read(0, "0 18\n", 512) = 5
mmap(NULL, 1937408, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7fa961f90000
brk(0x7ffffdb2bd000) = 0x7ffffdb2bd000
mmap(NULL, 135168, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7fa961f60000
brk(0x7ffffdb2ad000) = 0x7ffffdb2ad000
mmap(NULL, 266240, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7fa961f10000
munmap(0x7fa961f60000, 135168) = 0
mmap(NULL, 528384, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7fa961e80000
munmap(0x7fa961f10000, 266240) = 0
mmap(NULL, 1052672, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7fa961d70000
munmap(0x7fa961e80000, 528384) = 0
mmap(NULL, 2101248, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7fa961b60000
munmap(0x7fa961d70000, 1052672) = 0
mmap(NULL, 4198400, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7fa961750000
munmap(0x7fa961b60000, 2101248) = 0

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mmap(NULL, 8392704, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7fa960f40000
munmap(0x7fa961750000, 4198400)          = 0
munmap(0x7fa960f40000, 8392704)          = 0
munmap(0x7fa961f90000, 1937408)          = 0
write(1, "Your answer: 7\n", 15)         = 15
read(0, "2\n", 512)                     = 2
write(1, "Enter positive K\n", 17)        = 17
read(0, "919\n", 512)                    = 4
write(1, "Pi = 3.14074\n", 15)           = 15
read(0, "3\n", 512)                      = 2
lseek(0, -1, SEEK_CUR)                    = -1 EPIPE (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.

