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

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## Репозиторий

[https://github.com/.../os\\_lab1](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" ], 0x7ffffb25470 /* 28 vars */) = 0
brk(NULL)                                = 0x7ffffbecd1000
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\3\0\0\0\1\0\0\0P\16\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\3\0\0\0\1\0\0\0220\304\10\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\3\0\0\0\1\0\0\0300*\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\3\0\0\0\1\0\0\020\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"..., 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, 4096, 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) = 0x7ffffbecd1000
brk(0x7ffffbecf2000) = 0x7ffffbecf2000
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"..., 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\\0\\0\\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.

