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Кафедра вычислительной математики и программирования

**Лабораторная работа №8 по курсу**

**«Операционные системы»**

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Дата: \_\_\_\_\_\_\_\_\_\_\_

Подпись: \_\_\_\_\_\_\_\_\_\_\_

Москва, 2023

**Содержание**

1. Репозиторий

2. Постановка задачи

3. Используемые инструменты

4. Вывод strace

5. Анализ вывода strace

6. Вывод

**Репозиторий**

<https://github.com/pepelulka/OS_labs>

**Постановка задачи**

Приобретение практических навыков диагностики работы программного обеспечения.

**Используемые инструменты**

Диагностику программы мы будем проводить в операционной системе Lunux с использованием утилиты strace. Будем проводить диагностику программы, написанной для первой лабораторной работы.

**Вывод strace**

execve("lab1/lab1\_main", ["lab1/lab1\_main"], 0x7ffcfe00fa28 /\* 92 vars \*/) = 0

brk(NULL) = 0x55868c176000

arch\_prctl(0x3001 /\* ARCH\_??? \*/, 0x7ffeab3efed0) = -1 EINVAL (Invalid argument)

mmap(NULL, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_ANONYMOUS, -1, 0) = 0x7f9981c17000

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

newfstatat(3, "", {st\_mode=S\_IFREG|0644, st\_size=69011, ...}, AT\_EMPTY\_PATH) = 0

mmap(NULL, 69011, PROT\_READ, MAP\_PRIVATE, 3, 0) = 0x7f9981c06000

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\3\0>\0\1\0\0\0P\237\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"..., 48, 848) = 48

pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0 =\340\2563\265?\356\25x\261\27\313A#\350"..., 68, 896) = 68

newfstatat(3, "", {st\_mode=S\_IFREG|0755, st\_size=2216304, ...}, 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, 2260560, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7f9981800000

mmap(0x7f9981828000, 1658880, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x28000) = 0x7f9981828000

mmap(0x7f99819bd000, 360448, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x1bd000) = 0x7f99819bd000

mmap(0x7f9981a15000, 24576, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x214000) = 0x7f9981a15000

mmap(0x7f9981a1b000, 52816, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_ANONYMOUS, -1, 0) = 0x7f9981a1b000

close(3) = 0

mmap(NULL, 12288, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_ANONYMOUS, -1, 0) = 0x7f9981c03000

arch\_prctl(ARCH\_SET\_FS, 0x7f9981c03740) = 0

set\_tid\_address(0x7f9981c03a10) = 8516

set\_robust\_list(0x7f9981c03a20, 24) = 0

rseq(0x7f9981c040e0, 0x20, 0, 0x53053053) = 0

mprotect(0x7f9981a15000, 16384, PROT\_READ) = 0

mprotect(0x55868a7bb000, 4096, PROT\_READ) = 0

mprotect(0x7f9981c51000, 8192, PROT\_READ) = 0

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

munmap(0x7f9981c06000, 69011) = 0

getrandom("\x2d\x74\xd2\xbc\x43\x52\xf2\xea", 8, GRND\_NONBLOCK) = 8

brk(NULL) = 0x55868c176000

brk(0x55868c197000) = 0x55868c197000

newfstatat(0, "", {st\_mode=S\_IFCHR|0620, st\_rdev=makedev(0x88, 0), ...}, AT\_EMPTY\_PATH) = 0

read(0, t1

"t1\n", 1024) = 3

read(0, t2

"t2\n", 1024) = 3

pipe2([3, 4], 0) = 0

pipe2([5, 6], 0) = 0

clone(child\_stack=NULL, flags=CLONE\_CHILD\_CLEARTID|CLONE\_CHILD\_SETTID|SIGCHLDstrace: Process 8517 attached

, child\_tidptr=0x7f9981c03a10) = 8517

[pid 8516] clone(child\_stack=NULL, flags=CLONE\_CHILD\_CLEARTID|CLONE\_CHILD\_SETTID|SIGCHLD <unfinished ...>

[pid 8517] set\_robust\_list(0x7f9981c03a20, 24) = 0

[pid 8517] close(4) = 0

[pid 8517] close(5) = 0

[pid 8517] close(6strace: Process 8518 attached

<unfinished ...>

[pid 8516] <... clone resumed>, child\_tidptr=0x7f9981c03a10) = 8518

[pid 8517] <... close resumed>) = 0

[pid 8517] dup2(3, 0 <unfinished ...>

[pid 8516] close(3 <unfinished ...>

[pid 8518] set\_robust\_list(0x7f9981c03a20, 24 <unfinished ...>

[pid 8517] <... dup2 resumed>) = 0

[pid 8516] <... close resumed>) = 0

[pid 8518] <... set\_robust\_list resumed>) = 0

[pid 8516] close(5 <unfinished ...>

[pid 8517] execve("/home/pepelulka/Desktop/os/OS\_labs/build/lab1/lab1\_child", ["/home/pepelulka/Desktop/os/OS\_la"..., "t1"], 0x7ffeab3f00a8 /\* 92 vars \*/ <unfinished ...>

[pid 8516] <... close resumed>) = 0

[pid 8518] close(6) = 0

[pid 8516] read(0, <unfinished ...>

[pid 8518] close(3) = 0

[pid 8518] close(4) = 0

[pid 8518] dup2(5, 0) = 0

[pid 8518] execve("/home/pepelulka/Desktop/os/OS\_labs/build/lab1/lab1\_child", ["/home/pepelulka/Desktop/os/OS\_la"..., "t2"], 0x7ffeab3f00a8 /\* 92 vars \*/ <unfinished ...>

[pid 8517] <... execve resumed>) = 0

[pid 8517] brk(NULL) = 0x55c32e5a9000

[pid 8518] <... execve resumed>) = 0

[pid 8517] arch\_prctl(0x3001 /\* ARCH\_??? \*/, 0x7ffcfafd0480) = -1 EINVAL (Invalid argument)

[pid 8518] brk(NULL) = 0x55cc87f3e000

[pid 8517] mmap(NULL, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_ANONYMOUS, -1, 0 <unfinished ...>

[pid 8518] arch\_prctl(0x3001 /\* ARCH\_??? \*/, 0x7fffc1b66ad0 <unfinished ...>

[pid 8517] <... mmap resumed>) = 0x7f73d7e1e000

[pid 8518] <... arch\_prctl resumed>) = -1 EINVAL (Invalid argument)

[pid 8517] access("/etc/ld.so.preload", R\_OK <unfinished ...>

[pid 8518] mmap(NULL, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_ANONYMOUS, -1, 0 <unfinished ...>

[pid 8517] <... access resumed>) = -1 ENOENT (No such file or directory)

[pid 8518] <... mmap resumed>) = 0x7f51ec120000

[pid 8517] openat(AT\_FDCWD, "/etc/ld.so.cache", O\_RDONLY|O\_CLOEXEC <unfinished ...>

[pid 8518] access("/etc/ld.so.preload", R\_OK <unfinished ...>

[pid 8517] <... openat resumed>) = 4

[pid 8518] <... access resumed>) = -1 ENOENT (No such file or directory)

[pid 8517] newfstatat(4, "", <unfinished ...>

[pid 8518] openat(AT\_FDCWD, "/etc/ld.so.cache", O\_RDONLY|O\_CLOEXEC <unfinished ...>

[pid 8517] <... newfstatat resumed>{st\_mode=S\_IFREG|0644, st\_size=69011, ...}, AT\_EMPTY\_PATH) = 0

[pid 8518] <... openat resumed>) = 3

[pid 8517] mmap(NULL, 69011, PROT\_READ, MAP\_PRIVATE, 4, 0 <unfinished ...>

[pid 8518] newfstatat(3, "", <unfinished ...>

[pid 8517] <... mmap resumed>) = 0x7f73d7e0d000

[pid 8518] <... newfstatat resumed>{st\_mode=S\_IFREG|0644, st\_size=69011, ...}, AT\_EMPTY\_PATH) = 0

[pid 8517] close(4 <unfinished ...>

[pid 8518] mmap(NULL, 69011, PROT\_READ, MAP\_PRIVATE, 3, 0 <unfinished ...>

[pid 8517] <... close resumed>) = 0

[pid 8518] <... mmap resumed>) = 0x7f51ec10f000

[pid 8518] close(3 <unfinished ...>

[pid 8517] openat(AT\_FDCWD, "/lib/x86\_64-linux-gnu/libc.so.6", O\_RDONLY|O\_CLOEXEC <unfinished ...>

[pid 8518] <... close resumed>) = 0

[pid 8517] <... openat resumed>) = 4

[pid 8518] openat(AT\_FDCWD, "/lib/x86\_64-linux-gnu/libc.so.6", O\_RDONLY|O\_CLOEXEC <unfinished ...>

[pid 8517] read(4, <unfinished ...>

[pid 8518] <... openat resumed>) = 3

[pid 8517] <... read resumed>"\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0P\237\2\0\0\0\0\0"..., 832) = 832

[pid 8518] read(3, <unfinished ...>

[pid 8517] pread64(4, <unfinished ...>

[pid 8518] <... read resumed>"\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0P\237\2\0\0\0\0\0"..., 832) = 832

[pid 8517] <... pread64 resumed>"\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

[pid 8518] pread64(3, <unfinished ...>

[pid 8517] pread64(4, <unfinished ...>

[pid 8518] <... pread64 resumed>"\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

[pid 8517] <... pread64 resumed>"\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"..., 48, 848) = 48

[pid 8518] pread64(3, <unfinished ...>

[pid 8517] pread64(4, <unfinished ...>

[pid 8518] <... pread64 resumed>"\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"..., 48, 848) = 48

[pid 8517] <... pread64 resumed>"\4\0\0\0\24\0\0\0\3\0\0\0GNU\0 =\340\2563\265?\356\25x\261\27\313A#\350"..., 68, 896) = 68

[pid 8518] pread64(3, <unfinished ...>

[pid 8517] newfstatat(4, "", <unfinished ...>

[pid 8518] <... pread64 resumed>"\4\0\0\0\24\0\0\0\3\0\0\0GNU\0 =\340\2563\265?\356\25x\261\27\313A#\350"..., 68, 896) = 68

[pid 8517] <... newfstatat resumed>{st\_mode=S\_IFREG|0755, st\_size=2216304, ...}, AT\_EMPTY\_PATH) = 0

[pid 8518] newfstatat(3, "", <unfinished ...>

[pid 8517] pread64(4, <unfinished ...>

[pid 8518] <... newfstatat resumed>{st\_mode=S\_IFREG|0755, st\_size=2216304, ...}, AT\_EMPTY\_PATH) = 0

[pid 8517] <... pread64 resumed>"\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

[pid 8518] 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

[pid 8517] mmap(NULL, 2260560, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 4, 0 <unfinished ...>

[pid 8518] mmap(NULL, 2260560, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0 <unfinished ...>

[pid 8517] <... mmap resumed>) = 0x7f73d7a00000

[pid 8518] <... mmap resumed>) = 0x7f51ebe00000

[pid 8517] mmap(0x7f73d7a28000, 1658880, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 4, 0x28000 <unfinished ...>

[pid 8518] mmap(0x7f51ebe28000, 1658880, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x28000 <unfinished ...>

[pid 8517] <... mmap resumed>) = 0x7f73d7a28000

[pid 8518] <... mmap resumed>) = 0x7f51ebe28000

[pid 8517] mmap(0x7f73d7bbd000, 360448, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 4, 0x1bd000 <unfinished ...>

[pid 8518] mmap(0x7f51ebfbd000, 360448, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x1bd000 <unfinished ...>

[pid 8517] <... mmap resumed>) = 0x7f73d7bbd000

[pid 8518] <... mmap resumed>) = 0x7f51ebfbd000

[pid 8517] mmap(0x7f73d7c15000, 24576, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 4, 0x214000 <unfinished ...>

[pid 8518] mmap(0x7f51ec015000, 24576, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x214000) = 0x7f51ec015000

[pid 8517] <... mmap resumed>) = 0x7f73d7c15000

[pid 8518] mmap(0x7f51ec01b000, 52816, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_ANONYMOUS, -1, 0 <unfinished ...>

[pid 8517] mmap(0x7f73d7c1b000, 52816, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_ANONYMOUS, -1, 0 <unfinished ...>

[pid 8518] <... mmap resumed>) = 0x7f51ec01b000

[pid 8517] <... mmap resumed>) = 0x7f73d7c1b000

[pid 8518] close(3) = 0

[pid 8517] close(4) = 0

[pid 8518] mmap(NULL, 12288, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_ANONYMOUS, -1, 0) = 0x7f51ec10c000

[pid 8517] mmap(NULL, 12288, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_ANONYMOUS, -1, 0 <unfinished ...>

[pid 8518] arch\_prctl(ARCH\_SET\_FS, 0x7f51ec10c740 <unfinished ...>

[pid 8517] <... mmap resumed>) = 0x7f73d7e0a000

[pid 8518] <... arch\_prctl resumed>) = 0

[pid 8518] set\_tid\_address(0x7f51ec10ca10 <unfinished ...>

[pid 8517] arch\_prctl(ARCH\_SET\_FS, 0x7f73d7e0a740 <unfinished ...>

[pid 8518] <... set\_tid\_address resumed>) = 8518

[pid 8517] <... arch\_prctl resumed>) = 0

[pid 8518] set\_robust\_list(0x7f51ec10ca20, 24 <unfinished ...>

[pid 8517] set\_tid\_address(0x7f73d7e0aa10 <unfinished ...>

[pid 8518] <... set\_robust\_list resumed>) = 0

[pid 8517] <... set\_tid\_address resumed>) = 8517

[pid 8518] rseq(0x7f51ec10d0e0, 0x20, 0, 0x53053053 <unfinished ...>

[pid 8517] set\_robust\_list(0x7f73d7e0aa20, 24 <unfinished ...>

[pid 8518] <... rseq resumed>) = 0

[pid 8517] <... set\_robust\_list resumed>) = 0

[pid 8517] rseq(0x7f73d7e0b0e0, 0x20, 0, 0x53053053) = 0

[pid 8518] mprotect(0x7f51ec015000, 16384, PROT\_READ <unfinished ...>

[pid 8517] mprotect(0x7f73d7c15000, 16384, PROT\_READ <unfinished ...>

[pid 8518] <... mprotect resumed>) = 0

[pid 8517] <... mprotect resumed>) = 0

[pid 8518] mprotect(0x55cc864be000, 4096, PROT\_READ <unfinished ...>

[pid 8517] mprotect(0x55c32e17f000, 4096, PROT\_READ <unfinished ...>

[pid 8518] <... mprotect resumed>) = 0

[pid 8517] <... mprotect resumed>) = 0

[pid 8518] mprotect(0x7f51ec15a000, 8192, PROT\_READ <unfinished ...>

[pid 8517] mprotect(0x7f73d7e58000, 8192, PROT\_READ <unfinished ...>

[pid 8518] <... mprotect resumed>) = 0

[pid 8517] <... mprotect resumed>) = 0

[pid 8517] prlimit64(0, RLIMIT\_STACK, NULL, {rlim\_cur=8192\*1024, rlim\_max=RLIM64\_INFINITY}) = 0

[pid 8518] prlimit64(0, RLIMIT\_STACK, NULL, {rlim\_cur=8192\*1024, rlim\_max=RLIM64\_INFINITY}) = 0

[pid 8517] munmap(0x7f73d7e0d000, 69011 <unfinished ...>

[pid 8518] munmap(0x7f51ec10f000, 69011 <unfinished ...>

[pid 8517] <... munmap resumed>) = 0

[pid 8518] <... munmap resumed>) = 0

[pid 8517] getrandom("\x84\x3e\xa2\x70\xcf\x83\x7c\x54", 8, GRND\_NONBLOCK) = 8

[pid 8518] getrandom("\x55\xbb\xd5\xc2\x2b\xeb\x00\xe2", 8, GRND\_NONBLOCK) = 8

[pid 8517] brk(NULL <unfinished ...>

[pid 8518] brk(NULL <unfinished ...>

[pid 8517] <... brk resumed>) = 0x55c32e5a9000

[pid 8518] <... brk resumed>) = 0x55cc87f3e000

[pid 8517] brk(0x55c32e5ca000 <unfinished ...>

[pid 8518] brk(0x55cc87f5f000 <unfinished ...>

[pid 8517] <... brk resumed>) = 0x55c32e5ca000

[pid 8518] <... brk resumed>) = 0x55cc87f5f000

[pid 8518] openat(AT\_FDCWD, "t2", O\_WRONLY|O\_CREAT|O\_TRUNC, 0666 <unfinished ...>

[pid 8517] openat(AT\_FDCWD, "t1", O\_WRONLY|O\_CREAT|O\_TRUNC, 0666 <unfinished ...>

[pid 8518] <... openat resumed>) = 3

[pid 8518] newfstatat(0, "", <unfinished ...>

[pid 8517] <... openat resumed>) = 4

[pid 8518] <... newfstatat resumed>{st\_mode=S\_IFIFO|0600, st\_size=0, ...}, AT\_EMPTY\_PATH) = 0

[pid 8517] newfstatat(0, "", <unfinished ...>

[pid 8518] read(0, <unfinished ...>

[pid 8517] <... newfstatat resumed>{st\_mode=S\_IFIFO|0600, st\_size=0, ...}, AT\_EMPTY\_PATH) = 0

[pid 8517] read(0, meow

<unfinished ...>

[pid 8516] <... read resumed>"meow\n", 1024) = 5

[pid 8516] write(6, "meow\n", 5) = 5

[pid 8518] <... read resumed>"meow\n", 4096) = 5

[pid 8516] read(0, <unfinished ...>

[pid 8518] newfstatat(3, "", {st\_mode=S\_IFREG|0664, st\_size=0, ...}, AT\_EMPTY\_PATH) = 0

[pid 8518] write(3, "mw\n", 3) = 3

[pid 8518] read(0, pepe

<unfinished ...>

[pid 8516] <... read resumed>"pepe\n", 1024) = 5

[pid 8516] write(4, "pepe\n", 5) = 5

[pid 8517] <... read resumed>"pepe\n", 4096) = 5

[pid 8516] read(0, <unfinished ...>

[pid 8517] newfstatat(4, "", {st\_mode=S\_IFREG|0664, st\_size=0, ...}, AT\_EMPTY\_PATH) = 0

[pid 8517] write(4, "pp\n", 3) = 3

[pid 8517] read(0, lalala

<unfinished ...>

[pid 8516] <... read resumed>"lalala\n", 1024) = 7

[pid 8516] write(4, "lalala\n", 7) = 7

[pid 8517] <... read resumed>"lalala\n", 4096) = 7

[pid 8516] read(0, <unfinished ...>

[pid 8517] write(4, "lll\n", 4) = 4

[pid 8517] read(0, <unfinished ...>

[pid 8516] <... read resumed>"", 1024) = 0

[pid 8516] write(4, "", 0) = 0

[pid 8516] close(4) = 0

[pid 8517] <... read resumed>"", 4096) = 0

[pid 8516] close(6) = 0

[pid 8517] close(4 <unfinished ...>

[pid 8516] wait4(-1, <unfinished ...>

[pid 8518] <... read resumed>"", 4096) = 0

[pid 8518] close(3 <unfinished ...>

[pid 8517] <... close resumed>) = 0

[pid 8518] <... close resumed>) = 0

[pid 8518] exit\_group(0 <unfinished ...>

[pid 8517] exit\_group(0 <unfinished ...>

[pid 8518] <... exit\_group resumed>) = ?

[pid 8517] <... exit\_group resumed>) = ?

[pid 8518] +++ exited with 0 +++

[pid 8517] +++ exited with 0 +++

<... wait4 resumed>NULL, 0, NULL) = 8517

--- SIGCHLD {si\_signo=SIGCHLD, si\_code=CLD\_EXITED, si\_pid=8518, si\_uid=1000, si\_status=0, si\_utime=0, si\_stime=0} ---

wait4(-1, NULL, 0, NULL) = 8518

exit\_group(0) = ?

+++ exited with 0 +++

**Анализ вывода strace**

В самом начале видно, как программа подключает стандартные библиотеки из ld.so.cache, путем отображения их в память с помощью mmap. Далее программа делает системный вызов pipe для создания каналов для дочерних процессов, потом программа делает системный вызов clone для создания дочерних процессов, они в свою очередь делают вызов dup2 для того, чтобы сделать каналы стандартными файлами ввода. Далее идет череда вызовов write/read для чтения из канала и записи в файл. В конце программы мы видим вызов wait, который заставляет родительский процесс ждать завершения дочернего.

**Выводы**

В ходе выполнения лабораторной работе я узнал много новых системных вызовов и научился осуществлять диагностику программ с помощью утилиты strace.