Московский Авиационный Институт

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Институт №8 "Компьютерные науки и прикладная математика"

Кафедра №806 "Вычислительная математика и программирование"

Лабораторная работа №8 по курсу

«Операционные системы»

Группа: М80-206Б-22

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Оценка: _____

Дата: 01.03.2024

Москва, 2024

Постановка задачи

Приобретение практических навыков диагностики работы программного обеспечения. При выполнении лабораторных работ по курсу ОС необходимо продемонстрировать ключевые системные вызовы, которые в них используются и то, что их использование соответствует варианту ЛР. По итогам выполнения всех лабораторных работ отчет по данной ЛР должен содержать краткую сводку по исследованию написанных программ.

Общий метод и алгоритм решения

Команда **strace** показывает все системные вызовы программы, которые та отправляет к системе во время выполнения, а также их параметры и результат выполнения. Но при необходимости можно подключиться и к уже запущенному процессу. Перед тем, как перейти к практике, разберем опции утилиты и ее синтаксис:

$ strace опции команда аргументы

В самом простом варианте **strace** запускает переданную команду с её аргументами и выводит в стандартный поток ошибок все системные вызовы команды. Давайте разберём опции утилиты, с помощью которых можно управлять её поведением:

- **-i** - выводить указатель на инструкцию во время выполнения системного вызова;
- **-k** - выводить стек вызовов для отслеживаемого процесса после каждого системного вызова;
- **-o** - выводить всю информацию о системных вызовах не в стандартный поток ошибок, а в файл;
- **-q** - не выводить сообщения о подключении о отключении от процесса;
- **-qq** - не выводить сообщения о завершении работы процесса;
- **-r** - выводить временную метку для каждого системного вызова;
- **-s** - указать максимальный размер выводимой строки, по умолчанию 32;
- **-t** - выводить время суток для каждого вызова;
- **-tt** - добавить микросекунды;
- **-ttt** - добавить микросекунды и количество секунд после начала эпохи Unix;
- **-T** - выводить длительность выполнения системного вызова;
- **-x** - выводить все не ASCI-строки в шестнадцатеричном виде;
- **-xx** - выводить все строки в шестнадцатеричном виде;
- **-y** - выводить пути для файловых дескрипторов;
- **-yy** - выводить информацию о протоколе для файловых дескрипторов;

- **-c** - подсчитывать количество ошибок, вызовов и время выполнения для каждого системного вызова;
- **-O** - добавить определённое количество микросекунд к счетчику времени для каждого вызова;
- **-S** - сортировать информацию выводимую при опции -с. Доступны поля time, calls, name и nothing. По умолчанию используется time;
- **-w** - суммировать время между началом и завершением системного вызова;
- **-e** - позволяет отфильтровать только нужные системные вызовы или события;
- **-P** - отслеживать только системные вызовы, которые касаются указанного пути;
- **-v** - позволяет выводить дополнительную информацию, такую как версии окружения, статистику и так далее;
- **-b** - если указанный системный вызов обнаружен, трассировка прекращается;
- **-f** - отслеживать также дочерние процессы, если они будут созданы;
- **-ff** - если задана опция -o, то для каждого дочернего процесса будет создан отдельный файл с именем имя_файла.pid.
- **-I** - позволяет блокировать реакцию на нажатия Ctrl+C и Ctrl+Z;
- **-E** - добавляет переменную окружения для запускаемой программы;
- **-p** - указывает pid процесса, к которому следует подключиться;
- **-u** - запустить программу, от имени указанного пользователя.

Strace

Лабораторная 1:

```
$ strace -f ./parent
execve("./parent", ["./parent"], 0x7ffe0d0f10b8 /* 34 vars */) = 0
brk(NULL)                       = 0x55ab32794000
arch_prctl(0x3001 /* ARCH_??? */, 0x7fffd7e76fa0) = -1 EINVAL (Invalid argument)
mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7fef25707000
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=17231, ...}, AT_EMPTY_PATH) = 0
mmap(NULL, 17231, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7fef25702000
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\244;\374\204(\337f#\315I\214\234\f\
256\271\32"..., 68, 896) = 68
newfstatat(3, "", {st_mode=S_IFREG|0755, st_size=2216304, ...}, AT_EMPTY_PATH) = 0
pread64(3, "\6\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) =
0x7fef254da000
mmap(0x7fef25502000, 1658880, PROT_READ|PROT_EXEC, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x28000) = 0x7fef25502000
mmap(0x7fef25697000, 360448, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x1bd000) = 0x7fef25697000
mmap(0x7fef256ef000, 24576, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x214000) = 0x7fef256ef000
mmap(0x7fef256f5000, 52816, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_ANONYMOUS, -1, 0) = 0x7fef256f5000
close(3)   = 0
mmap(NULL, 12288, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -
1, 0) = 0x7fef254d7000
arch_prctl(ARCH_SET_FS, 0x7fef254d7740) = 0
set_tid_address(0x7fef254d7a10)   = 11732
set_robust_list(0x7fef254d7a20, 24)   = 0
rseq(0x7fef254d80e0, 0x20, 0, 0x53053053) = 0
mprotect(0x7fef256ef000, 16384, PROT_READ) = 0
mprotect(0x55ab314c4000, 4096, PROT_READ) = 0
mprotect(0x7fef25741000, 8192, PROT_READ) = 0
prlimit64(0, RLIMIT_STACK, NULL, {rlim_cur=8192*1024, rlim_max=RLIM64_INFINITY}) =
0
munmap(0x7fef25702000, 17231)   = 0
getrandom("\xa7\x27\xaa\x28\xeb\x1d\x61\x32", 8, GRND_NONBLOCK) = 8
brk(NULL)   = 0x55ab32794000
brk(0x55ab327b5000)   = 0x55ab327b5000
newfstatat(0, "", {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0x4), ...},
AT_EMPTY_PATH) = 0
read(0, aaaa
"aaaa\n", 1024)   = 5
openat(AT_FDCWD, "aaaa", O_WRONLY|O_CREAT|O_TRUNC, 0666) = 3
read(0, bbbb
"bbbb\n", 1024)   = 5
openat(AT_FDCWD, "bbbb", O_WRONLY|O_CREAT|O_TRUNC, 0666) = 4
pipe2([5, 6], O_CLOEXEC)   = 0
pipe2([7, 8], O_CLOEXEC)   = 0
clone(child_stack=NULL, flags=CLONE_CHILD_CLEARTID|CLONE_CHILD_SETTID|
SIGCHLDstrace: Process 11772 attached
, child_tidptr=0x7fef254d7a10) = 11772
[pid 11772] set_robust_list(0x7fef254d7a20, 24 <unfinished ...>
[pid 11732] clone(child_stack=NULL, flags=CLONE_CHILD_CLEARTID|
CLONE_CHILD_SETTID|SIGCHLD <unfinished ...>
[pid 11772] <... set_robust_list resumed>) = 0
strace: Process 11773 attached

[pid 11772] close(6 <unfinished ...>
[pid 11732] <... clone resumed>, child_tidptr=0x7fef254d7a10) = 11773
[pid 11773] set_robust_list(0x7fef254d7a20, 24 <unfinished ...>
[pid 11772] <... close resumed>)   = 0
[pid 11732] read(0, <unfinished ...>
[pid 11773] <... set_robust_list resumed>) = 0
[pid 11772] dup2(5, 0 <unfinished ...>
[pid 11773] close(8 <unfinished ...>
[pid 11772] <... dup2 resumed>)   = 0
[pid 11773] <... close resumed>)   = 0
[pid 11772] dup2(3, 1 <unfinished ...>
[pid 11773] dup2(7, 0 <unfinished ...>
[pid 11772] <... dup2 resumed>)   = 1
[pid 11773] <... dup2 resumed>)   = 0
[pid 11772] execve("./child", ["./child"], 0x7fffd7e77178 /* 34 vars */ <unfinished ...>
[pid 11773] dup2(4, 1)   = 1
[pid 11773] execve("./child", ["./child"], 0x7fffd7e77178 /* 34 vars */ <unfinished ...>
[pid 11772] <... execve resumed>)   = 0
[pid 11772] brk(NULL)   = 0x561fc8e81000
[pid 11772] arch_prctl(0x3001 /* ARCH_??? */, 0x7ffed19239b0) = -1 EINVAL (Invalid argument)
[pid 11772] mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7fd5bd676000
[pid 11772] access("/etc/ld.so.preload", R_OK <unfinished ...>
[pid 11773] <... execve resumed>)   = 0
[pid 11772] <... access resumed>)   = -1 ENOENT (No such file or directory)
[pid 11773] brk(NULL <unfinished ...>
[pid 11772] openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXEC <unfinished ...>
[pid 11773] <... brk resumed>)   = 0x55c13c608000
[pid 11772] <... openat resumed>)   = 5
[pid 11773] arch_prctl(0x3001 /* ARCH_??? */, 0x7ffda0542730 <unfinished ...>
[pid 11772] newfstatat(5, "", <unfinished ...>
[pid 11773] <... arch_prctl resumed>)   = -1 EINVAL (Invalid argument)
[pid 11772] <... newfstatat resumed>{st_mode=S_IFREG|0644, st_size=17231, ...}, AT_EMPTY_PATH) = 0
[pid 11773] mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7f64a1533000
[pid 11772] mmap(NULL, 17231, PROT_READ, MAP_PRIVATE, 5, 0 <unfinished ...>
[pid 11773] access("/etc/ld.so.preload", R_OK <unfinished ...>
[pid 11772] <... mmap resumed>)   = 0x7fd5bd671000
[pid 11773] <... access resumed>)   = -1 ENOENT (No such file or directory)
[pid 11772] close(5 <unfinished ...>
[pid 11773] openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXEC <unfinished ...>
[pid 11772] <... close resumed>)   = 0
[pid 11773] <... openat resumed>)   = 5

[pid 11772] openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libc.so.6", O_RDONLY|
O_CLOEXEC <unfinished ...>
[pid 11773] newfstatat(5, "", <unfinished ...>
[pid 11772] <... openat resumed>)   = 5
[pid 11772] read(5, <unfinished ...>
[pid 11773] <... newfstatat resumed>{st_mode=S_IFREG|0644, st_size=17231, ...},
AT_EMPTY_PATH) = 0
[pid 11772] <... 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 11773] mmap(NULL, 17231, PROT_READ, MAP_PRIVATE, 5, 0) = 0x7f64a152e000
[pid 11772] pread64(5, <unfinished ...>
[pid 11773] close(5 <unfinished ...>
[pid 11772] <... pread64 resumed>"\6\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 11773] <... close resumed>)   = 0
[pid 11772] pread64(5, <unfinished ...>
[pid 11773] openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libc.so.6", O_RDONLY|
O_CLOEXEC <unfinished ...>
[pid 11772] <... 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 11773] <... openat resumed>)   = 5
[pid 11772] pread64(5, <unfinished ...>
[pid 11773] read(5, <unfinished ...>
[pid 11772] <... pread64 resumed>"\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\244;\374\204(\337f#\
315I\214\234\f\256\271\32"..., 68, 896) = 68
[pid 11773] <... 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 11772] newfstatat(5, "", <unfinished ...>
[pid 11773] pread64(5, <unfinished ...>
[pid 11772] <... newfstatat resumed>{st_mode=S_IFREG|0755, st_size=2216304, ...},
AT_EMPTY_PATH) = 0
[pid 11773] <... pread64 resumed>"\6\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 11772] pread64(5, <unfinished ...>
[pid 11773] pread64(5, <unfinished ...>
[pid 11772] <... pread64 resumed>"\6\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 11773] <... 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 11772] mmap(NULL, 2260560, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 5, 0
<unfinished ...>
[pid 11773] pread64(5, <unfinished ...>
[pid 11772] <... mmap resumed>)   = 0x7fd5bd449000
[pid 11773] <... pread64 resumed>"\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\244;\374\204(\337f#\
315I\214\234\f\256\271\32"..., 68, 896) = 68
[pid 11772] mmap(0x7fd5bd471000, 1658880, PROT_READ|PROT_EXEC,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 5, 0x28000 <unfinished ...>
[pid 11773] newfstatat(5, "", <unfinished ...>

[pid 11772] <... mmap resumed>)   = 0x7fd5bd471000
[pid 11773] <... newfstatat resumed>{st_mode=S_IFREG|0755, st_size=2216304, ...},
AT_EMPTY_PATH) = 0
[pid 11772] mmap(0x7fd5bd606000, 360448, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 5, 0x1bd000 <unfinished ...>
[pid 11773] pread64(5, <unfinished ...>
[pid 11772] <... mmap resumed>)   = 0x7fd5bd606000
[pid 11773] <... 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 11772] mmap(0x7fd5bd65e000, 24576, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 5, 0x214000 <unfinished ...>
[pid 11773] mmap(NULL, 2260560, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 5, 0
<unfinished ...>
[pid 11772] <... mmap resumed>)   = 0x7fd5bd65e000
[pid 11773] <... mmap resumed>)   = 0x7f64a1306000
[pid 11772] mmap(0x7fd5bd664000, 52816, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_ANONYMOUS, -1, 0 <unfinished ...>
[pid 11773] mmap(0x7f64a132e000, 1658880, PROT_READ|PROT_EXEC,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 5, 0x28000 <unfinished ...>
[pid 11772] <... mmap resumed>)   = 0x7fd5bd664000
[pid 11773] <... mmap resumed>)   = 0x7f64a132e000
[pid 11772] close(5 <unfinished ...>
[pid 11773] mmap(0x7f64a14c3000, 360448, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 5, 0x1bd000 <unfinished ...>
[pid 11772] <... close resumed>)   = 0
[pid 11773] <... mmap resumed>)   = 0x7f64a14c3000
[pid 11772] mmap(NULL, 12288, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_ANONYMOUS, -1, 0 <unfinished ...>
[pid 11773] mmap(0x7f64a151b000, 24576, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 5, 0x214000 <unfinished ...>
[pid 11772] <... mmap resumed>)   = 0x7fd5bd446000
[pid 11773] <... mmap resumed>)   = 0x7f64a151b000
[pid 11772] arch_prctl(ARCH_SET_FS, 0x7fd5bd446740 <unfinished ...>
[pid 11773] mmap(0x7f64a1521000, 52816, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_ANONYMOUS, -1, 0 <unfinished ...>
[pid 11772] <... arch_prctl resumed>)   = 0
[pid 11773] <... mmap resumed>)   = 0x7f64a1521000
[pid 11772] set_tid_address(0x7fd5bd446a10 <unfinished ...>
[pid 11773] close(5 <unfinished ...>
[pid 11772] <... set_tid_address resumed>) = 11772
[pid 11773] <... close resumed>)   = 0
[pid 11772] set_robust_list(0x7fd5bd446a20, 24 <unfinished ...>
[pid 11773] mmap(NULL, 12288, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_ANONYMOUS, -1, 0 <unfinished ...>
[pid 11772] <... set_robust_list resumed>) = 0
[pid 11773] <... mmap resumed>)   = 0x7f64a1303000
[pid 11772] rseq(0x7fd5bd4470e0, 0x20, 0, 0x53053053 <unfinished ...>
[pid 11773] arch_prctl(ARCH_SET_FS, 0x7f64a1303740 <unfinished ...>

[pid 11772] <... rseq resumed>)   = 0
[pid 11773] <... arch_prctl resumed>)   = 0
[pid 11773] set_tid_address(0x7f64a1303a10 <unfinished ...>
[pid 11772] mprotect(0x7fd5bd65e000, 16384, PROT_READ <unfinished ...>
[pid 11773] <... set_tid_address resumed>) = 11773
[pid 11772] <... mprotect resumed>)   = 0
[pid 11773] set_robust_list(0x7f64a1303a20, 24 <unfinished ...>
[pid 11772] mprotect(0x561fc7a9e000, 4096, PROT_READ <unfinished ...>
[pid 11773] <... set_robust_list resumed>) = 0
[pid 11772] <... mprotect resumed>)   = 0
[pid 11773] rseq(0x7f64a13040e0, 0x20, 0, 0x53053053 <unfinished ...>
[pid 11772] mprotect(0x7fd5bd6b0000, 8192, PROT_READ <unfinished ...>
[pid 11773] <... rseq resumed>)   = 0
[pid 11772] <... mprotect resumed>)   = 0
[pid 11773] mprotect(0x7f64a151b000, 16384, PROT_READ <unfinished ...>
[pid 11772] prlimit64(0, RLIMIT_STACK, NULL, {rlim_cur=8192*1024,
rlim_max=RLIM64_INFINITY}) = 0
[pid 11773] <... mprotect resumed>)   = 0
[pid 11773] mprotect(0x55c13c055000, 4096, PROT_READ <unfinished ...>
[pid 11772] munmap(0x7fd5bd671000, 17231 <unfinished ...>
[pid 11773] <... mprotect resumed>)   = 0
[pid 11772] <... munmap resumed>)   = 0
[pid 11773] mprotect(0x7f64a156d000, 8192, PROT_READ <unfinished ...>
[pid 11772] read(0, <unfinished ...>
[pid 11773] <... mprotect resumed>)   = 0
[pid 11773] prlimit64(0, RLIMIT_STACK, NULL, {rlim_cur=8192*1024,
rlim_max=RLIM64_INFINITY}) = 0
[pid 11773] munmap(0x7f64a152e000, 17231) = 0
[pid 11773] read(0, qwerty
 <unfinished ...>
[pid 11732] <... read resumed>"qwerty\n", 1024) = 7
[pid 11732] write(6, "q\0\0\0", 4)   = 4
[pid 11772] <... read resumed>"q\0\0\0", 4) = 4
[pid 11732] write(6, "w\0\0\0", 4 <unfinished ...>
[pid 11772] write(1, "q", 1 <unfinished ...>
[pid 11732] <... write resumed>)   = 4
[pid 11732] write(6, "e\0\0\0", 4)   = 4
[pid 11732] write(6, "r\0\0\0", 4)   = 4
[pid 11732] write(6, "t\0\0\0", 4)   = 4
[pid 11732] write(6, "y\0\0\0", 4)   = 4
[pid 11732] write(6, "\n\0\0\0", 4)   = 4
[pid 11732] read(0, <unfinished ...>
[pid 11772] <... write resumed>)   = 1
[pid 11772] read(0, "w\0\0\0", 4)   = 4
[pid 11772] write(1, "w", 1)   = 1
[pid 11772] read(0, "e\0\0\0", 4)   = 4
[pid 11772] read(0, "r\0\0\0", 4)   = 4
[pid 11772] write(1, "r", 1)   = 1

```
[pid 11772] read(0, "t\0\0\0", 4)       = 4
[pid 11772] write(1, "t", 1)            = 1
[pid 11772] read(0, "y\0\0\0", 4)       = 4
[pid 11772] read(0, "\n\0\0\0", 4)      = 4
[pid 11772] write(1, "\n", 1)           = 1
[pid 11772] read(0, uyytr
 <unfinished ...>
[pid 11732] <... read resumed>"uyytr\n", 1024) = 6
[pid 11732] write(8, "u\0\0\0", 4)      = 4
[pid 11773] <... read resumed>"u\0\0\0", 4) = 4
[pid 11732] write(8, "y\0\0\0", 4 <unfinished ...>
[pid 11773] read(0,  <unfinished ...>
[pid 11732] <... write resumed>)        = 4
[pid 11773] <... read resumed>"y\0\0\0", 4) = 4
[pid 11732] write(8, "y\0\0\0", 4 <unfinished ...>
[pid 11773] read(0,  <unfinished ...>
[pid 11732] <... write resumed>)        = 4
[pid 11773] <... read resumed>"y\0\0\0", 4) = 4
[pid 11732] write(8, "t\0\0\0", 4 <unfinished ...>
[pid 11773] read(0,  <unfinished ...>
[pid 11732] <... write resumed>)        = 4
[pid 11773] <... read resumed>"t\0\0\0", 4) = 4
[pid 11732] write(8, "r\0\0\0", 4 <unfinished ...>
[pid 11773] write(1, "t", 1 <unfinished ...>
[pid 11732] <... write resumed>)        = 4
[pid 11732] write(8, "\n\0\0\0", 4)     = 4
[pid 11732] read(0,  <unfinished ...>
[pid 11773] <... write resumed>)        = 1
[pid 11773] read(0, "r\0\0\0", 4)       = 4
[pid 11773] write(1, "r", 1)            = 1
[pid 11773] read(0, "\n\0\0\0", 4)      = 4
[pid 11773] write(1, "\n", 1)           = 1
[pid 11773] read(0, qweasd
 <unfinished ...>
[pid 11732] <... read resumed>"qweasd\n", 1024) = 7
[pid 11732] write(6, "q\0\0\0", 4)      = 4
[pid 11772] <... read resumed>"q\0\0\0", 4) = 4
[pid 11732] write(6, "w\0\0\0", 4 <unfinished ...>
[pid 11772] write(1, "q", 1 <unfinished ...>
[pid 11732] <... write resumed>)        = 4
[pid 11732] write(6, "e\0\0\0", 4)      = 4
[pid 11732] write(6, "a\0\0\0", 4)      = 4
[pid 11732] write(6, "s\0\0\0", 4)      = 4
[pid 11732] write(6, "d\0\0\0", 4)      = 4
[pid 11732] write(6, "\n\0\0\0", 4)     = 4
[pid 11732] read(0,  <unfinished ...>
[pid 11772] <... write resumed>)        = 1
[pid 11772] read(0, "w\0\0\0", 4)       = 4
```

```
[pid 11772] write(1, "w", 1)          = 1
[pid 11772] read(0, "e\0\0\0", 4)     = 4
[pid 11772] read(0, "a\0\0\0", 4)     = 4
[pid 11772] read(0, "s\0\0\0", 4)     = 4
[pid 11772] write(1, "s", 1)          = 1
[pid 11772] read(0, "d\0\0\0", 4)     = 4
[pid 11772] write(1, "d", 1)          = 1
[pid 11772] read(0, "\n\0\0\0", 4)    = 4
[pid 11772] write(1, "\n", 1)         = 1
[pid 11772] read(0, qwe
 <unfinished ...>
[pid 11732] <... read resumed>"qwe\n", 1024) = 4
[pid 11732] write(8, "q\0\0\0", 4)      = 4
[pid 11773] <... read resumed>"q\0\0\0", 4) = 4
[pid 11732] write(8, "w\0\0\0", 4)      = 4
[pid 11773] write(1, "q", 1 <unfinished ...>
[pid 11732] write(8, "e\0\0\0", 4)      = 4
[pid 11732] write(8, "\n\0\0\0", 4)     = 4
[pid 11732] read(0,  <unfinished ...>
[pid 11773] <... write resumed>)       = 1
[pid 11773] read(0, "w\0\0\0", 4)      = 4
[pid 11773] write(1, "w", 1)           = 1
[pid 11773] read(0, "e\0\0\0", 4)      = 4
[pid 11773] read(0, "\n\0\0\0", 4)     = 4
[pid 11773] write(1, "\n", 1)          = 1
[pid 11773] read(0,  <unfinished ...>
[pid 11732] <... read resumed>"", 1024) = 0
[pid 11732] close(8)              = 0
[pid 11732] close(6 <unfinished ...>
[pid 11773] <... read resumed>"", 4)    = 0
[pid 11732] <... close resumed>)       = 0
[pid 11773] close(0 <unfinished ...>
[pid 11772] <... read resumed>"", 4)    = 0
[pid 11732] wait4(-1,  <unfinished ...>
[pid 11773] <... close resumed>)       = 0
[pid 11772] close(0 <unfinished ...>
[pid 11773] exit_group(0 <unfinished ...>
[pid 11772] <... close resumed>)       = 0
[pid 11773] <... exit_group resumed>)   = ?
[pid 11772] exit_group(0)           = ?
[pid 11773] +++ exited with 0 +++
[pid 11772] +++ exited with 0 +++
<... wait4 resumed>NULL, 0, NULL)       = 11772
--- SIGCHLD {si_signo=SIGCHLD, si_code=CLD_EXITED, si_pid=11773, si_uid=1000,
si_status=0, si_utime=0, si_stime=1} ---
exit_group(0)                   = ?
+++ exited with 0 +++
```

Лабораторная 2:
$ strace -f ./a.out 2
execve("./a.out", ["./a.out", "2"], 0x7ffd268697c0 /* 36 vars */) = 0
brk(NULL)   = 0x559786f32000
arch_prctl(0x3001 /* ARCH_??? */, 0x7ffd8c3b0c00) = -1 EINVAL (Invalid argument)
mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7fb6e42c4000
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=18151, ...}, AT_EMPTY_PATH) = 0
mmap(NULL, 18151, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7fb6e42bf000
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\244;\374\204(\337f#\315I\214\234\f\
256\271\32"..., 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) = 0x7fb6e4097000
mmap(0x7fb6e40bf000, 1658880, PROT_READ|PROT_EXEC, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x28000) = 0x7fb6e40bf000
mmap(0x7fb6e4254000, 360448, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x1bd000) = 0x7fb6e4254000
mmap(0x7fb6e42ac000, 24576, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x214000) = 0x7fb6e42ac000
mmap(0x7fb6e42b2000, 52816, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7fb6e42b2000
close(3)   = 0
mmap(NULL, 12288, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -
1, 0) = 0x7fb6e4094000
arch_prctl(ARCH_SET_FS, 0x7fb6e4094740) = 0
set_tid_address(0x7fb6e4094a10)   = 3863
set_robust_list(0x7fb6e4094a20, 24)   = 0
rseq(0x7fb6e40950e0, 0x20, 0, 0x53053053) = 0
mprotect(0x7fb6e42ac000, 16384, PROT_READ) = 0
mprotect(0x559785386000, 4096, PROT_READ) = 0
mprotect(0x7fb6e42fe000, 8192, PROT_READ) = 0
prlimit64(0, RLIMIT_STACK, NULL, {rlim_cur=8192*1024, rlim_max=RLIM64_INFINITY}) =
0
munmap(0x7fb6e42bf000, 18151)   = 0
newfstatat(1, "", {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0x4), ...},
AT_EMPTY_PATH) = 0
getrandom("\xeb\xfe\x18\x76\xab\x28\xa4\x68", 8, GRND_NONBLOCK) = 8
brk(NULL)   = 0x559786f32000
brk(0x559786f53000)   = 0x559786f53000

```
newfstatat(0, "", {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0x4), ...},
AT_EMPTY_PATH) = 0
write(1, "Please enter the matrix dimensio"..., 35Please enter the matrix dimension: ) = 35
read(0, 4
"4\n", 1024)               = 2
read(0, 1 2 3 4
"1 2 3 4\n", 1024)            = 8
read(0, 67 34 0 9
"67 34 0 9\n", 1024)           = 10
read(0, 12 3 4 1
"12 3 4 1\n", 1024)           = 9
read(0, 2 45 60
"2 45 60\n", 1024)           = 8
read(0, 89
"89\n", 1024)               = 3
rt_sigaction(SIGRT_1, {sa_handler=0x7fb6e4128870, sa_mask=[],
sa_flags=SA_RESTORER|SA_ONSTACK|SA_RESTART|SA_SIGINFO,
sa_restorer=0x7fb6e40d9520}, 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) = 0x7fb6e3893000
mprotect(0x7fb6e3894000, 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=0x7fb6e4093910, parent_tid=0x7fb6e4093910,
exit_signal=0, stack=0x7fb6e3893000, stack_size=0x7fff00, tls=0x7fb6e4093640}strace:
Process 3992 attached
 => {parent_tid=[3992]}, 88) = 3992
[pid  3863] rt_sigprocmask(SIG_SETMASK, [],  <unfinished ...>
[pid  3992] rseq(0x7fb6e4093fe0, 0x20, 0, 0x53053053 <unfinished ...>
[pid  3863] <... rt_sigprocmask resumed>NULL, 8) = 0
[pid  3992] <... rseq resumed>)        = 0
[pid  3863] mmap(NULL, 8392704, PROT_NONE, MAP_PRIVATE|MAP_ANONYMOUS|
MAP_STACK, -1, 0 <unfinished ...>
[pid  3992] set_robust_list(0x7fb6e4093920, 24 <unfinished ...>
[pid  3863] <... mmap resumed>)         = 0x7fb6e3092000
[pid  3992] <... set_robust_list resumed>) = 0
[pid  3863] mprotect(0x7fb6e3093000, 8388608, PROT_READ|PROT_WRITE
<unfinished ...>
[pid  3992] rt_sigprocmask(SIG_SETMASK, [],  <unfinished ...>
[pid  3863] <... mprotect resumed>)     = 0
[pid  3992] <... rt_sigprocmask resumed>NULL, 8) = 0
[pid  3863] rt_sigprocmask(SIG_BLOCK, ~[],  <unfinished ...>
[pid  3992] write(1, "\320\275\320\276\320\274\320\265\321\200 \
320\277\320\276\321\202\320\276\320\272\320\260: 1 \n", 28номер потока: 1
 <unfinished ...>
[pid  3863] <... rt_sigprocmask resumed>[], 8) = 0
```

[pid 3992] <... write resumed>)   = 28
[pid 3863] clone3({flags=CLONE_VM|CLONE_FS|CLONE_FILES|CLONE_SIGHAND|
CLONE_THREAD|CLONE_SYSVSEM|CLONE_SETTLS|CLONE_PARENT_SETTID|
CLONE_CHILD_CLEARTID, child_tid=0x7fb6e3892910, parent_tid=0x7fb6e3892910,
exit_signal=0, stack=0x7fb6e3092000, stack_size=0x7fff00, tls=0x7fb6e3892640}
<unfinished ...>
[pid 3992] openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXECstrace:
Process 3993 attached
) = 3
[pid 3863] <... clone3 resumed> => {parent_tid=[3993]}, 88) = 3993
[pid 3993] rseq(0x7fb6e3892fe0, 0x20, 0, 0x53053053 <unfinished ...>
[pid 3863] rt_sigprocmask(SIG_SETMASK, [], <unfinished ...>
[pid 3992] newfstatat(3, "", <unfinished ...>
[pid 3863] <... rt_sigprocmask resumed>NULL, 8) = 0
[pid 3993] <... rseq resumed>)   = 0
[pid 3863] futex(0x7fb6e4093910, FUTEX_WAIT_BITSET|FUTEX_CLOCK_REALTIME,
3992, NULL, FUTEX_BITSET_MATCH_ANY <unfinished ...>
[pid 3992] <... newfstatat resumed>{st_mode=S_IFREG|0644, st_size=18151, ...},
AT_EMPTY_PATH) = 0
[pid 3993] set_robust_list(0x7fb6e3892920, 24 <unfinished ...>
[pid 3992] mmap(NULL, 18151, PROT_READ, MAP_PRIVATE, 3, 0 <unfinished ...>
[pid 3993] <... set_robust_list resumed>) = 0
[pid 3992] <... mmap resumed>)   = 0x7fb6e42bf000
[pid 3993] rt_sigprocmask(SIG_SETMASK, [], <unfinished ...>
[pid 3992] close(3 <unfinished ...>
[pid 3993] <... rt_sigprocmask resumed>NULL, 8) = 0
[pid 3992] <... close resumed>)   = 0
[pid 3993] write(1, "\320\275\320\276\320\274\320\265\321\200 \
320\277\320\276\321\202\320\276\320\272\320\260: 2 \n", 28 <unfinished ...>
[pid 3992] mmap(NULL, 134217728, PROT_NONE, MAP_PRIVATE|MAP_ANONYMOUS|
MAP_NORESERVE, -1, 0номер потока: 2
 <unfinished ...>
[pid 3993] <... write resumed>)   = 28
[pid 3992] <... mmap resumed>)   = 0x7fb6db092000
[pid 3993] futex(0x7fb6e4300a48, FUTEX_WAIT_PRIVATE, 2, NULL <unfinished ...>
[pid 3992] munmap(0x7fb6db092000, 16179200) = 0
[pid 3992] munmap(0x7fb6e0000000, 50929664) = 0
[pid 3992] mprotect(0x7fb6dc000000, 135168, PROT_READ|PROT_WRITE) = 0
[pid 3992] openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libgcc_s.so.1", O_RDONLY|
O_CLOEXEC) = 3
[pid 3992] 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"..., 832) =
832
[pid 3992] newfstatat(3, "", {st_mode=S_IFREG|0644, st_size=125488, ...},
AT_EMPTY_PATH) = 0
[pid 3992] mmap(NULL, 127720, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0)
= 0x7fb6e3072000
[pid 3992] mmap(0x7fb6e3075000, 94208, PROT_READ|PROT_EXEC, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x3000) = 0x7fb6e3075000

```
[pid  3992] mmap(0x7fb6e308c000, 16384, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x1a000) = 0x7fb6e308c000
[pid  3992] mmap(0x7fb6e3090000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x1d000) = 0x7fb6e3090000
[pid  3992] close(3)                = 0
[pid  3992] mprotect(0x7fb6e3090000, 4096, PROT_READ) = 0
[pid  3992] munmap(0x7fb6e42bf000, 18151) = 0
[pid  3992] futex(0x7fb6e4300a48, FUTEX_WAKE_PRIVATE, 1 <unfinished ...>
[pid  3993] <... futex resumed>)        = 0
[pid  3992] <... futex resumed>)        = 1
[pid  3993] futex(0x7fb6e4300a48, FUTEX_WAKE_PRIVATE, 1 <unfinished ...>
[pid  3992] futex(0x7fb6e3091210, FUTEX_WAKE_PRIVATE, 2147483647 <unfinished ...>
[pid  3993] <... futex resumed>)        = 0
[pid  3992] <... futex resumed>)        = 0
[pid  3993] rt_sigprocmask(SIG_BLOCK, ~[RT_1],  <unfinished ...>
[pid  3992] rt_sigprocmask(SIG_BLOCK, ~[RT_1],  <unfinished ...>
[pid  3993] <... rt_sigprocmask resumed>NULL, 8) = 0
[pid  3992] <... rt_sigprocmask resumed>NULL, 8) = 0
[pid  3993] madvise(0x7fb6e3092000, 8368128, MADV_DONTNEED <unfinished ...>
[pid  3992] madvise(0x7fb6e3893000, 8368128, MADV_DONTNEED <unfinished ...>
[pid  3993] <... madvise resumed>)      = 0
[pid  3992] <... madvise resumed>)      = 0
[pid  3993] exit(0 <unfinished ...>
[pid  3992] exit(0 <unfinished ...>
[pid  3993] <... exit resumed>)        = ?
[pid  3992] <... exit resumed>)        = ?
[pid  3993] +++ exited with 0 +++
[pid  3863] <... futex resumed>)        = 0
[pid  3992] +++ exited with 0 +++
write(1, "\320\236\321\202\320\262\320\265\321\202: 4724 \n", 18Ответ: 4724
) = 18
lseek(0, -1, SEEK_CUR)              = -1 ESPIPE (Illegal seek)
exit_group(0)                      = ?
+++ exited with 0 +++
```

Лабораторная 3:
```
$ strace -f ./parent
execve("./parent", ["./parent"], 0x7ffd95cc05e8 /* 36 vars */) = 0
brk(NULL)                       = 0x556b2bc64000
arch_prctl(0x3001 /* ARCH_??? */, 0x7ffc089c41f0) = -1 EINVAL (Invalid argument)
mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1,
0) = 0x7f9a09803000
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=18151, ...}, AT_EMPTY_PATH) = 0
mmap(NULL, 18151, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7f9a097fe000
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\244;\374\204(\337f#\315I\214\234\f\256\271\32"..., 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) = 0x7f9a095d6000
mmap(0x7f9a095fe000, 1658880, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x28000) = 0x7f9a095fe000
mmap(0x7f9a09793000, 360448, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1bd000) = 0x7f9a09793000
mmap(0x7f9a097eb000, 24576, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x214000) = 0x7f9a097eb000
mmap(0x7f9a097f1000, 52816, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7f9a097f1000
close(3)   = 0
mmap(NULL, 12288, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7f9a095d3000
arch_prctl(ARCH_SET_FS, 0x7f9a095d3740) = 0
set_tid_address(0x7f9a095d3a10)   = 4189
set_robust_list(0x7f9a095d3a20, 24)   = 0
rseq(0x7f9a095d40e0, 0x20, 0, 0x53053053) = 0
mprotect(0x7f9a097eb000, 16384, PROT_READ) = 0
mprotect(0x556b2ab99000, 4096, PROT_READ) = 0
mprotect(0x7f9a0983d000, 8192, PROT_READ) = 0
prlimit64(0, RLIMIT_STACK, NULL, {rlim_cur=8192*1024, rlim_max=RLIM64_INFINITY}) = 0
munmap(0x7f9a097fe000, 18151)   = 0
getrandom("\xac\x8d\xc6\x8c\xd7\x6c\x03\xc7", 8, GRND_NONBLOCK) = 8
brk(NULL)   = 0x556b2bc64000
brk(0x556b2bc85000)   = 0x556b2bc85000
newfstatat(0, "", {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0x4), ...}, AT_EMPTY_PATH) = 0
read(0, aaaa
"aaaa\n", 1024)   = 5
openat(AT_FDCWD, "aaaa", O_WRONLY|O_CREAT|O_TRUNC, 0666) = 3
read(0, bbbb
"bbbb\n", 1024)   = 5
openat(AT_FDCWD, "bbbb", O_WRONLY|O_CREAT|O_TRUNC, 0666) = 4
openat(AT_FDCWD, "/dev/shm/first_mmf", O_RDWR|O_CREAT|O_TRUNC|O_NOFOLLOW|O_CLOEXEC, 0777) = 5
ftruncate(5, 2000)   = 0
mmap(NULL, 2000, PROT_READ|PROT_WRITE, MAP_SHARED, 5, 0) = 0x7f9a0983c000
openat(AT_FDCWD, "/dev/shm/second_mmf", O_RDWR|O_CREAT|O_TRUNC|O_NOFOLLOW|O_CLOEXEC, 0777) = 6
ftruncate(6, 2000)   = 0

mmap(NULL, 2000, PROT_READ|PROT_WRITE, MAP_SHARED, 6, 0) = 0x7f9a09802000
clone(child_stack=NULL, flags=CLONE_CHILD_CLEARTID|CLONE_CHILD_SETTID|
SIGCHLDstrace: Process 4208 attached
, child_tidptr=0x7f9a095d3a10) = 4208
[pid 4208] set_robust_list(0x7f9a095d3a20, 24 <unfinished ...>
[pid 4189] clone(child_stack=NULL, flags=CLONE_CHILD_CLEARTID|
CLONE_CHILD_SETTID|SIGCHLD <unfinished ...>
[pid 4208] <... set_robust_list resumed>) = 0
[pid 4208] dup2(3, 1strace: Process 4209 attached
 <unfinished ...>
[pid 4189] <... clone resumed>, child_tidptr=0x7f9a095d3a10) = 4209
[pid 4208] <... dup2 resumed>)   = 1
[pid 4189] read(0, <unfinished ...>
[pid 4209] set_robust_list(0x7f9a095d3a20, 24 <unfinished ...>
[pid 4208] execve("./child", ["./child", "5"], 0x7ffc089c43c8 /* 36 vars */ <unfinished ...>
[pid 4209] <... set_robust_list resumed>) = 0
[pid 4209] dup2(4, 1)   = 1
[pid 4209] execve("./child", ["./child", "6"], 0x7ffc089c43c8 /* 36 vars */) = 0
[pid 4209] brk(NULL <unfinished ...>
[pid 4208] <... execve resumed>)   = 0
[pid 4209] <... brk resumed>)   = 0x55b5200db000
[pid 4209] arch_prctl(0x3001 /* ARCH_??? */, 0x7ffd5eee27f0) = -1 EINVAL (Invalid
argument)
[pid 4209] mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_ANONYMOUS, -1, 0) = 0x7fefe252e000
[pid 4209] access("/etc/ld.so.preload", R_OK) = -1 ENOENT (No such file or directory)
[pid 4209] openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXEC) = 7
[pid 4209] newfstatat(7, "", {st_mode=S_IFREG|0644, st_size=18151, ...},
AT_EMPTY_PATH) = 0
[pid 4209] mmap(NULL, 18151, PROT_READ, MAP_PRIVATE, 7, 0 <unfinished ...>
[pid 4208] brk(NULL <unfinished ...>
[pid 4209] <... mmap resumed>)   = 0x7fefe2529000
[pid 4208] <... brk resumed>)   = 0x55c86e4af000
[pid 4209] close(7)   = 0
[pid 4208] arch_prctl(0x3001 /* ARCH_??? */, 0x7ffe45e420d0 <unfinished ...>
[pid 4209] openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libc.so.6", O_RDONLY|O_CLOEXEC
<unfinished ...>
[pid 4208] <... arch_prctl resumed>)   = -1 EINVAL (Invalid argument)
[pid 4209] <... openat resumed>)   = 7
[pid 4208] mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_ANONYMOUS, -1, 0 <unfinished ...>
[pid 4209] read(7, <unfinished ...>
[pid 4208] <... mmap resumed>)   = 0x7fded8be3000
[pid 4209] <... read resumed>"\177ELF\2\1\1\3\0\0\0\0\0\0\0\3\0>\0\1\0\0\0P\
237\2\0\0\0\0\0"..., 832) = 832
[pid 4208] access("/etc/ld.so.preload", R_OK <unfinished ...>
[pid 4209] pread64(7, <unfinished ...>
[pid 4208] <... access resumed>)   = -1 ENOENT (No such file or directory)

[pid 4209] <... pread64 resumed>"\6\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 4208] openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXEC
<unfinished ...>
[pid 4209] pread64(7, <unfinished ...>
[pid 4208] <... openat resumed>)   = 7
[pid 4209] <... 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 4208] newfstatat(7, "", <unfinished ...>
[pid 4209] pread64(7, <unfinished ...>
[pid 4208] <... newfstatat resumed>{st_mode=S_IFREG|0644, st_size=18151, ...},
AT_EMPTY_PATH) = 0
[pid 4209] <... pread64 resumed>"\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\244;\374\204(\337f#\315I\
214\234\f\256\271\32"..., 68, 896) = 68
[pid 4208] mmap(NULL, 18151, PROT_READ, MAP_PRIVATE, 7, 0 <unfinished ...>
[pid 4209] newfstatat(7, "", <unfinished ...>
[pid 4208] <... mmap resumed>)   = 0x7fded8bde000
[pid 4209] <... newfstatat resumed>{st_mode=S_IFREG|0755, st_size=2216304, ...},
AT_EMPTY_PATH) = 0
[pid 4208] close(7 <unfinished ...>
[pid 4209] pread64(7, <unfinished ...>
[pid 4208] <... close resumed>)   = 0
[pid 4209] <... pread64 resumed>"\6\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 4208] openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libc.so.6", O_RDONLY|O_CLOEXEC
<unfinished ...>
[pid 4209] mmap(NULL, 2260560, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 7, 0
<unfinished ...>
[pid 4208] <... openat resumed>)   = 7
[pid 4209] <... mmap resumed>)   = 0x7fefe2301000
[pid 4208] read(7, <unfinished ...>
[pid 4209] mmap(0x7fefe2329000, 1658880, PROT_READ|PROT_EXEC, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 7, 0x28000 <unfinished ...>
[pid 4208] <... read resumed>"\177ELF\2\1\1\3\0\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 4209] <... mmap resumed>)   = 0x7fefe2329000
[pid 4208] pread64(7, <unfinished ...>
[pid 4209] mmap(0x7fefe24be000, 360448, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 7, 0x1bd000 <unfinished ...>
[pid 4208] <... pread64 resumed>"\6\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 4209] <... mmap resumed>)   = 0x7fefe24be000
[pid 4208] pread64(7, <unfinished ...>
[pid 4209] mmap(0x7fefe2516000, 24576, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 7, 0x214000 <unfinished ...>
[pid 4208] <... 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 4209] <... mmap resumed>)   = 0x7fefe2516000

[pid 4208] pread64(7, <unfinished ...>
[pid 4209] mmap(0x7fefe251c000, 52816, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_ANONYMOUS, -1, 0 <unfinished ...>
[pid 4208] <... pread64 resumed>"\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\244;\374\204(\337f#\315l\
214\234\f\256\271\32"..., 68, 896) = 68
[pid 4209] <... mmap resumed>)   = 0x7fefe251c000
[pid 4208] newfstatat(7, "", <unfinished ...>
[pid 4209] close(7 <unfinished ...>
[pid 4208] <... newfstatat resumed>{st_mode=S_IFREG|0755, st_size=2216304, ...},
AT_EMPTY_PATH) = 0
[pid 4209] <... close resumed>)   = 0
[pid 4208] pread64(7, <unfinished ...>
[pid 4209] mmap(NULL, 12288, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_ANONYMOUS, -1, 0 <unfinished ...>
[pid 4208] <... 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 4209] <... mmap resumed>)   = 0x7fefe22fe000
[pid 4208] mmap(NULL, 2260560, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 7, 0
<unfinished ...>
[pid 4209] arch_prctl(ARCH_SET_FS, 0x7fefe22fe740 <unfinished ...>
[pid 4208] <... mmap resumed>)   = 0x7fded89b6000
[pid 4209] <... arch_prctl resumed>)   = 0
[pid 4208] mmap(0x7fded89de000, 1658880, PROT_READ|PROT_EXEC, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 7, 0x28000 <unfinished ...>
[pid 4209] set_tid_address(0x7fefe22fea10 <unfinished ...>
[pid 4208] <... mmap resumed>)   = 0x7fded89de000
[pid 4209] <... set_tid_address resumed>) = 4209
[pid 4208] mmap(0x7fded8b73000, 360448, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 7, 0x1bd000 <unfinished ...>
[pid 4209] set_robust_list(0x7fefe22fea20, 24 <unfinished ...>
[pid 4208] <... mmap resumed>)   = 0x7fded8b73000
[pid 4209] <... set_robust_list resumed>) = 0
[pid 4208] mmap(0x7fded8bcb000, 24576, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 7, 0x214000 <unfinished ...>
[pid 4209] rseq(0x7fefe22ff0e0, 0x20, 0, 0x53053053 <unfinished ...>
[pid 4208] <... mmap resumed>)   = 0x7fded8bcb000
[pid 4209] <... rseq resumed>)   = 0
[pid 4208] mmap(0x7fded8bd1000, 52816, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_ANONYMOUS, -1, 0 <unfinished ...>
[pid 4209] mprotect(0x7fefe2516000, 16384, PROT_READ <unfinished ...>
[pid 4208] <... mmap resumed>)   = 0x7fded8bd1000
[pid 4209] <... mprotect resumed>)   = 0
[pid 4209] mprotect(0x55b51fdc9000, 4096, PROT_READ <unfinished ...>
[pid 4208] close(7 <unfinished ...>
[pid 4209] <... mprotect resumed>)   = 0
[pid 4208] <... close resumed>)   = 0
[pid 4209] mprotect(0x7fefe2568000, 8192, PROT_READ <unfinished ...>

[pid 4208] mmap(NULL, 12288, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_ANONYMOUS, -1, 0 <unfinished ...>
[pid 4209] <... mprotect resumed>)   = 0
[pid 4208] <... mmap resumed>)   = 0x7fded89b3000
[pid 4209] prlimit64(0, RLIMIT_STACK, NULL, <unfinished ...>
[pid 4208] arch_prctl(ARCH_SET_FS, 0x7fded89b3740 <unfinished ...>
[pid 4209] <... prlimit64 resumed>{rlim_cur=8192*1024, rlim_max=RLIM64_INFINITY}) = 0
[pid 4208] <... arch_prctl resumed>)   = 0
[pid 4209] munmap(0x7fefe2529000, 18151 <unfinished ...>
[pid 4208] set_tid_address(0x7fded89b3a10 <unfinished ...>
[pid 4209] <... munmap resumed>)   = 0
[pid 4208] <... set_tid_address resumed>) = 4208
[pid 4209] mmap(NULL, 2000, PROT_READ|PROT_WRITE, MAP_SHARED, 6, 0
<unfinished ...>
[pid 4208] set_robust_list(0x7fded89b3a20, 24 <unfinished ...>
[pid 4209] <... mmap resumed>)   = 0x7fefe2567000
[pid 4208] <... set_robust_list resumed>) = 0
[pid 4209] rt_sigaction(SIGUSR1, {sa_handler=0x55b51fdc7229, sa_mask=[USR1],
sa_flags=SA_RESTORER|SA_RESTART, sa_restorer=0x7fefe2343520}, <unfinished ...>
[pid 4208] rseq(0x7fded89b40e0, 0x20, 0, 0x53053053 <unfinished ...>
[pid 4209] <... rt_sigaction resumed>{sa_handler=SIG_DFL, sa_mask=[], sa_flags=0}, 8) =
0
[pid 4208] <... rseq resumed>)   = 0
[pid 4209] rt_sigaction(SIGUSR2, {sa_handler=0x55b51fdc7339, sa_mask=[USR2],
sa_flags=SA_RESTORER|SA_RESTART, sa_restorer=0x7fefe2343520},
{sa_handler=SIG_DFL, sa_mask=[], sa_flags=0}, 8) = 0
[pid 4208] mprotect(0x7fded8bcb000, 16384, PROT_READ) = 0
[pid 4208] mprotect(0x55c86c89b000, 4096, PROT_READ) = 0
[pid 4208] mprotect(0x7fded8c1d000, 8192, PROT_READ) = 0
[pid 4208] prlimit64(0, RLIMIT_STACK, NULL, {rlim_cur=8192*1024,
rlim_max=RLIM64_INFINITY}) = 0
[pid 4208] munmap(0x7fded8bde000, 18151) = 0
[pid 4208] mmap(NULL, 2000, PROT_READ|PROT_WRITE, MAP_SHARED, 5, 0) =
0x7fded8c1c000
[pid 4208] rt_sigaction(SIGUSR1, {sa_handler=0x55c86c899229, sa_mask=[USR1],
sa_flags=SA_RESTORER|SA_RESTART, sa_restorer=0x7fded89f8520},
{sa_handler=SIG_DFL, sa_mask=[], sa_flags=0}, 8) = 0
[pid 4208] rt_sigaction(SIGUSR2, {sa_handler=0x55c86c899339, sa_mask=[USR2],
sa_flags=SA_RESTORER|SA_RESTART, sa_restorer=0x7fded89f8520},
{sa_handler=SIG_DFL, sa_mask=[], sa_flags=0}, 8) = 0
qwertyuuutrttt
[pid 4189] <... read resumed>"qwertyuuutrttt\n", 1024) = 15
[pid 4189] msync(0x7f9a0983c000, 2000, MS_SYNC|MS_INVALIDATE) = 0
[pid 4189] kill(4208, SIGUSR1)   = 0
[pid 4208] --- SIGUSR1 {si_signo=SIGUSR1, si_code=SI_USER, si_pid=4189, si_uid=1000}

[pid 4189] read(0, <unfinished ...>
[pid 4208] write(1, "q", 1)   = 1

```
[pid  4208] write(1, "w", 1)          = 1
[pid  4208] write(1, "r", 1)          = 1
[pid  4208] write(1, "t", 1)          = 1
[pid  4208] write(1, "t", 1)          = 1
[pid  4208] write(1, "r", 1)          = 1
[pid  4208] write(1, "t", 1)          = 1
[pid  4208] write(1, "t", 1)          = 1
[pid  4208] write(1, "t", 1)          = 1
[pid  4208] write(1, "\n", 1)         = 1
[pid  4208] rt_sigreturn({mask=[]})   = 0
ddkkkdkoooi
[pid  4189] <... read resumed>"ddkkkdkoooi\n", 1024) = 12
[pid  4189] msync(0x7f9a09802000, 2000, MS_SYNC|MS_INVALIDATE) = 0
[pid  4189] kill(4209, SIGUSR1)       = 0
[pid  4209] --- SIGUSR1 {si_signo=SIGUSR1, si_code=SI_USER, si_pid=4189, si_uid=1000}
---
[pid  4189] read(0,  <unfinished ...>
[pid  4209] write(1, "d", 1)          = 1
[pid  4209] write(1, "d", 1)          = 1
[pid  4209] write(1, "k", 1)          = 1
[pid  4209] write(1, "k", 1)          = 1
[pid  4209] write(1, "k", 1)          = 1
[pid  4209] write(1, "d", 1)          = 1
[pid  4209] write(1, "k", 1)          = 1
[pid  4209] write(1, "\n", 1)         = 1
[pid  4209] rt_sigreturn({mask=[]})   = 0
wertdffooi
[pid  4189] <... read resumed>"wertdffooi\n", 1024) = 11
[pid  4189] msync(0x7f9a0983c000, 2000, MS_SYNC|MS_INVALIDATE) = 0
[pid  4189] kill(4208, SIGUSR1)       = 0
[pid  4208] --- SIGUSR1 {si_signo=SIGUSR1, si_code=SI_USER, si_pid=4189, si_uid=1000}
---
[pid  4189] read(0,  <unfinished ...>
[pid  4208] write(1, "w", 1)          = 1
[pid  4208] write(1, "r", 1)          = 1
[pid  4208] write(1, "t", 1)          = 1
[pid  4208] write(1, "d", 1)          = 1
[pid  4208] write(1, "f", 1)          = 1
[pid  4208] write(1, "f", 1)          = 1
[pid  4208] write(1, "\n", 1)         = 1
[pid  4208] rt_sigreturn({mask=[]})   = 0
qwerrteeeaannnnn
[pid  4189] <... read resumed>"qwerrteeeaannnnn\n", 1024) = 17
[pid  4189] msync(0x7f9a09802000, 2000, MS_SYNC|MS_INVALIDATE) = 0
[pid  4189] kill(4209, SIGUSR1)       = 0
[pid  4209] --- SIGUSR1 {si_signo=SIGUSR1, si_code=SI_USER, si_pid=4189, si_uid=1000}
---
[pid  4189] read(0,  <unfinished ...>
```

```
[pid  4209] write(1, "q", 1)              = 1
[pid  4209] write(1, "w", 1)              = 1
[pid  4209] write(1, "r", 1)              = 1
[pid  4209] write(1, "r", 1)              = 1
[pid  4209] write(1, "t", 1)              = 1
[pid  4209] write(1, "n", 1)              = 1
[pid  4209] write(1, "n", 1)              = 1
[pid  4209] write(1, "n", 1)              = 1
[pid  4209] write(1, "n", 1)              = 1
[pid  4209] write(1, "n", 1)              = 1
[pid  4209] write(1, "\n", 1)             = 1
[pid  4209] rt_sigreturn({mask=[]})       = 0
[pid  4189] <... read resumed>"", 1024)   = 0
[pid  4189] kill(4208, SIGUSR2)           = 0
[pid  4208] --- SIGUSR2 {si_signo=SIGUSR2, si_code=SI_USER, si_pid=4189, si_uid=1000}
---
[pid  4189] kill(4209, SIGUSR2)           = 0
[pid  4209] --- SIGUSR2 {si_signo=SIGUSR2, si_code=SI_USER, si_pid=4189, si_uid=1000}
---
[pid  4208] exit_group(0 <unfinished ...>
[pid  4189] unlink("first_mmf.txt" <unfinished ...>
[pid  4209] exit_group(0 <unfinished ...>
[pid  4208] <... exit_group resumed>)     = ?
[pid  4209] <... exit_group resumed>)     = ?
[pid  4208] +++ exited with 0 +++
[pid  4209] +++ exited with 0 +++
<... unlink resumed>)                     = 0
--- SIGCHLD {si_signo=SIGCHLD, si_code=CLD_EXITED, si_pid=4208, si_uid=1000,
si_status=0, si_utime=2508, si_stime=1} ---
unlink("second_mmf.txt")                  = 0
exit_group(0)                             = ?
+++ exited with 0 +++
```

Лабораторная 4:
```
$ strace -f ./prog2
execve("./prog2", ["./prog2"], 0x7fff103ee6b8 /* 36 vars */) = 0
brk(NULL)                            = 0x565108878000
arch_prctl(0x3001 /* ARCH_??? */, 0x7ffe4f254490) = -1 EINVAL (Invalid
argument)
mmap(NULL, 8192, PROT_READ|PROT_WRITE,
 MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7f829e9fd000
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=19839, ...},
 AT_EMPTY_PATH) = 0
mmap(NULL, 19839, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7f829e9f8000
```

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) = 0x7f829e7d0000
mmap(0x7f829e7f8000, 1658880, PROT_READ|PROT_EXEC,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x28000) =
0x7f829e7f8000
mmap(0x7f829e98d000, 360448, PROT_READ,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1bd000) =
0x7f829e98d000
mmap(0x7f829e9e5000, 24576, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x214000) =
0x7f829e9e5000
mmap(0x7f829e9eb000, 52816, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7f829e9eb000
close(3)   = 0
mmap(NULL, 12288, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7f829e7cd000
arch_prctl(ARCH_SET_FS, 0x7f829e7cd740) = 0
set_tid_address(0x7f829e7cda10)   = 108265
set_robust_list(0x7f829e7cda20, 24)   = 0
rseq(0x7f829e7ce0e0, 0x20, 0, 0x53053053) = 0
mprotect(0x7f829e9e5000, 16384, PROT_READ) = 0
mprotect(0x565107daa000, 4096, PROT_READ) = 0
mprotect(0x7f829ea37000, 8192, PROT_READ) = 0
prlimit64(0, RLIMIT_STACK, NULL, {rlim_cur=8192*1024,
rlim_max=RLIM64_INFINITY}) = 0
munmap(0x7f829e9f8000, 19839)   = 0

getrandom("\x40\x08\xe2\x92\x3d\x67\x14\x0e", 8, GRND_NONBLOCK) = 8
brk(NULL)   = 0x565108878000
brk(0x565108899000)   = 0x565108899000
openat(AT_FDCWD, "./lib2/lib2.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\0\0\0\0\0\0\0"..., 832) = 832
newfstatat(3, "", {st_mode=S_IFREG|0777, st_size=15592, ...},
AT_EMPTY_PATH) = 0
getcwd("/mnt/c/Users/koche/mai/osi/laba4", 128) = 33
mmap(NULL, 16432, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f829e9f8000
mmap(0x7f829e9f9000, 4096, PROT_READ|PROT_EXEC,
 MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1000) =
0x7f829e9f9000
mmap(0x7f829e9fa000, 4096, PROT_READ,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x2000) = 0x7f829e9fa000
mmap(0x7f829e9fb000, 8192, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x2000) = 0x7f829e9fb000
close(3)   = 0
openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXEC) = 3
newfstatat(3, "", {st_mode=S_IFREG|0644, st_size=19839, ...},
AT_EMPTY_PATH) = 0
mmap(NULL, 19839, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7f829e7c8000
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\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|0644, st_size=940560, ...},
AT_EMPTY_PATH) = 0
mmap(NULL, 942344, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0)
= 0x7f829e6e1000
mmap(0x7f829e6ef000, 507904, PROT_READ|PROT_EXEC,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0xe000) = 0x7f829e6ef000
mmap(0x7f829e76b000, 372736, PROT_READ,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x8a000) =
0x7f829e76b000
mmap(0x7f829e7c6000, 8192, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0xe4000) =
0x7f829e7c6000
close(3)   = 0

```
mprotect(0x7f829e7c6000, 4096, PROT_READ) = 0
mprotect(0x7f829e9fb000, 4096, PROT_READ) = 0
munmap(0x7f829e7c8000, 19839)          = 0
newfstatat(0, "", {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0x4), ...},
AT_EMPTY_PATH) = 0
read(0, 1 2 2.5
"1 2 2.5\n", 1024)            = 8
newfstatat(1, "", {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0x4), ...},
AT_EMPTY_PATH) = 0
write(1, "Result: -0.099621\n", 18Result: -0.099621
)    = 18
read(0, 2 2 2.5
"2 2 2.5\n", 1024)            = 8
write(1, "Result: 2.500000\n", 17Result: 2.500000
)    = 17
read(0, 0
"0\n", 1024)                = 2
openat(AT_FDCWD, "./lib1/lib1.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\0\0\0\0\0\0\0"..., 832) =
832
newfstatat(3, "", {st_mode=S_IFREG|0777, st_size=15520, ...},
 AT_EMPTY_PATH) = 0
getcwd("/mnt/c/Users/koche/mai/osi/laba4", 128) = 33
mmap(NULL, 16432, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f829e7c8000
mmap(0x7f829e7c9000, 4096, PROT_READ|PROT_EXEC,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1000) = 0x7f829e7c9000
mmap(0x7f829e7ca000, 4096, PROT_READ,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x2000) = 0x7f829e7ca000
mmap(0x7f829e7cb000, 8192, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x2000) = 0x7f829e7cb000
close(3)                    = 0
mprotect(0x7f829e7cb000, 4096, PROT_READ) = 0
read(0, 1 2 2.5
"1 2 2.5\n", 1024)            = 8
write(1, "Result: -0.754731\n", 18Result: -0.754731
)    = 18
read(0, 2 2 2.5
"2 2 2.5\n", 1024)            = 8
write(1, "Result: 5.000000\n", 17Result: 5.000000
)    = 17
```

```
read(0, "", 1024)                = 0
munmap(0x7f829e7c8000, 16432)          = 0
exit_group(0)                = ?
+++ exited with 0 +++
```

```
$ strace -f ./prog1
execve("./prog1", ["./prog1"], 0x7ffe6af64358 /* 36 vars */) = 0
brk(NULL)                = 0x564212edf000
arch_prctl(0x3001 /* ARCH_??? */, 0x7ffd14a10420) = -1 EINVAL (Invalid
argument)
mmap(NULL, 8192, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7f92bab92000
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=19839, ...},
AT_EMPTY_PATH) = 0
mmap(NULL, 19839, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7f92bab8d000
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\0\3\0>\0\1\0\0\0\0\0\0\0\0\0\0\0"..., 832) =
832
newfstatat(3, "", {st_mode=S_IFREG|0644, st_size=940560, ...},
AT_EMPTY_PATH) = 0
mmap(NULL, 942344, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0)
= 0x7f92baaa6000
mmap(0x7f92baab4000, 507904, PROT_READ|PROT_EXEC,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0xe000) = 0x7f92baab4000
mmap(0x7f92bab30000, 372736, PROT_READ,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x8a000) =
0x7f92bab30000
mmap(0x7f92bab8b000, 8192, PROT_READ|PROT_WRITE,
 MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0xe4000) =
 0x7f92bab8b000
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) = 0x7f92ba87e000
mmap(0x7f92ba8a6000, 1658880, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x28000) = 0x7f92ba8a6000
mmap(0x7f92baa3b000, 360448, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1bd000) = 0x7f92baa3b000
mmap(0x7f92baa93000, 24576, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x214000) = 0x7f92baa93000
mmap(0x7f92baa99000, 52816, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7f92baa99000
close(3)   = 0
mmap(NULL, 12288, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7f92ba87b000
arch_prctl(ARCH_SET_FS, 0x7f92ba87b740) = 0
set_tid_address(0x7f92ba87ba10)   = 108406
set_robust_list(0x7f92ba87ba20, 24)   = 0
rseq(0x7f92ba87c0e0, 0x20, 0, 0x53053053) = 0
mprotect(0x7f92baa93000, 16384, PROT_READ) = 0
mprotect(0x7f92bab8b000, 4096, PROT_READ) = 0
mprotect(0x56421163c000, 4096, PROT_READ) = 0
mprotect(0x7f92babcc000, 8192, PROT_READ) = 0
prlimit64(0, RLIMIT_STACK, NULL, {rlim_cur=8192*1024, rlim_max=RLIM64_INFINITY}) = 0
munmap(0x7f92bab8d000, 19839)   = 0
newfstatat(0, "", {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0x4), ...}, AT_EMPTY_PATH) = 0
getrandom("\xd5\xec\x99\x01\xfe\xdd\xdb\x75", 8, GRND_NONBLOCK) = 8
brk(NULL)   = 0x564212edf000
brk(0x564212f00000)   = 0x564212f00000

```
read(0, 1 2 2.5
"1 2 2.5\n", 1024)            = 8
newfstatat(1, "", {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0x4), ...},
AT_EMPTY_PATH) = 0
write(1, "Result: -0.754731\n", 18Result: -0.754731
)    = 18
read(0, 2 2 2.5
"2 2 2.5\n", 1024)            = 8
write(1, "Result: 5.000000\n", 17Result: 5.000000
)    = 17
read(0, "", 1024)              = 0
exit_group(0)              = ?
+++ exited with 0 +++
```

Лабораторная 5-7:
Часть Strace, полный в strace8.txt:
```
$ strace -f ./server
execve("./server", ["./server"], 0x7fff026f4d78 /* 36 vars */) = 0
brk(NULL)                      = 0x56242bd13000
arch_prctl(0x3001 /* ARCH_??? */, 0x7ffe646ffdc0) = -1 EINVAL (Invalid argument)
mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_ANONYMOUS, -1, 0) = 0x7ff096387000
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=19839, ...}, AT_EMPTY_PATH) = 0
mmap(NULL, 19839, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7ff096382000
close(3)                     = 0
openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libzmq.so.5", 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\240\233\1\0\0\0\0\0"..., 832) = 832
newfstatat(3, "", {st_mode=S_IFREG|0644, st_size=634936, ...}, AT_EMPTY_PATH) = 0
mmap(NULL, 636784, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7ff0962e6000
mmap(0x7ff0962fe000, 397312, PROT_READ|PROT_EXEC, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x18000) = 0x7ff0962fe000
mmap(0x7ff09635f000, 106496, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x79000) = 0x7ff09635f000
mmap(0x7ff096379000, 36864, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x92000) = 0x7ff096379000
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\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) = 0x7ff0960be000

mmap(0x7ff0960e6000, 1658880, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x28000) = 0x7ff0960e6000

mmap(0x7ff09627b000, 360448, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1bd000) = 0x7ff09627b000

mmap(0x7ff0962d3000, 24576, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x214000) = 0x7ff0962d3000

mmap(0x7ff0962d9000, 52816, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7ff0962d9000

close(3)   = 0

openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libbsd.so.0", 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|0644, st_size=89096, ...}, AT_EMPTY_PATH) = 0

mmap(NULL, 94432, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7ff0960a6000

mprotect(0x7ff0960aa000, 69632, PROT_NONE) = 0

mmap(0x7ff0960aa000, 53248, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x4000) = 0x7ff0960aa000

mmap(0x7ff0960b7000, 12288, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x11000) = 0x7ff0960b7000

mmap(0x7ff0960bb000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x14000) = 0x7ff0960bb000

mmap(0x7ff0960bd000, 224, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7ff0960bd000

close(3)   = 0

openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libsodium.so.23", 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|0644, st_size=355040, ...}, AT_EMPTY_PATH) = 0

mmap(NULL, 357440, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7ff09604e000

mprotect(0x7ff09605a000, 303104, PROT_NONE) = 0

mmap(0x7ff09605a000, 229376, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0xc000) = 0x7ff09605a000

mmap(0x7ff096092000, 69632, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x44000) = 0x7ff096092000

mmap(0x7ff0960a4000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x55000) = 0x7ff0960a4000
close(3)   = 0
openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libpgm-5.3.so.0", 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\340L\0\0\0\0\0\0"..., 832) = 832
newfstatat(3, "", {st_mode=S_IFREG|0644, st_size=310264, ...}, AT_EMPTY_PATH) = 0
mmap(NULL, 329808, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7ff095ffd000
mmap(0x7ff096001000, 172032, PROT_READ|PROT_EXEC, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x4000) = 0x7ff096001000
mmap(0x7ff09602b000, 118784, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x2e000) = 0x7ff09602b000
mmap(0x7ff096048000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x4a000) = 0x7ff096048000
mmap(0x7ff09604a000, 14416, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7ff09604a000
close(3)   = 0
openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libnorm.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 \255\0\0\0\0\0\0"..., 832) = 832
newfstatat(3, "", {st_mode=S_IFREG|0644, st_size=497824, ...}, AT_EMPTY_PATH) = 0
mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_ANONYMOUS, -1, 0) = 0x7ff095ffb000
mmap(NULL, 1223168, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7ff095ed0000
mprotect(0x7ff095eda000, 446464, PROT_NONE) = 0
mmap(0x7ff095eda000, 286720, PROT_READ|PROT_EXEC, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0xa000) = 0x7ff095eda000
mmap(0x7ff095f20000, 155648, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x50000) = 0x7ff095f20000
mmap(0x7ff095f47000, 16384, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x76000) = 0x7ff095f47000
mmap(0x7ff095f4b000, 719360, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7ff095f4b000
close(3)   = 0
openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libgssapi_krb5.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\0\0\0\0\0\0\0\0\0"..., 832) = 832
newfstatat(3, "", {st_mode=S_IFREG|0644, st_size=338648, ...}, AT_EMPTY_PATH) = 0
mmap(NULL, 340960, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7ff095e7c000
mprotect(0x7ff095e87000, 282624, PROT_NONE) = 0

mmap(0x7ff095e87000, 229376, PROT_READ|PROT_EXEC, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0xb000) = 0x7ff095e87000
mmap(0x7ff095ebf000, 49152, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x43000) = 0x7ff095ebf000
mmap(0x7ff095ecc000, 16384, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x4f000) = 0x7ff095ecc000
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\0\3\0>\0\1\0\0\0\0\0\0\0\0\0\0"..., 832) = 832
newfstatat(3, "", {st_mode=S_IFREG|0644, st_size=2260296, ...}, AT_EMPTY_PATH) = 0
mmap(NULL, 2275520, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7ff095c50000
mprotect(0x7ff095cea000, 1576960, PROT_NONE) = 0
mmap(0x7ff095cea000, 1118208, PROT_READ|PROT_EXEC, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x9a000) = 0x7ff095cea000
mmap(0x7ff095dfb000, 454656, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x1ab000) = 0x7ff095dfb000
mmap(0x7ff095e6b000, 57344, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x21a000) = 0x7ff095e6b000
mmap(0x7ff095e79000, 10432, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7ff095e79000
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\0\0\3\0>\0\1\0\0\0\0\0\0\0\0\0\0"..., 832) = 832
newfstatat(3, "", {st_mode=S_IFREG|0644, st_size=125488, ...}, AT_EMPTY_PATH) = 0
mmap(NULL, 127720, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7ff095c30000
mmap(0x7ff095c33000, 94208, PROT_READ|PROT_EXEC, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x3000) = 0x7ff095c33000
mmap(0x7ff095c4a000, 16384, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x1a000) = 0x7ff095c4a000
mmap(0x7ff095c4e000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x1d000) = 0x7ff095c4e000
close(3)   = 0
…
[pid 106407] rseq(0x7ff095201fe0, 0x20, 0, 0x53053053 <unfinished ...>
[pid 106405] rt_sigprocmask(SIG_SETMASK, [], NULL, 8) = 0
[pid 106407] <... rseq resumed>)   = 0
[pid 106405] eventfd2(0, EFD_CLOEXEC <unfinished ...>
[pid 106407] set_robust_list(0x7ff095201920, 24 <unfinished ...>
[pid 106405] <... eventfd2 resumed>)   = 8
[pid 106407] <... set_robust_list resumed>) = 0

[pid 106405] fcntl(8, F_GETFL <unfinished ...>
[pid 106407] rt_sigprocmask(SIG_SETMASK, [], <unfinished ...>
[pid 106405] <... fcntl resumed>)   = 0x2 (flags O_RDWR)
[pid 106407] <... rt_sigprocmask resumed>NULL, 8) = 0
[pid 106405] fcntl(8, F_SETFL, O_RDWR|O_NONBLOCK <unfinished ...>
[pid 106407] rt_sigprocmask(SIG_BLOCK, ~[RTMIN RT_1], <unfinished ...>
[pid 106405] <... fcntl resumed>)   = 0
[pid 106407] <... rt_sigprocmask resumed>NULL, 8) = 0
[pid 106405] fcntl(8, F_GETFL <unfinished ...>
[pid 106407] sched_getparam(106407, <unfinished ...>
[pid 106405] <... fcntl resumed>)   = 0x802 (flags O_RDWR|O_NONBLOCK)
[pid 106407] <... sched_getparam resumed>[0]) = 0
[pid 106405] fcntl(8, F_SETFL, O_RDWR|O_NONBLOCK <unfinished ...>
[pid 106407] sched_getscheduler(106407 <unfinished ...>
[pid 106405] <... fcntl resumed>)   = 0
[pid 106407] <... sched_getscheduler resumed>) = 0 (SCHED_OTHER)
[pid 106405] getpid(<unfinished ...>
[pid 106407] sched_setscheduler(106407, SCHED_OTHER, [0] <unfinished ...>
[pid 106405] <... getpid resumed>)   = 106405
[pid 106407] <... sched_setscheduler resumed>) = 0
[pid 106405] getpid()   = 106405
[pid 106407] prctl(PR_SET_NAME, "ZMQbg/IO/0" <unfinished ...>
[pid 106405] poll([{fd=8, events=POLLIN}], 1, 0 <unfinished ...>
[pid 106407] <... prctl resumed>)   = 0
[pid 106405] <... poll resumed>)   = 0 (Timeout)
[pid 106405] socket(AF_NETLINK, SOCK_RAW|SOCK_CLOEXEC, NETLINK_ROUTE) = 9
[pid 106405] bind(9, {sa_family=AF_NETLINK, nl_pid=0, nl_groups=00000000}, 12) = 0
[pid 106407] epoll_wait(7, <unfinished ...>
[pid 106405] getsockname(9, {sa_family=AF_NETLINK, nl_pid=106405, nl_groups=00000000}, [12]) = 0
[pid 106405] sendto(9, [{nlmsg_len=20, nlmsg_type=RTM_GETLINK, nlmsg_flags=NLM_F_REQUEST|NLM_F_DUMP, nlmsg_seq=1702686593, nlmsg_pid=0}, {ifi_family=AF_UNSPEC, ...}], 20, 0, {sa_family=AF_NETLINK, nl_pid=0, nl_groups=00000000}, 12) = 20
[pid 106405] recvmsg(9, {msg_name={sa_family=AF_NETLINK, nl_pid=0, nl_groups=00000000}, msg_namelen=12, msg_iov=[{iov_base=[[{nlmsg_len=1336, nlmsg_type=RTM_NEWLINK, nlmsg_flags=NLM_F_MULTI, nlmsg_seq=1702686593, nlmsg_pid=106405}, {ifi_family=AF_UNSPEC, ifi_type=ARPHRD_LOOPBACK, ifi_index=if_nametoindex("lo"), ifi_flags=IFF_UP|IFF_LOOPBACK|IFF_RUNNING| IFF_LOWER_UP, ifi_change=0}, [[{nla_len=7, nla_type=IFLA_IFNAME}, "lo"], [{nla_len=8, nla_type=IFLA_TXQLEN}, 1000], type=NLMSG_DONE, nlmsg_flags=NLM_F_MULTI, nlmsg_seq=1702686594, nlmsg_pid=106405}, 0], iov_len=4096}], msg_iovlen=1, msg_controllen=0, msg_flags=0}, 0) = 20

[pid 106405] close(9)   = 0
[pid 106405] socket(AF_INET, SOCK_STREAM|SOCK_CLOEXEC, IPPROTO_TCP) = 9
[pid 106405] setsockopt(9, SOL_SOCKET, SO_REUSEADDR, [1], 4) = 0
[pid 106405] bind(9, {sa_family=AF_INET, sin_port=htons(5555),
sin_addr=inet_addr("127.0.0.1")}, 16) = 0
[pid 106405] listen(9, 100)   = 0
[pid 106405] getsockname(9, {sa_family=AF_INET, sin_port=htons(5555),
sin_addr=inet_addr("127.0.0.1")}, [128 => 16]) = 0
[pid 106405] getsockname(9, {sa_family=AF_INET, sin_port=htons(5555),
sin_addr=inet_addr("127.0.0.1")}, [128 => 16]) = 0
[pid 106405] getpid()   = 106405
[pid 106405] write(6, "\1\0\0\0\0\0\0\0", 8) = 8
[pid 106407] <... epoll_wait resumed>[{events=EPOLLIN, data={u32=735224416,
u64=94713354035808}}], 256, -1) = 1
[pid 106405] getpid(<unfinished ...>
[pid 106407] getpid(<unfinished ...>
[pid 106405] <... getpid resumed>)   = 106405
[pid 106407] <... getpid resumed>)   = 106405
[pid 106405] write(8, "\1\0\0\0\0\0\0\0", 8 <unfinished ...>
[pid 106407] poll([{fd=6, events=POLLIN}], 1, 0 <unfinished ...>
[pid 106405] <... write resumed>)   = 8
[pid 106407] <... poll resumed>)   = 1 ([{fd=6, revents=POLLIN}])
[pid 106407] getpid()   = 106405
[pid 106407] read(6, "\1\0\0\0\0\0\0\0", 8) = 8
[pid 106405] newfstatat(0, "", <unfinished ...>
[pid 106407] mmap(NULL, 134217728, PROT_NONE, MAP_PRIVATE|
MAP_ANONYMOUS|MAP_NORESERVE, -1, 0 <unfinished ...>
[pid 106405] <... newfstatat resumed>{st_mode=S_IFCHR|0620, st_rdev=makedev(0x88,
0x4), ...}, AT_EMPTY_PATH) = 0
[pid 106407] <... mmap resumed>)   = 0x7ff08ca01000
[pid 106405] read(0, <unfinished ...>
[pid 106407] munmap(0x7ff08ca01000, 56619008) = 0
[pid 106407] munmap(0x7ff094000000, 10489856) = 0
[pid 106407] mprotect(0x7ff090000000, 135168, PROT_READ|PROT_WRITE) = 0
[pid 106407] epoll_ctl(7, EPOLL_CTL_ADD, 9, {events=0, data={u32=2415922032,
u64=140671184800624}}) = 0
[pid 106407] epoll_ctl(7, EPOLL_CTL_MOD, 9, {events=EPOLLIN,
data={u32=2415922032, u64=140671184800624}}) = 0
[pid 106407] getpid()   = 106405
[pid 106407] poll([{fd=6, events=POLLIN}], 1, 0) = 0 (Timeout)
[pid 106407] epoll_wait(7, create 2 -1
 <unfinished ...>
…
[pid 106405] <... read resumed>"create 2 -1\n", 1024) = 12

[pid 106405] clone(child_stack=NULL, sin_addr=inet_addr("127.0.0.1")}, [128 => 16]) = 0
[pid 106627] epoll_ctl(7, EPOLL_CTL_DEL, 9, 0x7f2ba8001434 <unfinished ...>
[pid 106407] fcntl(11, F_GETFL <unfinished ...>
[pid 106627] <... epoll_ctl resumed>) = 0
[pid 106407] <... fcntl resumed>)   = 0x2 (flags O_RDWR)
[pid 106627] getsockopt(9, SOL_SOCKET, SO_ERROR, <unfinished ...>
[pid 106407] fcntl(11, F_SETFL, O_RDWR|O_NONBLOCK <unfinished ...>
[pid 106627] <... getsockopt resumed>[0], [4]) = 0
[pid 106407] <... fcntl resumed>)   = 0
[pid 106627] setsockopt(9, SOL_TCP, TCP_NODELAY, [1], 4 <unfinished ...>
[pid 106407] getpid(<unfinished ...>
[pid 106627] <... setsockopt resumed>) = 0
[pid 106407] <... getpid resumed>)   = 106405
[pid 106627] getsockname(9, <unfinished ...>
[pid 106407] write(6, "\1\0\0\0\0\0\0\0", 8 <unfinished ...>
[pid 106627] <... getsockname resumed>{sa_family=AF_INET, sin_port=htons(59230),
sin_addr=inet_addr("127.0.0.1")}, [128 => 16]) = 0
[pid 106407] <... write resumed>)   = 8
[pid 106627] getpeername(9, <unfinished ...>
[pid 106407] epoll_wait(7, <unfinished ...>
[pid 106627] <... getpeername resumed>{sa_family=AF_INET, sin_port=htons(5555),
sin_addr=inet_addr("127.0.0.1")}, [128 => 16]) = 0
[pid 106407] <... epoll_wait resumed>[{events=EPOLLIN, data={u32=735224416,
u64=94713354035808}}], 256, -1) = 1
[pid 106627] fcntl(9, F_GETFL <unfinished ...>
[pid 106407] getpid(<unfinished ...>
[pid 106627] <... fcntl resumed>)   = 0x802 (flags O_RDWR|O_NONBLOCK)
[pid 106407] <... getpid resumed>)   = 106405
[pid 106627] fcntl(9, F_SETFL, O_RDWR|O_NONBLOCK <unfinished ...>
[pid 106407] poll([{fd=6, events=POLLIN}], 1, 0 <unfinished ...>
[pid 106627] <... fcntl resumed>)   = 0
[pid 106407] <... poll resumed>)   = 1 ([{fd=6, revents=POLLIN}])
data={u32=2415988864, u64=140671184867456}} <unfinished ...>
[pid 106627] <... sendto resumed>)   = 27
[pid 106407] <... epoll_ctl resumed>) = 0
[pid 106627] epoll_wait(7, <unfinished ...>
[pid 106407] recvfrom(11, <unfinished ...>
[pid 106627] <... epoll_wait resumed>[{events=EPOLLOUT, data={u32=2818577456,
u64=139825478898736}}], 256, 29996) = 1
[pid 106407] <... recvfrom resumed>"\4\31\5READY\vSocket-Type\0\0\0\3SUB", 8192, 0,
NULL, NULL) = 27
[pid 106407] epoll_wait(7, [{events=EPOLLOUT, data={u32=2415988864,
u64=140671184867456}}], 256, 29993) = 1
[pid 106407] mprotect(0x7ff090021000, 4096, PROT_READ|PROT_WRITE) = 0

[pid 106407] getpid()   = 106405
[pid 106407] write(8, "\1\0\0\0\0\0\0", 8) = 8
[pid 106407] sendto(11, "\4\31\5READY\vSocket-Type\0\0\0\3PUB", 27, 0, NULL, 0) = 27
[pid 106407] epoll_wait(7, [{events=EPOLLOUT, data={u32=2415988864,
u64=140671184867456}}], 256, -1) = 1
[pid 106407] epoll_ctl(7, EPOLL_CTL_MOD, 11, {events=EPOLLIN,
data={u32=2415988864, u64=140671184867456}}) = 0
[pid 106407] epoll_wait(7, <unfinished ...>
[pid 106627] epoll_ctl(7, EPOLL_CTL_MOD, 9, {events=EPOLLIN,
data={u32=2818577456, u64=139825478898736}}) = 0
[pid 106627] epoll_wait(7, [{events=EPOLLIN, data={u32=2818577456,
u64=139825478898736}}], 256, 29990) = 1
[pid 106627] recvfrom(9, "\4\31\5READY\vSocket-Type\0\0\0\3PUB", 8192, 0, NULL,
NULL) = 27
[pid 106627] epoll_ctl(7, EPOLL_CTL_MOD, 9, {events=EPOLLIN|EPOLLOUT,
data={u32=2818577456, u64=139825478898736}}) = 0
[pid 106627] sendto(9, "\4\n\tSUBSCRIBE", 12, 0, NULL, 0) = 12
[pid 106407] <... epoll_wait resumed>[{events=EPOLLIN, data={u32=2415988864,
u64=140671184867456}}], 256, -1) = 1
[pid 106627] epoll_wait(7, <unfinished ...>
[pid 106407] recvfrom(11, <unfinished ...>
[pid 106627] <... epoll_wait resumed>[{events=EPOLLOUT, data={u32=2818577456,
u64=139825478898736}}], 256, -1) = 1
[pid 106407] <... recvfrom resumed>"\4\n\tSUBSCRIBE", 8192, 0, NULL, NULL) = 12
[pid 106627] epoll_ctl(7, EPOLL_CTL_MOD, 9, {events=EPOLLIN,
data={u32=2818577456, u64=139825478898736}} <unfinished ...>
[pid 106407] epoll_wait(7, <unfinished ...>
[pid 106627] <... epoll_ctl resumed>)   = 0
[pid 106405] read(0, exec 3 2 6 7
"exec 3 2 6 7\n", 1024) = 13
[pid 106405] getpid()   = 106405
[pid 106405] poll([{fd=8, events=POLLIN}], 1, 0) = 1 ([{fd=8, revents=POLLIN}])
[pid 106405] getpid()   = 106405
[pid 106405] read(8, "\1\0\0\0\0\0\0", 8) = 8
[pid 106405] getpid()   = 106405
[pid 106405] poll([{fd=8, events=POLLIN}], 1, 0) = 0 (Timeout)
[pid 106405] getpid()   = 106405
[pid 106405] write(6, "\1\0\0\0\0\0\0", 8) = 8
[pid 106407] <... epoll_wait resumed>[{events=EPOLLIN, data={u32=735224416,
u64=94713354035808}}], 256, -1) = 1
[pid 106405] read(0, <unfinished ...>
[pid 106407] getpid()   = 106405
[pid 106407] poll([{fd=6, events=POLLIN}], 1, 0) = 1 ([{fd=6, revents=POLLIN}])
[pid 106407] getpid()   = 106405

[pid 106407] read(6, "\1\0\0\0\0\0\0\0", 8) = 8
[pid 106407] epoll_ctl(7, EPOLL_CTL_MOD, 10, {events=EPOLLIN|EPOLLOUT,
data={u32=2415922128, u64=140671184800720}}) = 0
[pid 106407] sendto(10, "\0\rexec 3 2 6 7\n", 15, 0, NULL, 0 <unfinished ...>
[pid 106476] <... epoll_wait resumed>[{events=EPOLLIN, data={u32=3623883824,
u64=140156996686896}}], 256, -1) = 1
[pid 106407] <... sendto resumed>)   = 15
[pid 106476] recvfrom(9, <unfinished ...>
[pid 106407] epoll_ctl(7, EPOLL_CTL_MOD, 11, {events=EPOLLIN|EPOLLOUT,
data={u32=2415988864, u64=140671184867456}} <unfinished ...>
[pid 106476] <... recvfrom resumed>"\0\rexec 3 2 6 7\n", 8192, 0, NULL, NULL) = 15
[pid 106407] <... epoll_ctl resumed>)   = 0
[pid 106476] getpid(<unfinished ...>
[pid 106407] sendto(11, "\0\rexec 3 2 6 7\n", 15, 0, NULL, 0 <unfinished ...>
[pid 106476] <... getpid resumed>)   = 106474
[pid 106627] <... epoll_wait resumed>[{events=EPOLLIN, data={u32=2818577456,
u64=139825478898736}}], 256, -1) = 1
[pid 106476] write(8, "\1\0\0\0\0\0\0\0", 8 <unfinished ...>
[pid 106407] <... sendto resumed>)   = 15
[pid 106627] recvfrom(9, <unfinished ...>
[pid 106476] <... write resumed>)   = 8
[pid 106474] <... poll resumed>)   = 1 ([{fd=8, revents=POLLIN}])
[pid 106407] getpid(<unfinished ...>
[pid 106627] <... recvfrom resumed>"\0\rexec 3 2 6 7\n", 8192, 0, NULL, NULL) = 15
[pid 106476] epoll_wait(7, <unfinished ...>
[pid 106474] getpid(<unfinished ...>
[pid 106627] getpid(<unfinished ...>
[pid 106407] <... getpid resumed>)   = 106405
[pid 106627] <... getpid resumed>)   = 106625
[pid 106474] <... getpid resumed>)   = 106474
[pid 106407] poll([{fd=6, events=POLLIN}], 1, 0 <unfinished ...>
[pid 106627] write(8, "\1\0\0\0\0\0\0\0", 8 <unfinished ...>
[pid 106474] read(8, <unfinished ...>
[pid 106407] <... poll resumed>)   = 0 (Timeout)
[pid 106627] <... write resumed>)   = 8
[pid 106474] <... read resumed>"\1\0\0\0\0\0\0\0", 8) = 8
[pid 106627] epoll_wait(7, <unfinished ...>
[pid 106625] <... poll resumed>)   = 1 ([{fd=8, revents=POLLIN}])
[pid 106626] epoll_ctl(5, EPOLL_CTL_MOD, 8, {events=EPOLLIN,
data={u32=2684357488, u64=139825344678768}} <unfinished ...>
[pid 106475] mmap(NULL, 134217728, PROT_NONE, MAP_PRIVATE|
MAP_ANONYMOUS|MAP_NORESERVE, -1, 0 <unfinished ...>
[pid 106626] <... epoll_ctl resumed>)   = 0
[pid 106475] <... mmap resumed>)   = 0x7f78d0000000

```
[pid 106626] getpid( <unfinished ...>
[pid 106475] munmap(0x7f78d4000000, 67108864 <unfinished ...>
[pid 106626] <... getpid resumed>)      = 106625


[pid 106407] <... getpid resumed>)      = 106405
[pid 106406] rt_sigprocmask(SIG_BLOCK, ~[RT_1],  <unfinished ...>
[pid 106407] poll([{fd=6, events=POLLIN}], 1, 0 <unfinished ...>
[pid 106406] <... rt_sigprocmask resumed>NULL, 8) = 0
[pid 106407] <... poll resumed>)        = 1 ([{fd=6, revents=POLLIN}])
[pid 106406] madvise(0x7ff095202000, 8368128, MADV_DONTNEED <unfinished ...>
[pid 106407] getpid()              = 106405
[pid 106406] <... madvise resumed>)     = 0
[pid 106407] read(6,  <unfinished ...>
[pid 106406] exit(0 <unfinished ...>
[pid 106407] <... read resumed>"\1\0\0\0\0\0\0\0", 8) = 8
[pid 106406] <... exit resumed>)        = ?
[pid 106407] epoll_ctl(7, EPOLL_CTL_DEL, 6, 0x56242bd2a264 <unfinished ...>
[pid 106406] +++ exited with 0 +++
[pid 106407] <... epoll_ctl resumed>)   = 0
[pid 106407] getpid()              = 106405
[pid 106407] poll([{fd=6, events=POLLIN}], 1, 0) = 0 (Timeout)
[pid 106407] rt_sigprocmask(SIG_BLOCK, ~[RT_1], NULL, 8) = 0
[pid 106407] madvise(0x7ff094a01000, 8368128, MADV_DONTNEED) = 0
[pid 106407] exit(0)               = ?
[pid 106405] <... futex resumed>)      = 0
[pid 106407] +++ exited with 0 +++
close(7)                  = 0
close(6)                  = 0
close(5)                  = 0
close(4)                  = 0
close(3)                  = 0
exit_group(0)                = ?
+++ exited with 0 +++
```

Вывод

Strace показывает нам все системные вызовы, которые выполняются программой. Это очень важно для отладки и диагностики программы программистом. Я уверен, что буду использовать его в будущем.