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Факультет информационных технологий и прикладной математики

Кафедра вычислительной математики и программирования

**Лабораторная работа №1 по курсу**

**«Операционные системы»**

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**Репозиторий**

**Постановка задачи**

Подробно рассказать о каждом системном вызове из утилиты strace на примере лабораторной работы №4.

**Описание работы strace**

execve — открывает файл на исполнение.

brk — изменяет расположение маркера окончания неинициализированных данных, который определяет конец сегмента данных процесса.

arch\_prtcl — устанавливает состояние процесса или потока, зависящее от архитектуры.

access - для проверки существования файла

openat — открывает файл в определенной директории.

newfstatat — возвращает информацию о файле в буфер.

close — закрывает файловый дескриптор.

mmap — создает новое отображение памяти в адресном пространстве процесса.

ftruncate — устанавливает файлу необходимый размер.

munmap — удаляет отображение.

mprotect − контролирует доступ к области памяти.

set\_robust\_list - запрашивает ядро записать начало списка надёжных фьютексов, принадлежащего вызывающей нити

rt\_sigaction - получает и изменяет обработчик сигнала.

rt\_sigprocmask - используется для проверки или настройки сигнальной маски текущего процесса.

set\_tid\_address - устанавливает у вызывающей нити значение clear\_child\_tid равным tidptr (В ядре для каждой нити хранится два атрибута (адреса): set\_child\_tid и clear\_child\_tid. Их значение по умолчанию равно NULL)

futex - предоставляет программам метод для ожидания пока определённое условие не станет истинным

fstatat — требует права выполнения (поиска) на все каталоги, указанные в полном имени файла pathname. (опрашиваемый файл задаётся в виде файлового дескриптора fd.)

statfs - возвращает информацию о смонтированной файловой системе

clone - создаёт новый процесс подобно fork

clock\_nanosleep - позволяет вызывающей нити приостановить работу на некоторое время с наносекундной точностью

lseek - позволяет задавать смещение, которое будет находиться за существующим концом файла (но это не изменяет размер файла)

exit\_group - завершает исполнение всех потоков процесса.

**Демонстрация работы strace**

papik@papik-VirtualBox:~/OSlaba4/build$ strace -f ./main < test1.txt

execve("./main", ["./main"], 0x7ffcbfd25308 /\* 49 vars \*/) = 0

brk(NULL) = 0x561aa1055000

arch\_prctl(0x3001 /\* ARCH\_??? \*/, 0x7ffe4a34dc80) = -1 EINVAL (Недопустимый аргумент)

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

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

fstat(3, {st\_mode=S\_IFREG|0644, st\_size=77566, ...}) = 0

mmap(NULL, 77566, PROT\_READ, MAP\_PRIVATE, 3, 0) = 0x7f76ea49a000

close(3) = 0

openat(AT\_FDCWD, "/lib/x86\_64-linux-gnu/librt.so.1", O\_RDONLY|O\_CLOEXEC) = 3

read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0 '\0\0\0\0\0\0"..., 832) = 832

fstat(3, {st\_mode=S\_IFREG|0644, st\_size=35928, ...}) = 0

mmap(NULL, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_ANONYMOUS, -1, 0) = 0x7f76ea498000

mmap(NULL, 39904, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7f76ea48e000

mmap(0x7f76ea490000, 16384, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x2000) = 0x7f76ea490000

mmap(0x7f76ea494000, 8192, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x6000) = 0x7f76ea494000

mmap(0x7f76ea496000, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x7000) = 0x7f76ea496000

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`\341\t\0\0\0\0\0"..., 832) = 832

fstat(3, {st\_mode=S\_IFREG|0644, st\_size=1956992, ...}) = 0

mmap(NULL, 1972224, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7f76ea2ac000

mprotect(0x7f76ea342000, 1290240, PROT\_NONE) = 0

mmap(0x7f76ea342000, 987136, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x96000) = 0x7f76ea342000

mmap(0x7f76ea433000, 299008, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x187000) = 0x7f76ea433000

mmap(0x7f76ea47d000, 57344, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x1d0000) = 0x7f76ea47d000

mmap(0x7f76ea48b000, 10240, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_ANONYMOUS, -1, 0) = 0x7f76ea48b000

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\3\0>\0\1\0\0\0\3405\0\0\0\0\0\0"..., 832) = 832

fstat(3, {st\_mode=S\_IFREG|0644, st\_size=104984, ...}) = 0

mmap(NULL, 107592, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7f76ea291000

mmap(0x7f76ea294000, 73728, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x3000) = 0x7f76ea294000

mmap(0x7f76ea2a6000, 16384, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x15000) = 0x7f76ea2a6000

mmap(0x7f76ea2aa000, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x18000) = 0x7f76ea2aa000

close(3) = 0

openat(AT\_FDCWD, "/lib/x86\_64-linux-gnu/libpthread.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\220q\0\0\0\0\0\0"..., 832) = 832

pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\360\2300%\360\340\363'\246\332u/\364\377\246u"..., 68, 824) = 68

fstat(3, {st\_mode=S\_IFREG|0755, st\_size=157224, ...}) = 0

pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\360\2300%\360\340\363'\246\332u/\364\377\246u"..., 68, 824) = 68

mmap(NULL, 140408, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7f76ea26e000

mmap(0x7f76ea274000, 69632, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x6000) = 0x7f76ea274000

mmap(0x7f76ea285000, 24576, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x17000) = 0x7f76ea285000

mmap(0x7f76ea28b000, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x1c000) = 0x7f76ea28b000

mmap(0x7f76ea28d000, 13432, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_ANONYMOUS, -1, 0) = 0x7f76ea28d000

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\0\360A\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\20\0\0\0\5\0\0\0GNU\0\2\0\0\300\4\0\0\0\3\0\0\0\0\0\0\0", 32, 848) = 32

pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\237\333t\347\262\27\320l\223\27\*\202C\370T\177"..., 68, 880) = 68

fstat(3, {st\_mode=S\_IFREG|0755, st\_size=2029560, ...}) = 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

pread64(3, "\4\0\0\0\20\0\0\0\5\0\0\0GNU\0\2\0\0\300\4\0\0\0\3\0\0\0\0\0\0\0", 32, 848) = 32

pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\237\333t\347\262\27\320l\223\27\*\202C\370T\177"..., 68, 880) = 68

mmap(NULL, 2037344, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7f76ea07c000

mmap(0x7f76ea09e000, 1540096, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x22000) = 0x7f76ea09e000

mmap(0x7f76ea216000, 319488, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x19a000) = 0x7f76ea216000

mmap(0x7f76ea264000, 24576, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x1e7000) = 0x7f76ea264000

mmap(0x7f76ea26a000, 13920, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_ANONYMOUS, -1, 0) = 0x7f76ea26a000

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\300\323\0\0\0\0\0\0"..., 832) = 832

fstat(3, {st\_mode=S\_IFREG|0644, st\_size=1369352, ...}) = 0

mmap(NULL, 1368336, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7f76e9f2d000

mmap(0x7f76e9f3a000, 684032, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0xd000) = 0x7f76e9f3a000

mmap(0x7f76e9fe1000, 626688, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0xb4000) = 0x7f76e9fe1000

mmap(0x7f76ea07a000, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x14c000) = 0x7f76ea07a000

close(3) = 0

mmap(NULL, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_ANONYMOUS, -1, 0) = 0x7f76e9f2b000

mmap(NULL, 12288, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_ANONYMOUS, -1, 0) = 0x7f76e9f28000

arch\_prctl(ARCH\_SET\_FS, 0x7f76e9f28740) = 0

mprotect(0x7f76ea264000, 16384, PROT\_READ) = 0

mprotect(0x7f76ea07a000, 4096, PROT\_READ) = 0

mprotect(0x7f76ea28b000, 4096, PROT\_READ) = 0

mprotect(0x7f76ea2aa000, 4096, PROT\_READ) = 0

mprotect(0x7f76ea47d000, 45056, PROT\_READ) = 0

mprotect(0x7f76ea496000, 4096, PROT\_READ) = 0

mprotect(0x561a9fef2000, 4096, PROT\_READ) = 0

mprotect(0x7f76ea4da000, 4096, PROT\_READ) = 0

munmap(0x7f76ea49a000, 77566) = 0

set\_tid\_address(0x7f76e9f28a10) = 7047

set\_robust\_list(0x7f76e9f28a20, 24) = 0

rt\_sigaction(SIGRTMIN, {sa\_handler=0x7f76ea274bf0, sa\_mask=[], sa\_flags=SA\_RESTORER|SA\_SIGINFO, sa\_restorer=0x7f76ea2823c0}, NULL, 8) = 0

rt\_sigaction(SIGRT\_1, {sa\_handler=0x7f76ea274c90, sa\_mask=[], sa\_flags=SA\_RESTORER|SA\_RESTART|SA\_SIGINFO, sa\_restorer=0x7f76ea2823c0}, NULL, 8) = 0

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

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

brk(NULL) = 0x561aa1055000

brk(0x561aa1076000) = 0x561aa1076000

futex(0x7f76ea48b6bc, FUTEX\_WAKE\_PRIVATE, 2147483647) = 0

futex(0x7f76ea48b6c8, FUTEX\_WAKE\_PRIVATE, 2147483647) = 0

fstat(0, {st\_mode=S\_IFREG|0664, st\_size=6, ...}) = 0

read(0, "123 1\n", 4096) = 6

openat(AT\_FDCWD, "123", O\_WRONLY) = -1 ENOENT (Нет такого файла или каталога)

statfs("/dev/shm/", {f\_type=TMPFS\_MAGIC, f\_bsize=4096, f\_blocks=502219, f\_bfree=502217, f\_bavail=502217, f\_files=502219, f\_ffree=502216, f\_fsid={val=[469513582, 769839164]}, f\_namelen=255, f\_frsize=4096, f\_flags=ST\_VALID|ST\_NOSUID|ST\_NODEV}) = 0

futex(0x7f76ea290390, FUTEX\_WAKE\_PRIVATE, 2147483647) = 0

openat(AT\_FDCWD, "/dev/shm/sem.main1.semaphore", O\_RDWR|O\_NOFOLLOW) = 3

fstat(3, {st\_mode=S\_IFREG|0644, st\_size=32, ...}) = 0

mmap(NULL, 32, PROT\_READ|PROT\_WRITE, MAP\_SHARED, 3, 0) = 0x7f76ea4d9000

close(3) = 0

clone(child\_stack=NULL, flags=CLONE\_CHILD\_CLEARTID|CLONE\_CHILD\_SETTID|SIGCHLDstrace: Process 7048 attached

, child\_tidptr=0x7f76e9f28a10) = 7048

[pid 7047] openat(AT\_FDCWD, "/dev/shm/main1.back", O\_RDWR|O\_CREAT|O\_NOFOLLOW|O\_CLOEXEC, 0644 <unfinished ...>

[pid 7048] set\_robust\_list(0x7f76e9f28a20, 24 <unfinished ...>

[pid 7047] <... openat resumed>) = 3

[pid 7048] <... set\_robust\_list resumed>) = 0

[pid 7048] execve("child", ["123"], 0x7ffe4a34dd68 /\* 49 vars \*/) = 0

[pid 7048] brk(NULL) = 0x55aa53842000

[pid 7048] arch\_prctl(0x3001 /\* ARCH\_??? \*/, 0x7ffda065a720) = -1 EINVAL (Недопустимый аргумент)

[pid 7048] access("/etc/ld.so.preload", R\_OK) = -1 ENOENT (Нет такого файла или каталога)

[pid 7048] openat(AT\_FDCWD, "/etc/ld.so.cache", O\_RDONLY|O\_CLOEXEC) = 3

[pid 7048] fstat(3, {st\_mode=S\_IFREG|0644, st\_size=77566, ...}) = 0

[pid 7048] mmap(NULL, 77566, PROT\_READ, MAP\_PRIVATE, 3, 0) = 0x7f0cbfeb6000

[pid 7048] close(3) = 0

[pid 7048] openat(AT\_FDCWD, "/lib/x86\_64-linux-gnu/librt.so.1", O\_RDONLY|O\_CLOEXEC) = 3

[pid 7048] 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 7048] fstat(3, {st\_mode=S\_IFREG|0644, st\_size=35928, ...}) = 0

[pid 7048] mmap(NULL, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_ANONYMOUS, -1, 0) = 0x7f0cbfeb4000

[pid 7048] mmap(NULL, 39904, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7f0cbfeaa000

[pid 7048] mmap(0x7f0cbfeac000, 16384, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x2000) = 0x7f0cbfeac000

[pid 7048] mmap(0x7f0cbfeb0000, 8192, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x6000) = 0x7f0cbfeb0000

[pid 7048] mmap(0x7f0cbfeb2000, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x7000) = 0x7f0cbfeb2000

[pid 7048] close(3) = 0

[pid 7048] openat(AT\_FDCWD, "/lib/x86\_64-linux-gnu/libstdc++.so.6", O\_RDONLY|O\_CLOEXEC) = 3

[pid 7048] read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0`\341\t\0\0\0\0\0"..., 832) = 832

[pid 7048] fstat(3, {st\_mode=S\_IFREG|0644, st\_size=1956992, ...}) = 0

[pid 7048] mmap(NULL, 1972224, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7f0cbfcc8000

[pid 7048] mprotect(0x7f0cbfd5e000, 1290240, PROT\_NONE) = 0

[pid 7048] mmap(0x7f0cbfd5e000, 987136, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x96000) = 0x7f0cbfd5e000

[pid 7048] mmap(0x7f0cbfe4f000, 299008, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x187000) = 0x7f0cbfe4f000

[pid 7048] mmap(0x7f0cbfe99000, 57344, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x1d0000) = 0x7f0cbfe99000

[pid 7048] mmap(0x7f0cbfea7000, 10240, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_ANONYMOUS, -1, 0) = 0x7f0cbfea7000

[pid 7048] close(3) = 0

[pid 7048] openat(AT\_FDCWD, "/lib/x86\_64-linux-gnu/libgcc\_s.so.1", O\_RDONLY|O\_CLOEXEC) = 3

[pid 7048] read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\3405\0\0\0\0\0\0"..., 832) = 832

[pid 7048] fstat(3, {st\_mode=S\_IFREG|0644, st\_size=104984, ...}) = 0

[pid 7048] mmap(NULL, 107592, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7f0cbfcad000

[pid 7048] mmap(0x7f0cbfcb0000, 73728, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x3000) = 0x7f0cbfcb0000

[pid 7048] mmap(0x7f0cbfcc2000, 16384, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x15000) = 0x7f0cbfcc2000

[pid 7048] mmap(0x7f0cbfcc6000, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x18000) = 0x7f0cbfcc6000

[pid 7048] close(3) = 0

[pid 7048] openat(AT\_FDCWD, "/lib/x86\_64-linux-gnu/libpthread.so.0", O\_RDONLY|O\_CLOEXEC) = 3

[pid 7048] read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\220q\0\0\0\0\0\0"..., 832) = 832

[pid 7048] pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\360\2300%\360\340\363'\246\332u/\364\377\246u"..., 68, 824) = 68

[pid 7048] fstat(3, {st\_mode=S\_IFREG|0755, st\_size=157224, ...}) = 0

[pid 7048] pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\360\2300%\360\340\363'\246\332u/\364\377\246u"..., 68, 824) = 68

[pid 7048] mmap(NULL, 140408, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7f0cbfc8a000

[pid 7048] mmap(0x7f0cbfc90000, 69632, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x6000) = 0x7f0cbfc90000

[pid 7048] mmap(0x7f0cbfca1000, 24576, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x17000) = 0x7f0cbfca1000

[pid 7048] mmap(0x7f0cbfca7000, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x1c000) = 0x7f0cbfca7000

[pid 7048] mmap(0x7f0cbfca9000, 13432, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_ANONYMOUS, -1, 0) = 0x7f0cbfca9000

[pid 7048] close(3) = 0

[pid 7048] openat(AT\_FDCWD, "/lib/x86\_64-linux-gnu/libc.so.6", O\_RDONLY|O\_CLOEXEC) = 3

[pid 7048] read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\360A\2\0\0\0\0\0"..., 832) = 832

[pid 7048] 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 7048] pread64(3, "\4\0\0\0\20\0\0\0\5\0\0\0GNU\0\2\0\0\300\4\0\0\0\3\0\0\0\0\0\0\0", 32, 848) = 32

[pid 7048] pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\237\333t\347\262\27\320l\223\27\*\202C\370T\177"..., 68, 880) = 68

[pid 7048] fstat(3, {st\_mode=S\_IFREG|0755, st\_size=2029560, ...}) = 0

[pid 7048] 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 7048] pread64(3, "\4\0\0\0\20\0\0\0\5\0\0\0GNU\0\2\0\0\300\4\0\0\0\3\0\0\0\0\0\0\0", 32, 848) = 32

[pid 7048] pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\237\333t\347\262\27\320l\223\27\*\202C\370T\177"..., 68, 880) = 68

[pid 7048] mmap(NULL, 2037344, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7f0cbfa98000

[pid 7048] mmap(0x7f0cbfaba000, 1540096, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x22000) = 0x7f0cbfaba000

[pid 7048] mmap(0x7f0cbfc32000, 319488, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x19a000) = 0x7f0cbfc32000

[pid 7048] mmap(0x7f0cbfc80000, 24576, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x1e7000) = 0x7f0cbfc80000

[pid 7048] mmap(0x7f0cbfc86000, 13920, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_ANONYMOUS, -1, 0) = 0x7f0cbfc86000

[pid 7048] close(3) = 0

[pid 7048] openat(AT\_FDCWD, "/lib/x86\_64-linux-gnu/libm.so.6", O\_RDONLY|O\_CLOEXEC) = 3

[pid 7048] read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\300\323\0\0\0\0\0\0"..., 832) = 832

[pid 7048] fstat(3, {st\_mode=S\_IFREG|0644, st\_size=1369352, ...}) = 0

[pid 7048] mmap(NULL, 1368336, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7f0cbf949000

[pid 7048] mmap(0x7f0cbf956000, 684032, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0xd000) = 0x7f0cbf956000

[pid 7048] mmap(0x7f0cbf9fd000, 626688, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0xb4000) = 0x7f0cbf9fd000

[pid 7048] mmap(0x7f0cbfa96000, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x14c000) = 0x7f0cbfa96000

[pid 7048] close(3) = 0

[pid 7048] mmap(NULL, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_ANONYMOUS, -1, 0) = 0x7f0cbf947000

[pid 7048] mmap(NULL, 12288, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_ANONYMOUS, -1, 0) = 0x7f0cbf944000

[pid 7048] arch\_prctl(ARCH\_SET\_FS, 0x7f0cbf944740) = 0

[pid 7048] mprotect(0x7f0cbfc80000, 16384, PROT\_READ) = 0

[pid 7048] mprotect(0x7f0cbfa96000, 4096, PROT\_READ) = 0

[pid 7048] mprotect(0x7f0cbfca7000, 4096, PROT\_READ) = 0

[pid 7048] mprotect(0x7f0cbfcc6000, 4096, PROT\_READ) = 0

[pid 7048] mprotect(0x7f0cbfe99000, 45056, PROT\_READ) = 0

[pid 7048] mprotect(0x7f0cbfeb2000, 4096, PROT\_READ) = 0

[pid 7048] mprotect(0x55aa51fed000, 4096, PROT\_READ) = 0

[pid 7048] mprotect(0x7f0cbfef6000, 4096, PROT\_READ) = 0

[pid 7048] munmap(0x7f0cbfeb6000, 77566) = 0

[pid 7048] set\_tid\_address(0x7f0cbf944a10) = 7048

[pid 7048] set\_robust\_list(0x7f0cbf944a20, 24) = 0

[pid 7048] rt\_sigaction(SIGRTMIN, {sa\_handler=0x7f0cbfc90bf0, sa\_mask=[], sa\_flags=SA\_RESTORER|SA\_SIGINFO, sa\_restorer=0x7f0cbfc9e3c0}, NULL, 8) = 0

[pid 7048] rt\_sigaction(SIGRT\_1, {sa\_handler=0x7f0cbfc90c90, sa\_mask=[], sa\_flags=SA\_RESTORER|SA\_RESTART|SA\_SIGINFO, sa\_restorer=0x7f0cbfc9e3c0}, NULL, 8) = 0

[pid 7048] rt\_sigprocmask(SIG\_UNBLOCK, [RTMIN RT\_1], NULL, 8) = 0

[pid 7048] prlimit64(0, RLIMIT\_STACK, NULL, {rlim\_cur=8192\*1024, rlim\_max=RLIM64\_INFINITY}) = 0

[pid 7048] brk(NULL) = 0x55aa53842000

[pid 7048] brk(0x55aa53863000) = 0x55aa53863000

[pid 7048] futex(0x7f0cbfea76bc, FUTEX\_WAKE\_PRIVATE, 2147483647) = 0

[pid 7048] futex(0x7f0cbfea76c8, FUTEX\_WAKE\_PRIVATE, 2147483647) = 0

[pid 7048] statfs("/dev/shm/", {f\_type=TMPFS\_MAGIC, f\_bsize=4096, f\_blocks=502219, f\_bfree=502217, f\_bavail=502217, f\_files=502219, f\_ffree=502216, f\_fsid={val=[469513582, 769839164]}, f\_namelen=255, f\_frsize=4096, f\_flags=ST\_VALID|ST\_NOSUID|ST\_NODEV}) = 0

[pid 7048] futex(0x7f0cbfcac390, FUTEX\_WAKE\_PRIVATE, 2147483647) = 0

[pid 7048] openat(AT\_FDCWD, "/dev/shm/sem.main1.semaphore", O\_RDWR|O\_NOFOLLOW) = 3

[pid 7048] fstat(3, {st\_mode=S\_IFREG|0644, st\_size=32, ...}) = 0

[pid 7048] mmap(NULL, 32, PROT\_READ|PROT\_WRITE, MAP\_SHARED, 3, 0) = 0x7f0cbfef5000

[pid 7048] close(3) = 0

[pid 7047] futex(0x7f76ea4d9000, FUTEX\_WAIT\_BITSET|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 7048] openat(AT\_FDCWD, "123", O\_RDONLY) = -1 ENOENT (Нет такого файла или каталога)

[pid 7048] openat(AT\_FDCWD, "/dev/shm/main1.back", O\_RDWR|O\_NOFOLLOW|O\_CLOEXEC) = 3

[pid 7048] ftruncate(3, 9) = 0

[pid 7048] mmap(NULL, 9, PROT\_READ|PROT\_WRITE, MAP\_SHARED, 3, 0) = 0x7f0cbfec8000

[pid 7048] close(3) = 0

[pid 7048] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=0, tv\_nsec=53248000}, NULL) = 0

[pid 7048] futex(0x7f0cbfef5000, FUTEX\_WAKE, 1) = 1

[pid 7047] <... futex resumed>) = 0

[pid 7048] munmap(0x7f0cbfef5000, 32 <unfinished ...>

[pid 7047] fstat(3, <unfinished ...>

[pid 7048] <... munmap resumed>) = 0

[pid 7047] <... fstat resumed>{st\_mode=S\_IFREG|0644, st\_size=9, ...}) = 0

[pid 7048] exit\_group(0 <unfinished ...>

[pid 7047] mmap(NULL, 9, PROT\_READ|PROT\_WRITE, MAP\_SHARED, 3, 0 <unfinished ...>

[pid 7048] <... exit\_group resumed>) = ?

[pid 7047] <... mmap resumed>) = 0x7f76ea4ac000

[pid 7048] +++ exited with 0 +++

--- SIGCHLD {si\_signo=SIGCHLD, si\_code=CLD\_EXITED, si\_pid=7048, si\_uid=1000, si\_status=0, si\_utime=0, si\_stime=0} ---

fstat(1, {st\_mode=S\_IFCHR|0620, st\_rdev=makedev(0x88, 0x5), ...}) = 0

write(1, "Answer is:\n", 11Answer is:

) = 11

write(1, "0.000000\n", 90.000000

) = 9

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

exit\_group(0) = ?

+++ exited with 0 +++ [pid 7723] <... futex resumed>) = 0

[pid 7725] munmap(0x7f2975acd000, 32 <unfinished ...>

[pid 7723] newfstatat(1, "", <unfinished ...>

[pid 7725] <... munmap resumed>) = 0

[pid 7723] <... newfstatat resumed>{st\_mode=S\_IFCHR|0620, st\_rdev=makedev(0x88, 0), ...}, AT\_EMPTY\_PATH) = 0

[pid 7723] write(1, "#IFNDEF\_\_MASHINA\_TURINGA\_H\_\_\n", 29 <unfinished ...>

#IFNDEF\_\_MASHINA\_TURINGA\_H\_\_

[pid 7725] exit\_group(0 <unfinished ...>

[pid 7723] <... write resumed>) = 29

[pid 7723] write(1, "#DEFINE\_\_MASHINA\_TURINGA\_H\_\_\n", 29 <unfinished ...>

[pid 7725] <... exit\_group resumed>) = ?

#DEFINE\_\_MASHINA\_TURINGA\_H\_\_

[pid 7723] <... write resumed>) = 29

[pid 7723] write(1, "#ENDIF\n", 7#ENDIF

) = 7

[pid 7723] exit\_group(0) = ?

[pid 7725] +++ exited with 0 +++

+++ exited with 0 +++

**Вывод**

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