

Министерство науки и высшего образования РФ
Федеральное государственное бюджетное образовательное учреждение
высшего образования
«Московский Авиационный Институт»
Национальный Исследовательский Университет

Институт №8 «Информационные технологии и прикладная математика»
Кафедра 806 «Вычислительная математика и программирование»

Лабораторная работа №1
по курсу «Операционные системы»

Студент:	Хренникова А. С.
Группа:	М8О-208-19
Преподаватель:	Миронов Е. С.
Подпись:	
Оценка:	
Дата:	

Содержание

1. Постановка задачи;
2. Общие сведения о Strace;
3. Strace;
4. Вывод.

Постановка задачи

При выполнении лабораторных работ необходимо продемонстрировать ключевые системные вызовы, которые в них используются.

Общие сведения о Strace

Strace - это утилита, которая отслеживает системные вызовы, которые представляют собой механизм трансляции, обеспечивающий интерфейс между процессом и операционной системой. Эти вызовы могут быть перехвачены и прочитаны. Это позволяет лучше понять, что процесс пытается сделать в заданное время. Перехватывая эти вызовы, можно добиться лучшего понимания поведения процессов, особенно если что-то идет не так.

Strace

Lab 2

```
lina_tucha@LAPTOP-44CRFC1U:~/labs/os/lab2$ strace ./gal < test.txt
execve("./gal", ["/gal"], 0x7fffe198ad70 /* 19 vars */) = 0
brk(NULL) = 0x7fffc4bbd000
access("/etc/ld.so.nohwcap", F_OK) = -1 ENOENT (No such file or directory)
access("/etc/ld.so.preload", R_OK) = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXEC) = 3
fstat(3, {st_mode=S_IFREG|0644, st_size=47603, ...}) = 0
mmap(NULL, 47603, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7f60228f5000
close(3) = 0
access("/etc/ld.so.nohwcap", F_OK) = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libc.so.6", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\3\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\260\34\2\0\0\0\0"... , 832) = 832
fstat(3, {st_mode=S_IFREG|0755, st_size=2030544, ...}) = 0
mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7f60228f0000
mmap(NULL, 4131552, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7f6022200000
mprotect(0x7f60223e7000, 2097152, PROT_NONE) = 0
mmap(0x7f60225e7000, 24576, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1e7000) = 0x7f60225e7000
mmap(0x7f60225ed000, 15072, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7f60225ed000
close(3) = 0
arch_prctl(ARCH_SET_FS, 0x7f60228f14c0) = 0
mprotect(0x7f60225e7000, 16384, PROT_READ) = 0
mprotect(0x7f6022c01000, 4096, PROT_READ) = 0
mprotect(0x7f6022827000, 4096, PROT_READ) = 0
munmap(0x7f60228f5000, 47603) = 0
fstat(1, {st_mode=S_IFCHR|0660, st_rdev=makedev(4, 1), ...}) = 0
ioctl(1, TCGETS, {B38400 opost isig icanon echo ...}) = 0
brk(NULL) = 0x7fffc4bbd000
brk(0x7fffc4bde000) = 0x7fffc4bde000
```

```

pipe([3, 4]) = 0
clone(child_stack=NULL,
flags=CLONE_CHILD_CLEARTID|CLONE_CHILD_SETTID|SIGCHLD,
child_tidptr=0x7f60228f1790) = 109
close(4) = 0
read(3, "\4\0\0\0", 4) = 4
--- SIGCHLD {si_signo=SIGCHLD, si_code=CLD_EXITED, si_pid=109, si_uid=1000, si_status=0,
si_etime=0, si_stime=0} ---
write(1, "Enter file name to read data: 4\n", 32Enter file name to read data: 4
) = 32
read(3, "\5\0\0\0", 4) = 4
write(1, "5\n", 25
) = 2
read(3, "\350\377\377\377", 4) = 4
write(1, "-24\n", 4-24
) = 4
read(3, "\6\0\0\0", 4) = 4
write(1, "6\n", 26
) = 2
read(3, "", 4) = 0
close(3) = 0
exit_group(0) = ?
+++ exited with 0 +++

```

Lab 3

```

lina_tucha@LAPTOP-44CRFC1U:~/labs/os/lab3$ strace -f ./345
execve("./345", ["/345"], 0x7fffc6af55e8 /* 19 vars */) = 0
brk(NULL) = 0x7fffe5682000
access("/etc/ld.so.nohwcap", F_OK) = -1 ENOENT (No such file or directory)
access("/etc/ld.so.preload", R_OK) = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXEC) = 3
fstat(3, {st_mode=S_IFREG|0644, st_size=47603, ...}) = 0
mmap(NULL, 47603, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7fee748aa000
close(3) = 0
access("/etc/ld.so.nohwcap", F_OK) = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libm.so.6", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\0200\272\0\0\0\0\0\0"..., 832) = 832
fstat(3, {st_mode=S_IFREG|0644, st_size=1700792, ...}) = 0
mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7fee748a0000
mmap(NULL, 3789144, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7fee74260000
mprotect(0x7fee743fd000, 2093056, PROT_NONE) = 0
mmap(0x7fee745fc000, 8192, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x19c000) = 0x7fee745fc000
close(3) = 0
access("/etc/ld.so.nohwcap", F_OK) = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libpthread.so.0", 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\0000b\0\0\0\0\0\0"..., 832) = 832
fstat(3, {st_mode=S_IFREG|0755, st_size=144976, ...}) = 0
mmap(NULL, 2221184, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7fee74040000
mprotect(0x7fee7405a000, 2093056, PROT_NONE) = 0
mmap(0x7fee74259000, 8192, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x19000) = 0x7fee74259000
mmap(0x7fee7425b000, 13440, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7fee7425b000

```

```

close(3) = 0
access("/etc/ld.so.nohwcap", F_OK) = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libc.so.6", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\260\34\2\0\0\0\0"... , 832) = 832
fstat(3, {st_mode=S_IFREG|0755, st_size=2030544, ...}) = 0
mmap(NULL, 4131552, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7fee73c40000
mprotect(0x7fee73e27000, 2097152, PROT_NONE) = 0
mmap(0x7fee74027000, 24576, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1e7000) = 0x7fee74027000
mmap(0x7fee7402d000, 15072, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7fee7402d000
close(3) = 0
mmap(NULL, 12288, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) =
0x7fee74890000
arch_prctl(ARCH_SET_FS, 0x7fee74890740) = 0
mprotect(0x7fee74027000, 16384, PROT_READ) = 0
mprotect(0x7fee74259000, 4096, PROT_READ) = 0
mprotect(0x7fee745fc000, 4096, PROT_READ) = 0
mprotect(0x7fee74c01000, 4096, PROT_READ) = 0
mprotect(0x7fee74827000, 4096, PROT_READ) = 0
munmap(0x7fee748aa000, 47603) = 0
set_tid_address(0x7fee74890a10) = 22540
set_robust_list(0x7fee74890a20, 24) = 0
rt_sigaction(SIGRTMIN, {sa_handler=0x7fee74045cb0, sa_mask=[],
sa_flags=SA_RESTORER|SA_SIGINFO, sa_restorer=0x7fee740528a0}, NULL, 8) = 0
rt_sigaction(SIGRT_1, {sa_handler=0x7fee74045d50, sa_mask=[],
sa_flags=SA_RESTORER|SA_RESTART|SA_SIGINFO, sa_restorer=0x7fee740528a0}, NULL, 8) = 0
rt_sigprocmask(SIG_UNBLOCK, [RTMIN RT_1], NULL, 8) = 0
prlimit64(0, RLIMIT_STACK, NULL, {rlim_cur=8192*1024, rlim_max=8192*1024}) = 0
fstat(1, {st_mode=S_IFCHR|0660, st_rdev=makedev(4, 1), ...}) = 0
ioctl(1, TCGETS, {B38400 opost isig icanon echo ...}) = 0
brk(NULL) = 0x7fffe5682000
brk(0x7fffe56a3000) = 0x7fffe56a3000
fstat(0, {st_mode=S_IFCHR|0660, st_rdev=makedev(4, 1), ...}) = 0
ioctl(0, TCGETS, {B38400 opost isig icanon echo ...}) = 0
write(1, "Enter the number of arrays: ", 28Enter the number of arrays: ) = 28
read(0, 3
"3\n", 4096) = 2
write(1, "Enter the size of the arrays: ", 30Enter the size of the arrays: ) = 30
read(0, 3
"3\n", 4096) = 2
write(1, "Partitioning the matrix into 3 x "..., 42Partitioning the matrix into 3 x 3 cells.
) = 42
write(1, "Each cell size 1 x 1, except for"... , 49Each cell size 1 x 1, except for the outermosts.
) = 49
write(1, "\n", 1
) = 1
time(NULL) = 1605478002 (2020-11-16T01:06:42+0300)
write(1, "Element[0][0] = 347\n", 20Element[0][0] = 347
) = 20
write(1, "Element[0][1] = 615\n", 20Element[0][1] = 615
) = 20
write(1, "Element[0][2] = 361\n", 20Element[0][2] = 361
) = 20
write(1, "Element[1][0] = 853\n", 20Element[1][0] = 853
) = 20

```

```

write(1, "Element[1][1] = 878\n", 20Element[1][1] = 878
) = 20
write(1, "Element[1][2] = 587\n", 20Element[1][2] = 587
) = 20
write(1, "Element[2][0] = 372\n", 20Element[2][0] = 372
) = 20
write(1, "Element[2][1] = 788\n", 20Element[2][1] = 788
) = 20
write(1, "Element[2][2] = 167\n", 20Element[2][2] = 167
) = 20
write(1, "\n", 1
) = 1
write(1, "\n", 1
) = 1
write(1, "347\t615\t361\t\n", 13347 615 361
) = 13
write(1, "853\t878\t587\t\n", 13853 878 587
) = 13
write(1, "372\t788\t167\t\n", 13372 788 167
) = 13
write(1, "\n", 1
) = 1
mmap(NULL, 8392704, PROT_NONE, MAP_PRIVATE|MAP_ANONYMOUS|MAP_STACK, -1, 0) =
0x7fee73430000
mprotect(0x7fee73431000, 8388608, PROT_READ|PROT_WRITE) = 0
clone(child_stack=0x7fee73c2ffb0,
flags=CLONE_VM|CLONE_FS|CLONE_FILES|CLONE_SIGHAND|CLONE_THREAD|CLONE
_SYSVSEM|CLONE_SETTLS|CLONE_PARENT_SETTID|CLONE_CHILD_CLEARTID,
parent_tidptr=0x7fee73c309d0, tls=0x7fee73c30700, child_tidptr=0x7fee73c309d0) = 22541
mmap(NULL, 8392704, PROT_NONE, MAP_PRIVATE|MAP_ANONYMOUS|MAP_STACK, -1,
0strace: Process 22541 attached
) = 0x7fee72c20000
[pid 22541] set_robust_list(0x7fee73c309e0, 24 <unfinished ...>
[pid 22540] mprotect(0x7fee72c21000, 8388608, PROT_READ|PROT_WRITE <unfinished ...>
[pid 22541] <... set_robust_list resumed> ) = 0
[pid 22540] <... mprotect resumed> ) = 0
[pid 22541] write(1, "We are in 1 thread\n", 20We are in 1 thread
<unfinished ...>
[pid 22540] clone( <unfinished ...>
[pid 22541] <... write resumed> ) = 20
[pid 22540] <... clone resumed> child_stack=0x7fee7341ffb0,
flags=CLONE_VM|CLONE_FS|CLONE_FILES|CLONE_SIGHAND|CLONE_THREAD|CLONE
_SYSVSEM|CLONE_SETTLS|CLONE_PARENT_SETTID|CLONE_CHILD_CLEARTID,
parent_tidptr=0x7fee734209d0, tls=0x7fee73420700, child_tidptr=0x7fee734209d0) = 22542
[pid 22540] mmap(NULL, 8392704, PROT_NONE,
MAP_PRIVATE|MAP_ANONYMOUS|MAP_STACK, -1, 0 <unfinished ...>
[pid 22541] write(1, "result[0]: 347\n", 15result[0]: 347
<unfinished ...>
[pid 22540] <... mmap resumed> ) = 0x7fee72410000
[pid 22540] mprotect(0x7fee72411000, 8388608, PROT_READ|PROT_WRITE <unfinished ...>
[pid 22541] <... write resumed> ) = 15
[pid 22540] <... mprotect resumed> ) = 0
[pid 22541] write(1, "\n", 1
<unfinished ...>
[pid 22540] clone( <unfinished ...>
[pid 22541] <... write resumed> ) = 1

```

```

[pid 22540] <... clone resumed> child_stack=0x7fee72c0ffb0,
flags=CLONE_VM|CLONE_FS|CLONE_FILES|CLONE_SIGHAND|CLONE_THREAD|CLONE
_SYSVSEM|CLONE_SETTLS|CLONE_PARENT_SETTID|CLONE_CHILD_CLEARTID,
parent_tidptr=0x7fee72c109d0, tls=0x7fee72c10700, child_tidptr=0x7fee72c109d0) = 22543
[pid 22540] mmap(NULL, 8392704, PROT_NONE,
MAP_PRIVATE|MAP_ANONYMOUS|MAP_STACK, -1, 0 <unfinished ...>
[pid 22541] write(1, "\n", 1
<unfinished ...>
[pid 22540] <... mmap resumed> ) = 0x7fee71c00000
[pid 22540] mprotect(0x7fee71c01000, 8388608, PROT_READ|PROT_WRITE <unfinished ...>
[pid 22541] <... write resumed> ) = 1
[pid 22540] <... mprotect resumed> ) = 0
[pid 22541] madvise(0x7fee73430000, 8368128, MADV_DONTNEED <unfinished ...>
[pid 22540] clone( <unfinished ...>
[pid 22541] <... madvise resumed> ) = 0
strace: Process 22542 attached
[pid 22540] <... clone resumed> child_stack=0x7fee723fffb0,
flags=CLONE_VM|CLONE_FS|CLONE_FILES|CLONE_SIGHAND|CLONE_THREAD|CLONE
_SYSVSEM|CLONE_SETTLS|CLONE_PARENT_SETTID|CLONE_CHILD_CLEARTID,
parent_tidptr=0x7fee724009d0, tls=0x7fee72400700, child_tidptr=0x7fee724009d0) = 22544
[pid 22541] exit(0 <unfinished ...>
[pid 22540] mmap(NULL, 8392704, PROT_NONE,
MAP_PRIVATE|MAP_ANONYMOUS|MAP_STACK, -1, 0 <unfinished ...>
[pid 22541] <... exit resumed> ) = ?
[pid 22540] <... mmap resumed> ) = 0x7fee713f0000
[pid 22540] mprotect(0x7fee713f1000, 8388608, PROT_READ|PROT_WRITE <unfinished ...>
[pid 22541] +++ exited with 0 +++
[pid 22540] <... mprotect resumed> ) = 0
[pid 22542] set_robust_list(0x7fee734209e0, 24 <unfinished ...>
[pid 22540] clone( <unfinished ...>
[pid 22542] <... set_robust_list resumed> ) = 0
[pid 22540] <... clone resumed> child_stack=0x7fee71beffb0,
flags=CLONE_VM|CLONE_FS|CLONE_FILES|CLONE_SIGHAND|CLONE_THREAD|CLONE
_SYSVSEM|CLONE_SETTLS|CLONE_PARENT_SETTID|CLONE_CHILD_CLEARTID,
parent_tidptr=0x7fee71bf09d0, tls=0x7fee71bf0700, child_tidptr=0x7fee71bf09d0) = 22545
[pid 22540] mmap(NULL, 8392704, PROT_NONE,
MAP_PRIVATE|MAP_ANONYMOUS|MAP_STACK, -1, 0 <unfinished ...>
[pid 22542] write(1, "We are in 2 thread\n", 20We are in 2 thread
<unfinished ...>
[pid 22540] <... mmap resumed> ) = 0x7fee70be0000
[pid 22540] mprotect(0x7fee70be1000, 8388608, PROT_READ|PROT_WRITE <unfinished ...>
[pid 22542] <... write resumed> ) = 20
[pid 22540] <... mprotect resumed> ) = 0
[pid 22542] write(1, "result[1]: 615\n", 15result[1]: 615
<unfinished ...>
[pid 22540] clone( <unfinished ...>
[pid 22542] <... write resumed> ) = 15
[pid 22542] write(1, "\n", 1 <unfinished ...>

[pid 22540] <... clone resumed> child_stack=0x7fee713dffb0,
flags=CLONE_VM|CLONE_FS|CLONE_FILES|CLONE_SIGHAND|CLONE_THREAD|CLONE
_SYSVSEM|CLONE_SETTLS|CLONE_PARENT_SETTID|CLONE_CHILD_CLEARTID,
parent_tidptr=0x7fee713e09d0, tls=0x7fee713e0700, child_tidptr=0x7fee713e09d0) = 22546
[pid 22542] <... write resumed> ) = 1
[pid 22540] mmap(NULL, 8392704, PROT_NONE,
MAP_PRIVATE|MAP_ANONYMOUS|MAP_STACK, -1, 0 <unfinished ...>
[pid 22542] write(1, "\n", 1

```

```

<unfinished ...>
[pid 22540] <... mmap resumed> )    = 0x7fee703d0000
[pid 22540] mprotect(0x7fee703d1000, 8388608, PROT_READ|PROT_WRITE <unfinished ...>
[pid 22542] <... write resumed> )    = 1
[pid 22540] <... mprotect resumed> )  = 0
[pid 22542] madvise(0x7fee72c20000, 8368128, MADV_DONTNEED <unfinished ...>
[pid 22540] clone( <unfinished ...>
[pid 22542] <... madvise resumed> )  = 0
[pid 22540] <... clone resumed> child_stack=0x7fee70bcffb0,
flags=CLONE_VM|CLONE_FS|CLONE_FILES|CLONE_SIGHAND|CLONE_THREAD|CLONE
_SYSVSEM|CLONE_SETTLS|CLONE_PARENT_SETTID|CLONE_CHILD_CLEARTID,
parent_tidptr=0x7fee70bd09d0, tls=0x7fee70bd0700, child_tidptr=0x7fee70bd09d0) = 22547
[pid 22540] mmap(NULL, 8392704, PROT_NONE,
MAP_PRIVATE|MAP_ANONYMOUS|MAP_STACK, -1, 0 <unfinished ...>
[pid 22542] exit(0 <unfinished ...>
[pid 22540] <... mmap resumed> )    = 0x7fee6fbc0000
[pid 22540] mprotect(0x7fee6fbc1000, 8388608, PROT_READ|PROT_WRITE <unfinished ...>
[pid 22542] <... exit resumed> )    = ?
[pid 22540] <... mprotect resumed> )  = 0
[pid 22542] +++ exited with 0 +++
clone(strace: Process 22543 attached
child_stack=0x7fee703bffb0,
flags=CLONE_VM|CLONE_FS|CLONE_FILES|CLONE_SIGHAND|CLONE_THREAD|CLONE
_SYSVSEM|CLONE_SETTLS|CLONE_PARENT_SETTID|CLONE_CHILD_CLEARTID,
parent_tidptr=0x7fee703c09d0, tls=0x7fee703c0700, child_tidptr=0x7fee703c09d0) = 22548
[pid 22540] mmap(NULL, 8392704, PROT_NONE,
MAP_PRIVATE|MAP_ANONYMOUS|MAP_STACK, -1, 0 <unfinished ...>
[pid 22543] set_robust_list(0x7fee72c109e0, 24 <unfinished ...>
[pid 22540] <... mmap resumed> )    = 0x7fee6f3b0000
[pid 22540] mprotect(0x7fee6f3b1000, 8388608, PROT_READ|PROT_WRITE <unfinished ...>
[pid 22543] <... set_robust_list resumed> ) = 0
[pid 22540] <... mprotect resumed> )  = 0
[pid 22543] write(1, "We are in 3 thread \n", 20We are in 3 thread
<unfinished ...>
[pid 22540] clone( <unfinished ...>
[pid 22543] <... write resumed> )    = 20
[pid 22543] write(1, "result[2]: 361\n", 15result[2]: 361
<unfinished ...>
[pid 22540] <... clone resumed> child_stack=0x7fee6fbaffb0,
flags=CLONE_VM|CLONE_FS|CLONE_FILES|CLONE_SIGHAND|CLONE_THREAD|CLONE
_SYSVSEM|CLONE_SETTLS|CLONE_PARENT_SETTID|CLONE_CHILD_CLEARTID,
parent_tidptr=0x7fee6fbb09d0, tls=0x7fee6fbb0700, child_tidptr=0x7fee6fbb09d0) = 22549
[pid 22543] <... write resumed> )    = 15
[pid 22540] futex(0x7fee72c109d0, FUTEX_WAIT, 22543, NULL <unfinished ...>
[pid 22543] write(1, "\n", 1strace: Process 22544 attached

<unfinished ...>
[pid 22544] set_robust_list(0x7fee724009e0, 24 <unfinished ...>
[pid 22543] <... write resumed> )    = 1
[pid 22543] write(1, "\n", 1
<unfinished ...>
[pid 22544] <... set_robust_list resumed> ) = 0
[pid 22543] <... write resumed> )    = 1
[pid 22544] futex(0x7fee7402d8c0, FUTEX_WAIT_PRIVATE, 2, NULL <unfinished ...>
[pid 22543] futex(0x7fee7402d8c0, FUTEX_WAKE_PRIVATE, 1 <unfinished ...>
[pid 22544] <... futex resumed> )    = -1 EAGAIN (Resource temporarily unavailable)
[pid 22543] <... futex resumed> )    = 0

```



```

[pid 22544] write(1, "We are in 4 thread \n", 20We are in 4 thread
<unfinished ...>
[pid 22543] madvise(0x7fee72410000, 8368128, MADV_DONTNEED <unfinished ...>
[pid 22544] <... write resumed> )    = 20
[pid 22543] <... madvise resumed> )  = 0
[pid 22544] futex(0x7fee7402d8c0, FUTEX_WAKE_PRIVATE, 1 <unfinished ...>
[pid 22543] exit(0 <unfinished ...>
[pid 22544] <... futex resumed> )    = 0
[pid 22543] <... exit resumed> )    = ?
[pid 22544] write(1, "result[0]: 1200\n", 16result[0]: 1200
<unfinished ...>
[pid 22540] <... futex resumed> )    = 0
[pid 22540] futex(0x7fee724009d0, FUTEX_WAIT, 22544, NULL <unfinished ...>
[pid 22543] +++ exited with 0 +++
[pid 22544] <... write resumed> )    = 16
[pid 22544] write(1, "\n", 1strace: Process 22545 attached

<unfinished ...>
[pid 22545] set_robust_list(0x7fee71bf09e0, 24 <unfinished ...>
[pid 22544] <... write resumed> )    = 1
[pid 22545] <... set_robust_list resumed> ) = 0
[pid 22544] write(1, "\n", 1
<unfinished ...>
[pid 22545] futex(0x7fee7402d8c0, FUTEX_WAIT_PRIVATE, 2, NULL <unfinished ...>
[pid 22544] <... write resumed> )    = 1
[pid 22544] futex(0x7fee7402d8c0, FUTEX_WAKE_PRIVATE, 1strace: Process 22546 attached
) = 1
[pid 22544] madvise(0x7fee71c00000, 8368128, MADV_DONTNEED <unfinished ...>
[pid 22545] <... futex resumed> )    = 0
[pid 22544] <... madvise resumed> )  = 0
[pid 22544] exit(0 <unfinished ...>
[pid 22545] write(1, "We are in 5 thread \n", 20We are in 5 thread
<unfinished ...>
[pid 22544] <... exit resumed> )    = ?
[pid 22544] +++ exited with 0 +++
[pid 22540] <... futex resumed> )    = 0
[pid 22540] futex(0x7fee71bf09d0, FUTEX_WAIT, 22545, NULL <unfinished ...>
[pid 22545] <... write resumed> )    = 20
[pid 22546] set_robust_list(0x7fee713e09e0, 24 <unfinished ...>
[pid 22545] futex(0x7fee7402d8c0, FUTEX_WAKE_PRIVATE, 1 <unfinished ...>
[pid 22546] <... set_robust_list resumed> ) = 0
[pid 22545] <... futex resumed> )    = 0
[pid 22546] write(1, "We are in 6 thread \n", 20We are in 6 thread
<unfinished ...>
[pid 22545] futex(0x7fee7402d8c0, FUTEX_WAIT_PRIVATE, 2, NULL <unfinished ...>
[pid 22546] <... write resumed> )    = 20
strace: Process 22547 attached
[pid 22546] futex(0x7fee7402d8c0, FUTEX_WAKE_PRIVATE, 1) = 1
[pid 22545] <... futex resumed> )    = 0
[pid 22545] futex(0x7fee7402d8c0, FUTEX_WAIT_PRIVATE, 2, NULL <unfinished ...>
[pid 22546] write(1, "result[2]: 948\n", 15result[2]: 948
<unfinished ...>
[pid 22547] set_robust_list(0x7fee70bd09e0, 24 <unfinished ...>
[pid 22546] <... write resumed> )    = 15
[pid 22546] futex(0x7fee7402d8c0, FUTEX_WAKE_PRIVATE, 1 <unfinished ...>
[pid 22547] <... set_robust_list resumed> ) = 0
[pid 22545] <... futex resumed> )    = 0

```

```

[pid 22546] <... futex resumed> )    = 1
[pid 22545] futex(0x7fee7402d8c0, FUTEX_WAIT_PRIVATE, 2, NULL <unfinished ...>
[pid 22546] futex(0x7fee7402d8c0, FUTEX_WAIT_PRIVATE, 2, NULL <unfinished ...>
[pid 22547] write(1, "We are in 7 thread \n", 20We are in 7 thread
strace: Process 22548 attached
) = 20
[pid 22548] set_robust_list(0x7fee703c09e0, 24 <unfinished ...>
[pid 22547] futex(0x7fee7402d8c0, FUTEX_WAKE_PRIVATE, 1 <unfinished ...>
[pid 22548] <... set_robust_list resumed> ) = 0
[pid 22545] <... futex resumed> )    = 0
[pid 22547] <... futex resumed> )    = 1
[pid 22545] futex(0x7fee7402d8c0, FUTEX_WAIT_PRIVATE, 2, NULL <unfinished ...>
[pid 22547] futex(0x7fee7402d8c0, FUTEX_WAIT_PRIVATE, 2, NULL <unfinished ...>
[pid 22548] write(1, "We are in 8 thread \n", 20We are in 8 thread
strace: Process 22549 attached
) = 20
[pid 22548] futex(0x7fee7402d8c0, FUTEX_WAKE_PRIVATE, 1) = 1
[pid 22546] <... futex resumed> )    = 0
[pid 22546] futex(0x7fee7402d8c0, FUTEX_WAIT_PRIVATE, 2, NULL <unfinished ...>
[pid 22548] write(1, "result[1]: 2281\n", 16result[1]: 2281
<unfinished ...>
[pid 22549] set_robust_list(0x7fee6fbb09e0, 24 <unfinished ...>
[pid 22548] <... write resumed> )    = 16
[pid 22548] futex(0x7fee7402d8c0, FUTEX_WAKE_PRIVATE, 1 <unfinished ...>
[pid 22549] <... set_robust_list resumed> ) = 0
[pid 22545] <... futex resumed> )    = 0
[pid 22548] <... futex resumed> )    = 1
[pid 22545] futex(0x7fee7402d8c0, FUTEX_WAIT_PRIVATE, 2, NULL <unfinished ...>
[pid 22548] futex(0x7fee7402d8c0, FUTEX_WAIT_PRIVATE, 2, NULL <unfinished ...>
[pid 22549] write(1, "We are in 9 thread \n", 20We are in 9 thread
) = 20
[pid 22549] futex(0x7fee7402d8c0, FUTEX_WAKE_PRIVATE, 1 <unfinished ...>
[pid 22547] <... futex resumed> )    = 0
[pid 22549] <... futex resumed> )    = 1
[pid 22547] write(1, "result[0]: 1572\n", 16 <unfinished ...>
result[0]: 1572
[pid 22549] futex(0x7fee7402d8c0, FUTEX_WAIT_PRIVATE, 2, NULL <unfinished ...>
[pid 22547] <... write resumed> )    = 16
[pid 22547] futex(0x7fee7402d8c0, FUTEX_WAKE_PRIVATE, 1) = 1
[pid 22546] <... futex resumed> )    = 0
[pid 22546] futex(0x7fee7402d8c0, FUTEX_WAIT_PRIVATE, 2, NULL <unfinished ...>
[pid 22547] write(1, "\n", 1
)    = 1
[pid 22547] futex(0x7fee7402d8c0, FUTEX_WAKE_PRIVATE, 1) = 1
[pid 22545] <... futex resumed> )    = 0
[pid 22545] futex(0x7fee7402d8c0, FUTEX_WAIT_PRIVATE, 2, NULL <unfinished ...>
[pid 22547] write(1, "\n", 1
)    = 1
[pid 22547] futex(0x7fee7402d8c0, FUTEX_WAKE_PRIVATE, 1) = 1
[pid 22548] <... futex resumed> )    = 0
[pid 22547] madvise(0x7fee703d0000, 8368128, MADV_DONTNEED <unfinished ...>
[pid 22548] write(1, "\n", 1
<unfinished ...>
[pid 22547] <... madvise resumed> )    = 0
[pid 22548] <... write resumed> )    = 1
[pid 22547] exit(0)    = ?
[pid 22548] futex(0x7fee7402d8c0, FUTEX_WAKE_PRIVATE, 1 <unfinished ...>

```

```

[pid 22547] +++ exited with 0 +++
[pid 22548] <... futex resumed> )    = 1
[pid 22548] write(1, "\n", 1
<unfinished ...>
[pid 22549] <... futex resumed> )    = 0
[pid 22548] <... write resumed> )    = 1
[pid 22548] futex(0x7fee7402d8c0, FUTEX_WAKE_PRIVATE, 1 <unfinished ...>
[pid 22549] futex(0x7fee7402d8c0, FUTEX_WAIT_PRIVATE, 2, NULL <unfinished ...>
[pid 22546] <... futex resumed> )    = 0
[pid 22546] write(1, "\n", 1
<unfinished ...>
[pid 22548] <... futex resumed> )    = 1
[pid 22546] <... write resumed> )    = 1
[pid 22546] futex(0x7fee7402d8c0, FUTEX_WAKE_PRIVATE, 1 <unfinished ...>
[pid 22548] madvise(0x7fee6fbc0000, 8368128, MADV_DONTNEED <unfinished ...>
[pid 22545] <... futex resumed> )    = 0
[pid 22546] <... futex resumed> )    = 1
[pid 22545] write(1, "result[1]: 1493\n", 16result[1]: 1493
<unfinished ...>
[pid 22546] futex(0x7fee7402d8c0, FUTEX_WAIT_PRIVATE, 2, NULL <unfinished ...>
[pid 22545] <... write resumed> )    = 16
[pid 22548] <... madvise resumed> )    = 0
[pid 22545] futex(0x7fee7402d8c0, FUTEX_WAKE_PRIVATE, 1 <unfinished ...>
[pid 22548] exit(0 <unfinished ...>
[pid 22545] <... futex resumed> )    = 1
[pid 22546] <... futex resumed> )    = 0
[pid 22545] write(1, "\n", 1
<unfinished ...>
[pid 22546] futex(0x7fee7402d8c0, FUTEX_WAIT_PRIVATE, 2, NULL <unfinished ...>
[pid 22545] <... write resumed> )    = 1
[pid 22548] <... exit resumed> )    = ?
[pid 22545] futex(0x7fee7402d8c0, FUTEX_WAKE_PRIVATE, 1 <unfinished ...>
[pid 22548] +++ exited with 0 +++
[pid 22545] <... futex resumed> )    = 1
[pid 22545] write(1, "\n", 1
<unfinished ...>
[pid 22546] <... futex resumed> )    = 0
[pid 22545] <... write resumed> )    = 1
[pid 22546] futex(0x7fee7402d8c0, FUTEX_WAIT_PRIVATE, 2, NULL <unfinished ...>
[pid 22545] futex(0x7fee7402d8c0, FUTEX_WAKE_PRIVATE, 1 <unfinished ...>
[pid 22546] <... futex resumed> )    = -1 EAGAIN (Resource temporarily unavailable)
[pid 22545] <... futex resumed> )    = 0
[pid 22546] write(1, "\n", 1
<unfinished ...>
[pid 22545] madvise(0x7fee713f0000, 8368128, MADV_DONTNEED <unfinished ...>
[pid 22546] <... write resumed> )    = 1
[pid 22545] <... madvise resumed> )    = 0
[pid 22545] exit(0)                  = ?
[pid 22545] +++ exited with 0 +++
[pid 22540] <... futex resumed> )    = 0
[pid 22546] futex(0x7fee7402d8c0, FUTEX_WAKE_PRIVATE, 1 <unfinished ...>
[pid 22540] munmap(0x7fee73430000, 8392704 <unfinished ...>
[pid 22546] <... futex resumed> )    = 0
[pid 22540] <... munmap resumed> )    = 0
[pid 22546] madvise(0x7fee70be0000, 8368128, MADV_DONTNEED <unfinished ...>
[pid 22540] futex(0x7fee713e09d0, FUTEX_WAIT, 22546, NULL <unfinished ...>
[pid 22546] <... madvise resumed> )    = 0

```



```

mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) =
0x7f6661e40000
mmap(NULL, 2128864, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f66619f0000
mprotect(0x7f66619f7000, 2093056, PROT_NONE) = 0
mmap(0x7f6661bf6000, 8192, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x6000) = 0x7f6661bf6000
close(3) = 0
access("/etc/ld.so.nohwcap", F_OK) = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libc.so.6", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\260\34\2\0\0\0\0"..., 832) = 832
fstat(3, {st_mode=S_IFREG|0755, st_size=2030544, ...}) = 0
mmap(NULL, 4131552, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f66615f0000
mprotect(0x7f66617d7000, 2097152, PROT_NONE) = 0
mmap(0x7f66619d7000, 24576, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1e7000) = 0x7f66619d7000
mmap(0x7f66619dd000, 15072, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7f66619dd000
close(3) = 0
access("/etc/ld.so.nohwcap", F_OK) = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libpthread.so.0", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0000b\0\0\0\0\0"..., 832) = 832
fstat(3, {st_mode=S_IFREG|0755, st_size=144976, ...}) = 0
mmap(NULL, 2221184, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f66613d0000
mprotect(0x7f66613ea000, 2093056, PROT_NONE) = 0
mmap(0x7f66615e9000, 8192, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x19000) = 0x7f66615e9000
mmap(0x7f66615eb000, 13440, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7f66615eb000
close(3) = 0
mmap(NULL, 12288, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) =
0x7f6661e30000
arch_prctl(ARCH_SET_FS, 0x7f6661e30740) = 0
mprotect(0x7f66619d7000, 16384, PROT_READ) = 0
mprotect(0x7f66615e9000, 4096, PROT_READ) = 0
mprotect(0x7f6661bf6000, 4096, PROT_READ) = 0
mprotect(0x7f6662201000, 4096, PROT_READ) = 0
mprotect(0x7f6661e27000, 4096, PROT_READ) = 0
munmap(0x7f6661e51000, 47603) = 0
set_tid_address(0x7f6661e30a10) = 33
set_robust_list(0x7f6661e30a20, 24) = 0
rt_sigaction(SIGRTMIN, {sa_handler=0x7f66613d5cb0, sa_mask=[],
sa_flags=SA_RESTORER|SA_SIGINFO, sa_restorer=0x7f66613e28a0}, NULL, 8) = 0
rt_sigaction(SIGRT_1, {sa_handler=0x7f66613d5d50, sa_mask=[],
sa_flags=SA_RESTORER|SA_RESTART|SA_SIGINFO, sa_restorer=0x7f66613e28a0}, NULL, 8) = 0
rt_sigprocmask(SIG_UNBLOCK, [RTMIN RT_1], NULL, 8) = 0
prlimit64(0, RLIMIT_STACK, NULL, {rlim_cur=8192*1024, rlim_max=8192*1024}) = 0
brk(NULL) = 0x7fffc7f4f000
brk(0x7fffc7f70000) = 0x7fffc7f70000
clone(child_stack=NULL, flags=CLONE_CHILD_CLEARTID|CLONE_CHILD_SETTID|SIGCHLD,
child_tidptr=0x7f6661e30a10) = 34
wait4(34, [{WIFEXITED(s) && WEXITSTATUS(s) == 0}], 0, NULL) = 34
--- SIGCHLD {si_signo=SIGCHLD, si_code=CLD_EXITED, si_pid=34, si_uid=1000, si_status=0,
si_etime=0, si_stime=0} ---

```

```

statsfs("/dev/shm/", {f_type=TMPFS_MAGIC, f_bsize=4096, f_blocks=62187775, f_bfree=26835227,
f_bavail=26835227, f_files=999, f_ffree=1000000, f_fsid={val=[1, 0]}, f_namelen=255, f_frsize=4096,
f_flags=ST_VALID|ST_NOSUID|ST_NODEV|ST_NOATIME}) = 0
futext(0x7f66615ee370, FUTEX_WAKE_PRIVATE, 2147483647) = 0
openat(AT_FDCWD, "/dev/shm/lab4", O_RDONLY|O_NOFOLLOW|O_CLOEXEC) = 3
mmap(NULL, 4096, PROT_READ, MAP_SHARED, 3, 0) = 0x7f6661e5c000
fstat(1, {st_mode=S_IFCHR|0660, st_rdev=makedev(4, 1), ...}) = 0
ioctl(1, TCGETS, {B38400 opost isig icanon echo ...}) = 0
write(1, "50\n", 350
)
= 3
write(1, "10\n", 310
)
= 3
write(1, "7\n", 27
)
= 2
write(1, "50\n", 350
)
= 3
munmap(0x7f6661e5c000, 4096) = 0
unlink("/dev/shm/lab4") = 0
close(3) = 0
close(0) = 0
exit_group(0) = ?
+++ exited with 0 +++

```

Lab 5

lina_tucha@LAPTOP-44CRFC1U:~/labs/os/lab5\$ ltrace -o ltrace.log ./solution1

1

Enter line segment and step: 0 3.14 0.1

Result: 1.999548

3

Enter number: 4

Result: 2.441406

lina_tucha@LAPTOP-44CRFC1U:~/labs/os/lab5\$ cat ltrace.log

```

__isoc99_scanf(0x7fa0d4400d47, 0x7ffe70d8dc4, 0x7ffe70d8f08, 0x7fa0d4400c60) = 1
__printf_chk(1, 0x7fa0d4400cf0, 0x7fa0d3c4d8d0, 16) = 29
__isoc99_scanf(0x7fa0d4400d0e, 0x7ffe70d8dc8, 0x7ffe70d8dcc, 0x7ffe70d8dd0) = 3
sin(0, 3, 0x7fa0d3c4d8d0, 0x7ffe70d8873) = 0
sin(0, 3, 0, 0x7ffe70d8873) = 0
sin(0, 3, 0x3fb99999a0000000, 0x7ffe70d8873) = 0
sin(0, 3, 0x3fc99999a0000000, 0x7ffe70d8873) = 0
sin(0, 3, 0x7fa0d3d721e0, 154) = 0
sin(0, 3, 0x7fa0d3d721e0, 206) = 0
sin(0, 3, 0x7fa0d3d721e0, 258) = 0
sin(0, 3, 0x7fa0d3d721e0, 310) = 0
sin(0, 3, 0x7fa0d3d721e0, 362) = 0
sin(0, 3, 0x7fa0d3d721e0, 410) = 0
sin(0, 3, 0x7fa0d3d721e0, 346) = 0
sin(0, 3, 0x7fa0d3d721e0, 294) = 0
sin(0, 3, 0x7fa0d3d721e0, 242) = 0
sin(0, 3, 0x7fa0d3d721e0, 190) = 0
sin(0, 3, 0x7fa0d3d721e0, 142) = 0
sin(0, 3, 0x7fa0d3d721e0, 90) = 0
sin(0, 3, 0x7fa0d3d721e0, 38) = 0
sin(0, 3, 0x7fa0d3d721e0, 18) = 0
sin(0, 3, 0x7fa0d3d721e0, 70) = 0
sin(0, 3, 0x7fa0d3d721e0, 118) = 0
sin(0, 3, 0x7fa0d3d721e0, 170) = 0
sin(0, 3, 0x7fa0d3d721e0, 222) = 0

```

```

sin(0, 3, 0x7fa0d3d721e0, 274)          = 0
sin(0, 3, 0x7fa0d3d721e0, 326)          = 0
sin(0, 3, 0x7fa0d3d721e0, 374)          = 0
sin(0, 3, 0x7fa0d3d721e0, 426)          = 0
sin(0, 3, 0x7fa0d3d721e0, 330)          = 0
sin(0, 3, 0x7fa0d3d721e0, 278)          = 0
sin(0, 3, 0x7fa0d3d721e0, 230)          = 0
sin(0, 3, 0x7fa0d3d721e0, 178)          = 0
sin(0, 3, 0x7fa0d3d721e0, 126)          = 0
sin(0, 3, 0x7fa0d3d721e0, 74)           = 0
__printf_chk(1, 0x7fa0d4400d28, 0x4008cccc60000000, 74)      = 17
__isoc99_scanf(0x7fa0d4400d47, 0x7fffe70d8dc4, 0x7fa0d3c4d8c0, 0) = 1
__printf_chk(1, 0x7fa0d4400d65, 0x7fa0d3c4d8d0, 16)           = 14
__isoc99_scanf(0x7fa0d4400d74, 0x7fffe70d8dd0, 0x7fa0d3c4d8c0, 0) = 1
pow(0, 1, 0x7fa0d3c4d8d0, 0x7fffe70d8871)                    = 0
__printf_chk(1, 0x7fa0d4400d28, 0x4000000000000000, 561)      = 17
lina_tucha@LAPTOP-44CRFC1U:~/labs/os/lab5$ ltrace -o ltrace.log ./solution3
3
Enter number: 3
Result: 2.370370
0
3
Enter number: 3
Result: 2.666667
lina_tucha@LAPTOP-44CRFC1U:~/labs/os/lab5$ cat ltrace.log
dlopen("/lib1.so", 1)          = 0x7fffe2214280
dlsym(0x7fffe2214280, "SinIntegral")    = 0x7f021abe06f0
dlsym(0x7fffe2214280, "Sort")           = 0x7f021abe0780
dlsym(0x7fffe2214280, "E")              = 0x7f021abe07f0
dlerror()                          = nil
__isoc99_scanf(0x7f021b800e5b, 0x7fffe944da44, 1, 0)          = 1
__printf_chk(1, 0x7f021b800e77, 0x7f021b1dd8d0, 16)           = 14
__isoc99_scanf(0x7f021b800e86, 0x7fffe944da50, 0x7f021b1dd8c0, 0) = 1
__printf_chk(1, 0x7f021b800e3c, 0x4000000000000000, 529)      = 17
__isoc99_scanf(0x7f021b800e5b, 0x7fffe944da44, 0x7f021b1dd8c0, 0) = 1
dlclose(0x7fffe2214280)          = 0
dlopen("/lib2.so", 1)          = 0x7fffe2214280
dlsym(0x7fffe2214280, "SinIntegral")    = 0x7f021abe0740
dlsym(0x7fffe2214280, "Sort")           = 0x7f021abe0900
dlsym(0x7fffe2214280, "E")              = 0x7f021abe0950
dlerror()                          = nil
__isoc99_scanf(0x7f021b800e5b, 0x7fffe944da44, 1, 0)          = 1
__printf_chk(1, 0x7f021b800e77, 0x7f021b1dd8d0, 16)           = 14
__isoc99_scanf(0x7f021b800e86, 0x7fffe944da50, 0x7f021b1dd8c0, 0) = 1
__printf_chk(1, 0x7f021b800e3c, 0x7f021b1dd8d0, 0x7fffe944d4d1) = 17

```

Lab 6-8

```

lina_tucha@LAPTOP-44CRFC1U:~/labs/os/lab6_8$ strace -o res.txt ./lab6
create 4
Ok:3167
lina_tucha@LAPTOP-44CRFC1U:~/labs/os/lab6_8$ cat res.txt
execve("./lab6", ["/lab6"], 0x7ffd1a16c810 /* 63 vars */) = 0
brk(NULL)          = 0x5624ec813000
access("/etc/ld.so.nohwcap", F_OK) = -1 ENOENT (No such file or directory)
access("/etc/ld.so.preload", R_OK) = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXEC) = 3
fstat(3, {st_mode=S_IFREG|0644, st_size=161916, ...}) = 0
mmap(NULL, 161916, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7f42d70ad000

```

```

close(3) = 0
access("/etc/ld.so.nohwcap", F_OK) = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/usr/local/lib/libzmq.so.5", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\0\0\0\0>\0\1\0\0\0p\1\0\0\0\0\0...", 832) = 832
fstat(3, {st_mode=S_IFREG|0755, st_size=9356416, ...}) = 0
mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) =
0x7f42d70ab000
mmap(NULL, 2655728, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f42d6c25000
mprotect(0x7f42d6ca8000, 2093056, PROT_NONE) = 0
mmap(0x7f42d6ea7000, 28672, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x82000) = 0x7f42d6ea7000
close(3) = 0
access("/etc/ld.so.nohwcap", F_OK) = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/usr/lib/x86_64-linux-gnu/libstdc++.so.6", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\0\0\0>\0\1\0\0\0\0220\304\10\0\0\0\0...", 832) = 832
fstat(3, {st_mode=S_IFREG|0644, st_size=1594864, ...}) = 0
mmap(NULL, 3702848, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f42d689c000
mprotect(0x7f42d6a15000, 2097152, PROT_NONE) = 0
mmap(0x7f42d6c15000, 49152, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x179000) = 0x7f42d6c15000
mmap(0x7f42d6c21000, 12352, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7f42d6c21000
close(3) = 0
access("/etc/ld.so.nohwcap", F_OK) = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libgcc_s.so.1", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\0\0\0\0>\0\1\0\0\0\0300*\0\0\0\0\0\0...", 832) = 832
fstat(3, {st_mode=S_IFREG|0644, st_size=96616, ...}) = 0
mmap(NULL, 2192432, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f42d6684000
mprotect(0x7f42d669b000, 2093056, PROT_NONE) = 0
mmap(0x7f42d689a000, 8192, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x16000) = 0x7f42d689a000
close(3) = 0
access("/etc/ld.so.nohwcap", F_OK) = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libc.so.6", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\0\0\0>\0\1\0\0\0\0260\34\2\0\0\0\0\0...", 832) = 832
fstat(3, {st_mode=S_IFREG|0755, st_size=2030544, ...}) = 0
mmap(NULL, 4131552, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f42d6293000
mprotect(0x7f42d647a000, 2097152, PROT_NONE) = 0
mmap(0x7f42d667a000, 24576, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1e7000) = 0x7f42d667a000
mmap(0x7f42d6680000, 15072, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7f42d6680000
close(3) = 0
access("/etc/ld.so.nohwcap", F_OK) = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/lib/x86_64-linux-gnu/librt.so.1", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\0\0\0\0>\0\1\0\0\0\0\0\0\0\0\0\0\0...", 832) = 832
fstat(3, {st_mode=S_IFREG|0644, st_size=31680, ...}) = 0
mmap(NULL, 2128864, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f42d608b000
mprotect(0x7f42d6092000, 2093056, PROT_NONE) = 0
mmap(0x7f42d6291000, 8192, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x6000) = 0x7f42d6291000
close(3) = 0
access("/etc/ld.so.nohwcap", F_OK) = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libpthread.so.0", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\0\0\0\0>\0\1\0\0\0000b\0\0\0\0\0\0...", 832) = 832

```



```

fstat(3, {st_mode=S_IFREG|0755, st_size=144976, ...}) = 0
mmap(NULL, 2221184, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f42d5e6c000
mprotect(0x7f42d5e86000, 2093056, PROT_NONE) = 0
mmap(0x7f42d6085000, 8192, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x19000) = 0x7f42d6085000
mmap(0x7f42d6087000, 13440, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7f42d6087000
close(3) = 0
access("/etc/ld.so.nohwcap", F_OK) = -1 ENOENT (No such file or directory)
openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libm.so.6", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\0\0\0\0>\0\1\0\0\0\200\272\0\0\0\0\0"..., 832) = 832
fstat(3, {st_mode=S_IFREG|0644, st_size=1700792, ...}) = 0
mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) =
0x7f42d70a9000
mmap(NULL, 3789144, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f42d5ace000
mprotect(0x7f42d5c6b000, 2093056, PROT_NONE) = 0
mmap(0x7f42d5e6a000, 8192, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x19c000) = 0x7f42d5e6a000
close(3) = 0
mmap(NULL, 12288, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) =
0x7f42d70a6000
arch_prctl(ARCH_SET_FS, 0x7f42d70a6740) = 0
mprotect(0x7f42d667a000, 16384, PROT_READ) = 0
mprotect(0x7f42d5e6a000, 4096, PROT_READ) = 0
mprotect(0x7f42d6085000, 4096, PROT_READ) = 0
mprotect(0x7f42d6291000, 4096, PROT_READ) = 0
mprotect(0x7f42d689a000, 4096, PROT_READ) = 0
mprotect(0x7f42d6c15000, 40960, PROT_READ) = 0
mprotect(0x7f42d6ea7000, 24576, PROT_READ) = 0
mprotect(0x5624eb0b4000, 4096, PROT_READ) = 0
mprotect(0x7f42d70d5000, 4096, PROT_READ) = 0
munmap(0x7f42d70ad000, 161916) = 0
set_tid_address(0x7f42d70a6a10) = 4399
set_robust_list(0x7f42d70a6a20, 24) = 0
rt_sigaction(SIGRTMIN, {sa_handler=0x7f42d5e71cb0, sa_mask=[], sa_flags=SA_RESTORER|SA_SIGINFO,
sa_restorer=0x7f42d5e7e8a0}, NULL, 8) = 0
rt_sigaction(SIGRT_1, {sa_handler=0x7f42d5e71d50, sa_mask=[],
sa_flags=SA_RESTORER|SA_RESTART|SA_SIGINFO, sa_restorer=0x7f42d5e7e8a0}, 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) = 0x5624ec813000
brk(0x5624ec834000) = 0x5624ec834000
futexp(0x7f42d6c2209c, FUTEX_WAKE_PRIVATE, 2147483647) = 0
futexp(0x7f42d6c220a8, FUTEX_WAKE_PRIVATE, 2147483647) = 0
eventfd2(0, EFD_CLOEXEC) = 3
fcntl(3, F_GETFL) = 0x2 (flags O_RDWR)
fcntl(3, F_SETFL, O_RDWR|O_NONBLOCK) = 0
fcntl(3, F_GETFL) = 0x802 (flags O_RDWR|O_NONBLOCK)
fcntl(3, F_SETFL, O_RDWR|O_NONBLOCK) = 0
openat(AT_FDCWD, "/dev/urandom", O_RDONLY|O_CLOEXEC) = 4
eventfd2(0, EFD_CLOEXEC) = 5
fcntl(5, F_GETFL) = 0x2 (flags O_RDWR)
fcntl(5, F_SETFL, O_RDWR|O_NONBLOCK) = 0
fcntl(5, F_GETFL) = 0x802 (flags O_RDWR|O_NONBLOCK)
fcntl(5, F_SETFL, O_RDWR|O_NONBLOCK) = 0
epoll_create1(EPOCH_CLOEXEC) = 6
epoll_ctl(6, EPOLL_CTL_ADD, 5, {u32=3967974320, u64=94716586785712}) = 0
epoll_ctl(6, EPOLL_CTL_MOD, 5, {EPOLLIN, {u32=3967974320, u64=94716586785712}}) = 0

```

```

mmap(NULL, 8392704, PROT_NONE, MAP_PRIVATE|MAP_ANONYMOUS|MAP_STACK, -1, 0) =
0x7f42d52cd000
mprotect(0x7f42d52ce000, 8388608, PROT_READ|PROT_WRITE) = 0
clone(child_stack=0x7f42d5acfb0,
flags=CLONE_VM|CLONE_FS|CLONE_FILES|CLONE_SIGHAND|CLONE_THREAD|CLONE_SYSVSEM|CL
ONE_SETTLS|CLONE_PARENT_SETTID|CLONE_CHILD_CLEARPID, parent_tidptr=0x7f42d5acd9d0,
tls=0x7f42d5acd700, child_tidptr=0x7f42d5acd9d0) = 4401
openat(AT_FDCWD, "/proc/self/task/4401/comm", O_RDWR) = 7
write(7, "ZMQbg/0", 7) = 7
close(7) = 0
eventfd2(0, EFD_CLOEXEC) = 7
fcntl(7, F_GETFL) = 0x2 (flags O_RDWR)
fcntl(7, F_SETFL, O_RDWR|O_NONBLOCK) = 0
fcntl(7, F_GETFL) = 0x802 (flags O_RDWR|O_NONBLOCK)
fcntl(7, F_SETFL, O_RDWR|O_NONBLOCK) = 0
epoll_create1(EPOLL_CLOEXEC) = 8
epoll_ctl(8, EPOLL_CTL_ADD, 7, {u32=3967976256, u64=94716586787648}) = 0
epoll_ctl(8, EPOLL_CTL_MOD, 7, {EPOLLIN, {u32=3967976256, u64=94716586787648}}) = 0
mmap(NULL, 8392704, PROT_NONE, MAP_PRIVATE|MAP_ANONYMOUS|MAP_STACK, -1, 0) =
0x7f42d4acc000
mprotect(0x7f42d4acd000, 8388608, PROT_READ|PROT_WRITE) = 0
clone(child_stack=0x7f42d52cbfb0,
flags=CLONE_VM|CLONE_FS|CLONE_FILES|CLONE_SIGHAND|CLONE_THREAD|CLONE_SYSVSEM|CL
ONE_SETTLS|CLONE_PARENT_SETTID|CLONE_CHILD_CLEARPID, parent_tidptr=0x7f42d52cc9d0,
tls=0x7f42d52cc700, child_tidptr=0x7f42d52cc9d0) = 4402
openat(AT_FDCWD, "/proc/self/task/4402/comm", O_RDWR) = 9
write(9, "ZMQbg/1", 7) = 7
close(9) = 0
eventfd2(0, EFD_CLOEXEC) = 9
fcntl(9, F_GETFL) = 0x2 (flags O_RDWR)
fcntl(9, F_SETFL, O_RDWR|O_NONBLOCK) = 0
fcntl(9, F_GETFL) = 0x802 (flags O_RDWR|O_NONBLOCK)
fcntl(9, F_SETFL, O_RDWR|O_NONBLOCK) = 0
poll([{fd=9, events=POLLIN}], 1, 0) = 0 (Timeout)
socket(AF_NETLINK, SOCK_RAW|SOCK_CLOEXEC, NETLINK_ROUTE) = 10
bind(10, {sa_family=AF_NETLINK, nl_pid=0, nl_groups=00000000}, 12) = 0
getsockname(10, {sa_family=AF_NETLINK, nl_pid=4399, nl_groups=00000000}, [12]) = 0
sendto(10, {{len=20, type=RTM_GETLINK, flags=NLM_F_REQUEST|NLM_F_DUMP, seq=1619118807,
pid=0}, {ifi_family=AF_UNSPEC, ...}}, 20, 0, {sa_family=AF_NETLINK, nl_pid=0, nl_groups=00000000}, 12)
= 20
recvmsg(10, {msg_name={sa_family=AF_NETLINK, nl_pid=0, nl_groups=00000000}, msg_namelen=12,
msg_iov=[{iov_base=[{len=1316, type=RTM_NEWLINK, flags=NLM_F_MULTI, seq=1619118807,
pid=4399}, {ifi_family=AF_UNSPEC, ifi_type=ARPHRD_LOOPBACK, ifi_index=if_nametoindex("lo"),
ifi_flags=IFF_UP|IFF_LOOPBACK|IFF_RUNNING|0x10000, ifi_change=0}, {{nla_len=7,
nla_type=IFLA_IFNAME}, "lo"}, {{nla_len=8, nla_type=IFLA_TXQLEN}, 1000}, {{nla_len=5,
nla_type=IFLA_OPERSTATE}, 0}, {{nla_len=5, nla_type=IFLA_LINKMODE}, 0}, {{nla_len=8,
nla_type=IFLA_MTU}, 65536}, {{nla_len=8, nla_type=0x32 /* IFLA_??? */}, "\x00\x00\x00\x00"},
{{nla_len=8, nla_type=0x33 /* IFLA_??? */}, "\x00\x00\x00\x00"}, {{nla_len=8, nla_type=IFLA_GROUP}, 0},
{{nla_len=8, nla_type=IFLA_PROMISCUITY}, 0}, {{nla_len=8, nla_type=IFLA_NUM_TX_QUEUES}, 1},
{{nla_len=8, nla_type=IFLA_GSO_MAX_SEGS}, 65535}, {{nla_len=8, nla_type=IFLA_GSO_MAX_SIZE},
65536}, {{nla_len=8, nla_type=IFLA_NUM_RX_QUEUES}, 1}, {{nla_len=5, nla_type=IFLA_CARRIER}, 1},
{{nla_len=12, nla_type=IFLA_QDISC}, "noqueue"}, {{nla_len=8, nla_type=IFLA_CARRIER_CHANGES},
0}, {{nla_len=5, nla_type=IFLA_PROTO_DOWN}, 0}, {{nla_len=8, nla_type=0x2f /* IFLA_??? */},
"\x00\x00\x00\x00"}, {{nla_len=8, nla_type=0x30 /* IFLA_??? */}, "\x00\x00\x00\x00"}, {{nla_len=36,
nla_type=IFLA_MAP}, {mem_start=0, mem_end=0, base_addr=0, irq=0, dma=0, port=0}}, {{nla_len=10,
nla_type=IFLA_ADDRESS}, "\x00\x00\x00\x00\x00\x00"}, {{nla_len=10, nla_type=IFLA_BROADCAST},
"\x00\x00\x00\x00\x00\x00"}, {{nla_len=196, nla_type=IFLA_STATS64}, {rx_packets=25004,
tx_packets=25004, rx_bytes=12051737, tx_bytes=12051737, rx_errors=0, tx_errors=0, rx_dropped=0,
tx_dropped=0, multicast=0, collisions=0, rx_length_errors=0, rx_over_errors=0, rx_crc_errors=0,
rx_frame_errors=0, rx_fifo_errors=0, rx_missed_errors=0, tx_aborted_errors=0, tx_carrier_errors=0,

```

```
tx_fifo_errors=0, tx_heartbeat_errors=0, tx_window_errors=0, rx_compressed=0, tx_compressed=0, tx_nohandler=0}}, {{nla_len=100, nla_type=IFLA_STATS}, {rx_packets=25004, tx_packets=25004, rx_bytes=12051737, tx_bytes=12051737, rx_errors=0, tx_errors=0, rx_dropped=0, tx_dropped=0, multicast=0, collisions=0, rx_length_errors=0, rx_over_errors=0, rx_crc_errors=0, rx_frame_errors=0, rx_fifo_errors=0, rx_missed_errors=0, tx_aborted_errors=0, tx_carrier_errors=0, tx_fifo_errors=0, tx_heartbeat_errors=0, tx_window_errors=0, rx_compressed=0, tx_compressed=0, rx_nohandler=0}}, {{nla_len=12, nla_type=IFLA_XDP}, {{nla_len=5, nla_type=IFLA_XDP_ATTACHED}, 0}}, {{nla_len=760, nla_type=IFLA_AF_SPEC}, "\x88\x00\x02\x00\x84\x00\x01\x00\x00\x00\x00\x00\x00\x00\x00\x00\x01\x00\x00\x00\x01\x00\x00\x00\x01\x00\x00\x00\x00"...}}, {{len=1324, type=RTM_NEWLINK, flags=NLM_F_MULTI, seq=1619118807, pid=4399}, {ifi_family=AF_UNSPEC, ifi_type=ARPHRD_ETHER, ifi_index=if_nametoindex("enp2s0"), ifi_flags=IFF_UP|IFF_BROADCAST|IFF_MULTICAST, ifi_change=0}, [{nla_len=11, nla_type=IFLA_IFNAME}, "enp2s0"], {{nla_len=8, nla_type=IFLA_TXQLEN}, 1000}, {{nla_len=5, nla_type=IFLA_OPERSTATE}, 2}, {{nla_len=5, nla_type=IFLA_LINKMODE}, 0}, {{nla_len=8, nla_type=IFLA_MTU}, 1500}, {{nla_len=8, nla_type=0x32 /* IFLA_??? */}, "\x3c\x00\x00\x00"}, {{nla_len=8, nla_type=0x33 /* IFLA_??? */}, "\xf0\x23\x00\x00"}, {{nla_len=8, nla_type=IFLA_GROUP}, 0}, {{nla_len=8, nla_type=IFLA_PROMISCUITY}, 0}, {{nla_len=8, nla_type=IFLA_NUM_TX_QUEUES}, 1}, {{nla_len=8, nla_type=IFLA_GSO_MAX_SEGS}, 64}, {{nla_len=8, nla_type=IFLA_GSO_MAX_SIZE}, 64000}, {{nla_len=8, nla_type=IFLA_NUM_RX_QUEUES}, 1}, {{nla_len=5, nla_type=IFLA_CARRIER}, 0}, {{nla_len=13, nla_type=IFLA_QDISC}, "fq_codel"}, {{nla_len=8, nla_type=IFLA_CARRIER_CHANGES}, 1}, {{nla_len=5, nla_type=IFLA_PROTO_DOWN}, 0}, {{nla_len=8, nla_type=0x2f /* IFLA_??? */}, "\x00\x00\x00\x00"}, {{nla_len=8, nla_type=0x30 /* IFLA_??? */}, "\x01\x00\x00\x00"}, {{nla_len=36, nla_type=IFLA_MAP}, {mem_start=0, mem_end=0, base_addr=0, irq=0, dma=0, port=0}}, {{nla_len=10, nla_type=IFLA_ADDRESS}, "\x8c\xec\x4b\x0f\x57\x74"}, {{nla_len=10, nla_type=IFLA_BROADCAST}, "\xff\xff\xff\xff\xff\xff"}, {{nla_len=196, nla_type=IFLA_STATS64}, {rx_packets=0, tx_packets=0, rx_bytes=0, tx_bytes=0, rx_errors=0, tx_errors=0, rx_dropped=0, tx_dropped=0, multicast=0, collisions=0, rx_length_errors=0, rx_over_errors=0, rx_crc_errors=0, rx_frame_errors=0, rx_fifo_errors=0, rx_missed_errors=0, tx_aborted_errors=0, tx_carrier_errors=0, tx_fifo_errors=0, tx_heartbeat_errors=0, tx_window_errors=0, rx_compressed=0, tx_compressed=0, rx_nohandler=0}}, {{nla_len=100, nla_type=IFLA_STATS}, {rx_packets=0, tx_packets=0, rx_bytes=0, tx_bytes=0, rx_errors=0, tx_errors=0, rx_dropped=0, tx_dropped=0, multicast=0, collisions=0, rx_length_errors=0, rx_over_errors=0, rx_crc_errors=0, rx_frame_errors=0, rx_fifo_errors=0, rx_missed_errors=0, tx_aborted_errors=0, tx_carrier_errors=0, tx_fifo_errors=0, tx_heartbeat_errors=0, tx_window_errors=0, rx_compressed=0, tx_compressed=0, rx_nohandler=0}}, {{nla_len=12, nla_type=IFLA_XDP}, {{nla_len=5, nla_type=IFLA_XDP_ATTACHED}, 0}}, {{nla_len=760, nla_type=IFLA_AF_SPEC}, "\x88\x00\x02\x00\x84\x00\x01\x00\x00\x00\x00\x00\x00\x00\x00\x00\x01\x00\x00\x00\x01\x00\x00\x00\x01\x00\x00\x00\x00"...}}, {iov_len=4096}], msg_iovlen=1, msg_controllen=0, msg_flags=0}, 0) = 2640
recvmsg(10, {msg_name={sa_family=AF_NETLINK, nl_pid=0, nl_groups=00000000}, msg_namelen=12, msg_iov=[{iov_base={{len=1320, type=RTM_NEWLINK, flags=NLM_F_MULTI, seq=1619118807, pid=4399}, {ifi_family=AF_UNSPEC, ifi_type=ARPHRD_ETHER, ifi_index=if_nametoindex("wlp1s0"), ifi_flags=IFF_UP|IFF_BROADCAST|IFF_RUNNING|IFF_MULTICAST|0x10000, ifi_change=0}, [{nla_len=11, nla_type=IFLA_IFNAME}, "wlp1s0"], {{nla_len=8, nla_type=IFLA_TXQLEN}, 1000}, {{nla_len=5, nla_type=IFLA_OPERSTATE}, 6}, {{nla_len=5, nla_type=IFLA_LINKMODE}, 1}, {{nla_len=8, nla_type=IFLA_MTU}, 1500}, {{nla_len=8, nla_type=0x32 /* IFLA_??? */}, "\x00\x01\x00\x00"}, {{nla_len=8, nla_type=0x33 /* IFLA_??? */}, "\x00\x09\x00\x00"}, {{nla_len=8, nla_type=IFLA_GROUP}, 0}, {{nla_len=8, nla_type=IFLA_PROMISCUITY}, 0}, {{nla_len=8, nla_type=IFLA_NUM_TX_QUEUES}, 1}, {{nla_len=8, nla_type=IFLA_GSO_MAX_SEGS}, 65535}, {{nla_len=8, nla_type=IFLA_GSO_MAX_SIZE}, 65536}, {{nla_len=8, nla_type=IFLA_NUM_RX_QUEUES}, 1}, {{nla_len=5, nla_type=IFLA_CARRIER}, 1}, {{nla_len=12, nla_type=IFLA_QDISC}, "noqueue"}, {{nla_len=8, nla_type=IFLA_CARRIER_CHANGES}, 6}, {{nla_len=5, nla_type=IFLA_PROTO_DOWN}, 0}, {{nla_len=8, nla_type=0x2f /* IFLA_??? */}, "\x03\x00\x00\x00"}, {{nla_len=8, nla_type=0x30 /* IFLA_??? */}, "\x03\x00\x00\x00"}, {{nla_len=36, nla_type=IFLA_MAP}, {mem_start=0, mem_end=0, base_addr=0, irq=0, dma=0, port=0}}, {{nla_len=10, nla_type=IFLA_ADDRESS}, "\x9c\xda\x3e\x8c\x47\x45"}, {{nla_len=10, nla_type=IFLA_BROADCAST}, "\xff\xff\xff\xff\xff\xff"}, {{nla_len=196, nla_type=IFLA_STATS64}, {rx_packets=45534, tx_packets=38901, rx_bytes=43021795, tx_bytes=8426672, rx_errors=0, tx_errors=0, rx_dropped=0, tx_dropped=0, multicast=0, collisions=0, rx_length_errors=0, rx_over_errors=0, rx_crc_errors=0, rx_frame_errors=0, rx_fifo_errors=0, rx_missed_errors=0, tx_aborted_errors=0, tx_carrier_errors=0, tx_fifo_errors=0, tx_heartbeat_errors=0, tx_window_errors=0, rx_compressed=0, tx_compressed=0, rx_nohandler=0}}, {{nla_len=100, nla_type=IFLA_STATS}, {rx_packets=45534, tx_packets=38901, rx_bytes=43021795, tx_bytes=8426672,
```

```

rx_errors=0, tx_errors=0, rx_dropped=0, tx_dropped=0, multicast=0, collisions=0, rx_length_errors=0,
rx_over_errors=0, rx_crc_errors=0, rx_frame_errors=0, rx_fifo_errors=0, rx_missed_errors=0,
tx_aborted_errors=0, tx_carrier_errors=0, tx_fifo_errors=0, tx_heartbeat_errors=0, tx_window_errors=0,
rx_compressed=0, tx_compressed=0, rx_nohandler=0}}, {{nla_len=12, nla_type=IFLA_XDP}, {{nla_len=5,
nla_type=IFLA_XDP_ATTACHED}, 0}}, {{nla_len=760, nla_type=IFLA_AF_SPEC},
"\x88\x00\x02\x00\x84\x00\x01\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x00\x01\x00\x00\x00\x01\x00
0\x00\x00\x01\x00\x00\x00"...}}, iov_len=4096}}, msg_iovlen=1, msg_controllen=0, msg_flags=0}, 0) = 1320
recvmsg(10, {msg_name={sa_family=AF_NETLINK, nl_pid=0, nl_groups=00000000}, msg_namelen=12,
msg_iov=[{iov_base={{len=20, type=NLMMSG_DONE, flags=NLM_F_MULTI, seq=1619118807, pid=4399},
0}, iov_len=4096}], msg_iovlen=1, msg_controllen=0, msg_flags=0}, 0) = 20
sendto(10, {{len=20, type=RTM_GETADDR, flags=NLM_F_REQUEST|NLM_F_DUMP, seq=1619118808,
pid=0}, {ifa_family=AF_UNSPEC, ...}}, 20, 0, {sa_family=AF_NETLINK, nl_pid=0, nl_groups=00000000},
12) = 20
recvmsg(10, {msg_name={sa_family=AF_NETLINK, nl_pid=0, nl_groups=00000000}, msg_namelen=12,
msg_iov=[{iov_base=[{{len=76, type=RTM_NEWADDR, flags=NLM_F_MULTI, seq=1619118808, pid=4399},
{ifa_family=AF_INET, ifa_prefixlen=8, ifa_flags=IFA_F_PERMANENT, ifa_scope=RT_SCOPE_HOST,
ifa_index=if_nametoindex("lo")}, {{nla_len=8, nla_type=IFA_ADDRESS}, 127.0.0.1}, {{nla_len=8,
nla_type=IFA_LOCAL}, 127.0.0.1}, {{nla_len=7, nla_type=IFA_LABEL}, "lo"}, {{nla_len=8,
nla_type=IFA_FLAGS}, IFA_F_PERMANENT}, {{nla_len=20, nla_type=IFA_CACHEINFO},
{ifa_preferred=4294967295, ifa_valid=4294967295, cstamp=276, tstamp=276}}}], {len=88,
type=RTM_NEWADDR, flags=NLM_F_MULTI, seq=1619118808, pid=4399}, {ifa_family=AF_INET,
ifa_prefixlen=24, ifa_flags=0, ifa_scope=RT_SCOPE_UNIVERSE, ifa_index=if_nametoindex("wlp1s0")},
[{{nla_len=8, nla_type=IFA_ADDRESS}, 192.168.0.103}, {{nla_len=8, nla_type=IFA_LOCAL},
192.168.0.103}, {{nla_len=8, nla_type=IFA_BROADCAST}, 192.168.0.255}, {{nla_len=11,
nla_type=IFA_LABEL}, "wlp1s0"}, {{nla_len=8, nla_type=IFA_FLAGS}, IFA_F_NOPREFIXROUTE},
{{nla_len=20, nla_type=IFA_CACHEINFO}, {ifa_preferred=3891, ifa_valid=3891, cstamp=528642,
tstamp=660733}}}], iov_len=4096}], msg_iovlen=1, msg_controllen=0, msg_flags=0}, 0) = 164
recvmsg(10, {msg_name={sa_family=AF_NETLINK, nl_pid=0, nl_groups=00000000}, msg_namelen=12,
msg_iov=[{iov_base=[{{len=72, type=RTM_NEWADDR, flags=NLM_F_MULTI, seq=1619118808, pid=4399},
{ifa_family=AF_INET6, ifa_prefixlen=128, ifa_flags=IFA_F_PERMANENT, ifa_scope=RT_SCOPE_HOST,
ifa_index=if_nametoindex("lo")}, {{nla_len=20, nla_type=IFA_ADDRESS}, ::1}, {{nla_len=20,
nla_type=IFA_CACHEINFO}, {ifa_preferred=4294967295, ifa_valid=4294967295, cstamp=276, tstamp=276}},
{{nla_len=8, nla_type=IFA_FLAGS}, IFA_F_PERMANENT}}], {len=72, type=RTM_NEWADDR,
flags=NLM_F_MULTI, seq=1619118808, pid=4399}, {ifa_family=AF_INET6, ifa_prefixlen=64,
ifa_flags=IFA_F_PERMANENT, ifa_scope=RT_SCOPE_LINK, ifa_index=if_nametoindex("wlp1s0")},
[{{nla_len=20, nla_type=IFA_ADDRESS}, fe80::9f49:25b8:cafc:b7fc}, {{nla_len=20,
nla_type=IFA_CACHEINFO}, {ifa_preferred=4294967295, ifa_valid=4294967295, cstamp=528630,
tstamp=528803}}, {{nla_len=8, nla_type=IFA_FLAGS},
IFA_F_PERMANENT|IFA_F_NOPREFIXROUTE}}], iov_len=4096}], msg_iovlen=1, msg_controllen=0,
msg_flags=0}, 0) = 144
recvmsg(10, {msg_name={sa_family=AF_NETLINK, nl_pid=0, nl_groups=00000000}, msg_namelen=12,
msg_iov=[{iov_base={{len=20, type=NLMMSG_DONE, flags=NLM_F_MULTI, seq=1619118808, pid=4399},
0}, iov_len=4096}], msg_iovlen=1, msg_controllen=0, msg_flags=0}, 0) = 20
close(10) = 0
socket(AF_INET, SOCK_STREAM|SOCK_CLOEXEC, IPPROTO_TCP) = 10
setsockopt(10, SOL_SOCKET, SO_REUSEADDR, [1], 4) = 0
bind(10, {sa_family=AF_INET, sin_port=htons(30000), sin_addr=inet_addr("127.0.0.1")}, 16) = 0
listen(10, 100) = 0
getsockname(10, {sa_family=AF_INET, sin_port=htons(30000), sin_addr=inet_addr("127.0.0.1")}, [128->16])
= 0
write(7, "\1\0\0\0\0\0\0", 8) = 8
write(9, "\1\0\0\0\0\0\0", 8) = 8
fstat(0, {st_mode=S_IFCHR|0620, st_rdev=makedev(136, 1), ...}) = 0
read(0, "create 4'n", 1024) = 9
clone(child_stack=NULL, flags=CLONE_CHILD_CLEARTID|CLONE_CHILD_SETTID|SIGCHLD,
child_tidptr=0x7f42d70a6a10) = 4405
poll([fd=9, events=POLLIN], 1, 0) = 1 ([fd=9, revents=POLLIN])
read(9, "\1\0\0\0\0\0\0", 8) = 8
poll([fd=9, events=POLLIN], 1, 0) = 0 (Timeout)
poll([fd=9, events=POLLIN], 1, 2000) = 1 ([fd=9, revents=POLLIN])

```

```
read(9, "\1\0\0\0\0\0\0", 8)      = 8
poll([ {fd=9, events=POLLIN}], 1, 0) = 0 (Timeout)
write(7, "\1\0\0\0\0\0\0", 8)      = 8
poll([ {fd=9, events=POLLIN}], 1, -1) = 1 ([ {fd=9, revents=POLLIN}])
read(9, "\1\0\0\0\0\0\0", 8)      = 8
poll([ {fd=9, events=POLLIN}], 1, 0) = 1 ([ {fd=9, revents=POLLIN}])
read(9, "\1\0\0\0\0\0\0", 8)      = 8
poll([ {fd=9, events=POLLIN}], 1, 0) = 0 (Timeout)
write(7, "\1\0\0\0\0\0\0", 8)      = 8
fstat(1, {st_mode=S_IFCHR|0620, st_rdev=makedev(136, 1), ...}) = 0
write(1, "Ok:4405\n", 8)           = 8
read(0, "exit\n", 1024)            = 5
read(0, 0x5624ec828920, 1024)      = -1 EIO (Input/output error)
write(5, "\1\0\0\0\0\0\0", 8)      = 8
--- SIGHUP {si_signo=SIGHUP, si_code=SI_USER, si_pid=4375, si_uid=1000} ---
+++ killed by SIGHUP +++
```

Вывод

Такие утилиты, как `strace` или, например, `ltrace` являются простыми и довольно надежными инструментами, которые позволяют следить за процессом работы программы, отслеживая используемые системные вызовы. Анализируя вывод `strace` можно узнать как именно работает программа, как совершает свои вызовы, в каком порядке, а эта информация крайне полезна при дебаггинге или оптимизации. С помощью различных ключей можно применять различные фильтры для более удобного поиска необходимой информации.

В целом, это очень удобный инструмент, который поможет изучить принципы работы программы и отследить возникшие ошибки.