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

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Оценка: _____

Дата: _____

Подпись: _____

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Постановка задачи

Приобретение практических навыков диагностики работы программного обеспечения.
Используемое средство диагностики — утилита strace.

Демонстрация полного функционала утилиты strace на примере ЛР №2

Strace - это утилита для диагностики, отладки и поиска неисправностей программ для Linux. Она используется для мониторинга взаимодействиями между процессами и ядром Linux, которые включают в себя системные вызовы, доставку сигналов и изменение состояния процесса. Работа strace становится возможной благодаря функции ядра, известной как ptrace.

Отображение всех вызовов:

```
execve("./lab2", ["../lab2", "child1", "child2"], 0x7ffc23170b60 /* 18 vars */) = 0
brk(NULL)                               = 0x562bd9d30000
arch_prctl(0x3001 /* ARCH_??? */, 0x7fff92df4950) = -1 EINVAL (Invalid argument)
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=82162, ...}) = 0
mmap(NULL, 82162, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7f5d3fe63000
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\3\0>\0\1\0\0\0\341\t\0\0\0\0"..., 832) = 832
fstat(3, {st_mode=S_IFREG|0644, st_size=1956992, ...}) = 0
mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) =
0x7f5d3fe61000
mmap(NULL, 1972224, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7f5d3fc7f000
mprotect(0x7f5d3fd15000, 1290240, PROT_NONE) = 0
mmap(0x7f5d3fd15000, 987136, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x96000) = 0x7f5d3fd15000
mmap(0x7f5d3fe06000, 299008, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3,
0x187000) = 0x7f5d3fe06000
mmap(0x7f5d3fe50000, 57344, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x1d0000) = 0x7f5d3fe50000
mmap(0x7f5d3fe5e000, 10240, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_ANONYMOUS, -1, 0) = 0x7f5d3fe5e000
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\3\0>\0\1\0\0\0\3405\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) = 0x7f5d3fc64000
mmap(0x7f5d3fc67000, 73728, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x3000) = 0x7f5d3fc67000
mmap(0x7f5d3fc79000, 16384, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x15000)
= 0x7f5d3fc79000
mmap(0x7f5d3fc7d000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x18000) = 0x7f5d3fc7d000
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\3\0>\0\1\0\0\0\360q\2\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"..., 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", 32, 848) = 32
pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\t\233\222%\274\260\320\31\331\326\10\204\276X>\
263"..., 68, 880) = 68
fstat(3, {st_mode=S_IFREG|0755, st_size=2029224, ...}) = 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"..., 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", 32, 848) = 32
pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\t\233\222%\274\260\320\31\331\326\10\204\276X>\
263"..., 68, 880) = 68
mmap(NULL, 2036952, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7f5d3fa72000
mprotect(0x7f5d3fa97000, 1847296, PROT_NONE) = 0
mmap(0x7f5d3fa97000, 1540096, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x25000) = 0x7f5d3fa97000
mmap(0x7f5d3fc0f000, 303104, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3,
0x19d000) = 0x7f5d3fc0f000
mmap(0x7f5d3fc5a000, 24576, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x1e7000) = 0x7f5d3fc5a000
mmap(0x7f5d3fc60000, 13528, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_ANONYMOUS, -1, 0) = 0x7f5d3fc60000
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\3\0>\0\1\0\0\0\300\363\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) = 0x7f5d3f923000
mmap(0x7f5d3f932000, 684032, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0xf000) = 0x7f5d3f932000
mmap(0x7f5d3f9d9000, 618496, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3,
0xb6000) = 0x7f5d3f9d9000
mmap(0x7f5d3fa70000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x14c000) = 0x7f5d3fa70000
close(3) = 0
mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) =
0x7f5d3f921000
arch_prctl(ARCH_SET_FS, 0x7f5d3f922100) = 0
mprotect(0x7f5d3fc5a000, 12288, PROT_READ) = 0
mprotect(0x7f5d3fa70000, 4096, PROT_READ) = 0
mprotect(0x7f5d3fc7d000, 4096, PROT_READ) = 0
mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) =
0x7f5d3f91f000
mprotect(0x7f5d3fe50000, 45056, PROT_READ) = 0
mprotect(0x562bd9503000, 4096, PROT_READ) = 0
mprotect(0x7f5d3fea5000, 4096, PROT_READ) = 0
munmap(0x7f5d3fe63000, 82162) = 0
brk(NULL) = 0x562bd9d30000
brk(0x562bd9d51000) = 0x562bd9d51000
fstat(0, {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0x3), ...}) = 0
read(0,
"\n", 1024) = 1
pipe([3, 4]) = 0
pipe([5, 6]) = 0
clone(child_stack=NULL, flags=CLONE_CHILD_CLEARTID|CLONE_CHILD_SETTID|SIGCHLD,
child_tidptr=0x7f5d3f9223d0) = 1876
close(3) = 0
write(4, "", 0) = 0
close(4) = 0
pipe([3, 4]) = 0
clone(child_stack=NULL, flags=CLONE_CHILD_CLEARTID|CLONE_CHILD_SETTID|SIGCHLD,
child_tidptr=0x7f5d3f9223d0) = 1877
close(4) = 0

```

```

close(6)                = 0
close(5)                = 0
wait4(-1, NULL, 0, NULL) = 1876
--- SIGCHLD {si_signo=SIGCHLD, si_code=CLD_EXITED, si_pid=1876, si_uid=1000, si_status=0,
si_ftime=0, si_stime=0} ---
read(3, "", 1)          = 0
close(3)                = 0
fstat(1, {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0x3), ...}) = 0
write(1, "\n", 1
)                        = 1
exit_group(0)           = ?
+++ exited with 0 +++

```

Опция -e служит для отображения лишь определенных вызовов.

```
kivi@LAPTOP-DGOM1IRE:~/os/lab_2/lab2/l2$ strace -e fork ./lab2 child1 child2
```

```

--- SIGCHLD {si_signo=SIGCHLD, si_code=CLD_EXITED, si_pid=1889, si_uid=1000, si_status=0,
si_ftime=0, si_stime=1} ---
--- SIGCHLD {si_signo=SIGCHLD, si_code=CLD_EXITED, si_pid=1890, si_uid=1000, si_status=0,
si_ftime=0, si_stime=0} ---

```

```
+++ exited with 0 +++
```

```
kivi@LAPTOP-DGOM1IRE:~/os/lab_2/lab2/l2$ strace -e close ./lab2 child1 child2
```

```

close(3)                = 0
close(3)                = 0
close(3)                = 0
close(3)                = 0
close(3)                = 0

close(3)                = 0
close(4)                = 0
--- SIGCHLD {si_signo=SIGCHLD, si_code=CLD_EXITED, si_pid=1895, si_uid=1000, si_status=0,
si_ftime=0, si_stime=0} ---
close(4)                = 0
close(6)                = 0
close(5)                = 0

```

```
--- SIGCHLD {si_signo=SIGCHLD, si_code=CLD_EXITED, si_pid=1896, si_uid=1000, si_status=0,
si_utime=1, si_stime=0} ---
close(3)                = 0
```

+++ exited with 0 +++

kivi@LAPTOP-DGOM1IRE:~/os/lab_2/lab2/l2\$ strace -e pipe ./lab2 child1 child2

```
pipe([3, 4])             = 0
```

```
pipe([5, 6])             = 0
```

```
pipe([3, 4])             = 0
```

```
--- SIGCHLD {si_signo=SIGCHLD, si_code=CLD_EXITED, si_pid=1901, si_uid=1000, si_status=0,
si_utime=0, si_stime=0} ---
```

+++ exited with 0 +++

Можно и несколько типов вызовов сразу: -e trace= и через запятую — список вызовов.

kivi@LAPTOP-DGOM1IRE:~/os/lab_2/lab2/l2\$ strace -f -e trace=write,read ./lab2 child1 child2

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

```
read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\3405\0\0\0\0\0"..., 832) = 832
```

```
read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\360q\2\0\0\0\0\0"..., 832) = 832
```

```
read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\300\363\0\0\0\0\0"..., 832) = 832
```

```
read(0,
```

```
"\n", 1024)              = 1
```

strace: Process 1930 attached

```
[pid 1929] write(4, "", 0)      = 0
```

strace: Process 1931 attached

```
[pid 1930] read(4, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\341\t\0\0\0\0"..., 832) = 832
```

```
[pid 1931] read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\341\t\0\0\0\0"..., 832) = 832
```

```
[pid 1930] read(4, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\360q\2\0\0\0\0\0"..., 832) = 832
```

```
[pid 1931] read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\360q\2\0\0\0\0\0"..., 832) = 832
```

```
[pid 1930] read(4, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\300\363\0\0\0\0\0"..., 832) = 832
```

```
[pid 1931] read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\300\363\0\0\0\0\0"..., 832) = 832
```

```
[pid 1930] read(4, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\3405\0\0\0\0\0"..., 832) = 832
```

```
[pid 1931] read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\3405\0\0\0\0\0"..., 832) = 832
```

```
[pid 1931] read(0, <unfinished ...>
```

```
[pid 1930] read(0, "", 100)    = 0
```

```
[pid 1931] <... read resumed>"", 100) = 0
[pid 1930] +++ exited with 0 +++
[pid 1929] --- SIGCHLD {si_signo=SIGCHLD, si_code=CLD_EXITED, si_pid=1930, si_uid=1000,
si_status=0, si_utime=0, si_stime=0} ---
[pid 1929] read(3, "", 1) = 0
[pid 1931] +++ exited with 0 +++
--- SIGCHLD {si_signo=SIGCHLD, si_code=CLD_EXITED, si_pid=1931, si_uid=1000, si_status=0,
si_utime=0, si_stime=0} ---
write(1, "\n", 1
) = 1
+++ exited with 0 +++
```

Отслеживание дочерних процессов:

Отслеживать дерево процессов целиком помогает флаг -f, с которым strace отслеживает системные вызовы в процессах-потомках. К каждой строке вывода при этом добавляется pid процесса, делающего системный вывод:

```
kivi@LAPTOP-DGOM1IRE:~/os/lab_2/lab2/l2$ strace -f -e trace=pipe ./lab2 child1 child2
```

```
pipe([3, 4]) = 0
pipe([5, 6]) = 0
strace: Process 1937 attached
[pid 1936] pipe([3, 4]) = 0
strace: Process 1938 attached
[pid 1937] +++ exited with 0 +++
[pid 1936] --- SIGCHLD {si_signo=SIGCHLD, si_code=CLD_EXITED, si_pid=1937, si_uid=1000,
si_status=0, si_utime=0, si_stime=0} ---
[pid 1938] +++ exited with 0 +++
--- SIGCHLD {si_signo=SIGCHLD, si_code=CLD_EXITED, si_pid=1938, si_uid=1000, si_status=0,
si_utime=0, si_stime=0} ---

+++ exited with 0 +++
```

Пути к файлам вместо дескрипторов: Ключ -у позволяет взглянуть на название файлов, с которыми работает процесс, вместо файловых дескрипторов:

```
kivi@LAPTOP-DGOM1IRE:~/os/lab_2/lab2/l2$ strace -y -e read ./lab2 child1 child2
read(3</usr/lib/x86_64-linux-gnu/libstdc++.so.6.0.28>, "\177ELF\2\1\1\3\0\0\0\0\0\0\3\0>\0\1\0\0\0\
341\t\0\0\0\0"... , 832) = 832
read(3</usr/lib/x86_64-linux-gnu/libgcc_s.so.1>, "\177ELF\2\1\1\0\0\0\0\0\0\0\3\0>\
0\1\0\0\0\3405\0\0\0\0\0"... , 832) = 832
read(3</usr/lib/x86_64-linux-gnu/libc-2.31.so>, "\177ELF\2\1\1\3\0\0\0\0\0\0\3\0>\0\1\0\0\0\360q\
2\0\0\0\0"... , 832) = 832
read(3</usr/lib/x86_64-linux-gnu/libm-2.31.so>, "\177ELF\2\1\1\3\0\0\0\0\0\0\3\0>\
0\1\0\0\0\300\363\0\0\0\0\0"... , 832) = 832
read(0</dev/pts/3>,
"\n", 1024)      = 1
--- SIGCHLD {si_signo=SIGCHLD, si_code=CLD_EXITED, si_pid=1951, si_uid=1000, si_status=0,
si_utime=0, si_stime=0} ---read(3<pipe:[261277]>, "", 1)      = 0
--- SIGCHLD {si_signo=SIGCHLD, si_code=CLD_EXITED, si_pid=1952, si_uid=1000, si_status=0,
si_utime=0, si_stime=0} ---
+++ exited with 0 +++
```

Отображение времени выполнения вызова: Посмотреть время выполнения того или иного вызова позволяет ключ -t:

```
kivi@LAPTOP-DGOM1IRE:~/os/lab_2/lab2/l2$ strace -y -t -e read ./lab2 child1 child2
01:05:28 read(3</usr/lib/x86_64-linux-gnu/libstdc++.so.6.0.28>, "\177ELF\2\1\1\3\0\0\0\0\0\0\3\0>\
0\1\0\0\0\341\t\0\0\0\0"... , 832) = 832
01:05:28 read(3</usr/lib/x86_64-linux-gnu/libgcc_s.so.1>, "\177ELF\2\1\1\0\0\0\0\0\0\0\3\0>\
0\1\0\0\0\3405\0\0\0\0\0"... , 832) = 832
01:05:28 read(3</usr/lib/x86_64-linux-gnu/libc-2.31.so>, "\177ELF\2\1\1\3\0\0\0\0\0\0\3\0>\
0\1\0\0\0\360q\2\0\0\0\0"... , 832) = 832
01:05:28 read(3</usr/lib/x86_64-linux-gnu/libm-2.31.so>, "\177ELF\2\1\1\3\0\0\0\0\0\0\3\0>\
0\1\0\0\0\300\363\0\0\0\0\0"... , 832) = 832
01:05:28 read(0</dev/pts/3>,
"\n", 1024) = 1
01:05:30 --- SIGCHLD {si_signo=SIGCHLD, si_code=CLD_EXITED, si_pid=1957, si_uid=1000,
si_status=0, si_utime=0, si_stime=0} ---
01:05:30 --- SIGCHLD {si_signo=SIGCHLD, si_code=CLD_EXITED, si_pid=1958, si_uid=1000,
si_status=0, si_utime=0, si_stime=0} ---
```



```
01:05:30 read(3<pipe:[265752]>,"", 1) = 0
```

```
01:05:30 +++ exited with 0 +++
```

Печать “относительной” времени вызова системных процессов:

```
kivi@LAPTOP-DGOM1IRE:~/os/lab_2/lab2/l2$ strace -r -e close ./lab2 child1 child2
```

```
0.000000 close(3)          = 0
0.000855 close(3)          = 0
0.000542 close(3)          = 0
0.001064 close(3)          = 0
0.000543 close(3)          = 0

0.997358 close(3)          = 0
0.000291 close(4)          = 0
0.000579 close(4)          = 0
0.000105 close(6)          = 0
0.000129 --- SIGCHLD {si_signo=SIGCHLD, si_code=CLD_EXITED, si_pid=1970, si_uid=1000,
si_status=0, si_utime=0, si_stime=0} ---
0.000067 close(5)          = 0
0.000446 --- SIGCHLD {si_signo=SIGCHLD, si_code=CLD_EXITED, si_pid=1971, si_uid=1000,
si_status=0, si_utime=0, si_stime=0} ---
0.000051 close(3)          = 0

0.000394 +++ exited with 0 +++
```

Трассировка вызовов запущенного процесса:

Для подключения к уже работающему процессу — используется опция -p.

Запустим main и оставим его ожидать входные данные. Узнаем его PID и подключимся к нему в другой консоли

```
kivi@LAPTOP-DGOM1IRE:~/os/lab_2/lab2/l2$ ps -a
```

```
PID TTY      TIME CMD
1973 pts/3    00:00:00 lab2
1992 pts/4    00:00:00 ps
```

Статистика системных вызовов: С помощью опции -с — можно получить наглядную статистику выполнения программы:

```
kivi@LAPTOP-DGOM1IRE:~/os/lab_2/lab2/l2$ strace -c ./lab2
```

% time	seconds	usecs/call	calls	errors	syscall
18.99	0.000545	24	22		mmap
17.07	0.000490	245	2		clone
13.14	0.000377	377	1		execve
8.68	0.000249	22	11		close
6.45	0.000185	30	6		read
6.38	0.000183	22	8		mprotect
6.06	0.000174	24	7		fstat
5.47	0.000157	31	5		openat
4.43	0.000127	21	6		pread64
3.38	0.000097	32	3		pipe
2.26	0.000065	21	3		brk
2.06	0.000059	29	2		write
1.64	0.000047	23	2	1	arch_prctl
1.53	0.000044	44	1		munmap
1.53	0.000044	44	1		wait4
0.94	0.000027	27	1	1	access
100.00	0.002870		81	2	total

Диагностика Strace других ЛР

```
0.000000 execve("./lab3", ["/lab3"], 0x7ffef2cf3640 /* 17 vars */) = 0
0.003221 brk(NULL) = 0x55b870f43000
0.000149 arch_prctl(0x3001 /* ARCH_??? */, 0x7fff8b92a030) = -1 EINVAL (Invalid argument)
0.000217 access("/etc/ld.so.preload", R_OK) = -1 ENOENT (No such file or directory)
0.000142 openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXEC) = 3
0.000115 fstat(3, {st_mode=S_IFREG|0644, st_size=82162, ...}) = 0
0.000158 mmap(NULL, 82162, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7fc4a4c8f000
0.000085 close(3) = 0
0.000128 openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libstdc++.so.6", O_RDONLY|O_CLOEXEC)
= 3
```

```

0.000132 read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\341\t\0\0\0\0"..., 832) = 832
0.000137 fstat(3, {st_mode=S_IFREG|0644, st_size=1956992, ...}) = 0
0.000116 mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_ANONYMOUS, -1, 0) = 0x7fc4a4c8d000
0.000116 mmap(NULL, 1972224, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7fc4a4aab000
0.000101 mprotect(0x7fc4a4b41000, 1290240, PROT_NONE) = 0
0.000096 mmap(0x7fc4a4b41000, 987136, PROT_READ|PROT_EXEC, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x96000) = 0x7fc4a4b41000
0.000104 mmap(0x7fc4a4c32000, 299008, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x187000) = 0x7fc4a4c32000 0.000102 mmap(0x7fc4a4c7c000, 57344,
PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1d0000) =
0x7fc4a4c7c000
0.000100 mmap(0x7fc4a4c8a000, 10240, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7fc4a4c8a000
0.000121 close(3) = 0
0.000113 openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libgcc_s.so.1", O_RDONLY|O_CLOEXEC) =
3
0.000110 read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\3405\0\0\0\0\0"..., 832) = 832
0.000096 fstat(3, {st_mode=S_IFREG|0644, st_size=104984, ...}) = 0
0.000110 mmap(NULL, 107592, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7fc4a4a90000
0.000101 mmap(0x7fc4a4a93000, 73728, PROT_READ|PROT_EXEC, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x3000) = 0x7fc4a4a93000
0.000093 mmap(0x7fc4a4aa5000, 16384, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x15000) = 0x7fc4a4aa5000
0.000085 mmap(0x7fc4a4aa9000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x18000) = 0x7fc4a4aa9000
0.000096 close(3) = 0
0.000090 openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libpthread.so.0", O_RDONLY|O_CLOEXEC)
= 3
0.000112 read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\220\201\0\0\0\0\0"..., 832) = 832
0.000091 pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\345Ga\367\265T\320\374\301V)Yf\
223\337"..., 68, 824) = 68
0.000096 fstat(3, {st_mode=S_IFREG|0755, st_size=157224, ...}) = 0
0.000090 pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\345Ga\367\265T\320\374\301V)Yf\
223\337"..., 68, 824) = 68

```

```

0.000091 mmap(NULL, 140408, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7fc4a4a6d000
0.000111 mmap(0x7fc4a4a74000, 69632, PROT_READ|PROT_EXEC, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x7000) = 0x7fc4a4a74000
0.000108 mmap(0x7fc4a4a85000, 20480, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x18000) = 0x7fc4a4a85000
0.000088 mmap(0x7fc4a4a8a000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x1c000) = 0x7fc4a4a8a000
0.000093 mmap(0x7fc4a4a8c000, 13432, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7fc4a4a8c000
0.000106 close(3) = 0
0.000113 openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libc.so.6", O_RDONLY|O_CLOEXEC) = 3
0.000111 read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\3\0>\0\1\0\0\0\360q\2\0\0\0\0"..., 832) = 832
0.000121 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"..., 784, 64) =
784
0.000106 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", 32, 848) =
32
0.000107 pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\t\233\222%\
274\260\320\31\331\326\10\204\276X>\263"..., 68, 880) = 68
0.000096 fstat(3, {st_mode=S_IFREG|0755, st_size=2029224, ...}) = 0
0.000082 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"..., 784, 64) =
784
0.000104 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", 32, 848) =
32
0.000105 pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\t\233\222%\
274\260\320\31\331\326\10\204\276X>\263"..., 68, 880) = 68
0.000089 mmap(NULL, 2036952, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7fc4a4a87b000
0.000088 mprotect(0x7fc4a4a8a000, 1847296, PROT_NONE) = 0
0.000095 mmap(0x7fc4a4a8a000, 1540096, PROT_READ|PROT_EXEC, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x25000) = 0x7fc4a4a8a000
0.000108 mmap(0x7fc4a4a18000, 303104, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x19d000) = 0x7fc4a4a18000 0.000112 mmap(0x7fc4a4a63000, 24576,
PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1e7000) =
0x7fc4a4a63000
0.000089 mmap(0x7fc4a4a69000, 13528, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7fc4a4a69000
0.000095 close(3) = 0

```

```

0.000107 openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libm.so.6", O_RDONLY|O_CLOEXEC) = 3
0.000106 read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\3\0>\0\1\0\0\0\300\363\0\0\0\0\0"..., 832) = 832
0.000099 fstat(3, {st_mode=S_IFREG|0644, st_size=1369352, ...}) = 0
0.000090 mmap(NULL, 1368336, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7fc4a472c000
0.000110 mmap(0x7fc4a473b000, 684032, PROT_READ|PROT_EXEC, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0xf000) = 0x7fc4a473b000
0.000104 mmap(0x7fc4a47e2000, 618496, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0xb6000) = 0x7fc4a47e2000
0.000097 mmap(0x7fc4a4879000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x14c000) = 0x7fc4a4879000
0.000123 close(3) = 0
0.000110 mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_ANONYMOUS, -1, 0) = 0x7fc4a472a000
0.000146 mmap(NULL, 12288, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_ANONYMOUS, -1, 0) = 0x7fc4a4727000
0.000097 arch_prctl(ARCH_SET_FS, 0x7fc4a4727740) = 0
0.000137 mprotect(0x7fc4a4a63000, 12288, PROT_READ) = 0
0.000129 mprotect(0x7fc4a4879000, 4096, PROT_READ) = 0
0.000117 mprotect(0x7fc4a4a8a000, 4096, PROT_READ) = 0
0.000115 mprotect(0x7fc4a4aa9000, 4096, PROT_READ) = 0
0.000524 mprotect(0x7fc4a4c7c000, 45056, PROT_READ) = 0
0.000127 mprotect(0x55b86fbff000, 4096, PROT_READ) = 0
0.000124 mprotect(0x7fc4a4cd1000, 4096, PROT_READ) = 0
0.000104 munmap(0x7fc4a4c8f000, 82162) = 0
0.000107 set_tid_address(0x7fc4a4727a10) = 2031
0.000088 set_robust_list(0x7fc4a4727a20, 24) = 0
0.000095 rt_sigaction(SIGRTMIN, {sa_handler=0x7fc4a4a74bf0, sa_mask=[],
sa_flags=SA_RESTORER|SA_SIGINFO, sa_restorer=0x7fc4a4a823c0}, NULL, 8) = 0
0.000117 rt_sigaction(SIGRT_1, {sa_handler=0x7fc4a4a74c90, sa_mask=[],
sa_flags=SA_RESTORER|SA_RESTART|SA_SIGINFO, sa_restorer=0x7fc4a4a823c0}, NULL, 8) = 0
0.000102 rt_sigprocmask(SIG_UNBLOCK, [RTMIN RT_1], NULL, 8) = 0
0.000101 prlimit64(0, RLIMIT_STACK, NULL, {rlim_cur=8192*1024,
rlim_max=RLIM64_INFINITY}) = 0
0.000292 brk(NULL) = 0x55b870f43000
0.000094 brk(0x55b870f64000) = 0x55b870f64000
0.000121 futex(0x7fc4a4c8a6bc, FUTEX_WAKE_PRIVATE, 2147483647) = 0
0.000156 futex(0x7fc4a4c8a6c8, FUTEX_WAKE_PRIVATE, 2147483647) = 0

```

```

0.000112 fstat(0, {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0x3), ...}) = 0
0.000106 read(0,
"\n", 1024)    = 1
5.238468 read(0,
"\n", 1024)    = 1
0.976995 read(0,
"\n", 1024)    = 1
0.346844 read(0,
"\n", 1024)    = 1
0.478044 read(0,
"\n", 1024)    = 1
0.281061 read(0,
"\n", 1024)    = 1
0.756995 read(0,
"\n", 1024)    = 1
0.507046 read(0,
"\n", 1024)    = 1
0.032345 read(0,
"\n", 1024)    = 1
0.030472 read(0,
"\n", 1024)    = 1
0.031948 read(0,
"\n", 1024)    = 1
0.031054 read(0,
"\n", 1024)    = 1
0.046101 read(0,
"\n", 1024)    = 1
0.032738 read(0,
"\n", 1024)    = 1
0.029735 read(0, 0x55b870f54eb0, 1024) = ? ERESTARTSYS (To be restarted if SA_RESTART is
set)
1.377311 --- SIGWINCH {si_signo=SIGWINCH, si_code=SI_KERNEL} ---

```

JIP №4

```

kivi@LAPTOP-DGOM1IRE:~/os/lab_4/14$ strace -f -r ./lab4
0.000000 execve("./lab4", ["/lab4"], 0x7ffd37f5e240 /* 17 vars */) = 0
0.000399 brk(NULL)           = 0x559011705000
0.000209 arch_prctl(0x3001 /* ARCH_??? */, 0x7ffc146bbaa0) = -1 EINVAL (Invalid argument)
0.000231 access("/etc/ld.so.preload", R_OK) = -1 ENOENT (No such file or directory)

```

```

0.000152 openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXEC) = 3
0.000150 fstat(3, {st_mode=S_IFREG|0644, st_size=82162, ...}) = 0
0.000128 mmap(NULL, 82162, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7f6121a6a000
0.000100 close(3) = 0
0.000100 openat(AT_FDCWD, "/lib/x86_64-linux-gnu/librt.so.1", O_RDONLY|O_CLOEXEC) = 3
0.000103 read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\7\0\0\0\0\0"..., 832) = 832
0.000097 fstat(3, {st_mode=S_IFREG|0644, st_size=40040, ...}) = 0
0.000091 mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_ANONYMOUS, -1, 0) = 0x7f6121a68000
0.000102 mmap(NULL, 44000, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f6121a5d000
0.000110 mprotect(0x7f6121a60000, 24576, PROT_NONE) = 0
0.000171 mmap(0x7f6121a60000, 16384, PROT_READ|PROT_EXEC, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x3000) = 0x7f6121a60000
0.000102 mmap(0x7f6121a64000, 4096, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x7000) = 0x7f6121a64000
0.000097 mmap(0x7f6121a66000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x8000) = 0x7f6121a66000
0.000102 close(3) = 0
0.000100 openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libstdc++.so.6", O_RDONLY|O_CLOEXEC)
= 3
0.000101 read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\3\0>\0\1\0\0\0\341\t\0\0\0\0"..., 832) = 832
0.000101 fstat(3, {st_mode=S_IFREG|0644, st_size=1956992, ...}) = 0
0.000100 mmap(NULL, 1972224, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f612187b000
0.000097 mprotect(0x7f6121911000, 1290240, PROT_NONE) = 0
0.000096 mmap(0x7f6121911000, 987136, PROT_READ|PROT_EXEC, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x96000) = 0x7f6121911000
0.000109 mmap(0x7f6121a02000, 299008, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x187000) = 0x7f6121a02000
0.000102 mmap(0x7f6121a4c000, 57344, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x1d0000) = 0x7f6121a4c000
0.000104 mmap(0x7f6121a5a000, 10240, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7f6121a5a000
0.000104 close(3) = 0
0.000119 openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libgcc_s.so.1", O_RDONLY|O_CLOEXEC) =
3
0.000091 read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\3405\0\0\0\0\0"..., 832) = 832

```

```

0.000090 fstat(3, {st_mode=S_IFREG|0644, st_size=104984, ...}) = 0
0.000104 mmap(NULL, 107592, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f6121860000
0.000110 mmap(0x7f6121863000, 73728, PROT_READ|PROT_EXEC, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x3000) = 0x7f6121863000
0.000126 mmap(0x7f6121875000, 16384, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x15000) = 0x7f6121875000
0.000100 mmap(0x7f6121879000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x18000) = 0x7f6121879000
0.000100 close(3) = 0
0.000102 openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libpthread.so.0", O_RDONLY|O_CLOEXEC)
= 3
0.000130 read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\220\201\0\0\0\0\0"..., 832) = 832
0.000086 pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\345Ga\367\265T\320\374\301V)Yf\
223\337"..., 68, 824) = 68
0.000063 fstat(3, {st_mode=S_IFREG|0755, st_size=157224, ...}) = 0
0.000102 pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\345Ga\367\265T\320\374\301V)Yf\
223\337"..., 68, 824) = 68
0.000097 mmap(NULL, 140408, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f612183d000
0.000094 mmap(0x7f6121844000, 69632, PROT_READ|PROT_EXEC, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x7000) = 0x7f6121844000
0.000097 mmap(0x7f6121855000, 20480, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x18000) = 0x7f6121855000
0.000093 mmap(0x7f612185a000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x1c000) = 0x7f612185a000
0.000099 mmap(0x7f612185c000, 13432, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7f612185c000
0.000111 close(3) = 0
0.000106 openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libc.so.6", O_RDONLY|O_CLOEXEC) = 3
0.000102 read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\3\0>\0\1\0\0\0\360q\2\0\0\0\0"..., 832) = 832
0.000090 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"..., 784, 64) =
784
0.000088 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", 32, 848) =
32
0.000098 pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\t\233\222%\
274\260\320\31\331\326\10\204\276X>\263"..., 68, 880) = 68
0.000099 fstat(3, {st_mode=S_IFREG|0755, st_size=2029224, ...}) = 0

```



```

0.000101 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"..., 784, 64) =
784
0.000084 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", 32, 848) =
32
0.000095 pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\t\233\222%\
274\260\320\31\331\326\10\204\276X>\263"..., 68, 880) = 68
0.000093 mmap(NULL, 2036952, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f612164b000
0.000102 mprotect(0x7f6121670000, 1847296, PROT_NONE) = 0
0.000106 mmap(0x7f6121670000, 1540096, PROT_READ|PROT_EXEC, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x25000) = 0x7f6121670000
0.000098 mmap(0x7f61217e8000, 303104, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x19d000) = 0x7f61217e8000
0.000092 mmap(0x7f6121833000, 24576, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x1e7000) = 0x7f6121833000
0.000101 mmap(0x7f6121839000, 13528, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7f6121839000
0.000097 close(3) = 0
0.000083 openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libm.so.6", O_RDONLY|O_CLOEXEC) = 3
0.000113 read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\3\0>\0\1\0\0\0\300\363\0\0\0\0\0"..., 832) = 832
0.000112 fstat(3, {st_mode=S_IFREG|0644, st_size=1369352, ...}) = 0
0.000101 mmap(NULL, 1368336, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f61214fc000
0.000082 mmap(0x7f612150b000, 684032, PROT_READ|PROT_EXEC, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0xf000) = 0x7f612150b000
0.000091 mmap(0x7f61215b2000, 618496, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0xb6000) = 0x7f61215b2000
0.000101 mmap(0x7f6121649000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x14c000) = 0x7f6121649000
0.000116 close(3) = 0
0.000110 mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_ANONYMOUS, -1, 0) = 0x7f61214fa000
0.000113 mmap(NULL, 12288, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_ANONYMOUS, -1, 0) = 0x7f61214f7000
0.000100 arch_prctl(ARCH_SET_FS, 0x7f61214f7740) = 0
0.000139 mprotect(0x7f6121833000, 12288, PROT_READ) = 0
0.000118 mprotect(0x7f6121649000, 4096, PROT_READ) = 0
0.000109 mprotect(0x7f612185a000, 4096, PROT_READ) = 0

```

```

0.000105 mprotect(0x7f6121879000, 4096, PROT_READ) = 0
0.000483 mprotect(0x7f6121a4c000, 45056, PROT_READ) = 0
0.000117 mprotect(0x7f6121a66000, 4096, PROT_READ) = 0
0.000102 mprotect(0x55900fdb4000, 4096, PROT_READ) = 0
0.000094 mprotect(0x7f6121aac000, 4096, PROT_READ) = 0
0.000102 munmap(0x7f6121a6a000, 82162) = 0
0.000102 set_tid_address(0x7f61214f7a10) = 2204
0.000103 set_robust_list(0x7f61214f7a20, 24) = 0
0.000093 rt_sigaction(SIGRTMIN, {sa_handler=0x7f6121844bf0, sa_mask=[],
sa_flags=SA_RESTORER|SA_SIGINFO, sa_restorer=0x7f61218523c0}, NULL, 8) = 0
0.000095 rt_sigaction(SIGRT_1, {sa_handler=0x7f6121844c90, sa_mask=[],
sa_flags=SA_RESTORER|SA_RESTART|SA_SIGINFO, sa_restorer=0x7f61218523c0}, NULL, 8) = 0
0.000103 rt_sigprocmask(SIG_UNBLOCK, [RTMIN RT_1], NULL, 8) = 0
0.000101 prlimit64(0, RLIMIT_STACK, NULL, {rlim_cur=8192*1024,
rlim_max=RLIM64_INFINITY}) = 0
0.000175 brk(NULL) = 0x559011705000
0.000091 brk(0x559011726000) = 0x559011726000
0.000117 futex(0x7f6121a5a6bc, FUTEX_WAKE_PRIVATE, 2147483647) = 0
0.000141 futex(0x7f6121a5a6c8, FUTEX_WAKE_PRIVATE, 2147483647) = 0
0.000125 fstat(0, {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0x3), ...}) = 0

```

JIP №5

kivi@LAPTOP-DGOMIIRE:~/os/lab_5/ch1/lch1\$ strace -f -r ./lab5

```

0.000000 execve("./lab5", ["/lab5"], 0x7ffc8325720 /* 17 vars */) = 0
0.000342 brk(NULL) = 0x55898d59a000
0.000140 arch_prctl(0x3001 /* ARCH_??? */, 0x7ffc8bf1e270) = -1 EINVAL (Invalid argument)
0.000200 access("/etc/ld.so.preload", R_OK) = -1 ENOENT (No such file or directory)
0.000111 openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXEC) = 3
0.000190 fstat(3, {st_mode=S_IFREG|0644, st_size=82162, ...}) = 0
0.000123 mmap(NULL, 82162, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7f56a0906000
0.000097 close(3) = 0
0.000088 openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libstdc++.so.6", O_RDONLY|O_CLOEXEC)
= 3
0.000104 read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\3\0>\0\1\0\0\0\341\t\0\0\0\0"..., 832) = 832
0.000095 fstat(3, {st_mode=S_IFREG|0644, st_size=1956992, ...}) = 0
0.000107 mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_ANONYMOUS, -1, 0) = 0x7f56a0904000
0.000126 mmap(NULL, 1972224, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f56a0722000

```

```

0.000129 mprotect(0x7f56a07b8000, 1290240, PROT_NONE) = 0
0.000106 mmap(0x7f56a07b8000, 987136, PROT_READ|PROT_EXEC, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x96000) = 0x7f56a07b8000
0.000102 mmap(0x7f56a08a9000, 299008, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x187000) = 0x7f56a08a9000
0.000089 mmap(0x7f56a08f3000, 57344, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x1d0000) = 0x7f56a08f3000
0.000123 mmap(0x7f56a0901000, 10240, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7f56a0901000
0.000126 close(3) = 0
0.000130 openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libc.so.6", O_RDONLY|O_CLOEXEC) = 3
0.000113 read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\360q\2\0\0\0\0"... , 832) = 832
0.000108 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"... , 784, 64) =
784
0.000127 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", 32, 848) =
32
0.000109 pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\t\233\222%\
274\260\320\31\331\326\10\204\276X>\263"... , 68, 880) = 68
0.000100 fstat(3, {st_mode=S_IFREG|0755, st_size=2029224, ...}) = 0
0.000105 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"... , 784, 64) =
784
0.000107 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", 32, 848) =
32
0.000092 pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\t\233\222%\
274\260\320\31\331\326\10\204\276X>\263"... , 68, 880) = 68
0.000096 mmap(NULL, 2036952, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f56a0530000
0.000098 mprotect(0x7f56a0555000, 1847296, PROT_NONE) = 0
0.000095 mmap(0x7f56a0555000, 1540096, PROT_READ|PROT_EXEC, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x25000) = 0x7f56a0555000
0.000089 mmap(0x7f56a06cd000, 303104, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x19d000) = 0x7f56a06cd000
0.000097 mmap(0x7f56a0718000, 24576, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x1e7000) = 0x7f56a0718000
0.000099 mmap(0x7f56a071e000, 13528, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7f56a071e000
0.000098 close(3) = 0
0.000102 openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libm.so.6", O_RDONLY|O_CLOEXEC) = 3

```

```

0.000101 read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\3\0>\0\1\0\0\0\300\363\0\0\0\0\0"..., 832) = 832
0.000100 fstat(3, {st_mode=S_IFREG|0644, st_size=1369352, ...}) = 0
0.000090 mmap(NULL, 1368336, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f56a03e1000
0.000089 mmap(0x7f56a03f0000, 684032, PROT_READ|PROT_EXEC, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0xf000) = 0x7f56a03f0000
0.000102 mmap(0x7f56a0497000, 618496, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0xb6000) = 0x7f56a0497000
0.000092 mmap(0x7f56a052e000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x14c000) = 0x7f56a052e000
0.000110 close(3) = 0
0.000151 openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libgcc_s.so.1", O_RDONLY|O_CLOEXEC) =
3
0.000108 read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\3405\0\0\0\0\0"..., 832) = 832
0.000100 fstat(3, {st_mode=S_IFREG|0644, st_size=104984, ...}) = 0
0.000100 mmap(NULL, 107592, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f56a03c6000
0.000099 mmap(0x7f56a03c9000, 73728, PROT_READ|PROT_EXEC, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x3000) = 0x7f56a03c9000
0.000101 mmap(0x7f56a03db000, 16384, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x15000) = 0x7f56a03db000
0.000097 mmap(0x7f56a03df000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x18000) = 0x7f56a03df000
0.000096 close(3) = 0
0.000105 mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_ANONYMOUS, -1, 0) = 0x7f56a03c4000
0.000108 arch_prctl(ARCH_SET_FS, 0x7f56a03c4f40) = 0
0.000118 mprotect(0x7f56a0718000, 12288, PROT_READ) = 0
0.000088 mprotect(0x7f56a03df000, 4096, PROT_READ) = 0
0.000106 mprotect(0x7f56a052e000, 4096, PROT_READ) = 0
0.000184 mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_ANONYMOUS, -1, 0) = 0x7f56a03c2000
0.000356 mprotect(0x7f56a08f3000, 45056, PROT_READ) = 0
0.000108 mprotect(0x55898c2a2000, 4096, PROT_READ) = 0
0.000102 mprotect(0x7f56a0948000, 4096, PROT_READ) = 0
0.000098 munmap(0x7f56a0906000, 82162) = 0
0.000162 brk(NULL) = 0x55898d59a000
0.000090 brk(0x55898d5bb000) = 0x55898d5bb000

```

```
0.000168 fstat(0, {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0x3), ...}) = 0
```

2 программа:

```
kivi@LAPTOP-DGOM1IRE:~/os/lab_5/ch2/lch2$ strace -f -r ./lab5
```

```
0.000000 execve("./lab5", ["/lab5"], 0x7ffdd8dcb8e0 /* 17 vars */) = 0
0.000287 brk(NULL) = 0x560fe1e0a000
0.000138 arch_prctl(0x3001 /* ARCH_??? */, 0x7ffc5bccaf40) = -1 EINVAL (Invalid argument)
0.000161 access("/etc/ld.so.preload", R_OK) = -1 ENOENT (No such file or directory)
0.000124 openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXEC) = 3
0.000143 fstat(3, {st_mode=S_IFREG|0644, st_size=82162, ...}) = 0
0.000105 mmap(NULL, 82162, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7f54868fa000
0.000158 close(3) = 0
0.000124 openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libdl.so.2", O_RDONLY|O_CLOEXEC) = 3
0.000130 read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\22\0\0\0\0\0"..., 832) = 832
0.000111 fstat(3, {st_mode=S_IFREG|0644, st_size=18816, ...}) = 0
0.000100 mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_ANONYMOUS, -1, 0) = 0x7f54868f8000
0.000104 mmap(NULL, 20752, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f54868f2000
0.000089 mmap(0x7f54868f3000, 8192, PROT_READ|PROT_EXEC, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x1000) = 0x7f54868f3000
0.000120 mmap(0x7f54868f5000, 4096, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x3000) = 0x7f54868f5000
0.000124 mmap(0x7f54868f6000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x3000) = 0x7f54868f6000
0.000109 close(3) = 0
0.000103 openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libstdc++.so.6", O_RDONLY|O_CLOEXEC)
= 3
0.000103 read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\3\0>\0\1\0\0\0\341\t\0\0\0\0"..., 832) = 832
0.000099 fstat(3, {st_mode=S_IFREG|0644, st_size=1956992, ...}) = 0
0.000092 mmap(NULL, 1972224, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f5486710000
0.000093 mprotect(0x7f54867a6000, 1290240, PROT_NONE) = 0
0.000089 mmap(0x7f54867a6000, 987136, PROT_READ|PROT_EXEC, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x96000) = 0x7f54867a6000
0.000123 mmap(0x7f5486897000, 299008, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x187000) = 0x7f5486897000
0.000104 mmap(0x7f54868e1000, 57344, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x1d0000) = 0x7f54868e1000
```

```

0.000095 mmap(0x7f54868ef000, 10240, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7f54868ef000
0.000105 close(3) = 0
0.000099 openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libm.so.6", O_RDONLY|O_CLOEXEC) = 3
0.000099 read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\300\363\0\0\0\0\0"..., 832) = 832
0.000097 fstat(3, {st_mode=S_IFREG|0644, st_size=1369352, ...}) = 0
0.000101 mmap(NULL, 1368336, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f54865c1000
0.000089 mmap(0x7f54865d0000, 684032, PROT_READ|PROT_EXEC, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0xf000) = 0x7f54865d0000
0.000098 mmap(0x7f5486677000, 618496, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0xb6000) = 0x7f5486677000
0.000101 mmap(0x7f548670e000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x14c000) = 0x7f548670e000
0.000119 close(3) = 0
0.000108 openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libgcc_s.so.1", O_RDONLY|O_CLOEXEC) =
3
0.000131 read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\3405\0\0\0\0\0"..., 832) = 832
0.000107 fstat(3, {st_mode=S_IFREG|0644, st_size=104984, ...}) = 0
0.000096 mmap(NULL, 107592, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f54865a6000
0.000088 mmap(0x7f54865a9000, 73728, PROT_READ|PROT_EXEC, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x3000) = 0x7f54865a9000
0.000097 mmap(0x7f54865bb000, 16384, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x15000) = 0x7f54865bb000
0.000091 mmap(0x7f54865bf000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x18000) = 0x7f54865bf000
0.000110 close(3) = 0
0.000129 openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libc.so.6", O_RDONLY|O_CLOEXEC) = 3
0.000091 read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\360q\2\0\0\0\0"..., 832) = 832
0.000103 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"..., 784, 64) =
784
0.000105 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", 32, 848) =
32
0.000097 pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\t\233\222%\n
274\260\320\31\331\326\10\204\276X>\263"..., 68, 880) = 68
0.000095 fstat(3, {st_mode=S_IFREG|0755, st_size=2029224, ...}) = 0

```

```

0.000091 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"..., 784, 64) =
784
0.000085 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", 32, 848) =
32
0.000092 pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\t\233\222%\
274\260\320\31\331\326\10\204\276X>\263"..., 68, 880) = 68
0.000087 mmap(NULL, 2036952, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f54863b4000
0.000103 mprotect(0x7f54863d9000, 1847296, PROT_NONE) = 0
0.000100 mmap(0x7f54863d9000, 1540096, PROT_READ|PROT_EXEC, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x25000) = 0x7f54863d9000
0.000105 mmap(0x7f5486551000, 303104, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x19d000) = 0x7f5486551000
0.000114 mmap(0x7f548659c000, 24576, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x1e7000) = 0x7f548659c000
0.000108 mmap(0x7f54865a2000, 13528, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7f54865a2000
0.000092 close(3) = 0
0.000102 mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_ANONYMOUS, -1, 0) = 0x7f54863b2000
0.000107 mmap(NULL, 12288, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_ANONYMOUS, -1, 0) = 0x7f54863af000
0.000089 arch_prctl(ARCH_SET_FS, 0x7f54863af740) = 0
0.000134 mprotect(0x7f548659c000, 12288, PROT_READ) = 0
0.000094 mprotect(0x7f54865bf000, 4096, PROT_READ) = 0
0.000093 mprotect(0x7f548670e000, 4096, PROT_READ) = 0
0.000465 mprotect(0x7f54868e1000, 45056, PROT_READ) = 0
0.000114 mprotect(0x7f54868f6000, 4096, PROT_READ) = 0
0.000121 mprotect(0x560fe101c000, 4096, PROT_READ) = 0
0.000096 mprotect(0x7f548693c000, 4096, PROT_READ) = 0
0.000121 munmap(0x7f54868fa000, 82162) = 0
0.000177 brk(NULL) = 0x560fe1e0a000
0.000098 brk(0x560fe1e2b000) = 0x560fe1e2b000
0.000243 fstat(0, {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0x3), ...}) = 0
0.000119 read(0,
"\n", 1024) = 1
1.303293 read(0,
"\n", 1024) = 1

```

```

0.436915 read(0, f
"f\n", 1024)    = 2
8.225992 fstat(1, {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0x3), ...}) = 0
0.000415 write(1, "rez: 4.67516e-310\n", 18rez: 4.67516e-310
) = 18
0.000194 lseek(0, -2, SEEK_CUR) = -1 ESPIPE (Illegal seek)
0.000115 exit_group(0)          = ?
0.000272 +++ exited with 0 +++

```

ЛІП №6-8

```

kivi@LAPTOP-DGOM1IRE:~/os/lab_6-8/l6$ strace -f -r ./control
0.000000 execve("./control", [ "./control"], 0x7ffe2fad70d0 /* 17 vars */) = 0
0.000400 brk(NULL)                = 0x55d8687f4000
0.000161 arch_prctl(0x3001 /* ARCH_??? */, 0x7ffc826b3e0) = -1 EINVAL (Invalid argument)
0.000292 access("/etc/ld.so.preload", R_OK) = -1 ENOENT (No such file or directory)
0.000165 openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXEC) = 3
0.000130 fstat(3, {st_mode=S_IFREG|0644, st_size=82162, ...}) = 0
0.000110 mmap(NULL, 82162, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7f3bcf1a6000
0.000105 close(3)                  = 0
0.000133 openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libzmq.so.5", O_RDONLY|O_CLOEXEC) =
3
0.000145 read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\3\0>\0\1\0\0\0`z\1\0\0\0\0"... , 832) = 832
0.000177 fstat(3, {st_mode=S_IFREG|0644, st_size=675776, ...}) = 0
0.000149 mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_ANONYMOUS, -1, 0) = 0x7f3bcf1a4000
0.000109 mmap(NULL, 678128, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f3bcf0fe000
0.000092 mmap(0x7f3bcf114000, 430080, PROT_READ|PROT_EXEC, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x16000) = 0x7f3bcf114000
0.000095 mmap(0x7f3bcf17d000, 126976, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x7f000) = 0x7f3bcf17d000
0.000109 mmap(0x7f3bcf19c000, 32768, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x9d000) = 0x7f3bcf19c000
0.000194 close(3)                  = 0
0.000129 openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libstdc++.so.6", O_RDONLY|O_CLOEXEC)
= 3
0.000115 read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\3\0>\0\1\0\0\0\`341\t\0\0\0\0"... , 832) = 832

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0.000095 fstat(3, {st_mode=S_IFREG|0644, st_size=1956992, ...}) = 0
0.000100 mmap(NULL, 1972224, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f3bcef1c000
0.000132 mprotect(0x7f3bcefb2000, 1290240, PROT_NONE) = 0
0.000140 mmap(0x7f3bcefb2000, 987136, PROT_READ|PROT_EXEC, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x96000) = 0x7f3bcefb2000
0.000108 mmap(0x7f3bcf0a3000, 299008, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x187000) = 0x7f3bcf0a3000
0.000105 mmap(0x7f3bcf0ed000, 57344, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x1d0000) = 0x7f3bcf0ed000
0.000107 mmap(0x7f3bcf0fb000, 10240, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7f3bcf0fb000
0.000113 close(3) = 0
0.000157 openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libgcc_s.so.1", O_RDONLY|O_CLOEXEC) =
3
0.000106 read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\3405\0\0\0\0\0"..., 832) = 832
0.000095 fstat(3, {st_mode=S_IFREG|0644, st_size=104984, ...}) = 0
0.000091 mmap(NULL, 107592, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f3bcef01000
0.000095 mmap(0x7f3bcef04000, 73728, PROT_READ|PROT_EXEC, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x3000) = 0x7f3bcef04000
0.000098 mmap(0x7f3bcef16000, 16384, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x15000) = 0x7f3bcef16000
0.000094 mmap(0x7f3bcef1a000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x18000) = 0x7f3bcef1a000
0.000107 close(3) = 0
0.000092 openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libc.so.6", O_RDONLY|O_CLOEXEC) = 3
0.000111 read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\3\0>\0\1\0\0\0\360q\2\0\0\0\0"..., 832) = 832
0.000103 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"..., 784, 64) =
784
0.000099 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", 32, 848) =
32
0.000089 pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\t\233\222%\
274\260\320\31\331\326\10\204\276X>\263"..., 68, 880) = 68
0.000092 fstat(3, {st_mode=S_IFREG|0755, st_size=2029224, ...}) = 0
0.000091 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"..., 784, 64) =
784

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0.000100 pread64(3, "\4\0\0\20\0\0\5\0\0\0GNU\0\2\0\0\300\4\0\0\3\0\0\0\0\0", 32, 848) =
32
0.000090 pread64(3, "\4\0\0\24\0\0\3\0\0\0GNU\0\t\233\222%\
274\260\320\31\331\326\10\204\276X>\263"... , 68, 880) = 68
0.000100 mmap(NULL, 2036952, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f3bcd0f000
0.000099 mprotect(0x7f3bcd34000, 1847296, PROT_NONE) = 0
0.000097 mmap(0x7f3bcd34000, 1540096, PROT_READ|PROT_EXEC, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x25000) = 0x7f3bcd34000
0.000102 mmap(0x7f3bceeac000, 303104, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x19d000) = 0x7f3bceeac000
0.000126 mmap(0x7f3bceef7000, 24576, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x1e7000) = 0x7f3bceef7000
0.000108 mmap(0x7f3bceefd000, 13528, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7f3bceefd000
0.000107 close(3) = 0
0.000095 openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libsodium.so.23", O_RDONLY|
O_CLOEXEC) = 3
0.000167 read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\200\302\0\0\0\0\0"... , 832) = 832
0.000178 fstat(3, {st_mode=S_IFREG|0644, st_size=355016, ...}) = 0
0.000088 mmap(NULL, 357384, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f3bcecb7000
0.000130 mmap(0x7f3bcecc3000, 229376, PROT_READ|PROT_EXEC, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0xc000) = 0x7f3bcecc3000
0.000140 mmap(0x7f3bcecfb000, 73728, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x44000) = 0x7f3bcecfb000
0.000120 mmap(0x7f3bcd0d000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x55000) = 0x7f3bcd0d000
0.000197 close(3) = 0
0.000207 openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libpgm-5.2.so.0", O_RDONLY|
O_CLOEXEC) = 3
0.000161 read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\240L\0\0\0\0\0"... , 832) = 832
0.000211 fstat(3, {st_mode=S_IFREG|0644, st_size=302056, ...}) = 0
0.000126 mmap(NULL, 321584, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f3bcec68000
0.000097 mmap(0x7f3bcec6c000, 163840, PROT_READ|PROT_EXEC, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x4000) = 0x7f3bcec6c000

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0.000081 mmap(0x7f3bcec94000, 118784, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x2c000) = 0x7f3bcec94000
0.000077 mmap(0x7f3bcecb1000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x48000) = 0x7f3bcecb1000
0.000151 mmap(0x7f3bcecb3000, 14384, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7f3bcecb3000
0.000138 close(3) = 0
0.000123 openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libnorm.so.1", O_RDONLY|O_CLOEXEC) =
3
0.000153 read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\0\257\0\0\0\0\0"..., 832) = 832
0.000157 fstat(3, {st_mode=S_IFREG|0644, st_size=690344, ...}) = 0
0.000099 mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_ANONYMOUS, -1, 0) = 0x7f3bcec66000
0.000091 mmap(NULL, 1420000, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f3bceb0b000
0.000103 mmap(0x7f3bceb15000, 421888, PROT_READ|PROT_EXEC, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0xa000) = 0x7f3bceb15000
0.000107 mmap(0x7f3bceb7c000, 217088, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x71000) = 0x7f3bceb7c000
0.000105 mmap(0x7f3bcebb1000, 16384, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0xa5000) = 0x7f3bcebb1000
0.000157 mmap(0x7f3bcebb5000, 723680, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7f3bcebb5000
0.000157 close(3) = 0
0.000195 openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libgssapi_krb5.so.2", O_RDONLY|
O_CLOEXEC) = 3
0.000119 read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\3\0>\0\1\0\0\0P\321\0\0\0\0\0"..., 832) = 832
0.000097 fstat(3, {st_mode=S_IFREG|0644, st_size=309712, ...}) = 0
0.000088 mmap(NULL, 312128, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f3bceabe000
0.000079 mmap(0x7f3bceac9000, 204800, PROT_READ|PROT_EXEC, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0xb000) = 0x7f3bceac9000
0.000095 mmap(0x7f3bceafb000, 49152, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x3d000) = 0x7f3bceafb000
0.000100 mmap(0x7f3bceb07000, 16384, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x48000) = 0x7f3bceb07000
0.000096 close(3) = 0

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0.000096 openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libpthread.so.0", O_RDONLY|O_CLOEXEC)
= 3
0.000105 read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\220\201\0\0\0\0\0"..., 832) = 832
0.000084 pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0\0GNU\0\345Ga\367\265T\320\374\301V)Yf\
223\337"..., 68, 824) = 68
0.000106 fstat(3, {st_mode=S_IFREG|0755, st_size=157224, ...}) = 0
0.000100 pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0\0GNU\0\345Ga\367\265T\320\374\301V)Yf\
223\337"..., 68, 824) = 68
0.000112 mmap(NULL, 140408, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f3bcea9b000
0.000247 mmap(0x7f3bceaa2000, 69632, PROT_READ|PROT_EXEC, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x7000) = 0x7f3bceaa2000
0.000112 mmap(0x7f3bceab3000, 20480, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x18000) = 0x7f3bceab3000
0.000118 mmap(0x7f3bceab8000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x1c000) = 0x7f3bceab8000
0.000102 mmap(0x7f3bceaba000, 13432, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7f3bceaba000
0.000092 close(3) = 0
0.000087 openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libm.so.6", O_RDONLY|O_CLOEXEC) = 3
0.000096 read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\3\0>\0\1\0\0\0\300\363\0\0\0\0\0"..., 832) = 832
0.000087 fstat(3, {st_mode=S_IFREG|0644, st_size=1369352, ...}) = 0
0.000086 mmap(NULL, 1368336, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f3bce94c000
0.000083 mmap(0x7f3bce95b000, 684032, PROT_READ|PROT_EXEC, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0xf000) = 0x7f3bce95b000
0.000090 mmap(0x7f3bcea02000, 618496, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0xb6000) = 0x7f3bcea02000
0.000084 mmap(0x7f3bcea99000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x14c000) = 0x7f3bcea99000
0.000092 close(3) = 0
0.000093 openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libkrb5.so.3", O_RDONLY|O_CLOEXEC) =
3
0.000093 read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\2\0\0\0\0\0"..., 832) = 832
0.000119 fstat(3, {st_mode=S_IFREG|0644, st_size=902016, ...}) = 0
0.000087 mmap(NULL, 904640, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f3bce86f000
0.000123 mprotect(0x7f3bce891000, 700416, PROT_NONE) = 0

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0.000124 mmap(0x7f3bce891000, 397312, PROT_READ|PROT_EXEC, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x22000) = 0x7f3bce891000
0.000100 mmap(0x7f3bce8f2000, 299008, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x83000) = 0x7f3bce8f2000
0.000100 mmap(0x7f3bce93c000, 65536, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0xcc000) = 0x7f3bce93c000
0.000138 close(3) = 0
0.000108 openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libk5crypto.so.3", O_RDONLY|
O_CLOEXEC) = 3
0.000118 read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\240D\0\0\0\0\0"..., 832) = 832
0.000104 fstat(3, {st_mode=S_IFREG|0644, st_size=191040, ...}) = 0
0.000093 mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_ANONYMOUS, -1, 0) = 0x7f3bce86d000
0.000093 mmap(NULL, 196696, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f3bce83c000
0.000093 mprotect(0x7f3bce840000, 172032, PROT_NONE) = 0
0.000076 mmap(0x7f3bce840000, 114688, PROT_READ|PROT_EXEC, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x4000) = 0x7f3bce840000
0.000095 mmap(0x7f3bce85c000, 53248, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x20000) = 0x7f3bce85c000
0.000102 mmap(0x7f3bce86a000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x2d000) = 0x7f3bce86a000
0.000097 mmap(0x7f3bce86c000, 88, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_ANONYMOUS, -1, 0) = 0x7f3bce86c000
0.000106 close(3) = 0
0.000109 openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libcom_err.so.2", O_RDONLY|
O_CLOEXEC) = 3
0.000113 read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\200$\0\0\0\0\0"..., 832) = 832
0.000099 fstat(3, {st_mode=S_IFREG|0644, st_size=22600, ...}) = 0
0.000091 mmap(NULL, 24744, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f3bce835000
0.000095 mmap(0x7f3bce837000, 8192, PROT_READ|PROT_EXEC, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x2000) = 0x7f3bce837000
0.000088 mmap(0x7f3bce839000, 4096, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x4000) = 0x7f3bce839000
0.000083 mmap(0x7f3bce83a000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x4000) = 0x7f3bce83a000
0.000101 close(3) = 0

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0.000101 openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libkrb5support.so.0", O_RDONLY|
O_CLOEXEC) = 3
0.000143 read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\3605\0\0\0\0\0"..., 832) = 832
0.000099 fstat(3, {st_mode=S_IFREG|0644, st_size=56096, ...}) = 0
0.000101 mmap(NULL, 58344, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f3bce826000
0.000104 mmap(0x7f3bce829000, 28672, PROT_READ|PROT_EXEC, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x3000) = 0x7f3bce829000
0.000098 mmap(0x7f3bce830000, 12288, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0xa000) = 0x7f3bce830000
0.000087 mmap(0x7f3bce833000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0xc000) = 0x7f3bce833000
0.000130 close(3) = 0
0.000102 openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libkeyutils.so.1", O_RDONLY|O_CLOEXEC)
= 3
0.000096 read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\3\0>\0\1\0\0\0@\\"0\0\0\0\0"..., 832) = 832
0.000080 fstat(3, {st_mode=S_IFREG|0644, st_size=22600, ...}) = 0
0.000084 mmap(NULL, 24592, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f3bce81f000
0.000114 mmap(0x7f3bce821000, 8192, PROT_READ|PROT_EXEC, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x2000) = 0x7f3bce821000
0.000089 mmap(0x7f3bce823000, 4096, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x4000) = 0x7f3bce823000
0.000100 mmap(0x7f3bce824000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x4000) = 0x7f3bce824000
0.000111 close(3) = 0
0.000085 openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libresolv.so.2", O_RDONLY|O_CLOEXEC)
= 3
0.000094 read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\3\0>\0\1\0\0\0 G\0\0\0\0\0"..., 832) = 832
0.000092 fstat(3, {st_mode=S_IFREG|0644, st_size=101320, ...}) = 0
0.000081 mmap(NULL, 113280, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f3bce803000
0.000078 mprotect(0x7f3bce807000, 81920, PROT_NONE) = 0
0.000078 mmap(0x7f3bce807000, 65536, PROT_READ|PROT_EXEC, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x4000) = 0x7f3bce807000
0.000086 mmap(0x7f3bce817000, 12288, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x14000) = 0x7f3bce817000

```

```

0.000091 mmap(0x7f3bce81b000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x17000) = 0x7f3bce81b000
0.000091 mmap(0x7f3bce81d000, 6784, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7f3bce81d000
0.000090 close(3) = 0
0.000097 openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libdl.so.2", O_RDONLY|O_CLOEXEC) = 3
0.000078 read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\3\0>\0\1\0\0\0 \22\0\0\0\0\0"..., 832) = 832
0.000126 fstat(3, {st_mode=S_IFREG|0644, st_size=18816, ...}) = 0
0.000093 mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_ANONYMOUS, -1, 0) = 0x7f3bce801000
0.000085 mmap(NULL, 20752, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f3bce7fb000
0.000074 mmap(0x7f3bce7fc000, 8192, PROT_READ|PROT_EXEC, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x1000) = 0x7f3bce7fc000
0.000070 mmap(0x7f3bce7fe000, 4096, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x3000) = 0x7f3bce7fe000
0.000081 mmap(0x7f3bce7ff000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x3000) = 0x7f3bce7ff000
0.000103 close(3) = 0
0.000176 mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_ANONYMOUS, -1, 0) = 0x7f3bce7f9000
0.000095 mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_ANONYMOUS, -1, 0) = 0x7f3bce7f7000
0.000086 arch_prctl(ARCH_SET_FS, 0x7f3bce7fa600) = 0
0.000122 mprotect(0x7f3bceef7000, 12288, PROT_READ) = 0
0.000121 mprotect(0x7f3bce7ff000, 4096, PROT_READ) = 0
0.000092 mprotect(0x7f3bce81b000, 4096, PROT_READ) = 0
0.000088 mprotect(0x7f3bce824000, 4096, PROT_READ) = 0
0.000097 mprotect(0x7f3bce833000, 4096, PROT_READ) = 0
0.000127 mprotect(0x7f3bceab8000, 4096, PROT_READ) = 0
0.000151 mprotect(0x7f3bce83a000, 4096, PROT_READ) = 0
0.000087 mprotect(0x7f3bce86a000, 4096, PROT_READ) = 0
0.000137 mprotect(0x7f3bce93c000, 57344, PROT_READ) = 0
0.000122 mprotect(0x7f3bcea99000, 4096, PROT_READ) = 0
0.000105 mprotect(0x7f3bceb07000, 8192, PROT_READ) = 0
0.000081 mprotect(0x7f3bcefla000, 4096, PROT_READ) = 0
0.000658 mprotect(0x7f3bcf0ed000, 45056, PROT_READ) = 0
0.000323 mprotect(0x7f3bcebb1000, 12288, PROT_READ) = 0

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0.000137 mprotect(0x7f3bcecb1000, 4096, PROT_READ) = 0
0.000214 mprotect(0x7f3bced0d000, 4096, PROT_READ) = 0
0.000567 mprotect(0x7f3bcf19c000, 28672, PROT_READ) = 0
0.000161 mprotect(0x55d866fce000, 4096, PROT_READ) = 0
0.000086 mprotect(0x7f3bcf1e8000, 4096, PROT_READ) = 0
0.000114 munmap(0x7f3bcf1a6000, 82162) = 0
0.000086 set_tid_address(0x7f3bce7fa8d0) = 2515
0.000074 set_robust_list(0x7f3bce7fa8e0, 24) = 0
0.000094 rt_sigaction(SIGRTMIN, {sa_handler=0x7f3bceaa2bf0, sa_mask=[],
sa_flags=SA_RESTORER|SA_SIGINFO, sa_restorer=0x7f3bceab03c0}, NULL, 8) = 0
0.000084 rt_sigaction(SIGRT_1, {sa_handler=0x7f3bceaa2c90, sa_mask=[],
sa_flags=SA_RESTORER|SA_RESTART|SA_SIGINFO, sa_restorer=0x7f3bceab03c0}, NULL, 8) = 0
0.000084 rt_sigprocmask(SIG_UNBLOCK, [RTMIN RT_1], NULL, 8) = 0
0.000085 prlimit64(0, RLIMIT_STACK, NULL, {rlim_cur=8192*1024,
rlim_max=RLIM64_INFINITY}) = 0
0.000171 brk(NULL) = 0x55d8687f4000
0.000077 brk(0x55d868815000) = 0x55d868815000
0.000588 futex(0x7f3bcf0fb6bc, FUTEX_WAKE_PRIVATE, 2147483647) = 0
0.000168 futex(0x7f3bcf0fb6c8, FUTEX_WAKE_PRIVATE, 2147483647) = 0
0.000242 fstat(0, {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0x3), ...}) = 0
0.000116 read(0, 1
"1\n", 1024) = 2
3.290535 read(0, create 1 -1
"create 1 -1\n", 1024) = 12
10.674351 lseek(0, -12, SEEK_CUR) = -1 ESPIPE (Illegal seek)
0.000146 exit_group(0) = ?
0.000364 +++ exited with 0 +++

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Выводы

По мере выполнения данной лабораторной работы я освоил диагностику работы ПО с помощью утилиты strace — простого и надёжного инструмента. Strace позволяет отслеживать выполнение системных вызовов и сигналов к ядру системы. Ее функционал прост, но широк; работать с ней комфортно и, главное, полезно. Я научился просматривать как все вызовы сразу, так и несколько отдельных; получилось отследить работу и дочерних процессов. Научился отображать названия, пути к файлам, с которыми работает программа, вместо дескрипторов. Получилось взглянуть на удобную статистику системных вызовов и наблюдать время выполнения (обычное и относительное) тех или иных вызовов. Смог подключиться к уже запущенному процессу. Все это — лишь малая часть функционала утилиты strace. С ее помощью можно делать еще много интересных вещей: намеренно ломать программу (инъекция ошибок) для выявления уязвимостей,

наблюдать стек процесса в момент системного вызова и другое. Но больше всего мне понравилась возможность отследить время тех или иных вызовов, т.к. это в будущем позволит определить, в каком участке кода программа могла заикнуться; или понять, в каком месте стоит произвести оптимизацию. Также интересной и полезной я нахожу возможность отобразить статистику системных вызовов в удобной форме, в виде таблицы.