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Институт №8 “Компьютерные науки и прикладная математика”  
Кафедра №806 “Вычислительная математика и программирование”

**Лабораторная работа №5 по курсу**  
**«Операционные системы»**

Группа: М8О-209БВ-24

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Оценка: \_\_\_\_\_

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## Постановка задачи

### Цель работы:

Приобретение практических навыков диагностики работы программного обеспечения.

### Задание:

При выполнении лабораторных работ по курсу ОС нужно продемонстрировать ключевые системные вызовы, которые в них используются и то, что их выполнение соответствует варианту лабораторной работы.

## Общий метод и алгоритм решения

Strace — утилита командной строки для трассировки системных вызовов и сигналов операционной системы Linux. Ее основное назначение — перехват и запись взаимодействия между пользовательским процессом и ядром операционной системы в реальном времени.

## Основные флаги:

- p <PID> присоединиться к уже работающему процессу с указанным PID
- c — подсчитать статистику по системным вызовам и вывести сводку после завершения.
- f — трассировать также все дочерние процессы, созданные при помощи fork()
- e — фильтрация вывода
- o <file> - вывести вывод трассировки в указанный файл вместо stderr.
- s<размер> - увеличить максимальную длину выводимых строк аргументов (по умолчанию 32 символа).
- t — выводить время

# Протокол работы программы

## Lab 1:

```
$ strace -f ./main
execve("./main", [ "./main" ], 0x7ffde1b8ad38 /* 49 vars */) = 0
brk(NULL)
= 0x5643edd4d000
arch_prctl(0x3001 /* ARCH_??? */, 0x7ffed25bee60) = -1 EINVAL (Недопустимый
аргумент)
access("/etc/ld.so.preload", R_OK)
каталога)
= -1 ENOENT (Нет такого файла или
openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXEC) = 3
fstat(3, {st_mode=S_IFREG|0644, st_size=73833, ...}) = 0
mmap(NULL, 73833, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7fb731768000
close(3)
= 0
openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libc.so.6", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\360q\2\0\0\0\0\0"...
, 832) = 832
pread64(3, "\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"...
, 784, 64) = 784
pread64(3, "\4\0\0\0\20\0\0\0\5\0\0\0GNU\0\2\0\0\300\4\0\0\0\3\0\0\0\0\0\0\0"...
, 32, 848) = 32
pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\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
```

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mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) =
0x7fb731766000
pread64(3, "\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"... ,
784, 64) = 784
pread64(3, "\4\0\0\0\20\0\0\0\5\0\0\0\GNU\
0\2\0\0\300\4\0\0\0\5\0\0\0\0\0\0",
32, 848) = 32
pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0\GNU\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) =
0x7fb731574000
mprotect(0x7fb731599000, 1847296, PROT_NONE) = 0
mmap(0x7fb731599000, 1540096, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x25000) = 0x7fb731599000
mmap(0x7fb731711000, 303104, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3,
0x19d000) = 0x7fb731711000
mmap(0x7fb73175c000, 24576, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x1e7000) = 0x7fb73175c000
mmap(0x7fb731762000, 13528, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_ANONYMOUS, -1, 0) = 0x7fb731762000
close(3)
= 0
arch_prctl(ARCH_SET_FS, 0x7fb731767540) = 0
mprotect(0x7fb73175c000, 12288, PROT_READ) = 0
mprotect(0x5643edb3c000, 4096, PROT_READ) = 0
mprotect(0x7fb7317a8000, 4096, PROT_READ) = 0
munmap(0x7fb731768000, 73833) = 0
brk(NULL) = 0x5643edd4d000
brk(0x5643edd6e000) = 0x5643edd6e000
fstat(0, {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0), ...}) = 0
read(0, file1.txt
"file1.txt\n", 1024)
= 10
openat(AT_FDCWD, "file1.txt", O_WRONLY|O_CREAT|O_TRUNC, 0666) = 3
read(0, file2.txt
"file2.txt\n", 1024)
= 10
openat(AT_FDCWD, "file2.txt", O_WRONLY|O_CREAT|O_TRUNC, 0666) = 4
pipe([5, 6]) = 0
pipe([7, 8]) = 0
clone(child_stack=NULL, flags=CLONE_CHILD_CLEARTID|CLONE_CHILD_SETTID|SIGCHLD,
child_tidptr=0x7fb731767810) = 4728
clone(child_stack=NULL, flags=CLONE_CHILD_CLEARTID|CLONE_CHILD_SETTID|SIGCHLD,
child_tidptr=0x7fb731767810) = 4729
close(3) = 0
close(4) = 0
close(5) = 0
close(7) = 0
read(0, strace: Process 4728 attached
<unfinished ...>

```

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[pid4728] close(4)= 0
[pid4728] close(7)= 0
[pid4728] close(8)= 0
[pid4728] close(6)= 0[pid4728] dup2(5, 0)
= 0
[pid4728] dup2(3, 1)
= 1
[pid4728] close(3strace: Process 4729 attached
)
= 0
[pid4728] execve("child", NULL, 0x7ffed25bef48 /* 49 vars */ <unfinished ...>
[pid4729] close(3)
= 0
[pid4729] close(5)
= 0
[pid4729] close(6)
= 0
[pid4729] close(8)
= 0
[pid4729] dup2(7, 0)
= 0
[pid4729] dup2(4, 1)
= 1
[pid4729] close(4)
= 0
[pid4729] execve("child", NULL, 0x7ffed25bef48 /* 49 vars */ <unfinished ...>
[pid4728] <... execve resumed>)
[pid4728] brk(NULL <unfinished ...>
[pid4729] <... execve resumed>)
[pid4729] brk(NULL <unfinished ...>
[pid4728] <... brk resumed>)
[pid4728] arch_prctl(0x3001 /* ARCH_??? */, 0x7ffc0937eb80 <unfinished ...>
[pid4729] <... brk resumed>)
= 0
= 0
= 0x55b32f123000
= 0x55884ee36000
[pid 4729]
arch_prctl(0x3001 /* ARCH_??? */, 0x7ffd061df910) = -1 EINVAL
(Недопустимый
аргумент)
[pid4728] <... arch_prctl resumed>)
= -1 EINVAL (Недопустимый аргумент)
[pid4729] access("/etc/ld.so.preload", R_OK <unfinished ...>
[pid 4728] access("/etc/ld.so.preload", R_OK) = -1 ENOENT (Нет такого файла
или каталога)
[pid
каталога)4729] <... access resumed>)
= -1 ENOENT (Нет такого файла или

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```

<unfinished> [pid4728] openat(AT_FDCWD, "/etc/ld.so.cache", 0_RDONLY|O_CLOEXEC
[pid4729] openat(AT_FDCWD, "/etc/ld.so.cache", 0_RDONLY|O_CLOEXEC) = 3
[pid4728] <... openat resumed>)
[pid4728] fstat(3,
<unfinished ...>
[pid4729] fstat(3,
<unfinished ...>
[pid4728] <... fstat resumed>{st_mode=S_IFREG|0644, st_size=73833, ...}) = 0
[pid4729] <... fstat resumed>{st_mode=S_IFREG|0644, st_size=73833, ...}) = 0
[pid4729] mmap(NULL, 73833, PROT_READ, MAP_PRIVATE, 3, 0 <unfinished ...>
[pid4728] mmap(NULL, 73833, PROT_READ, MAP_PRIVATE, 3, 0 <unfinished ...>
[pid4729] <... mmap resumed>)
= 0x7f9f03ba1000
[pid4728] <... mmap resumed>)
= 0x7f8c0c66c000
[pid4728] close(3 <unfinished ...>
[pid4729] close(3 <unfinished ...>
[pid4728] <... close resumed>)
= 0
[pid4729] <... close resumed>)
= 0
= 3
[pid <unfinished
4728] openat(AT_FDCWD,
"/lib/x86_64-linux-gnu/libc.so.6", 0_RDONLY|
O_CLOEXEC
...>
[pid 4729] openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libc.so.6", 0_RDONLY|
O_CLOEXEC) = 3
[pid4728] <... openat resumed>)
[pid4729] read(3,<unfinished ...>
[pid4728] read(3,<unfinished ...>
= 3[pid 4729] <... read resumed>"\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\3\0>\
0\1\0\0\0\360q\2\0\0\0\0\0"... , 832) = 832
[pid 4728] <... read resumed>"\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\3\0>\
0\1\0\0\0\360q\2\0\0\0\0\0"... , 832) = 832
[pid4729] pread64(3,<unfinished ...>
[pid4728] pread64(3,<unfinished ...>
[pid 4729] <... pread64 resumed>"\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\
0\0\0\0\0\0\0@\0\0\0\0\0\0\0\0"... , 784, 64) = 784
[pid 4728] <... pread64 resumed>"\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\
0\0\0\0\0\0\0@\0\0\0\0\0\0\0\0"... , 784, 64) = 784
[pid4729] pread64(3,<unfinished ...>
[pid4728] pread64(3,<unfinished ...>
[pid 4729] <... pread64 resumed>"\4\0\0\0\20\0\0\0\5\0\0\0GNU\
0\2\0\0\300\4\0\0\0\3\0\0\0\0\0\0\0", 32, 848) = 32
[pid 4728] <... pread64 resumed>"\4\0\0\0\20\0\0\0\5\0\0\0GNU\
0\2\0\0\300\4\0\0\0\3\0\0\0\0\0\0\0", 32, 848) = 32

```

```

[pid4729] pread64(3,<unfinished ...>
[pid4728] pread64(3,<unfinished ...>
[pid 4729] <... pread64 resumed>"\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
[pid 4728] <... pread64 resumed>"\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
[pid
4729] fstat(3, {st_mode=S_IFREG|0755, st_size=2029224, ...}) = 0
[pid 4729] mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -
1, 0) = 0x7f9f03b9f000
[pid 4729] 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
[pid 4729] 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
[pid 4729] 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
[pid 4729] mmap(NULL, 2036952, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f9f039ad000
[pid
4729] mprotect(0x7f9f039d2000, 1847296, PROT_NONE) = 0
[pid 4729] mmap(0x7f9f039d2000, 1540096, PROT_READ|PROT_EXEC, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x25000) = 0x7f9f039d2000
[pid 4729] mmap(0x7f9f03b4a000, 303104, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x19d000) = 0x7f9f03b4a000
[pid 4729] mmap(0x7f9f03b95000, 24576, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x1e7000 <unfinished ...>
[pid4728] fstat(3,
<unfinished ...>
[pid4729] <... mmap resumed>)
= 0x7f9f03b95000[pid
4728] <... fstat resumed>{st_mode=S_IFREG|0755, st_size=2029224, ...}) =
0
[pid 4728] mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -
1, 0 <unfinished ...>
[pid 4729] mmap(0x7f9f03b9b000, 13528, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_ANONYMOUS, -1, 0 <unfinished ...>
[pid4728] <... mmap resumed>)
[pid4728] pread64(3,
[pid4729] <... mmap resumed>)
[pid4729] close(3 <unfinished ...>
= 0x7f8c0c66a000
<unfinished ...>
= 0x7f9f03b9b000
[pid 4728] <... pread64 resumed>"\6\0\0\0\4\0\0\0@\0\0\0\0\0\0@\
0\0\0\0\0\0@\0\0\0\0\0\0"..., 784, 64) = 784
[pid4728] pread64(3,
<unfinished ...>
[pid4729] <... close resumed>)
= 0

```

```

[pid 4728] <... pread64 resumed>"\4\0\0\0\20\0\0\0\5\0\0\0GNU\
0\2\0\0\300\4\0\0\0\3\0\0\0\0\0\0\0", 32, 848) = 32
[pid
4729] arch_prctl(ARCH_SET_FS, 0x7f9f03ba0540 <unfinished ...>
[pid 4728] 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
[pid 4728] mmap(NULL, 2036952, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f8c0c478000
[pid4728] mprotect(0x7f8c0c49d000, 1847296, PROT_NONE) = 0
[pid4729] <... arch_prctl resumed>)
[pid4729] mprotect(0x7f9f03b95000, 12288, PROT_READ <unfinished ...>
= 0
[pid 4728] mmap(0x7f8c0c49d000, 1540096, PROT_READ|PROT_EXEC, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x25000) = 0x7f8c0c49d000
[pid 4728] mmap(0x7f8c0c615000, 303104, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x19d000) = 0x7f8c0c615000
[pid 4728] mmap(0x7f8c0c660000, 24576, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE, 3, 0x1e7000) = 0x7f8c0c660000
[pid 4728] mmap(0x7f8c0c666000, 13528, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7f8c0c666000
[pid4728] close(3)
= 0
[pid4728] arch_prctl(ARCH_SET_FS, 0x7f8c0c66b540 <unfinished ...>
[pid4729] <... mprotect resumed>)
= 0
[pid4728] <... arch_prctl resumed>)
= 0
[pid4728] mprotect(0x7f8c0c660000, 12288, PROT_READ <unfinished ...>
[pid4729] mprotect(0x55884dfa5000, 4096, PROT_READ) = 0
[pid4729] mprotect(0x7f9f03be1000, 4096, PROT_READ) = 0
[pid4729] munmap(0x7f9f03ba1000, 73833) = 0
[pid4728] <... mprotect resumed>)
[pid4728] mprotect(0x55b32d937000, 4096, PROT_READ <unfinished ...>
[pid4729] read(0,
[pid4728] <... mprotect resumed>)
= 0
<unfinished ...>
= 0[pid4728] mprotect(0x7f8c0c6ac000, 4096, PROT_READ) = 0
[pid4728] munmap(0x7f8c0c66c000, 73833) = 0
[pid4728] read(0, 123456789123456789123456789
<unfinished ...>
[pid4726] <... read resumed>"1", 1)
= 1
[pid4726] read(0, "2", 1)
= 1
[pid4726] read(0, "3", 1)
= 1
[pid4726] read(0, "4", 1)
= 1

```

```
[pid4726] read(0, "5", 1)
= 1
[pid4726] read(0, "6", 1)
= 1
[pid4726] read(0, "7", 1)
= 1
[pid4726] read(0, "8", 1)
= 1
[pid4726] read(0, "9", 1)
= 1
[pid4726] read(0, "1", 1)
= 1
[pid4726] read(0, "2", 1)
= 1
[pid4726] read(0, "3", 1)
= 1
[pid4726] read(0, "4", 1)
= 1
[pid4726] read(0, "5", 1)
= 1
[pid4726] read(0, "6", 1)
= 1
[pid4726] read(0, "7", 1)
= 1
[pid4726] read(0, "8", 1)
= 1
[pid4726] read(0, "9", 1)
= 1
[pid4726] read(0, "1", 1)
= 1
[pid4726] read(0, "2", 1)
= 1
[pid4726] read(0, "3", 1)
= 1
[pid4726] read(0, "4", 1)
= 1
[pid4726] read(0, "5", 1)
= 1
[pid4726] read(0, "6", 1)
= 1
[pid4726] read(0, "7", 1)
= 1
[pid4726] read(0, "8", 1)
= 1
[pid4726] read(0, "9", 1)
= 1
[pid4726] read(0, "\n", 1)
= 1
[pid4726] write(8, "\33\0\0\0", 4)
```

```

= 4
[pid4726] write(8, "123456789123456789123456789", 27) = 27
[pid4726] read(0,
[pid4729] <... read resumed>"\33\0\0\0", 4) = 4
[pid4729] read(0, "123456789123456789123456789", 27) = 27
[pid4729] fstat(1, {st_mode=S_IFREG|0664, st_size=0, ...}) = 0
[pid4729] brk(NULL)
= 0x55884ee36000
[pid4729] brk(0x55884ee57000)
= 0x55884ee57000
[pid4729] write(1, "987654321987654321987654321\n", 28) = 28
[pid4729] read(0, okay
<unfinished ...>
<unfinished ...>
[pid4726] <... read resumed>"o", 1)= 1
[pid4726] read(0, "k", 1)= 1
[pid4726] read(0, "a", 1)= 1
[pid4726] read(0, "y", 1)= 1
[pid4726] read(0, "\n", 1)= 1
[pid4726] write(8, "\4\0\0\0", 4)= 4[pid4726] write(8, "okay", 4)
= 4
[pid4726] read(0,
[pid4729] <... read resumed>"\4\0\0\0", 4) = 4
[pid4729] read(0, "okay", 4)
= 4
[pid4729] write(1, "yako\n", 5)
= 5
[pid4729] read(0, fedor
<unfinished ...>
<unfinished ...>
[pid4726] <... read resumed>"f", 1)
= 1
[pid4726] read(0, "e", 1)
= 1
[pid4726] read(0, "d", 1)
= 1
[pid4726] read(0, "o", 1)
= 1
[pid4726] read(0, "r", 1)
= 1
[pid4726] read(0, "\n", 1)
= 1
[pid4726] write(6, "\5\0\0\0", 4)
= 4
[pid4726] write(6, "fedor", 5)
= 5
[pid4726] read(0,
[pid4728] <... read resumed>"\5\0\0\0", 4) = 4
[pid4728] read(0, "fedor", 5)

```

```

[pid4728] fstat(1, {st_mode=S_IFREG|0664, st_size=0, ...}) = 0
[pid4728] brk(NULL)
= 0x55b32f123000
[pid4728] brk(0x55b32f144000)
= 0x55b32f144000
[pid4728] write(1, "rodef\n", 6)
= 6
[pid4728] read(0, rodeo
<unfinished ...>
= 5
<unfinished ...>
[pid4726] <... read resumed>"r", 1)
= 1
[pid4726] read(0, "o", 1)
= 1
[pid4726] read(0, "d", 1)
= 1
[pid4726] read(0, "e", 1)
= 1
[pid4726] read(0, "o", 1)
= 1
[pid4726] read(0, "\n", 1)
= 1
[pid4726] write(6, "\5\0\0\0", 4)
= 4
[pid4726] write(6, "rodeo", 5)
= 5
[pid4726] read(0,
[pid4728] <... read resumed>"\5\0\0\0", 4) = 4
[pid4728] read(0, "rodeo", 5)
= 5
[pid4728] write(1, "oedor\n", 6)
= 6
[pid4728] read(0, hihhi
<unfinished ...>
<unfinished ...>
[pid4726] <... read resumed>"h", 1)
= 1
[pid4726] read(0, "i", 1)
= 1
[pid4726] read(0, "h", 1)
= 1
[pid4726] read(0, "i", 1)
= 1
[pid4726] read(0, "h", 1)
= 1
[pid4726] read(0, "i", 1)
= 1
[pid4726] read(0, "\n", 1)

```

```

= 1
[pid4726] write(8, "\6\0\0\0", 4)
= 4
[pid4726] write(8, "hihihi", 6)
= 6
[pid4726] read(0,
[pid4729] <... read resumed>"\6\0\0\0", 4) = 4
<unfinished ...>[pid4729] read(0, "hihihi", 6)= 6
[pid4729] write(1, "ihihih\n", 7)= 7
[pid4729] read(0,[pid4726] <... read resumed>"", 1)= 0
[pid4726] close(6)= 0
[pid4726] close(8)= 0
[pid4726] exit_group(0)= ?
[pid4726] +++ exited with 0 +++[pid4728] <... read resumed>"", 4)= 0
[pid4728] exit_group(0)= ?
[pid4728] +++ exited with 0 +++
<unfinished ...>
<... read resumed>"", 4)= 0
exit_group(0)= ?
+++ exited with 0 +++

```

## Lab 2:

```

$ strace -f ./a.out -t 4
execve("./a.out", [". /a.out", "-t", "4"], 0x7ffe273340a8 /* 62 vars */) = 0
brk(NULL)
= 0x55f15bfa9000
mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) =
0x7dbfca2f8000
access("/etc/ld.so.preload", R_OK)
каталога)

```

```

= 1 ENOENT (Нет такого файла или каталога)
openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|
O_CLOEXEC) = 3
fstat(3, {st_mode=S_IFREG|0644, st_size=149367, ...}) = 0
mmap(NULL, 149367, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7dbfca2d3000
close(3)
= 0
openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libm.so.6", O_RDONLY|O_CLOEXEC) = 3
"\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\0\0\0\0\0\0\0\0"...,
832) read(3,
= 832
fstat(3, {st_mode=S_IFREG|0644, st_size=952616, ...}) = 0
mmap(NULL, 950296, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7dbfca1ea000
mmap(0x7dbfca1fa000,
PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE,
3, 0x10000)520192,
= 0x7dbfca1fa000
mmap(0x7dbfca279000,
0x8f000)
= 0x7dbfca279000 360448, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3,

```

```

mmap(0x7dbfca2d1000,
PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE,
3, 0xe7000)8192,
= 0x7dbfca2d1000
close(3)
= 0
openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libc.so.6", 0_RDONLY|0_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\3\0>\
0\1\0\0\0\220\243\2\0\0\0\0\0"... ,
832) = 832
784, pread64(3,
64) = 784 "\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"... ,
fstat(3, {st_mode=S_IFREG|0755, st_size=2125328, ...}) = 0
784, pread64(3,
64) = 784 "\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"... ,
mmap(NULL, 2170256, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7dbfc9e00000
mmap(0x7dbfc9e28000,
PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE,
3, 0x28000)1605632,
= 0x7dbfc9e28000
mmap(0x7dbfc9fb0000,
0x1b0000)
= 0x7dbfc9fb0000323584, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3,
mmap(0x7dbfc9fff000,
24576,
PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE,
3, 0x1fe000)
= 0x7dbfc9fff000
mmap(0x7dbfca005000,
52624, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_ANONYMOUS,
-1, 0) = 0x7dbfca005000
close(3)
= 0
mmap(NULL, 12288, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) =
0x7dbfca1e7000
arch_prctl(ARCH_SET_FS, 0x7dbfca1e7740) = 0
set_tid_address(0x7dbfca1e7a10)= 9859
set_robust_list(0x7dbfca1e7a20, 24)= 0
rseq(0x7dbfca1e8060, 0x20, 0, 0x53053053) = 0
mprotect(0x7dbfc9fff000, 16384, PROT_READ) = 0
mprotect(0x7dbfca2d1000, 4096, PROT_READ) = 0
mprotect(0x55f13da4d000, 4096, PROT_READ) = 0
mprotect(0x7dbfca330000, 8192, PROT_READ) = 0
prlimit64(0, RLIMIT_STACK,

```

```

rlim_max=RLIM64_INFINITY})
= 0 NULL, {rlim_cur=8192*1024,
munmap(0x7dbfca2d3000, 149367)
= 0
fstat(0, {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0), ...}) = 0
getrandom("\x2d\x8a\x66\x10\x60\x60\x7d\x3d", 8, GRND_NONBLOCK) = 8
brk(NULL)= 0x55f15bfa9000
brk(0x55f15bfca000)= 0x55f15bfca000
read(0, 2 4
"2 4\n", 1024)
= 4
read(0, 1 1
"1 1\n", 1024)
= 4
read(0, 2 2
"2 2\n", 1024)
= 4read(0, 3 3
"3 3\n", 1024)
= 4
read(0, 4 4
"4 4\n", 1024)
= 4
fstat(1, {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0), ...}) = 0
write(1, "\320\241\320\276\320\267\320\264\320\260\320\275\320\276
\
320\277\320\276\321\202\320\276\320\272\320\276\320\262
\320\264"..., 80Создано
потокaв для пересчета центроидов: 2
) = 80
rt_sigaction(SIGRT_1, {sa_handler=0x7dbfc9e99530, sa_mask=[],
sa_flags=SA_RESTORER|SA_ONSTACK|SA_RESTART|SA_SIGINFO,
sa_restorer=0x7dbfc9e45330},
NULL, 8) = 0
rt_sigprocmask(SIG_UNBLOCK, [RTMIN RT_1], NULL, 8) = 0
mmap(NULL, 8392704, PROT_NONE, MAP_PRIVATE|MAP_ANONYMOUS|MAP_STACK, -1, 0) =
0x7dbfc95ff000
mprotect(0x7dbfc9600000, 8388608, PROT_READ|PROT_WRITE) = 0
rt_sigprocmask(SIG_BLOCK, ~[], [], 8)
= 0
clone3({flags=CLONE_VM|CLONE_FS|CLONE_FILES|CLONE_SIGHAND|CLONE_THREAD|
CLONE_SYSVSEM|CLONE_SETTID|CLONE_PARENT_SETTID|CLONE_CHILD_CLEARTID,
child_tid=0x7dbfc9dff990, parent_tid=0x7dbfc9dff990, exit_signal=0,
stack=0x7dbfc95ff000, stack_size=0x7fff80, tls=0x7dbfc9dff6c0}strace: Process
9861 attached
=> {parent_tid=[9861]}, 88) = 9861
[pid9861] rseq(0x7dbfc9dffffe0, 0x20, 0, 0x53053053 <unfinished ...>
[pid9859] rt_sigprocmask(SIG_SETMASK, [], NULL, 8) = 0
[pid9861] <... rseq resumed>

```

```

= 0
[pid
9859] mmap(NULL, 8392704, PROT_NONE, MAP_PRIVATE|MAP_ANONYMOUS|MAP_STACK,
-1, 0)
= 0x7dbfc8dfe000
[pid
9861] set_robust_list(0x7dbfc9dff9a0, 24 <unfinished ...>
[pid 9859]
<unfinished
...> mprotect(0x7dbfc8dff000, 8388608, PROT_READ|PROT_WRITE
[pid9861] <... set_robust_list resumed>) = 0
[pid9859] <... mprotect resumed>)[pid9859] rt_sigprocmask(SIG_BLOCK,
~[], <unfinished ...>
[pid9861] rt_sigprocmask(SIG_SETMASK, [], <unfinished ...>
[pid9859] <... rt_sigprocmask resumed>[], 8) = 0
= 0
[pid 9859] clone3({flags=CLONE_VM|CLONE_FS|CLONE_FILES|CLONE_SIGHAND|
CLONE_THREAD|CLONE_SYSVSEM|CLONE_SETTLS|CLONE_PARENT_SETTID|
CLONE_CHILD_CLEAR_TID,
child_tid=0x7dbfc95fe990, parent_tid=0x7dbfc95fe990, exit_signal=0,
stack=0x7dbfc8dfe000, stack_size=0x7fff80, tls=0x7dbfc95fe6c0} <unfinished ...>
[pid
9861] <... rt_sigprocmask resumed>NULL, 8) = 0
strace: Process 9862 attached
[pid 9861]
<unfinished
...> mmap(NULL, 134217728, PROT_NONE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0
[pid9859] <... clone3 resumed> => {parent_tid=[9862]}, 88) = 9862
[pid9862] rseq(0x7dbfc95fefe0, 0x20, 0, 0x53053053 <unfinished ...>
[pid9861] <... mmap resumed>)
[pid9859] rt_sigprocmask(SIG_SETMASK, [],
[pid9862] <... rseq resumed>)
[pid9859] <... rt_sigprocmask resumed>NULL, 8) = 0
[pid9861] munmap(0x7dbfc0c00000, 54525952 <unfinished ...>
[pid9862] set_robust_list(0x7dbfc95fe9a0, 24 <unfinished ...>
= 0x7dbfc0c00000
<unfinished ...>
= 0
9859] futex(0x7dbfc9dff990,
FUTEX_WAIT_BITSET|FUTEX_CLOCK_REALTIME,
9861,
NULL,[pid
FUTEX_BITSET_MATCH_ANY
<unfinished
...>
[pid9862] <... set_robust_list resumed>) = 0
[pid9861] <... munmap resumed>)
[pid9862] rt_sigprocmask(SIG_SETMASK, [],
[pid9861] munmap(0x7dbfc8000000, 12582912 <unfinished ...>
[pid9862] <... rt_sigprocmask resumed>NULL, 8) = 0

```

```

= 0
<unfinished ...>[pid 9862]
<unfinished
...> mmap(NULL, 134217728, PROT_NONE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0
[pid9861] <... munmap resumed>)= 0
[pid9862] <... mmap resumed>)= 0x7dbfbc000000
[pid 9861]
<unfinished
...> mprotect(0x7dbfc4000000, 135168, PROT_READ|PROT_WRITE
[pid9862] munmap(0x7dbfc0000000, 67108864 <unfinished ...>
[pid9861] <... mprotect resumed>)
= 0
[pid9862] <... munmap resumed>)
= 0
[pid 9862]
<unfinished
...> mprotect(0x7dbfbc000000, 135168, PROT_READ|PROT_WRITE
[pid9861] rt_sigprocmask(SIG_BLOCK, ~[RT_1],
<unfinished ...>
[pid9862] <... mprotect resumed>)
[pid9861] <... rt_sigprocmask resumed>NULL, 8) = 0
[pid9861] madvise(0x7dbfc95ff000, 8368128, MADV_DONTNEED <unfinished ...>
[pid9862] rt_sigprocmask(SIG_BLOCK, ~[RT_1],
[pid9861] <... madvise resumed>)
[pid9862] <... rt_sigprocmask resumed>NULL, 8) = 0
[pid9862] madvise(0x7dbfc8dfe000, 8368128, MADV_DONTNEED <unfinished ...>
[pid9861] exit(0 <unfinished ...>
[pid9862] <... madvise resumed>)
= 0
[pid9861] <... exit resumed>)
= ?
[pid9862] exit(0 <unfinished ...>
[pid9861] +++ exited with 0 +++
[pid9859] <... futex resumed>)
= 0
[pid9862] <... exit resumed>)
= ?
= 0
<unfinished ...>
= 0
9859] futex(0x7dbfc95fe990,
FUTEX_WAIT_BITSET|FUTEX_CLOCK_REALTIME,
9862,
NULL,[pid
FUTEX_BITSET_MATCH_ANY
<unfinished
...>
[pid
9862] +++ exited with 0 +++

```

```

<... futex resumed>)
недоступен)
= -1 EAGAIN (Ресурс временно
write(1, "\\320\\241\\320\\276\\320\\267\\320\\264\\320\\260\\320\\275\\320\\276
\\
320\\277\\320\\276\\321\\202\\320\\276\\320\\272\\320\\276\\320\\262
\\320\\264"..., 114Создано
потоков для перераспределения точек: 4 (ограничение: 4)
) = 114
rt_sigprocmask(SIG_BLOCK, ~[], [], 8)
= 0
clone3({flags=CLONE_VM|CLONE_FS|CLONE_FILES|CLONE_SIGHAND|CLONE_THREAD|
CLONE_SYSVSEM|CLONE_SETTLS|CLONE_PARENT_SETTID|CLONE_CHILD_CLEARTID,
child_tid=0x7dbfc95fe990, parent_tid=0x7dbfc95fe990, exit_signal=0,
9863 stack=0x7dbfc8dfe000, stack_size=0x7fff80, tls=0x7dbfc95fe6c0}strace: Process
attached
=> {parent_tid=[9863]}, 88) = 9863
[pid9863] rseq(0x7dbfc95fefe0, 0x20, 0, 0x53053053 <unfinished ...>
[pid9859] rt_sigprocmask(SIG_SETMASK, [],
[pid9863] <... rseq resumed>)
[pid9859] <... rt_sigprocmask resumed>NULL, 8) = 0
[pid9863] set_robust_list(0x7dbfc95fe9a0, 24 <unfinished ...>
[pid9859] rt_sigprocmask(SIG_BLOCK, ~[],
[pid9863] <... set_robust_list resumed>) = 0
[pid9859] <... rt_sigprocmask resumed>[], 8) = 0
[pid9863] rt_sigprocmask(SIG_SETMASK, [],
<unfinished ...>
= 0
<unfinished ...>
<unfinished ...>
[pid 9859] clone3({flags=CLONE_VM|CLONE_FS|CLONE_FILES|CLONE_SIGHAND|
CLONE_THREAD|CLONE_SYSVSEM|CLONE_SETTLS|CLONE_PARENT_SETTID|
CLONE_CHILD_CLEARTID,
child_tid=0x7dbfc9dff990, parent_tid=0x7dbfc9dff990, exit_signal=0,
stack=0x7dbfc95ff000, stack_size=0x7fff80, tls=0x7dbfc9dff6c0} <unfinished ...>
[pid9863] <... rt_sigprocmask resumed>NULL, 8) = 0
[pid9863] rt_sigprocmask(SIG_BLOCK, ~[RT_1], strace: Process 9864 attached
NULL, 8) = 0[pid9859] <... clone3 resumed> => {parent_tid=[9864]}, 88) = 9864
[pid9864] rseq(0x7dbfc9dfffe0, 0x20, 0, 0x53053053 <unfinished ...>
[pid9859] rt_sigprocmask(SIG_SETMASK, [],
[pid9863] madvise(0x7dbfc8dfe000, 8368128, MADV_DONTNEED <unfinished ...>
[pid9859] <... rt_sigprocmask resumed>NULL, 8) = 0
[pid9864] <... rseq resumed>)
<unfinished ...>
= 0
9859] mmap(NULL,
8392704, PROT_NONE, MAP_PRIVATE|MAP_ANONYMOUS|MAP_STACK,
-1, 0[pid
<unfinished

```

```

...>
[pid9863] <... madvise resumed>)
= 0
[pid9864] set_robust_list(0x7dbfc9dff9a0, 24 <unfinished ...>
[pid9859] <... mmap resumed>)
[pid9864] <... set_robust_list resumed>) = 0
[pid9863] exit(0 <unfinished ...>
= 0x7dbfc85fd000
[pid 9859]
<unfinished
...> mprotect(0x7dbfc85fe000, 8388608, PROT_READ|PROT_WRITE
[pid9864] rt_sigprocmask(SIG_SETMASK, [],
<unfinished ...>
[pid9859] <... mprotect resumed>)
= 0
[pid9863] <... exit resumed>)
= ?
[pid9864] <... rt_sigprocmask resumed>NULL, 8) = 0
[pid9859] rt_sigprocmask(SIG_BLOCK, ~[],
[pid9863] +++ exited with 0 +++
[pid9859] <... rt_sigprocmask resumed>[], 8) = 0
[pid9864] rt_sigprocmask(SIG_BLOCK, ~[RT_1],
<unfinished ...>
<unfinished ...>
[pid 9859] clone3({flags=CLONE_VM|CLONE_FS|CLONE_FILES|CLONE_SIGHAND|
CLONE_THREAD|CLONE_SYSVSEM|CLONE_SETTLS|CLONE_PARENT_SETTID|
CLONE_CHILD_CLEAR_TID,
child_tid=0x7dbfc8dfd990, parent_tid=0x7dbfc8dfd990, exit_signal=0,
stack=0x7dbfc85fd000, stack_size=0x7fff80, tls=0x7dbfc8dfd6c0} <unfinished ...>
[pid
9864] <... rt_sigprocmask resumed>NULL, 8) = 0
strace: Process 9865 attached
[pid9859] <... clone3 resumed> => {parent_tid=[9865]}, 88) = 9865
[pid9865] rseq(0x7dbfc8dfdf0, 0x20, 0, 0x53053053 <unfinished ...>
[pid9859] rt_sigprocmask(SIG_SETMASK, [],
[pid9865] <... rseq resumed>)
[pid9864] madvise(0x7dbfc95ff000, 8368128, MADV_DONTNEED <unfinished ...>
[pid9859] <... rt_sigprocmask resumed>NULL, 8) = 0
[pid9865] set_robust_list(0x7dbfc8dfd9a0, 24 <unfinished ...>
<unfinished ...>
= 0
9859] mmap(NULL,
8392704, PROT_NONE, MAP_PRIVATE|MAP_ANONYMOUS|MAP_STACK,
-1, 0[pid
<unfinished
...>
[pid9864] <... madvise resumed>)= 0
[pid9859] <... mmap resumed>)= 0x7dbfc37ff000
[pid9865] <... set_robust_list resumed>) = 0

```

```

[pid 9859]
<unfinished ...>
...> mprotect(0x7dbfc3800000, 8388608, PROT_READ|PROT_WRITE
[pid9864] exit(0 <unfinished ...>
[pid9865] rt_sigprocmask(SIG_SETMASK, [],
[pid9859] <... mprotect resumed>)
= 0
[pid9864] <... exit resumed>)
= ?
[pid9865] <... rt_sigprocmask resumed>NULL, 8) = 0
[pid9859] rt_sigprocmask(SIG_BLOCK, ~[],
[pid9864] +++ exited with 0 +++
[pid9859] <... rt_sigprocmask resumed>[], 8) = 0
[pid9865] rt_sigprocmask(SIG_BLOCK, ~[RT_1],
<unfinished ...>
<unfinished ...>
<unfinished ...>
[pid 9859] clone3({flags=CLONE_VM|CLONE_FS|CLONE_FILES|CLONE_SIGHAND|
CLONE_THREAD|CLONE_SYSVSEM|CLONE_SETTLS|CLONE_PARENT_SETTID|
CLONE_CHILD_CLEAR_TID,child_tid=0x7dbfc3fff990,
parent_tid=0x7dbfc3fff990,
exit_signal=0,
stack=0x7dbfc37ff000, stack_size=0x7fff80,
tls=0x7dbfc3fff6c0}
<unfinished ...>
[pid
[pid
attached
9865] <... rt_sigprocmask resumed>NULL, 8) = 0
9865] madvise(0x7dbfc85fd000, 8368128, MADV_DONTNEEDstrace: Process 9866
) = 0
[pid9859] <... clone3 resumed> => {parent_tid=[9866]}, 88) = 9866
[pid9866] rseq(0x7dbfc3ffffe0, 0x20, 0, 0x53053053 <unfinished ...>
[pid9865] exit(0 <unfinished ...>
[pid9859] rt_sigprocmask(SIG_SETMASK, [],
[pid9866] <... rseq resumed>)
= 0
[pid9865] <... exit resumed>)
= ?
[pid9859] <... rt_sigprocmask resumed>NULL, 8) = 0
[pid9866] set_robust_list(0x7dbfc3fff9a0, 24 <unfinished ...>
<unfinished ...>
9859] futex(0x7dbfc3fff990,
FUTEX_WAIT_BITSET|FUTEX_CLOCK_REALTIME,
9866,
NULL,[pid
FUTEX_BITSET_MATCH_ANY
<unfinished ...>
...>

```

```

[pid9865] +++ exited with 0 +++
[pid9866] <... set_robust_list resumed>) = 0
[pid9866] rt_sigprocmask(SIG_SETMASK, [], NULL, 8) = 0
[pid9866] rt_sigprocmask(SIG_BLOCK, ~[RT_1], NULL, 8) = 0
[pid9866] madvise(0x7dbfc37ff000, 8368128, MADV_DONTNEED) = 0
[pid9866] exit(0)
[pid9866] +++ exited with 0 +++
= ?
<... futex resumed>)
= 0
write(1, "1.000000 1.000000\n", 181.000000 1.000000
)
= 18
write(1, "3.000000 3.000000\n", 183.000000 3.000000
)
= 18
write(1, "\320\222\321\200\320\265\320\274\321\217 \
: "... \320\262\321\213\320\277\320\276\320\273\320\275\320\265\320\275\320\270\321\217
, 55Время выполнения: 0.007517 секунд
) = 55
write(1, "\
\320\234\320\260\320\272\321\201\320\270\320\274\320\260\320\273\321\214\320\275
\320\276\320\265 \320\272\320\276\320\273\320"... , 64Максимальное количество
потокoв: 4
) = 64
lseek(0, -1, SEEK_CUR)
смещения)
exit_group(0)
= -1 ESPIPE (Недопустимая операция
= ?
+++ exited with 0 +++

```

### Lab 3:

```

$ strace -f ./parent
execve("./parent", [ "./parent" ], 0x7fff13d0c108 /* 63 vars */) = 0
brk(NULL)
= 0x63f913080000
mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) =
0x7ef1a2c36000
access("/etc/ld.so.preload", R_OK)
каталога)
= -1 ENOENT (Нет такого файла или
openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXEC) = 3
fstat(3, {st_mode=S_IFREG|0644, st_size=153815, ...}) = 0mmap(NULL, 153815,
PROT_READ, MAP_PRIVATE, 3, 0) = 0x7ef1a2c10000
close(3)
= 0
openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libc.so.6", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\3\0>\
0\1\0\0\0\220\243\2\0\0\0\0\0"... ,

```

```

832) = 832
784, pread64(3,
64) = 784 "\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"...,
fstat(3, {st_mode=S_IFREG|0755, st_size=2125328, ...}) = 0
784, pread64(3,
64) = 784 "\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"...,
mmap(NULL, 2170256, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7ef1a2800000
mmap(0x7ef1a2828000,
PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE,
3, 0x28000)1605632,
= 0x7ef1a2828000
mmap(0x7ef1a29b0000,
0x1b0000)
= 0x7ef1a29b0000323584, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3,
mmap(0x7ef1a29ff000,
24576,
PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE,
3, 0x1fe000)
= 0x7ef1a29ff000
mmap(0x7ef1a2a05000,
52624, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_ANONYMOUS,
-1, 0) = 0x7ef1a2a05000
close(3)
= 0
mmap(NULL, 12288, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) =
0x7ef1a2c0d000
arch_prctl(ARCH_SET_FS, 0x7ef1a2c0d740) = 0
set_tid_address(0x7ef1a2c0da10)= 7743
set_robust_list(0x7ef1a2c0da20, 24)= 0
rseq(0x7ef1a2c0e060, 0x20, 0, 0x53053053) = 0
mprotect(0x7ef1a29ff000, 16384, PROT_READ) = 0
mprotect(0x63f8dcb0e000, 4096, PROT_READ) = 0
mprotect(0x7ef1a2c6e000, 8192, PROT_READ) = 0
prlimit64(0, RLIMIT_STACK,
rlim_max=RLIM64_INFINITY})
= 0 NULL, {rlim_cur=8192*1024,
munmap(0x7ef1a2c10000, 153815)
= 0
openat(AT_FDCWD, "FileMapping", 0_RDWR|O_CREAT, 0666) = 3
openat(AT_FDCWD, "Errors File Mapping", 0_RDWR|O_CREAT, 0666) = 4
ftruncate(3, 4104)= 0
ftruncate(4, 4104)= 0
mmap(NULL, 4104, PROT_READ|PROT_WRITE, MAP_SHARED, 3, 0) = 0x7ef1a2c34000
mmap(NULL, 4104, PROT_READ|PROT_WRITE, MAP_SHARED, 4, 0) = 0x7ef1a2c32000
getrandom("\x04\x02\xe5\x64\x87\x84\xeb\x31", 8, GRND_NONBLOCK) = 8

```

```

brk(NULL)= 0x63f913080000
brk(0x63f9130a1000)= 0x63f9130a1000
fstat(0, {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0), ...}) = 0
read(0, example.txt
"example.txt\n", 1024)
= 12
rt_sigaction(SIGUSR2, {sa_handler=0x63f8dcb0c3e9,
sa_mask=[USR2],
sa_flags=SA_RESTORER|SA_RESTART,
sa_restorer=0x7ef1a2845330},
{sa_handler=SIG_DFL,
sa_mask=[], sa_flags=0}, 8) = 0
(child_stack=NULL,
flags=CLONE_CHILD_CLEARTID|CLONE_CHILD_SETTID|SIGCHLDstrace:
Process
7745 attached
, child_tidptr=0x7ef1a2c0da10) = 7745
[pid7745] set_robust_list(0x7ef1a2c0da20, 24) = 0
[pid7743] read(0,
<unfinished ...>
execve("./child", ["/child", "FileMapping"], 0x7ffe23ff5b88 /* 63
vars [pid
*/) = 7745]
0
[pid
7745] brk(NULL)
= 0x5c926e158000
7745] mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -
1, 0)[pid
= 0x7aa540e95000[pid 7745] access("/etc/ld.so.preload", R_OK) = -1 ENOENT (Нет
такого файла
или каталога)
[pid7745] openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXEC) = 5
[pid7745] fstat(5, {st_mode=S_IFREG|0644, st_size=153815, ...}) = 0
[pid7745] mmap(NULL, 153815, PROT_READ, MAP_PRIVATE, 5, 0) = 0x7aa540e6f000
[pid7745] close(5)
= 0
[pid 7745]
openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libc.so.6", O_RDONLY|
O_CLOEXEC)
= 5
[pid 7745] read(5, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\0\3\0>\
0\1\0\0\0\220\243\2\0\0\0\0\0"... ,
832) = 832
[pid 7745] pread64(5,
0\0\0\0\0\0\0"... ,
784, 64) "\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0\0@\0\0\0\0\0\0\0\0@
= 784
[pid

```

```

7745] fstat(5, {st_mode=S_IFREG|0755, st_size=2125328, ...}) = 0
[pid 7745] pread64(5,
0\0\0\0\0\0\0"....,
784, 64) "\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@
= 784
[pid 7745] mmap(NULL, 2170256, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 5, 0) =
0x7aa540c00000
[pid 7745] mmap(0x7aa540c28000,
PROT_READ|PROT_EXEC, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE,
5, 0x28000) =1605632,
0x7aa540c28000
[pid 7745]5,mmap(0x7aa540db0000,
323584, PROT_READ, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE,
0x1b0000) = 0x7aa540db0000
[pid 7745] mmap(0x7aa540dff000,
PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_DENYWRITE,
5, 0x1fe000) 24576,
= 0x7aa540dff000
[pid 7745] mmap(0x7aa540e05000,
52624, PROT_READ|PROT_WRITE, MAP_PRIVATE|
MAP_FIXED|MAP_ANONYMOUS,
-1, 0) = 0x7aa540e05000
[pid
7745] close(5)
= 0
[pid
7745] mmap(NULL, 12288, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS,
-1, 0)
= 0x7aa540e6c000
[pid7745] arch_prctl(ARCH_SET_FS, 0x7aa540e6c740) = 0
[pid7745] set_tid_address(0x7aa540e6ca10) = 7745
[pid7745] set_robust_list(0x7aa540e6ca20, 24) = 0
[pid7745] rseq(0x7aa540e6d060, 0x20, 0, 0x53053053) = 0
[pid7745] mprotect(0x7aa540dff000, 16384, PROT_READ) = 0
[pid7745] mprotect(0x5c92424f1000, 4096, PROT_READ) = 0
[pid7745] mprotect(0x7aa540ecd000, 8192, PROT_READ) = 0
[pid 7745] prlimit64(0,
rlim_max=RLIM64_INFINITY})
= 0RLIMIT_STACK, NULL, {rlim_cur=8192*1024,
[pid
7745] munmap(0x7aa540e6f000, 153815) = 0
[pid 7745] rt_sigaction(SIGUSR1,
{sa_handler=0x5c92424ef3a9,
sa_mask=[USR1],
sa_flags=SA_RESTORER|SA_RESTART,
sa_restorer=0x7aa540c45330},

```

```

{sa_handler=SIG_DFL,
sa_mask=[], sa_flags=0}, 8) = 0
[pid7745] openat(AT_FDCWD, "FileMapping", 0_RDWR) = 5
[pid7745] openat(AT_FDCWD, "Errors File Mapping", 0_RDWR) = 6
[pid7745] fstat(5, {st_mode=S_IFREG|0664, st_size=4104, ...}) = 0
[pid 7745] mmap(NULL, 4104, PROT_READ|PROT_WRITE, MAP_SHARED, 5, 0) =
0x7aa540e93000
[pid 7745] mmap(NULL, 4104, PROT_READ|PROT_WRITE, MAP_SHARED, 6, 0) =
0x7aa540e91000
[pid7745] getrandom("\x05\x7e\xc4\xae\x67\x49\x57\xb7", 8, GRND_NONBLOCK) = 8
[pid7745] brk(NULL)
= 0x5c926e158000
[pid7745] brk(0x5c926e179000)
= 0x5c926e179000
[pid7745] openat(AT_FDCWD, "example.txt", 0_WRONLY|0_CREAT|0_TRUNC, 0666) = 7
[pid7745] fstat(1, {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0), ...}) = 0
[pid 7745] write(1, "\320\236\321\202\320\272\321\200\321\213\321\202
\ записи
321\204\320\260\320\271\320\273
example.tx"... , 540ткрыт файл example.txt для
) = 54
[pid
7745] pause>Hello
<unfinished ...>
[pid7743] <... read resumed>"Hello\n", 1024) = 6
[pid7743] fstat(1, {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0), ...}) =
0[pid 7743] write(1, "\
320\236\321\202\320\277\321\200\320\260\320\262\320\273\320\265\320\275\320\276
\
321\207\320\265\321\200\320\265\320\267 "... , 520тправлено через File Mapping:
Hello
) = 52
[pid
7743] kill(7745, SIGUSR1)
[pid 7745] <... pause resumed>
no handler)
[pid
= 0
= ? ERESTARTNOHAND (To be restarted if
7743] pause( <unfinished ...>
[pid 7745]
si_uid=1000}
--- --- SIGUSR1 {si_signo=SIGUSR1, si_code=SI_USER, si_pid=7743,
[pid
7745] rt_sigreturn({mask=[]})
= -1 EINTR (Прерван системный вызов)
[pid 7745] write(1, "\
320\237\320\276\320\273\321\203\321\207\320\265\320\275\320\276
\
321\207\320\265\321\200\320\265\320\267 File"... , 48Получено через File
Mapping:

```

```

Hello
) = 48
[pid7745] fstat(7, {st_mode=S_IFREG|0664, st_size=0, ...}) = 0
[pid7745] write(7, "Hello\n", 6)
= 6
[pid7745] getppid()
= 7743
[pid7745] kill(7743, SIGUSR2)
= 0
[pid 7743] <... pause resumed>
no handler)
[pid
= ? ERESTARTNOHAND (To be restarted if
7745] pause( <unfinished ...>
[pid 7743]
si_uid=1000}
--- --- SIGUSR2 {si_signo=SIGUSR2, si_code=SI_USER, si_pid=7745,
[pid7743] rt_sigreturn({mask=[]})
[pid7743] read(0, Abo abof
= -1 EINTR (Прерван системный вызов)
"Abo abof\n", 1024) = 9
[pid 7743] write(1, "\
320\236\321\202\320\277\321\200\320\260\320\262\320\273\320\265\320\275\320\276
\
Abo 321\207\320\265\321\200\320\265\320\267 "..., 550тправлено через File Mapping:
abof
) = 55
[pid7743] kill(7745, SIGUSR1)
[pid7743] pause( <unfinished ...>
[pid 7745] <... pause resumed>
no handler)
= 0
= ? ERESTARTNOHAND (To be restarted if
[pid 7745]
si_uid=1000}
--- --- SIGUSR1 {si_signo=SIGUSR1, si_code=SI_USER, si_pid=7743,
[pid
7745] rt_sigreturn({mask=[]})
= -1 EINTR (Прерван системный вызов)
[pid 7745] write(1, "\
320\237\320\276\320\273\321\203\321\207\320\265\320\275\320\276
\
321\207\320\265\321\200\320\265\320\267 File"..., 51Получено через File
Mapping: Abo
abof
) = 51
[pid7745] write(7, "Abo abof\n", 9)= 9
[pid7745] getppid()= 7743
[pid7745] kill(7743, SIGUSR2)= 0

```

```

[pid 7743] <... pause resumed>)
no handler)
[pid
= ? ERESTARTNOHAND (To be restarted if
7745] pause( <unfinished ...>
[pid 7743]
si_uid=1000}
--- --- SIGUSR2 {si_signo=SIGUSR2, si_code=SI_USER, si_pid=7745,
[pid7743] rt_sigreturn({mask=[]})
[pid7743] read(0, hi
"hi\n", 1024)
= -1 EINTR (Прерван системный вызов)
= 3
[pid 7743] write(1, "\
320\236\321\202\320\277\321\200\320\260\320\262\320\273\320\265\320\275\320\276
\
hi 321\207\320\265\321\200\320\265\320\267 "..., 490тправлено через File Mapping:
) = 49
[pid
7743] kill(7745, SIGUSR1)
[pid 7745] <... pause resumed>)
no handler)
= 0
= ? ERESTARTNOHAND (To be restarted if[pid
7743] pause( <unfinished ...>
[pid 7745]
si_uid=1000}
--- --- SIGUSR1 {si_signo=SIGUSR1, si_code=SI_USER, si_pid=7743,
[pid
7745] rt_sigreturn({mask=[]})
= -1 EINTR (Прерван системный вызов)
[pid 7745] write(1, "\
320\237\320\276\320\273\321\203\321\207\320\265\320\275\320\276
\
Mapping: hi 321\207\320\265\321\200\320\265\320\267 File"..., 45Получено через File
) = 45
[pid7745] getppid()= 7743
[pid7745] kill(7743, SIGUSR2)= 0
[pid 7743] <... pause resumed>)
no handler)
[pid
= ? ERESTARTNOHAND (To be restarted if
7745] getppid( <unfinished ...>
[pid 7743]
si_uid=1000}
--- --- SIGUSR2 {si_signo=SIGUSR2, si_code=SI_USER, si_pid=7745,
[pid7745] <... getppid resumed>)
= 7743

```

```

[pid7743] rt_sigreturn({mask=[]} <unfinished ...>
[pid7745] kill(7743, SIGUSR2 <unfinished ...>
[pid7743] <... rt_sigreturn resumed>) = -1 EINTR (Прерван системный вызов)
[pid7745] <... kill resumed>
= 0
[pid 7743]
si_uid=1000}
--- --- SIGUSR2 {si_signo=SIGUSR2, si_code=SI_USER, si_pid=7745,
[pid7745] pause( <unfinished ...>
[pid7743] rt_sigreturn({mask=[]})
= -1 EINTR (Прерван системный вызов)
[pid 7743] write(1, "\
320\224\320\276\321\207\320\265\321\200\320\275\320\270\320\271
\
320\277\321\200\320\276\321\206\320\265\321\201\321\201 "..., 55Дочерний
процесс
ответил: ERROR!
) = 55
[pid
7743] read(0, Hewfrwq
"Hewfrwq\n", 1024)
= 8
[pid 7743] write(1, "\
320\236\321\202\320\277\321\200\320\260\320\262\320\273\320\265\320\275\320\276
\
321\207\320\265\321\200\320\265\320\267 "..., 540тправлено через File Mapping:
Hewfrwq
) = 54
[pid
7743] kill(7745, SIGUSR1)
[pid 7745] <... pause resumed>
no handler)
[pid
= 0
= ? ERESTARTNOHAND (To be restarted if
7743] pause( <unfinished ...>
[pid 7745]
si_uid=1000}
--- --- SIGUSR1 {si_signo=SIGUSR1, si_code=SI_USER, si_pid=7743,
[pid
7745] rt_sigreturn({mask=[]})
= -1 EINTR (Прерван системный вызов)
[pid 7745] write(1, "\
320\237\320\276\320\273\321\203\321\207\320\265\320\275\320\276
\
321\207\320\265\321\200\320\265\320\267 File"..., 50Получено через File
Mapping:
Hewfrwq
) = 50
[pid7745] write(7, "Hewfrwq\n", 8)= 8

```

```

[pid7745] getppid()= 7743
[pid7745] kill(7743, SIGUSR2)= 0
[pid 7743] <... pause resumed>
no handler)
[pid
= ? ERESTARTNOHAND (To be restarted if
7745] pause( <unfinished ...>
[pid 7743]
si_uid=1000}
--- --- SIGUSR2 {si_signo=SIGUSR2, si_code=SI_USER, si_pid=7745,
[pid7743] rt_sigreturn({mask=[]})
[pid7743] read(0, exit
"exit\n", 1024)
[pid
= -1 EINTR (Прерван системный вызов)
= 5
7743] kill(7745, SIGUSR1)
= 0[pid 7745] <... pause resumed>
no handler)
[pid
7743] wait4(-1,
= ? ERESTARTNOHAND (To be restarted if
<unfinished ...>
[pid 7745]
si_uid=1000}
--- --- SIGUSR1 {si_signo=SIGUSR1, si_code=SI_USER, si_pid=7743,
[pid
7745] rt_sigreturn({mask=[]})
= -1 EINTR (Прерван системный вызов)
[pid 7745] write(1, "\
320\237\320\276\320\273\321\203\321\207\320\265\320\275\320\276
\
321\207\320\265\321\200\320\265\320\267 File"... , 50Получено через File
Mapping:
Hewfrwq
) = 50
[pid 7745] write(1, "\
320\237\320\276\320\273\321\203\321\207\320\265\320\275
\
321\201\320\270\320\263\320\275\320\260\320\273 \320\267\320\260"... , 49Получен
сигнал завершения
) = 49
[pid7745] close(7)
[pid7745] munmap(0x7aa540e93000, 4104) = 0
[pid7745] munmap(0x7aa540e91000, 4104) = 0
[pid7745] close(6)
= 0
[pid7745] close(5)
= 0

```

```
[pid7745] exit_group(0)
= ?
[pid7745] +++ exited with 0 +++
<... wait4 resumed>NULL, 0, NULL)
= 0
= 7745
--- SIGCHLD
{si_signo=SIGCHLD,
si_pid=7745, si_uid=1000,
si_status=0,
si_utime=0,
si_stime=0}si_code=CLD_EXITED,
---
munmap(0x7ef1a2c34000, 4104)= 0
close(3)= 0
exit_group(0)= ?
+++ exited with 0 +++
```

## Lab 4:

```

$ strace -f ./program1
execve("./program1", ["/program1"], 0x7ffecca77bb8 /* 63 vars */) = 0
brk(NULL)                               = 0x5c223ae3d000
mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) =
0x75b6cec27000
access("/etc/ld.so.preload", R_OK)      = -1 ENOENT (Нет такого файла или
каталога)
openat(AT_FDCWD, "/glibc-hwcaps/x86-64-v3/libeuclid_leibniz.so", O_RDONLY|
O_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)
openat(AT_FDCWD, "/glibc-hwcaps/x86-64-v2/libeuclid_leibniz.so", O_RDONLY|
O_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)
openat(AT_FDCWD, "./libeuclid_leibniz.so", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\0\0\0\0\0\0\0\0"...
832) = 832
fstat(3, {st_mode=S_IFREG|0775, st_size=15232, ...}) = 0
getcwd("/home/demetrio/MyCodesZZZZZ/05_LABS/Lab4", 128) = 41
mmap(NULL, 16400, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x75b6cec22000
mmap(0x75b6cec23000, 4096, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x1000) = 0x75b6cec23000
mmap(0x75b6cec24000, 4096, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3,
0x2000) = 0x75b6cec24000
mmap(0x75b6cec25000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x2000) = 0x75b6cec25000
close(3)                                = 0
ENOENT (Нет такого файла или каталога)
openat(AT_FDCWD, "/glibc-hwcaps/x86-64-v3/libc.so.6", O_RDONLY|O_CLOEXEC) = -1
ENOENT (Нет такого файла или каталога)
openat(AT_FDCWD, "/glibc-hwcaps/x86-64-v2/libc.so.6", O_RDONLY|O_CLOEXEC) = -1
ENOENT (Нет такого файла или каталога)
openat(AT_FDCWD, "./libc.so.6", O_RDONLY|O_CLOEXEC) = -1 ENOENT (Нет такого
файла или каталога)
openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXEC) = 3
fstat(3, {st_mode=S_IFREG|0644, st_size=153815, ...}) = 0
mmap(NULL, 153815, PROT_READ, MAP_PRIVATE, 3, 0) = 0x75b6cebfc000
close(3)                                = 0
openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libc.so.6", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\0\0\0\0\0\0\0\0"...
832) = 832
read(3, "\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0\0@\0\0\0\0\0\0\0\0@\0\0\0\0\0\0\0\0"...
784, 64) = 784

```

```

fstat(3, {st_mode=S_IFREG|0755, st_size=2125328, ...}) = 0
read(3, "\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"...,
784, 64) = 784
mmap(NULL, 2170256, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x75b6ce80000
mmap(0x75b6ce828000, 1605632, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x28000) = 0x75b6ce828000
mmap(0x75b6ce9b0000, 323584, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3,
0x1b0000) = 0x75b6ce9b0000
mmap(0x75b6ce9ff000, 24576, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x1fe000) = 0x75b6ce9ff000
mmap(0x75b6cea05000, 52624, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_ANONYMOUS, -1, 0) = 0x75b6cea05000
close(3) = 0
mmap(NULL, 12288, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) =
0x75b6ceb19000
arch_prctl(ARCH_SET_FS, 0x75b6cebf9740) = 0
set_tid_address(0x75b6cebf9a10) = 11019
set_robust_list(0x75b6cebf9a20, 24) = 0
rseq(0x75b6cebfa060, 0x20, 0, 0x53053053) = 0
mprotect(0x75b6ce9ff000, 16384, PROT_READ) = 0
mprotect(0x75b6cec25000, 4096, PROT_READ) = 0
mprotect(0x5c22238f5000, 4096, PROT_READ) = 0
mprotect(0x75b6cec5f000, 8192, PROT_READ) = 0
rlim_max=RLIM64_INFINITY) = 0
prlimit64(0, RLIMIT_STACK, NULL, {rlim_cur=8192*1024,
munmap(0x75b6cebf9c000, 153815) = 0
fstat(1, {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0), ...}) = 0
getrandom("\x6d\xa8\x29\xde\xc7\x24\x89\xff", 8, GRND_NONBLOCK) = 8
brk(NULL) = 0x5c223ae3d000
brk(0x5c223ae5e000) = 0x5c223ae5e000
write(1, "\320\276\320\263\321\209\320\268\320\274\320\274\320\260 1: \
библиотеки на этапе компиляции", 107) = 107
write(1, "\320\242\320\265\320\272\321\203\321\211\320\260\321\217 \
библиотека: Euclid+Leibniz (static link)", 67) = 67
write(1, "\320\272\320\278\320\274\320\266\320\275\320\264\321\213\320\265 \
доступные команды:", 35) = 35
write(1, "\t0 \
\320\276 \320\261\320\275\321\204\320\276\321\200\320\274\320\260\321\206\320\270\321\217 \
информация о библиотеке", 50) = 50
write(1, "\t1 a b \
\320\235\320\236 ... , 53 1 a b - вычислить под чисел а и б", 53) = 53
write(1, "\t3 n \
\320\237\320\270 \321\207\320\270\321\201\320\273\320\270\321\202\321\214 \
57 2 n - вычислить пи с n итерациями", 57) = 57
write(1, "\tq - \320\262\321\213\321\205\320\276\320\264\n", 16) = 16
write(1, "\n", 1) = 1
fstat(0, {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0), ...}) = 0

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```

write(1, "> ", 2> ) = 2
read(0, 0
"0\n", 1024) = 2
320\write(1, "\320\247\320\265\320\272\321\203\321\211\320\260\321\217,\66Текущая
библиотека: Euclid+Leibniz (static link)
) = 66
320\write(1, "\320\220\320\273\320\263\320\276\321\200\320\270\321\202\320\274 \
235\320\236\320\224: \320\225\320\262\320\272\320...,\40Алгоритм НОД: Евклида
) = 40
320\write(1, "\320\220\320\273\320\263\320\276\321\200\320\270\321\202\320\274 \
237\320\270: \320\244\320\276\321\200\320\274\321...,\55Алгоритм ПИ: Формула
лейбница
) = 55
write(1, "> ", 2> ) = 2
read(0, 1 1000 1252
"1 1000 1252\n", 1024) = 12
write(1, "\320\235\320\236\320\224(1000, 1252) = 4\n", 23НОД(1000, 1252) = 4
) = 23
write(1, "> ", 2> ) = 2
read(0, 2 1000
"2 1000\n", 1024) = 7
320\write(1, "\320\247\320\270\321\201\320\273\320\276\320\237\320\270:(1000 \
205\321\202\320\265\321\200\320\260...,\59число ПИ:(1000-итерации)=
3.140592653839794
) = 59
write(1, "> ", 2> ) = 2
read(0, q
"q\n", 1024) = 2
exit_group(0) = ?
+++ exited with 0 +++

$ strace -f ./program2
execve("./program2", [ "./program2"], 0x7fffddeeea98 /* 63 vars */) = 0
brk(NULL) = 0x5e4d85557000
0x7bc75e922000 mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) =
каталога) access("/etc/ld.so.preload", R_OK) = -1 ENOENT (Нет такого файла или
openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXEC) = 3
fstat(3, {st_mode=S_IFREG|0644, st_size=153815, ...}) = 0
mmap(NULL, 153815, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7bc75e8fc000
close(3) = 0
openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libc.so.6", O_RDONLY|O_CLOEXEC) = 3
0\1\0\0\0\220\243\2\0\0\0\0\0...,\832) = 832
784, 64) = 784, "\6\0\0\0\4\0\0\0@ \0\0\0\0\0\0\0\0@ \0\0\0\0\0\0\0\0@ \0\0\0\0\0\0\0\0"...,
fstat(3, {st_mode=S_IFREG|0755, st_size=2125328, ...}) = 0
784, 64) = 784, "\6\0\0\0\4\0\0\0@ \0\0\0\0\0\0\0\0@ \0\0\0\0\0\0\0\0@ \0\0\0\0\0\0\0\0"...,
0x7bc75e600000 mmap(NULL, 2170256, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
MAP_DENYWRITE, 3, 0x28000) = 0x7bc75e628000
0x1b0000) = 0x7bc75e7b0000, 323584, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3,
MAP_DENYWRITE, 3, 0x1fe000) = 0x7bc75e7ff000

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```

mmap(0x7bc75e805000, 52624, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_ANONYMOUS, -1, 0) = 0x7bc75e805000
close(3) = 0
mmap(NULL, 12288, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) =
0x7bc75e8f9000
arch_prctl(ARCH_SET_FS, 0x7bc75e8f9740) = 0
set_tid_address(0x7bc75e8f9a10) = 11288
set_robust_list(0x7bc75e8f9a20, 24) = 0
rseq(0x7bc75e8fa060, 0x20, 0, 0x53053053) = 0
mprotect(0x7bc75e7ff000, 16384, PROT_READ) = 0
mprotect(0x5e4d796f7000, 4096, PROT_READ) = 0
mprotect(0x7bc75e95a000, 8192, PROT_READ) = 0
rlim_t rlim_cur=8192*1024,
rlim_max=RLIM64_INFINITY) = 0
munmap(0x7bc75e8fc000, 153815) = 0
fstat(1, {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0), ...}) = 0
getrandom("\xf2\x65\x58\x99\x9e\xc5\x42\x14", 8, GRND_NONBLOCK) = 8
brk(NULL) = 0x5e4d85557000
brk(0x5e4d85578000) = 0x5e4d85578000
320\274\320\270\320\275\320\260\320\274"...; 83программа 2: динамическая загрузка
библиотек
) = 83
write(1, "\n", 1
) = 1
openat(AT_FDCWD, "./libeuclid_leibniz.so", O_RDONLY|O_CLOEXEC) = 3
832) read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\0\0\0\0\0\0\0\0"...;
fstat(3, {st_mode=S_IFREG|0775, st_size=15232, ...}) = 0
getcwd("/home/demetrio/MyCodesZZZZZ/OS_LABS/Lab4", 128) = 41
mmap(NULL, 16400, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7bc75e91d000
MAP_DENYWRITE, 3, 0x1000) = 0x7bc75e91e000
mmap(0x7bc75e91e000, 4096, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|
0x2000) = 0x7bc75e91f000
mmap(0x7bc75e920000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x2000) = 0x7bc75e920000
close(3) = 0
mprotect(0x7bc75e920000, 4096, PROT_READ) = 0
320\274\320\276\321\201\321\202\321\203\320\277\320\275\321\213\320\265\
320\261\320\270\320\261\320\273\320\270\320\276\321"...; 41доступные библиотеки:
) = 41
./libeuclid_leibniz.so (текущая)
) = 44
write(1, "\t1: ./libnaive_wallis.so\n", 25 1: ./libnaive_wallis.so
) = 25
write(1, "\n", 1
) = 1
320\274\320\276\320\274\320\260\320\275\320\264\321"...; 35доступные команды:
) = 35
320\274\320\275\321\200\320\265\320\272\320\273\321\216\321\207\320\270\321\202\321\
214\320\261\320\270"...; 490 - переключить библиотеку
) = 49

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```

320\write(1, "\t1 a b\n", 16) = 55
320\235\320\236 "...; 55 1 a b - Вычислить НОД 2 чисел а и b
) = 55
320\write(1, "\t2 n\n", 16) = 57
320\237\320\270\321 "...; 57 2 n - Вычислить ПИ с n итерациями
) = 57
320\write(1, "\t3 i\n", 16) = 65
320\276\321\202\320 "...; 65 1 - информация о текущей библиотке
) = 65
write(1, "\tq - \320\262\321\213\321\205\320\276\320\264\n", 16) = 16
q - выход
) = 16
write(1, "\n", 1)
) = 1
fstat(0, {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0), ...}) = 0
write(1, "> ", 2) = 2
read(0, i
"i\n", 1024) = 2
320\write(1, "\320\242\320\265\320\272\321\203\321\211\320\260\321\217\n", 52) = 52
Текущая библиотека: Euclid+leibniz
) = 52
write(1, "\320\230\320\275\320\264\320\265\320\272\321\201: 0\n", 16) = 16
Индекс: 0
) = 16
write(1, "\320\237\321\203\321\202\321\214: ./libeuclid_leibniz.so"...; 33) = 33
Путь:
) = 33
write(1, "> ", 2) = 2
read(0, 1 1000 23
"1 1000 23\n", 1024) = 10
write(1, "\320\235\320\236\320\224(1000, 23) = 1\n", 21) = 21
НОД(1000, 23) = 1
) = 21
write(1, "> ", 2) = 2
read(0, 2 1125
"2 1125\n", 1024) = 7
320\write(1, "\320\237\320\270(1125\n", 48) = 48
(1125 \
итераций) = 3.142481542303102
) = 48
write(1, "> ", 2) = 2
read(0, 0
"0\n", 1024) = 2
munmap(0x7bc75e91d000, 16400) = 0
openat(AT_FDCWD, "./libnaive_wallis.so", O_RDONLY|O_CLOEXEC) = 3
832) read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\0\0\0\0\0\0"..., 832) = 832
fstat(3, {st_mode=S_IFREG|0775, st_size=15224, ...}) = 0
getcwd("/home/demetrio/MyCodesZZZZ/OS_LABS/Lab4", 128) = 41
mmap(NULL, 16400, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7bc75e91d000
mmap(0x7bc75e91d000, 4096, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1000) = 0x7bc75e91e000
mmap(0x7bc75e91f000, 4096, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x2000) = 0x7bc75e91f000
mmap(0x7bc75e920000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x2000) = 0x7bc75e920000
close(3) = 0

```

```

mprotect(0x7bc75e920000, 4096, PROT_READ) = 0
write(1, "\320\265\321\200\320\265\320\272\320\273\321\216\321\207\320\265\320\275\320\276\320\275\320\260\320\261\320\270"... , 63Переключено на библиотеку: NaiveWallis
) = 63
write(1, "> ", 2) = 2
read(0, 1 245323 215123
"1 245323 215123\n", 1024) = 16
write(1, "\320\235\320\236\320\224(245323, 215123) = 1\n", 27НОД(245323,
215123) = 1
) = 27
write(1, "> ", 2) = 2
read(0, 2 125
"2 125\n", 1024) = 6
write(1, "\320\237\320\270(125 \
итераций) = 3.135340746498788\320\260\321\206\320\270\320\271) = 3.1"... , 47Пи(125
) = 47
write(1, "> ", 2) = 2
read(0, i
"i\n", 1024) = 2
write(1, "\320\242\320\265\320\272\321\203\321\211\320\260\321\217,\50Текущая
библиотека: NaiveWallis\320\273\320\270\320\276\321\202\320\265\320\270"... , 50
) = 50
write(1, "\320\230\320\275\320\264\320\265\320\272\321\201: 1\n", 16Индекс: 1
) = 16
write(1, "\320\237\321\203\321\202\321\214: ./libnaive_wallis.so\n",
31Путь: ./libnaive_wallis.so
) = 31
write(1, "> ", 2) = 2
read(0, q
"q\n", 1024) = 2
munmap(0x7bc75e91d000, 16400) = 0
exit_group(0) = ?
+++ exited with 0 +++

```

## Вывод

В ходе выполнения лабораторной №5 был проведён детальный анализ системных вызовов, разработанных в предыдущих 4 лабораторных с помощью утилиты strace. Это позволило освоить навыки диагностирования программ, написанных на языке С.