Московский Авиационный Институт

(Национальный Исследовательский Университет)

Институт №8 “Компьютерные науки и прикладная математика”

Кафедра №806 “Вычислительная математика и программирование”

**Лабораторная работа №8 по курсу**

**«Операционные системы»**

Группа: М8О-215Б-23

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Оценка: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Постановка задачи**

Приобретение практических навыков диагностики работы программного обеспечения.

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

**Общий метод и алгоритм решения**

Утилита strace

Утилита strace отслеживает системные вызовы и сигналы, которые процесс делает во время выполнения. Используется для диагностики и отладки на системном уровне.

Основные флаги

* -f - отслеживать дочерние процессы
* -o file - записывать вывод в файл
* -p PID - прикрепиться к работающему процессу
* -t - добавлять временные метки
* -e expr - фильтровать трассируемые события (например, -e open,close,network)
* -c - выводить сводку с подсчетом вызовов и времени
* -s SIZE - задать максимальную длину выводимых строк
* -T - показывать время, затраченное на каждый системный вызов
* -r - показывать относительное время между вызовами
* -k - отображать стек вызовов для каждого системного вызова
* -y - расшифровывать пути, связанные с файловыми дескрипторами

**Протокол работы программы**

**Лабораторная работа №1**

$ ./parent

Write a doc name

hellow

Enter a message

hellow;

Status: Success

Enter a message:

qwe

Status Not over in ';' or '.'

Enter a message

asfdd;

Status: Success

Enter a message

xddddd;

Status: Success

Enter a message

exit

Strace:

$ strace -f ./parent

execve("./parent", ["./parent"], 0x7ffd5c20faa8 /\* 50 vars \*/) = 0

brk(NULL) = 0x5cec77aeb000

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=121423, ...}) = 0

mmap(NULL, 121423, PROT\_READ, MAP\_PRIVATE, 3, 0) = 0x7fb904dc3000

close(3) = 0

openat(AT\_FDCWD, "/usr/lib/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\340\_\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

fstat(3, {st\_mode=S\_IFREG|0755, st\_size=2014520, ...}) = 0

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

0x7fb904dc1000

pread64(3, "\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"..., 784, 64)

= 784

mmap(NULL, 2034616, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7fb904bd0000

mmap(0x7fb904bf4000, 1511424, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE,

3, 0x24000) = 0x7fb904bf4000

mmap(0x7fb904d65000, 319488, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3,

0x195000) = 0x7fb904d65000

mmap(0x7fb904db3000, 24576, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE,

3, 0x1e3000) = 0x7fb904db3000

mmap(0x7fb904db9000, 31672, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_ANONYMOUS,

-1, 0) = 0x7fb904db9000

close(3) = 0

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

0x7fb904bcd000

arch\_prctl(ARCH\_SET\_FS, 0x7fb904bcd740) = 0

set\_tid\_address(0x7fb904bcda10) = 36016

set\_robust\_list(0x7fb904bcda20, 24) = 0

rseq(0x7fb904bce060, 0x20, 0, 0x53053053) = 0

mprotect(0x7fb904db3000, 16384, PROT\_READ) = 0

mprotect(0x5cec42537000, 4096, PROT\_READ) = 0

mprotect(0x7fb904e1b000, 8192, PROT\_READ) = 0

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

munmap(0x7fb904dc3000, 121423) = 0

pipe2([3, 4], 0) = 0

pipe2([5, 6], 0) = 0

clone(child\_stack=NULL, flags=CLONE\_CHILD\_CLEARTID|CLONE\_CHILD\_SETTID|SIGCHLD,

child\_tidptr=0x7fb904bcda10) = 36017

strace: Process 36017 attached

[pid 36016] close(3) = 0

[pid 36016] close(6 <unfinished ...>

[pid 36017] set\_robust\_list(0x7fb904bcda20, 24 <unfinished ...>

[pid 36016] <... close resumed>) = 0

[pid 36016] fstat(1, <unfinished ...>

[pid 36017] <... set\_robust\_list resumed>) = 0

[pid 36016] <... fstat resumed>{st\_mode=S\_IFCHR|0620, st\_rdev=makedev(0x88, 0), ...}) =0

[pid 36016] getrandom("\x30\x10\xd3\x1b\xe3\x53\x96\x65", 8, GRND\_NONBLOCK) = 8

[pid 36016] brk(NULL) = 0x5cec77aeb000

[pid 36017] close(4 <unfinished ...>

[pid 36016] brk(0x5cec77b0c000) = 0x5cec77b0c000

[pid 36017] <... close resumed>) = 0

[pid 36016] write(1, "write a doc name\n", 17 <unfinished ...>

write a doc name

[pid 36017] close(5 <unfinished ...>

[pid 36016] <... write resumed>) = 17

[pid 36017] <... close resumed>) = 0

[pid 36016] fstat(0, {st\_mode=S\_IFCHR|0620, st\_rdev=makedev(0x88, 0), ...}) = 0

[pid 36017] dup2(3, 0 <unfinished ...>

[pid 36016] read(0, <unfinished ...>

[pid 36017] <... dup2 resumed>) = 0

[pid 36017] dup2(6, 1) = 1

[pid 36017] close(3) = 0

[pid 36017] close(6) = 0

[pid 36017] execve("./child", ["child"], 0x7ffc5812e4b8 /\* 50 vars \*/) = 0

[pid 36017] brk(NULL) = 0x569d17ded000

[pid 36017] access("/etc/ld.so.preload", R\_OK) = -1 ENOENT (No such file or directory)

[pid 36017] openat(AT\_FDCWD, "/etc/ld.so.cache", O\_RDONLY|O\_CLOEXEC) = 3

[pid 36017] fstat(3, {st\_mode=S\_IFREG|0644, st\_size=121423, ...}) = 0

[pid 36017] mmap(NULL, 121423, PROT\_READ, MAP\_PRIVATE, 3, 0) = 0x74a86bff5000

[pid 36017] close(3) = 0

[pid 36017] openat(AT\_FDCWD, "/usr/lib/libc.so.6", O\_RDONLY|O\_CLOEXEC) = 3

[pid 36017] read(3,

"\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\340\_\2\0\0\0\0\0"..., 832) = 832

[pid 36017] pread64(3,

"\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"..., 784, 64) = 784

[pid 36017] fstat(3, {st\_mode=S\_IFREG|0755, st\_size=2014520, ...}) = 0

[pid 36017] mmap(NULL, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_ANONYMOUS, -1, 0) =

0x74a86bff3000

[pid 36017] pread64(3,

"\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"..., 784, 64) = 784

[pid 36017] mmap(NULL, 2034616, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) =

0x74a86be02000

[pid 36017] mmap(0x74a86be26000, 1511424, PROT\_READ|PROT\_EXEC,

MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x24000) = 0x74a86be26000

[pid 36017] mmap(0x74a86bf97000, 319488, PROT\_READ,

MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x195000) = 0x74a86bf97000

[pid 36017] mmap(0x74a86bfe5000, 24576, PROT\_READ|PROT\_WRITE,

MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x1e3000) = 0x74a86bfe5000

[pid 36017] mmap(0x74a86bfeb000, 31672, PROT\_READ|PROT\_WRITE,

MAP\_PRIVATE|MAP\_FIXED|MAP\_ANONYMOUS, -1, 0) = 0x74a86bfeb000

[pid 36017] close(3) = 0

[pid 36017] mmap(NULL, 12288, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_ANONYMOUS, -1, 0) =

0x74a86bdff000

[pid 36017] arch\_prctl(ARCH\_SET\_FS, 0x74a86bdff740) = 0

[pid 36017] set\_tid\_address(0x74a86bdffa10) = 36017

[pid 36017] set\_robust\_list(0x74a86bdffa20, 24) = 0

[pid 36017] rseq(0x74a86be00060, 0x20, 0, 0x53053053) = 0

[pid 36017] mprotect(0x74a86bfe5000, 16384, PROT\_READ) = 0

[pid 36017] mprotect(0x569cef063000, 4096, PROT\_READ) = 0

[pid 36017] mprotect(0x74a86c04d000, 8192, PROT\_READ) = 0

[pid 36017] prlimit64(0, RLIMIT\_STACK, NULL, {rlim\_cur=8192\*1024,

rlim\_max=RLIM64\_INFINITY}) = 0

[pid 36017] munmap(0x74a86bff5000, 121423) = 0

[pid 36017] read(0, hellow

<unfinished ...>

[pid 36016] <... read resumed>"hellow\n", 1024) = 7

[pid 36016] write(4, "hellow\n\0", 8) = 8

[pid 36017] <... read resumed>"hellow\n\0", 100) = 8

[pid 36016] write(1, "Enter a message: ", 17 <unfinished ...>

[pid 36017] getrandom(Enter a message: <unfinished ...>

[pid 36016] <... write resumed>) = 17

[pid 36017] <... getrandom resumed>"\xaa\x27\x82\x44\x3f\x93\xbb\x5e", 8,

GRND\_NONBLOCK) = 8

[pid 36016] read(0, <unfinished ...>

[pid 36017] brk(NULL) = 0x569d17ded000

[pid 36017] brk(0x569d17e0e000) = 0x569d17e0e000

[pid 36017] openat(AT\_FDCWD, "hellow\n", O\_WRONLY|O\_CREAT|O\_TRUNC, 0666) = 3

[pid 36017] read(0, hellow;

<unfinished ...>

[pid 36016] <... read resumed>"hellow;\n", 1024) = 8

[pid 36016] write(4, "hellow;\n\0", 9) = 9

[pid 36017] <... read resumed>"hellow;\n\0", 100) = 9

[pid 36016] read(5, <unfinished ...>

[pid 36017] fstat(3, {st\_mode=S\_IFREG|0644, st\_size=0, ...}) = 0

[pid 36017] write(1, "\320\243\321\201\320\277\320\265\321\210\320\275\320\276\0", 15)= 15

[pid 36016] <... read

resumed>"\320\243\321\201\320\277\320\265\321\210\320\275\320\276\0", 100) = 15

[pid 36017] read(0, <unfinished ...>

[pid 36016] write(1, "Parent read:

\320\243\321\201\320\277\320\265\321\210\320\275\320\276\n", 28Parent read: Успешно

) = 28

[pid 36016] write(1, "Enter a message: ", 17Enter a message: ) = 17

[pid 36016] read(0, bye

"bye\n", 1024) = 4

[pid 36016] write(4, "bye\n\0", 5) = 5

[pid 36017] <... read resumed>"bye\n\0", 100) = 5

[pid 36016] read(5, <unfinished ...>

[pid 36017] write(1,

"\320\237\321\200\320\265\320\264\320\273\320\276\320\266\320\265\320\275\320\270\320\265

\320\275\320\265 \320\276\320\272"..., 69 <unfinished ...>

[pid 36016] <... read

resumed>"\320\237\321\200\320\265\320\264\320\273\320\276\320\266\320\265\320\275\320\270\32

0\265 \320\275\320\265 \320\276\320\272"..., 100) = 69

[pid 36017] <... write resumed>) = 69

[pid 36016] write(1, "Parent read:

\320\237\321\200\320\265\320\264\320\273\320\276\320\266\320\265\320\275\320"..., 82

<unfinished ...>

[pid 36017] read(0, Parent read: Предложение не оканчивается на . или ;

<unfinished ...>

[pid 36016] <... write resumed>) = 82

[pid 36016] write(1, "Enter a message: ", 17Enter a message: ) = 17

[pid 36016] read(0, asd;

"asd;\n", 1024) = 5

[pid 36016] write(4, "asd;\n\0", 6) = 6

[pid 36017] <... read resumed>"asd;\n\0", 100) = 6

[pid 36016] read(5, <unfinished ...>

[pid 36017] write(1, "\320\243\321\201\320\277\320\265\321\210\320\275\320\276\0", 15)= 15

[pid 36016] <... read

resumed>"\320\243\321\201\320\277\320\265\321\210\320\275\320\276\0", 100) = 15

[pid 36017] read(0, <unfinished ...>

[pid 36016] write(1, "Parent read:

\320\243\321\201\320\277\320\265\321\210\320\275\320\276\n", 28Parent read: Успешно

) = 28

[pid 36016] write(1, "Enter a message: ", 17Enter a message: ) = 17

[pid 36016] read(0, exit

"exit\n", 1024) = 5

[pid 36016] close(4) = 0

[pid 36017] <... read resumed>"", 100) = 0

[pid 36016] close(5) = 0

[pid 36017] write(3, "hellow;\nasd;\n", 13 <unfinished ...>

[pid 36016] wait4(36017, <unfinished ...>

[pid 36017] <... write resumed>) = 13

[pid 36017] close(3) = 0

[pid 36017] exit\_group(0) = ?

[pid 36017] +++ exited with 0 +++

<... wait4 resumed>NULL, 0, NULL) = 36017

--- SIGCHLD {si\_signo=SIGCHLD, si\_code=CLD\_EXITED, si\_pid=36017, si\_uid=1000,

si\_status=0, si\_utime=0, si\_stime=0} ---

exit\_group(0) = ?

+++ exited with 0 +++

**Лабораторная работа №2**

$ strace -f ./main 5 4

execve("./main", ["./main", "5", "4"], 0x7ffcf3cb3ca8 /\* 50 vars \*/) = 0

brk(NULL) = 0x5b46adac8000

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=121423, ...}) = 0

mmap(NULL, 121423, PROT\_READ, MAP\_PRIVATE, 3, 0) = 0x7b82c2c90000

close(3) = 0

openat(AT\_FDCWD, "/usr/lib/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\340\_\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

fstat(3, {st\_mode=S\_IFREG|0755, st\_size=2014520, ...}) = 0

mmap(NULL, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_ANONYMOUS, -1, 0) =0x7b82c2c8e000

pread64(3, "\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"..., 784, 64)= 784

mmap(NULL, 2034616, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7b82c2a9d000

mmap(0x7b82c2ac1000, 1511424, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE,3, 0x24000) = 0x7b82c2ac1000

mmap(0x7b82c2c32000, 319488, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3,0x195000) = 0x7b82c2c32000

mmap(0x7b82c2c80000, 24576, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE,3, 0x1e3000) = 0x7b82c2c80000

mmap(0x7b82c2c86000, 31672, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_ANONYMOUS,-1, 0) = 0x7b82c2c86000

close(3) = 0

mmap(NULL, 12288, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_ANONYMOUS, -1, 0) =0x7b82c2a9a000

arch\_prctl(ARCH\_SET\_FS, 0x7b82c2a9a740) = 0

set\_tid\_address(0x7b82c2a9aa10) = 45190

set\_robust\_list(0x7b82c2a9aa20, 24) = 0

rseq(0x7b82c2a9b060, 0x20, 0, 0x53053053) = 0

mprotect(0x7b82c2c80000, 16384, PROT\_READ) = 0

mprotect(0x5b469a694000, 4096, PROT\_READ) = 0

mprotect(0x7b82c2ce8000, 8192, PROT\_READ) = 0

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

munmap(0x7b82c2c90000, 121423) = 0

rt\_sigaction(SIGRT\_1, {sa\_handler=0x7b82c2b2e2b0, sa\_mask=[],sa\_flags=SA\_RESTORER|SA\_ONSTACK|SA\_RESTART|SA\_SIGINFO, sa\_restorer=0x7b82c2ada1d0}, 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) =0x7b82c2200000

mprotect(0x7b82c2201000, 8388608, PROT\_READ|PROT\_WRITE) = 0

getrandom("\xe1\xab\xcf\x06\xb4\x30\xff\x30", 8, GRND\_NONBLOCK) = 8

brk(NULL) = 0x5b46adac8000

brk(0x5b46adae9000) = 0x5b46adae9000

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=0x7b82c2a00990,parent\_tid=0x7b82c2a00990, exit\_signal=0, stack=0x7b82c2200000, stack\_size=0x7fff80,tls=0x7b82c2a006c0}strace: Process 45191 attached

=> {parent\_tid=[45191]}, 88) = 45191

[pid 45191] rseq(0x7b82c2a00fe0, 0x20, 0, 0x53053053 <unfinished ...>

[pid 45190] rt\_sigprocmask(SIG\_SETMASK, [], <unfinished ...>

[pid 45191] <... rseq resumed>) = 0

[pid 45190] <... rt\_sigprocmask resumed>NULL, 8) = 0

[pid 45190] mmap(NULL, 8392704, PROT\_NONE, MAP\_PRIVATE|MAP\_ANONYMOUS|MAP\_STACK, -1, 0<unfinished ...>

[pid 45191] set\_robust\_list(0x7b82c2a009a0, 24 <unfinished ...>

[pid 45190] <... mmap resumed>) = 0x7b82c1800000

[pid 45191] <... set\_robust\_list resumed>) = 0

[pid 45190] mprotect(0x7b82c1801000, 8388608, PROT\_READ|PROT\_WRITE <unfinished ...>

[pid 45191] rt\_sigprocmask(SIG\_SETMASK, [], <unfinished ...>

[pid 45190] <... mprotect resumed>) = 0

[pid 45191] <... rt\_sigprocmask resumed>NULL, 8) = 0

[pid 45190] rt\_sigprocmask(SIG\_BLOCK, ~[], [], 8) = 0

[pid 45190]clone3({flags=CLONE\_VM|CLONE\_FS|CLONE\_FILES|CLONE\_SIGHAND|CLONE\_THREAD|CLONE\_SYSVSEM|CLONE\_SETTLS|CLONE\_PARENT\_SETTID|CLONE\_CHILD\_CLEARTID, child\_tid=0x7b82c2000990,parent\_tid=0x7b82c2000990, exit\_signal=0, stack=0x7b82c1800000, stack\_size=0x7fff80,tls=0x7b82c20006c0}strace: Process 45192 attached

=> {parent\_tid=[45192]}, 88) = 45192

[pid 45192] rseq(0x7b82c2000fe0, 0x20, 0, 0x53053053 <unfinished ...>

[pid 45190] rt\_sigprocmask(SIG\_SETMASK, [], <unfinished ...>

[pid 45192] <... rseq resumed>) = 0

[pid 45190] <... rt\_sigprocmask resumed>NULL, 8) = 0

[pid 45192] set\_robust\_list(0x7b82c20009a0, 24 <unfinished ...>

[pid 45190] mmap(NULL, 8392704, PROT\_NONE, MAP\_PRIVATE|MAP\_ANONYMOUS|MAP\_STACK, -1, 0<unfinished ...>

[pid 45192] <... set\_robust\_list resumed>) = 0

[pid 45190] <... mmap resumed>) = 0x7b82c0e00000

[pid 45192] rt\_sigprocmask(SIG\_SETMASK, [], <unfinished ...>

[pid 45190] mprotect(0x7b82c0e01000, 8388608, PROT\_READ|PROT\_WRITE <unfinished ...>

[pid 45192] <... rt\_sigprocmask resumed>NULL, 8) = 0

[pid 45190] <... mprotect resumed>) = 0

[pid 45190] rt\_sigprocmask(SIG\_BLOCK, ~[], [], 8) = 0

[pid 45190]clone3({flags=CLONE\_VM|CLONE\_FS|CLONE\_FILES|CLONE\_SIGHAND|CLONE\_THREAD|CLONE\_SYSVSEM|CLONE\_SETTLS|CLONE\_PARENT\_SETTID|CLONE\_CHILD\_CLEARTID, child\_tid=0x7b82c1600990,parent\_tid=0x7b82c1600990, exit\_signal=0, stack=0x7b82c0e00000, stack\_size=0x7fff80,tls=0x7b82c16006c0}strace: Process 45193 attached

=> {parent\_tid=[45193]}, 88) = 45193

[pid 45193] rseq(0x7b82c1600fe0, 0x20, 0, 0x53053053 <unfinished ...>

[pid 45190] rt\_sigprocmask(SIG\_SETMASK, [], <unfinished ...>

[pid 45193] <... rseq resumed>) = 0

[pid 45190] <... rt\_sigprocmask resumed>NULL, 8) = 0

[pid 45193] set\_robust\_list(0x7b82c16009a0, 24 <unfinished ...>

[pid 45190] mmap(NULL, 8392704, PROT\_NONE, MAP\_PRIVATE|MAP\_ANONYMOUS|MAP\_STACK, -1, 0<unfinished ...>

[pid 45193] <... set\_robust\_list resumed>) = 0

[pid 45190] <... mmap resumed>) = 0x7b82c0400000

[pid 45193] rt\_sigprocmask(SIG\_SETMASK, [], <unfinished ...>

[pid 45190] mprotect(0x7b82c0401000, 8388608, PROT\_READ|PROT\_WRITE <unfinished ...>

[pid 45193] <... rt\_sigprocmask resumed>NULL, 8) = 0

[pid 45190] <... mprotect resumed>) = 0

[pid 45190] rt\_sigprocmask(SIG\_BLOCK, ~[], [], 8) = 0

[pid 45190]clone3({flags=CLONE\_VM|CLONE\_FS|CLONE\_FILES|CLONE\_SIGHAND|CLONE\_THREAD|CLONE\_SYSVSEM|CLONE\_SETTLS|CLONE\_PARENT\_SETTID|CLONE\_CHILD\_CLEARTID, child\_tid=0x7b82c0c00990,parent\_tid=0x7b82c0c00990, exit\_signal=0, stack=0x7b82c0400000, stack\_size=0x7fff80,tls=0x7b82c0c006c0}strace: Process 45194 attached

=> {parent\_tid=[45194]}, 88) = 45194

[pid 45194] rseq(0x7b82c0c00fe0, 0x20, 0, 0x53053053 <unfinished ...>

[pid 45190] rt\_sigprocmask(SIG\_SETMASK, [], <unfinished ...>

[pid 45194] <... rseq resumed>) = 0

[pid 45190] <... rt\_sigprocmask resumed>NULL, 8) = 0

[pid 45194] set\_robust\_list(0x7b82c0c009a0, 24 <unfinished ...>

[pid 45190] futex(0x7b82c2a00990, FUTEX\_WAIT\_BITSET|FUTEX\_CLOCK\_REALTIME, 45191, NULL,FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 45194] <... set\_robust\_list resumed>) = 0

[pid 45194] rt\_sigprocmask(SIG\_SETMASK, [], NULL, 8) = 0

[pid 45192] openat(AT\_FDCWD, "/etc/ld.so.cache", O\_RDONLY|O\_CLOEXEC) = 3

[pid 45192] fstat(3, {st\_mode=S\_IFREG|0644, st\_size=121423, ...}) = 0

[pid 45192] mmap(NULL, 121423, PROT\_READ, MAP\_PRIVATE, 3, 0) = 0x7b82c2c90000

[pid 45192] close(3) = 0

[pid 45192] mmap(NULL, 134217728, PROT\_NONE, MAP\_PRIVATE|MAP\_ANONYMOUS, -1, 0) =0x7b82b8400000

[pid 45192] munmap(0x7b82b8400000, 62914560) = 0

[pid 45192] munmap(0x7b82c0000000, 4194304 <unfinished ...>

[pid 45191] futex(0x7b82c2ceaa08, FUTEX\_WAIT\_PRIVATE, 2, NULL <unfinished ...>

[pid 45192] <... munmap resumed>) = 0

[pid 45192] mprotect(0x7b82bc000000, 135168, PROT\_READ|PROT\_WRITE) = 0

[pid 45192] openat(AT\_FDCWD, "/usr/lib/libgcc\_s.so.1", O\_RDONLY|O\_CLOEXEC) = 3

[pid 45192] read(3,"\177ELF\2\1\1\0\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\0\0\0\0\0\0\0\0"..., 832) = 832

[pid 45192] fstat(3, {st\_mode=S\_IFREG|0644, st\_size=915712, ...}) = 0

[pid 45192] mmap(NULL, 184808, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) =0x7b82c2a6c000

[pid 45192] mmap(0x7b82c2a70000, 147456, PROT\_READ|PROT\_EXEC,MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x4000) = 0x7b82c2a70000

[pid 45192] mmap(0x7b82c2a94000, 16384, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE,3, 0x28000) = 0x7b82c2a94000

[pid 45192] mmap(0x7b82c2a98000, 8192, PROT\_READ|PROT\_WRITE,MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x2b000) = 0x7b82c2a98000

[pid 45192] close(3) = 0

[pid 45192] mprotect(0x7b82c2a98000, 4096, PROT\_READ) = 0

[pid 45192] munmap(0x7b82c2c90000, 121423) = 0

[pid 45192] futex(0x7b82c2ceaa08, FUTEX\_WAKE\_PRIVATE, 1) = 1

[pid 45191] <... futex resumed>) = 0

[pid 45192] futex(0x7b82c2a99070, FUTEX\_WAKE\_PRIVATE, 2147483647 <unfinished ...>

[pid 45191] futex(0x7b82c2ceaa08, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 45192] <... futex resumed>) = 0

[pid 45191] <... futex resumed>) = 0

[pid 45192] rt\_sigprocmask(SIG\_BLOCK, ~[RT\_1], <unfinished ...>

[pid 45191] rt\_sigprocmask(SIG\_BLOCK, ~[RT\_1], <unfinished ...>

[pid 45192] <... rt\_sigprocmask resumed>NULL, 8) = 0

[pid 45191] <... rt\_sigprocmask resumed>NULL, 8) = 0

[pid 45192] madvise(0x7b82c1800000, 8368128, MADV\_DONTNEED <unfinished ...>

[pid 45191] madvise(0x7b82c2200000, 8368128, MADV\_DONTNEED <unfinished ...>

[pid 45192] <... madvise resumed>) = 0

[pid 45191] <... madvise resumed>) = 0

[pid 45192] exit(0 <unfinished ...>

[pid 45191] exit(0 <unfinished ...>

[pid 45192] <... exit resumed>) = ?

[pid 45191] <... exit resumed>) = ?

[pid 45192] +++ exited with 0 +++

[pid 45190] <... futex resumed>) = 0

[pid 45191] +++ exited with 0 +++

[pid 45190] futex(0x7b82c1600990, FUTEX\_WAIT\_BITSET|FUTEX\_CLOCK\_REALTIME, 45193, NULL,FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 45194] rt\_sigprocmask(SIG\_BLOCK, ~[RT\_1], NULL, 8) = 0

[pid 45194] madvise(0x7b82c0400000, 8368128, MADV\_DONTNEED) = 0

[pid 45194] exit(0) = ?

[pid 45194] +++ exited with 0 +++

[pid 45193] rt\_sigprocmask(SIG\_BLOCK, ~[RT\_1], NULL, 8) = 0

[pid 45193] madvise(0x7b82c0e00000, 8368128, MADV\_DONTNEED) = 0

[pid 45193] exit(0) = ?

[pid 45193] +++ exited with 0 +++

<... futex resumed>) = 0

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

write(1, "Circle area with radius 5.00 is "..., 41Circle area with radius 5.00 is78.54487

) = 41

exit\_group(0) = ?

+++ exited with 0 +++

**Лабораторная работа №3**

$ strace -f ./parent

execve("./parent", ["./parent"], 0x7fff222b3548 /\* 50 vars \*/) = 0

brk(NULL) = 0x58cbfc040000

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=121891, ...}) = 0

mmap(NULL, 121891, PROT\_READ, MAP\_PRIVATE, 3, 0) = 0x7e9538879000

close(3) = 0

openat(AT\_FDCWD, "/usr/lib/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\340\_\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

fstat(3, {st\_mode=S\_IFREG|0755, st\_size=2014520, ...}) = 0

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

0x7e9538877000

pread64(3, "\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"..., 784, 64)

= 784

mmap(NULL, 2034616, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7e9538686000

mmap(0x7e95386aa000, 1511424, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE,

3, 0x24000) = 0x7e95386aa000

mmap(0x7e953881b000, 319488, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3,

0x195000) = 0x7e953881b000

mmap(0x7e9538869000, 24576, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE,

3, 0x1e3000) = 0x7e9538869000

mmap(0x7e953886f000, 31672, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_ANONYMOUS,

-1, 0) = 0x7e953886f000

close(3) = 0

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

0x7e9538683000

arch\_prctl(ARCH\_SET\_FS, 0x7e9538683740) = 0

set\_tid\_address(0x7e9538683a10) = 30517

set\_robust\_list(0x7e9538683a20, 24) = 0

rseq(0x7e9538684060, 0x20, 0, 0x53053053) = 0

mprotect(0x7e9538869000, 16384, PROT\_READ) = 0

mprotect(0x58cbf187c000, 4096, PROT\_READ) = 0

mprotect(0x7e95388d1000, 8192, PROT\_READ) = 0

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

munmap(0x7e9538879000, 121891) = 0

openat(AT\_FDCWD, "/dev/shm/shared\_memory", O\_RDWR|O\_CREAT|O\_NOFOLLOW|O\_CLOEXEC, 0666) =

3

ftruncate(3, 256) = 0

mmap(NULL, 256, PROT\_READ|PROT\_WRITE, MAP\_SHARED, 3, 0) = 0x7e9538896000

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

Process 30518 attached

, child\_tidptr=0x7e9538683a10) = 30518

[pid 30518] set\_robust\_list(0x7e9538683a20, 24 <unfinished ...>

[pid 30517] fstat(1, <unfinished ...>

[pid 30518] <... set\_robust\_list resumed>) = 0

[pid 30517] <... fstat resumed>{st\_mode=S\_IFCHR|0620, st\_rdev=makedev(0x88, 0), ...}) =

0

[pid 30517] getrandom("\x0b\x43\xf8\xda\x33\xbc\x71\x00", 8, GRND\_NONBLOCK) = 8

[pid 30518] execve("./child", ["./child", "/shared\_memory"], 0x7ffe560e3b68 /\* 50 vars

\*/ <unfinished ...>

[pid 30517] brk(NULL) = 0x58cbfc040000

[pid 30517] brk(0x58cbfc061000) = 0x58cbfc061000

[pid 30517] write(1, "Write a doc name\n", 17Write a doc name

) = 17

[pid 30517] fstat(0, {st\_mode=S\_IFCHR|0620, st\_rdev=makedev(0x88, 0), ...}) = 0

[pid 30517] read(0, <unfinished ...>

[pid 30518] <... execve resumed>) = 0

[pid 30518] brk(NULL) = 0x5b3b8209b000

[pid 30518] access("/etc/ld.so.preload", R\_OK) = -1 ENOENT (No such file or directory)

[pid 30518] openat(AT\_FDCWD, "/etc/ld.so.cache", O\_RDONLY|O\_CLOEXEC) = 3

[pid 30518] fstat(3, {st\_mode=S\_IFREG|0644, st\_size=121891, ...}) = 0

[pid 30518] mmap(NULL, 121891, PROT\_READ, MAP\_PRIVATE, 3, 0) = 0x7ef86a452000

[pid 30518] close(3) = 0

[pid 30518] openat(AT\_FDCWD, "/usr/lib/libc.so.6", O\_RDONLY|O\_CLOEXEC) = 3

[pid 30518] read(3,

"\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\340\_\2\0\0\0\0\0"..., 832) = 832

[pid 30518] pread64(3,

"\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"..., 784, 64) = 784

[pid 30518] fstat(3, {st\_mode=S\_IFREG|0755, st\_size=2014520, ...}) = 0

[pid 30518] mmap(NULL, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_ANONYMOUS, -1, 0) =

0x7ef86a450000

[pid 30518] pread64(3,

"\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"..., 784, 64) = 784

[pid 30518] mmap(NULL, 2034616, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) =

0x7ef86a25f000

[pid 30518] mmap(0x7ef86a283000, 1511424, PROT\_READ|PROT\_EXEC,

MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x24000) = 0x7ef86a283000

[pid 30518] mmap(0x7ef86a3f4000, 319488, PROT\_READ,

MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x195000) = 0x7ef86a3f4000

[pid 30518] mmap(0x7ef86a442000, 24576, PROT\_READ|PROT\_WRITE,

MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x1e3000) = 0x7ef86a442000

[pid 30518] mmap(0x7ef86a448000, 31672, PROT\_READ|PROT\_WRITE,

MAP\_PRIVATE|MAP\_FIXED|MAP\_ANONYMOUS, -1, 0) = 0x7ef86a448000

[pid 30518] close(3) = 0

[pid 30518] mmap(NULL, 12288, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_ANONYMOUS, -1, 0) =

0x7ef86a25c000

[pid 30518] arch\_prctl(ARCH\_SET\_FS, 0x7ef86a25c740) = 0

[pid 30518] set\_tid\_address(0x7ef86a25ca10) = 30518

[pid 30518] set\_robust\_list(0x7ef86a25ca20, 24) = 0

[pid 30518] rseq(0x7ef86a25d060, 0x20, 0, 0x53053053) = 0

[pid 30518] mprotect(0x7ef86a442000, 16384, PROT\_READ) = 0

[pid 30518] mprotect(0x5b3b715d7000, 4096, PROT\_READ) = 0

[pid 30518] mprotect(0x7ef86a4aa000, 8192, PROT\_READ) = 0

[pid 30518] prlimit64(0, RLIMIT\_STACK, NULL, {rlim\_cur=8192\*1024,

rlim\_max=RLIM64\_INFINITY}) = 0

[pid 30518] munmap(0x7ef86a452000, 121891) = 0

[pid 30518] openat(AT\_FDCWD, "/dev/shm/shared\_memory", O\_RDWR|O\_NOFOLLOW|O\_CLOEXEC) = 3

[pid 30518] mmap(NULL, 256, PROT\_READ|PROT\_WRITE, MAP\_SHARED, 3, 0) = 0x7ef86a46f000

[pid 30518] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=1, tv\_nsec=0},

test.0x7ffe5af1fe60) = 0

[pid 30518] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=1, tv\_nsec=0}, txt

<unfinished ...>

[pid 30517] <... read resumed>"test.txt\n", 1024) = 9

[pid 30517] write(1, "Enter a message (exit for exit)\n", 32Enter a message (exit for

exit)

) = 32

[pid 30517] read(0, <unfinished ...>

[pid 30518] <... clock\_nanosleep resumed>0x7ffe5af1fe60) = 0

[pid 30518] getrandom("\xc5\x10\x72\x31\x59\xd1\x69\x43", 8, GRND\_NONBLOCK) = 8

[pid 30518] brk(NULL) = 0x5b3b8209b000

[pid 30518] brk(0x5b3b820bc000) = 0x5b3b820bc000

[pid 30518] openat(AT\_FDCWD, "test.txt", O\_WRONLY|O\_CREAT|O\_TRUNC, 0666) = 4

[pid 30518] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=1, tv\_nsec=0}, 0x7ffe5af1fe60) =

0

[pid 30518] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=1, tv\_nsec=0}, 0x7ffe5af1fe60) =

0

[pid 30518] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=1, tv\_nsec=0},

hel0x7ffe5af1fe60) = 0

[pid 30518] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=1, tv\_nsec=0},

low0x7ffe5af1fe60) = 0

[pid 30518] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=1, tv\_nsec=0}, ;

<unfinished ...>

[pid 30517] <... read resumed>"hellow;\n", 1024) = 8

[pid 30517] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=0, tv\_nsec=100000000}, NULL) = 0

[pid 30517] write(1, "Status: Not over in ';' or '.'\n", 31Status: Not over in ';' or

'.'

) = 31

[pid 30517] write(1, "Enter a message (exit for exit)\n", 32Enter a message (exit for

exit)

) = 32

[pid 30517] read(0, <unfinished ...>

[pid 30518] <... clock\_nanosleep resumed>0x7ffe5af1fe60) = 0

[pid 30518] fstat(4, {st\_mode=S\_IFREG|0644, st\_size=0, ...}) = 0

[pid 30518] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=1, tv\_nsec=0}, 0x7ffe5af1fe60) =

0

[pid 30518] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=1, tv\_nsec=0}, 0x7ffe5af1fe60) =

0

[pid 30518] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=1, tv\_nsec=0}, yo0x7ffe5af1fe60)

= 0

[pid 30518] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=1, tv\_nsec=0}, oo

<unfinished ...>

[pid 30517] <... read resumed>"yooo\n", 1024) = 5

[pid 30517] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=0, tv\_nsec=100000000}, NULL) = 0

[pid 30517] write(1, "Status: Success\n", 16Status: Success

) = 16

[pid 30517] write(1, "Enter a message (exit for exit)\n", 32Enter a message (exit for

exit)

) = 32

[pid 30517] read(0, <unfinished ...>

[pid 30518] <... clock\_nanosleep resumed>0x7ffe5af1fe60) = 0

[pid 30518] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=1, tv\_nsec=0}, l0x7ffe5af1fe60)

= 0

[pid 30518] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=1, tv\_nsec=0},0x7ffe5af1fe60) =

0

[pid 30518] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=1, tv\_nsec=0}, 0x7ffe5af1fe60) =

0

[pid 30518] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=1, tv\_nsec=0}, n0x7ffe5af1fe60)

= 0

[pid 30518] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=1, tv\_nsec=0},

aaaa;0x7ffe5af1fe60) = 0

[pid 30518] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=1, tv\_nsec=0},

<unfinished ...>

[pid 30517] <... read resumed>"naaaa;\n", 1024) = 7

[pid 30517] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=0, tv\_nsec=100000000}, NULL) = 0

[pid 30517] write(1, "Status: Not over in ';' or '.'\n", 31Status: Not over in ';' or

'.'

) = 31

[pid 30517] write(1, "Enter a message (exit for exit)\n", 32Enter a message (exit for

exit)

) = 32

[pid 30517] read(0, e <unfinished ...>

[pid 30518] <... clock\_nanosleep resumed>0x7ffe5af1fe60) = 0

[pid 30518] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=1, tv\_nsec=0},

xit0x7ffe5af1fe60) = 0

[pid 30518] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=1, tv\_nsec=0},

<unfinished ...>

[pid 30517] <... read resumed>"exit\n", 1024) = 5

[pid 30517] wait4(30518, <unfinished ...>

[pid 30518] <... clock\_nanosleep resumed>0x7ffe5af1fe60) = 0

[pid 30518] write(4, "hellow;\nhellow;\nhellow;\nhellow;\n"..., 46) = 46

[pid 30518] close(4) = 0

[pid 30518] exit\_group(0) = ?

[pid 30518] +++ exited with 0 +++

<... wait4 resumed>NULL, 0, NULL) = 30518

--- SIGCHLD {si\_signo=SIGCHLD, si\_code=CLD\_EXITED, si\_pid=30518, si\_uid=1000,

si\_status=0, si\_utime=0, si\_stime=0} ---

unlink("/dev/shm/shared\_memory") = 0

exit\_group(0) = ?

+++ exited with 0 +++

**Лабораторная работа №4**

$ strace ./prog1

execve("./prog1", ["./prog1"], 0x7ffcf53e8d60 /\* 51 vars \*/) = 0

brk(NULL) = 0x60bc51ad6000

access("/etc/ld.so.preload", R\_OK) = -1 ENOENT (No such file or directory)

openat(AT\_FDCWD, "./glibc-hwcaps/x86-64-v3/libprogv1.so", O\_RDONLY|O\_CLOEXEC) = -1

ENOENT (No such file or directory)

openat(AT\_FDCWD, "./glibc-hwcaps/x86-64-v2/libprogv1.so", O\_RDONLY|O\_CLOEXEC) = -1

ENOENT (No such file or directory)

openat(AT\_FDCWD, "./libprogv1.so", O\_RDONLY|O\_CLOEXEC) = 3

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

fstat(3, {st\_mode=S\_IFREG|0755, st\_size=15040, ...}) = 0

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

0x78495b133000

getcwd("/home/abs/projects/os\_labs/lab4/src", 128) = 36

mmap(NULL, 16416, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x78495b12e000

mmap(0x78495b12f000, 4096, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3,

0x1000) = 0x78495b12f000

mmap(0x78495b130000, 4096, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x2000) =

0x78495b130000

mmap(0x78495b131000, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE,

3, 0x2000) = 0x78495b131000

close(3) = 0

openat(AT\_FDCWD, "./glibc-hwcaps/x86-64-v3/libc.so.6", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT

(No such file or directory)

openat(AT\_FDCWD, "./glibc-hwcaps/x86-64-v2/libc.so.6", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT

(No such file or directory)

openat(AT\_FDCWD, "./libc.so.6", O\_RDONLY|O\_CLOEXEC) = -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=121891, ...}) = 0

mmap(NULL, 121891, PROT\_READ, MAP\_PRIVATE, 3, 0) = 0x78495b110000

close(3) = 0

openat(AT\_FDCWD, "/usr/lib/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\340\_\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

fstat(3, {st\_mode=S\_IFREG|0755, st\_size=2014520, ...}) = 0

pread64(3, "\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"..., 784, 64)

= 784

mmap(NULL, 2034616, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x78495af1f000

mmap(0x78495af43000, 1511424, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE,

3, 0x24000) = 0x78495af43000

mmap(0x78495b0b4000, 319488, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3,

0x195000) = 0x78495b0b4000

mmap(0x78495b102000, 24576, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE,

3, 0x1e3000) = 0x78495b102000

mmap(0x78495b108000, 31672, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_ANONYMOUS,

-1, 0) = 0x78495b108000

close(3) = 0

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

0x78495af1c000

arch\_prctl(ARCH\_SET\_FS, 0x78495af1c740) = 0

set\_tid\_address(0x78495af1ca10) = 16594

set\_robust\_list(0x78495af1ca20, 24) = 0

rseq(0x78495af1d060, 0x20, 0, 0x53053053) = 0

mprotect(0x78495b102000, 16384, PROT\_READ) = 0

mprotect(0x78495b131000, 4096, PROT\_READ) = 0

mprotect(0x60bc23133000, 4096, PROT\_READ) = 0

mprotect(0x78495b16f000, 8192, PROT\_READ) = 0

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

munmap(0x78495b110000, 121891) = 0

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

getrandom("\xcc\xa0\x17\x79\x0e\x5d\x4f\x6d", 8, GRND\_NONBLOCK) = 8

brk(NULL) = 0x60bc51ad6000

brk(0x60bc51af7000) = 0x60bc51af7000

write(1, "1 - GCF\n", 81 - GCF

) = 8

write(1, "2 - Translate number\n", 212 - Translate number

) = 21

write(1, "3 - exit\n", 93 - exit

) = 9

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

read(0, 2

"2\n", 1024) = 2

write(1, "\320\222\320\262\320\265\320\264\320\270\321\202\320\265

\321\207\320\270\321\201\320\273\320\276\n", 26Введите число

) = 26

read(0, 10

"10\n", 1024) = 3

write(1, "1010\n", 51010

) = 5

write(1, "1 - GCF\n2 - Translate number\n", 291 - GCF

2 - Translate number

) = 29

write(1, "3 - exit\n", 93 - exit

) = 9

read(0, 15

"15\n", 1024) = 3

write(1, "1 - GCF\n2 - Translate number\n", 291 - GCF

2 - Translate number

) = 29

write(1, "3 - exit\n", 93 - exit

) = 9

read(0, 3

"3\n", 1024) = 2

lseek(0, -1, SEEK\_CUR) = -1 ESPIPE (Illegal seek)

exit\_group(0) = ?

+++ exited with 0 +++

strace prog2:

$ strace ./prog2

execve("./prog2", ["./prog2"], 0x7ffeb47c0b58 /\* 51 vars \*/) = 0

brk(NULL) = 0x5a829db04000

access("/etc/ld.so.preload", R\_OK) = -1 ENOENT (No such file or directory)

openat(AT\_FDCWD, "./glibc-hwcaps/x86-64-v3/libc.so.6", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT

(No such file or directory)

openat(AT\_FDCWD, "./glibc-hwcaps/x86-64-v2/libc.so.6", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT

(No such file or directory)

openat(AT\_FDCWD, "./libc.so.6", O\_RDONLY|O\_CLOEXEC) = -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=121891, ...}) = 0

mmap(NULL, 121891, PROT\_READ, MAP\_PRIVATE, 3, 0) = 0x77624070e000

close(3) = 0

openat(AT\_FDCWD, "/usr/lib/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\340\_\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

fstat(3, {st\_mode=S\_IFREG|0755, st\_size=2014520, ...}) = 0

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

0x77624070c000

pread64(3, "\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"..., 784, 64)

= 784

mmap(NULL, 2034616, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x77624051b000

mmap(0x77624053f000, 1511424, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE,

3, 0x24000) = 0x77624053f000

mmap(0x7762406b0000, 319488, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3,

0x195000) = 0x7762406b0000

mmap(0x7762406fe000, 24576, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE,

3, 0x1e3000) = 0x7762406fe000

mmap(0x776240704000, 31672, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_ANONYMOUS,

-1, 0) = 0x776240704000

close(3) = 0

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

0x776240518000

arch\_prctl(ARCH\_SET\_FS, 0x776240518740) = 0

set\_tid\_address(0x776240518a10) = 16729

set\_robust\_list(0x776240518a20, 24) = 0

rseq(0x776240519060, 0x20, 0, 0x53053053) = 0

mprotect(0x7762406fe000, 16384, PROT\_READ) = 0

mprotect(0x5a829a6d9000, 4096, PROT\_READ) = 0

mprotect(0x776240766000, 8192, PROT\_READ) = 0

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

munmap(0x77624070e000, 121891) = 0

getrandom("\x3d\x53\xd9\xa9\x9b\x86\x8e\x8c", 8, GRND\_NONBLOCK) = 8

brk(NULL) = 0x5a829db04000

brk(0x5a829db25000) = 0x5a829db25000

openat(AT\_FDCWD, "./libprogv1.so", O\_RDONLY|O\_CLOEXEC) = 3

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

fstat(3, {st\_mode=S\_IFREG|0755, st\_size=15040, ...}) = 0

getcwd("/home/abs/projects/os\_labs/lab4/src", 128) = 36

mmap(NULL, 16416, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x776240727000

mmap(0x776240728000, 4096, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3,

0x1000) = 0x776240728000

mmap(0x776240729000, 4096, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x2000) =

0x776240729000

mmap(0x77624072a000, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE,

3, 0x2000) = 0x77624072a000

close(3) = 0

mprotect(0x77624072a000, 4096, PROT\_READ) = 0

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

write(1, "\320\242\320\265\320\272\321\203\321\211\320\260\321\217

\321\200\320\265\320\260\320\273\320\270\320\267\320\260\321\206\320"..., 40Текущая

реализация: 1v

) = 40

write(1, "0 -

\320\237\320\265\321\200\320\265\320\272\320\273\321\216\321\207\320\270\321\202\321\214

\321\200\320\265\320"..., 480 - Переключить реализацию

) = 48

write(1, "1 - GCF\n", 81 - GCF

) = 8

write(1, "2 - Translate number\n", 212 - Translate number

) = 21

write(1, "3 - Exit\n", 93 - Exit

) = 9

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

read(0, 0

"0\n", 1024) = 2

openat(AT\_FDCWD, "./libprogv2.so", O\_RDONLY|O\_CLOEXEC) = 3

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

fstat(3, {st\_mode=S\_IFREG|0755, st\_size=15040, ...}) = 0

getcwd("/home/abs/projects/os\_labs/lab4/src", 128) = 36

mmap(NULL, 16416, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x776240722000

mmap(0x776240723000, 4096, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3,

0x1000) = 0x776240723000

mmap(0x776240724000, 4096, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x2000) =

0x776240724000

mmap(0x776240725000, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE,

3, 0x2000) = 0x776240725000

close(3) = 0

mprotect(0x776240725000, 4096, PROT\_READ) = 0

write(1, "\320\242\320\265\320\272\321\203\321\211\320\260\321\217

\321\200\320\265\320\260\320\273\320\270\320\267\320\260\321\206\320"..., 126Текущая

реализация: 2v

0 - Переключить реализацию

1 - GCF

2 - Translate number

3 - Exit

) = 126

read(0, 3

"3\n", 1024) = 2

lseek(0, -1, SEEK\_CUR) = -1 ESPIPE (Illegal seek)

exit\_group(0) = ?

+++ exited with 0 +++

**Лабораторная работа №5-7**

$ $ strace ./client

14163 eventfd2(0, EFD\_CLOEXEC) = 3

14163 fcntl(3, F\_GETFL) = 0x2 (flags O\_RDWR)

14163 fcntl(3, F\_SETFL, O\_RDWR|O\_NONBLOCK) = 0

# ZeroMQ использует eventfd для асинхронного оповещения о событиях между потоками. 14163 socket(AF\_INET, SOCK\_STREAM|SOCK\_CLOEXEC, IPPROTO\_TCP) = 10

14163 setsockopt(10, SOL\_SOCKET, SO\_REUSEADDR, [1], 4) = 0

14163 bind(10, {sa\_family=AF\_INET, sin\_port=htons(59001),

sin\_addr=inet\_addr("127.0.0.1")}, 16) = 0

14163 listen(10, 100) = 0

#Здесь программа создает TCP-сокет и привязывает его к порту 59001 на локальном

интерфейсе. 14163

clone3({flags=CLONE\_VM|CLONE\_FS|CLONE\_FILES|CLONE\_SIGHAND|CLONE\_THREAD|CLONE\_SYSVSEM|CLONE\_S

ETTLS|CLONE\_PARENT\_SETTID|CLONE\_CHILD\_CLEARTID, ...

14164 prctl(PR\_SET\_NAME, "ZMQbg/Reaper") = 0

...

14165 prctl(PR\_SET\_NAME, "ZMQbg/IO/0") = 0

# потоки для обработки сообщений (Reaper для управления ресурсами и IO для операций

ввода-вывода).

14163 clone(child\_stack=NULL, flags=CLONE\_CHILD\_CLEARTID|CLONE\_CHILD\_SETTID|SIGCHLD,

...

14185 execve("./worker", ["worker", "1", "59001"], 0x7ffcb02eb0c8 /\* 51 vars \*/)

**Вывод**

Были приобретены практические навыки для диагностики работы программного обеспечения.