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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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## Постановка задачи

Цель работы: Приобретение практических навыков диагностики работы программного обеспечения.

Задание: 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

Для иллюстрации системных вызовов воспользуемся утилитой `strace` в операционной системе Linux.

`Strace` представляет собой инструмент для диагностики, отладки и обучения в пользовательском пространстве Linux. Он применяется для мониторинга и вмешательства во взаимодействие между процессами и ядром системы, включая системные вызовы, передачу сигналов и изменение состояния процессов. Работа `strace` основана на функции ядра, известной как `ptrace`. Чаще всего `strace` используется для запуска программы с последующим отображением списка выполняемых ею системных вызовов. Это особенно полезно, когда программа часто аварийно завершает работу или ведет себя непредсказуемо; например, `strace` может показать, что программа пытается обратиться к несуществующему или недоступному файлу.

Еще одним полезным применением `strace` является использование опции `-p` для присоединения к уже запущенному процессу. Это может быть необходимо, если процесс перестал отвечать, и `strace` может помочь определить, что процесс зависает при попытке установить сетевое соединение.

Кроме того, `strace` предоставляет множество других возможностей:

- **Фильтрация системных вызовов:** Вы можете указать, какие системные вызовы следует отслеживать, используя параметр `-e trace=`. Это можно сделать по имени (например, `clone`, `fork`, `vfork`), с использованием предопределенных групп (например, `%ipc` или `%file`) или с помощью регулярных выражений (начиная с версии `strace 4.17`, например, `-e trace=/clock_.*`).
- **Трассировка путей:** Вы можете указать список путей для трассировки, используя параметр `-P` (например, `-P /etc/ld.so.cache`).
- **Выгрузка ввода-вывода:** Вы можете указать список файловых дескрипторов для выгрузки ввода-вывода, используя параметры `-e read=` и `-e write=`.
- **Подсчет времени выполнения:** `Strace` позволяет подсчитывать время выполнения системных вызовов и их количество, используя параметры `-T`, `-c`, `-C` и `-w`. Параметр `-U` позволяет выводить дополнительную информацию, такую как минимальное и максимальное время выполнения системного вызова.
- **Временные метки:** `Strace` может печатать относительные или абсолютные временные метки, используя опции `-t` и `-g`.
- **Изменение системных вызовов:** `Strace` позволяет изменять выполняемые системные вызовы, включая изменение возвращаемого значения и кода ошибки, внедрение сигналов, задержек и изменение данных, на которые указывают аргументы системных вызовов. Это достигается с помощью опции `-e inject=syscall specification:tampering specification:retval=:error=:signal=:delay_enter=:delay_exit=:poke_enter=:poke_exit=`.
- **Информация о дескрипторах файлов:** `Strace` может извлекать информацию о дескрипторах файлов, включая сокеты, используя опцию `-u`. Опция `-uu` предоставляет дополнительную информацию, такую как адреса конечных точек для сокетов, пути и основные/дополнительные номера устройств для файлов.
- **Трассировка стека:** `Strace` может печатать трассировки стека, включая разборку символов (начиная с версии `strace 4.21`, используя опцию `-k`).

`Strace` также поддерживает множество других опций и параметров, которые делают его мощным инструментом для диагностики и отладки программного обеспечения.

# Протокол работы программы

## Лабораторная работа №1.

```
38485 execve("./main", ["/main"], 0x7ffc849a5ae8 /* 30 vars */) = 0
38485 close(3) = 0
38485 read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\3\0>\0\1\0\0\0\0\0\0\0\0\0"..., 832) = 832
38485 close(3) = 0
38485 read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\3\0>\0\1\0\0\0\0\0\0\0\0\0"..., 832) = 832
38485 close(3) = 0
38485 read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\0\0\0\0\0\0"..., 832) = 832
38485 close(3) = 0
38485 read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\3\0>\0\1\0\0\0\20t\2\0\0\0\0"..., 832) = 832
38485 close(3) = 0
38485 write(1, "Enter file's name for child proc"..., 39) = 39
38485 read(0, "ch1\n", 1024) = 4
38485 write(1, "Enter file's name for child proc"..., 39) = 39
38485 read(0, "ch2\n", 1024) = 4
38485 clone(child_stack=NULL,
flags=CLONE_CHILD_CLEARTID|CLONE_CHILD_SETTID|SIGCHLD,
child_tidptr=0x7f5b96080750) = 38521
38485 clone(child_stack=NULL,
flags=CLONE_CHILD_CLEARTID|CLONE_CHILD_SETTID|SIGCHLD <unfinished ...>
38521 close(6 <unfinished ...>
38485 <... clone resumed>, child_tidptr=0x7f5b96080750) = 38522
38521 <... close resumed>) = 0
38485 close(5) = 0
38521 close(7 <unfinished ...>
38485 close(7) = 0
38521 <... close resumed>) = 0
38485 read(0, <unfinished ...>
38522 close(5 <unfinished ...>
38521 close(8 <unfinished ...>
38522 <... close resumed>) = 0
38521 <... close resumed>) = 0
```

```

38522 close(6 <unfinished ...>
38521 dup2(5, 0 <unfinished ...>
38522 <... close resumed>)          = 0
38521 <... dup2 resumed>)           = 0
38522 close(8 <unfinished ...>
38521 dup2(3, 1 <unfinished ...>
38522 <... close resumed>)          = 0
38521 <... dup2 resumed>)           = 1
38522 dup2(7, 0 <unfinished ...>
38521 execve("./child", ["./child"], 0x7fff0a011c28 /* 30 vars */ <unfinished ...>
38522 <... dup2 resumed>)           = 0
38522 dup2(4, 1)                   = 1
38522 execve("./child", ["./child"], 0x7fff0a011c28 /* 30 vars */) = 0
38521 <... execve resumed>)         = 0
38522 close(5)                     = 0
38522 read(5, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\0\0\0\0\0\0\0"..., 832) = 832
38521 close(6)                     = 0
38521 read(6, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\0\0\0\0\0\0\0"..., 832) = 832
38522 close(5)                     = 0
38522 read(5, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\0\0\0\0\0\0\0"..., 832) = 832
38521 close(6)                     = 0
38521 read(6, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\0\0\0\0\0\0\0"..., 832) = 832
38522 close(5)                     = 0
38522 read(5, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\0\0\0\0\0\0\0"..., 832) = 832
38521 close(6)                     = 0
38521 read(6, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\0\0\0\0\0\0\0"..., 832) = 832
38522 close(5)                     = 0
38522 read(5, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\0\0\0\0\0\0\0"..., 832) = 832
38521 close(6)                     = 0
38521 read(6, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\0\0\0\0\0\0\0"..., 832) = 832
38522 close(5)                     = 0
38521 close(6)                     = 0

```

```

38522 read(0, <unfinished ...>
38521 read(0, <unfinished ...>
38485 <... read resumed>"0123456789\n", 1024) = 11
38485 write(6, "0123456789", 10)      = 10
38521 <... read resumed>"0", 1)      = 1
38485 write(6, "\0", 1 <unfinished ...>
38521 read(0, <unfinished ...>
38485 <... write resumed>)            = 1
38521 <... read resumed>"1", 1)      = 1
38485 read(0, <unfinished ...>
38521 read(0, "2", 1)                = 1
38521 read(0, "3", 1)                = 1
38521 read(0, "4", 1)                = 1
38521 read(0, "5", 1)                = 1
38521 read(0, "6", 1)                = 1
38521 read(0, "7", 1)                = 1
38521 read(0, "8", 1)                = 1
38521 read(0, "9", 1)                = 1
38521 read(0, "\0", 1)                = 1
38521 write(1, "9876543210\n", 11)    = 11
38521 read(0, <unfinished ...>
38485 <... read resumed>"0123456789a\n", 1024) = 12
38485 write(8, "0123456789a", 11)    = 11
38522 <... read resumed>"0", 1)      = 1
38485 write(8, "\0", 1 <unfinished ...>
38522 read(0, <unfinished ...>
38485 <... write resumed>)            = 1
38522 <... read resumed>"1", 1)      = 1
38485 read(0, <unfinished ...>
38522 read(0, "2", 1)                = 1
38522 read(0, "3", 1)                = 1
38522 read(0, "4", 1)                = 1

```

```

38522 read(0, "5", 1)          = 1
38522 read(0, "6", 1)          = 1
38522 read(0, "7", 1)          = 1
38522 read(0, "8", 1)          = 1
38522 read(0, "9", 1)          = 1
38522 read(0, "a", 1)          = 1
38522 read(0, "\0", 1)         = 1
38522 write(1, "a9876543210\n", 12)  = 12
38522 read(0, <unfinished ...>
38485 <... read resumed>"\n", 1024)  = 1
38485 write(6, "", 0)           = 0
38485 write(6, "\0", 1)         = 1
38521 <... read resumed>"\0", 1)      = 1
38485 write(8, "", 0 <unfinished ...>
38521 exit_group(0 <unfinished ...>
38485 <... write resumed>)          = 0
38521 <... exit_group resumed>)      = ?
38485 write(8, "\0", 1)         = 1
38522 <... read resumed>"\0", 1)      = 1
38485 close(6 <unfinished ...>
38521 +++ exited with 0 +++
38485 <... close resumed>)          = 0
38522 exit_group(0 <unfinished ...>
38485 --- SIGCHLD {si_signo=SIGCHLD, si_code=CLD_EXITED, si_pid=38521, si_uid=0,
si_status=0, si_utime=0, si_stime=0} ---
38522 <... exit_group resumed>)      = ?
38485 close(8)                  = 0
38522 +++ exited with 0 +++
38485 --- SIGCHLD {si_signo=SIGCHLD, si_code=CLD_EXITED, si_pid=38522, si_uid=0,
si_status=0, si_utime=0, si_stime=0} ---
38485 exit_group(0)                = ?
38485 +++ exited with 0 +++

```

## Лабораторная работа №2.

```
execve("./sort", ["/./sort", "-t", "2", "-i", "test.txt", "-o", "output4.txt"], 0x7ffe92931d98 /* 30 vars
*/) = 0

brk(NULL) = 0x1445000

mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1,
0) = 0x7fe07f0fa000

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

newfstatat(3, "", {st_mode=S_IFREG|0644, st_size=25258, ...}, AT_EMPTY_PATH) = 0

mmap(NULL, 25258, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7fe07f0f3000

close(3) = 0

openat(AT_FDCWD, "/usr/local/lib64/libstdc++.so.6", O_RDONLY|O_CLOEXEC) = 3

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

newfstatat(3, "", {st_mode=S_IFREG|0755, st_size=2530008, ...}, AT_EMPTY_PATH) = 0

mmap(NULL, 2543808, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7fe07ee85000

mmap(0x7fe07ef2a000, 1216512, PROT_READ|PROT_EXEC,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0xa5000) = 0x7fe07ef2a000

mmap(0x7fe07f053000, 581632, PROT_READ,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1ce000) = 0x7fe07f053000

mmap(0x7fe07f0e1000, 57344, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x25c000) = 0x7fe07f0e1000

mmap(0x7fe07f0ef000, 12480, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7fe07f0ef000

close(3) = 0

openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libm.so.6", O_RDONLY|O_CLOEXEC) = 3

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

newfstatat(3, "", {st_mode=S_IFREG|0644, st_size=907784, ...}, AT_EMPTY_PATH) = 0

mmap(NULL, 909560, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7fe07eda6000

mmap(0x7fe07edb6000, 471040, PROT_READ|PROT_EXEC,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x10000) = 0x7fe07edb6000
```

mmap(0x7fe07ee29000, 368640, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x83000) = 0x7fe07ee29000

mmap(0x7fe07ee83000, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0xdc000) = 0x7fe07ee83000

close(3) = 0

openat(AT\_FDCWD, "/usr/local/lib64/libgcc\_s.so.1", O\_RDONLY|O\_CLOEXEC) = 3

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

newfstatat(3, "", {st\_mode=S\_IFREG|0644, st\_size=906528, ...}, AT\_EMPTY\_PATH) = 0

mmap(NULL, 181160, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7fe07ed79000

mmap(0x7fe07ed7d000, 143360, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x4000) = 0x7fe07ed7d000

mmap(0x7fe07eda0000, 16384, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x27000) = 0x7fe07eda0000

mmap(0x7fe07eda4000, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x2b000) = 0x7fe07eda4000

close(3) = 0

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

read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\0\20t\2\0\0\0\0"..., 832) = 832

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

newfstatat(3, "", {st\_mode=S\_IFREG|0755, st\_size=1922136, ...}, AT\_EMPTY\_PATH) = 0

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

mmap(NULL, 1970000, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7fe07eb98000

mmap(0x7fe07ebbe000, 1396736, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x26000) = 0x7fe07ebbe000

mmap(0x7fe07ed13000, 339968, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x17b000) = 0x7fe07ed13000

mmap(0x7fe07ed66000, 24576, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x1ce000) = 0x7fe07ed66000

mmap(0x7fe07ed6c000, 53072, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_ANONYMOUS, -1, 0) = 0x7fe07ed6c000

close(3) = 0

mmap(NULL, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_ANONYMOUS, -1, 0) = 0x7fe07eb96000

arch\_prctl(ARCH\_SET\_FS, 0x7fe07eb97480) = 0



```

set_tid_address(0x7fe07eb97750)      = 6212

set_robust_list(0x7fe07eb97760, 24)  = 0

rseq(0x7fe07eb97da0, 0x20, 0, 0x53053053) = 0

mprotect(0x7fe07ed66000, 16384, PROT_READ) = 0

mprotect(0x7fe07eda4000, 4096, PROT_READ) = 0

mprotect(0x7fe07ee83000, 4096, PROT_READ) = 0

mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) =
0x7fe07eb94000

mprotect(0x7fe07f0e1000, 45056, PROT_READ) = 0

mprotect(0x407000, 4096, PROT_READ)   = 0

mprotect(0x7fe07f12c000, 8192, PROT_READ) = 0

prlimit64(0, RLIMIT_STACK, NULL, {rlim_cur=8192*1024, rlim_max=RLIM64_INFINITY}) = 0

munmap(0x7fe07f0f3000, 25258)        = 0

futex(0x7fe07f0ef73c, FUTEX_WAKE_PRIVATE, 2147483647) = 0

getrandom("\x00\x18\xb3\xc6\x50\xc\x00\xfe", 8, GRND_NONBLOCK) = 8

brk(NULL)                                = 0x1445000

brk(0x1466000)                          = 0x1466000

openat(AT_FDCWD, "test.txt", O_RDONLY) = 3

read(3, "4\n5310515 1933384 7154451 698388"..., 8191) = 35

close(3)                                = 0

rt_sigaction(SIGRT_1,                    {sa_handler=0x7fe07ec1e6a0,          sa_mask=[],
sa_flags=SA_RESTORER|SA_ONSTACK|SA_RESTART|SA_SIGINFO, sa_restorer=0x7fe07ebd4050},
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) =
0x7fe07e393000

mprotect(0x7fe07e394000, 8388608, PROT_READ|PROT_WRITE) = 0

rt_sigprocmask(SIG_BLOCK, ~[], [], 8)  = 0

clone3({ flags=CLONE_VM|CLONE_FS|CLONE_FILES|CLONE_SIGHAND|CLONE_THREAD|CLON
E_SYSVSEM|CLONE_SETTLS|CLONE_PARENT_SETTID|CLONE_CHILD_CLEARPID,
child_tid=0x7fe07eb93990, parent_tid=0x7fe07eb93990, exit_signal=0, stack=0x7fe07e393000,
stack_size=0x7fff80, tls=0x7fe07eb936c0}strace: Process 6213 attached

```

```

=> {parent_tid=[6213]}, 88) = 6213

[pid 6213] rseq(0x7fe07eb93fe0, 0x20, 0, 0x53053053 <unfinished ...>

[pid 6212] rt_sigprocmask(SIG_SETMASK, [], <unfinished ...>

[pid 6213] <... rseq resumed>      = 0

[pid 6212] <... rt_sigprocmask resumed>NULL, 8) = 0

[pid 6213] set_robust_list(0x7fe07eb939a0, 24 <unfinished ...>

[pid 6212]      6212]      mmap(NULL,      8392704,      PROT_NONE,
MAP_PRIVATE|MAP_ANONYMOUS|MAP_STACK, -1, 0 <unfinished ...>

[pid 6213] <... set_robust_list resumed>) = 0

[pid 6212] <... mmap resumed>)      = 0x7fe07db92000

[pid 6213] rt_sigprocmask(SIG_SETMASK, [], <unfinished ...>

[pid 6212] mprotect(0x7fe07db93000, 8388608, PROT_READ|PROT_WRITE <unfinished ...>

[pid 6213] <... rt_sigprocmask resumed>NULL, 8) = 0

[pid 6212] <... mprotect resumed>)  = 0

[pid 6213] rt_sigprocmask(SIG_BLOCK, ~[RT_1], <unfinished ...>

[pid 6212] rt_sigprocmask(SIG_BLOCK, ~[], <unfinished ...>

[pid 6213] <... rt_sigprocmask resumed>NULL, 8) = 0

[pid 6212] <... rt_sigprocmask resumed>[], 8) = 0

[pid 6213] madvise(0x7fe07e393000, 8368128, MADV_DONTNEED <unfinished ...>

[pid 6212]      6212]
clone3({ flags=CLONE_VM|CLONE_FS|CLONE_FILES|CLONE_SIGHAND|CLONE_THREAD|CLON
E_SYSVSEM|CLONE_SETTLS|CLONE_PARENT_SETTID|CLONE_CHILD_CLEARPID,
child_tid=0x7fe07e392990,  parent_tid=0x7fe07e392990,  exit_signal=0,  stack=0x7fe07db92000,
stack_size=0x7fff80, tls=0x7fe07e3926c0} <unfinished ...>

[pid 6213] <... madvise resumed>)    = 0

[pid 6213] exit(0strace: Process 6214 attached

)      = ?

[pid 6212] <... clone3 resumed> => {parent_tid=[6214]}, 88) = 6214

[pid 6214] rseq(0x7fe07e392fe0, 0x20, 0, 0x53053053 <unfinished ...>

[pid 6212] rt_sigprocmask(SIG_SETMASK, [], <unfinished ...>

[pid 6213] +++ exited with 0 +++

[pid 6214] <... rseq resumed>)      = 0

```

[pid 6212] <... rt\_sigprocmask resumed>NULL, 8) = 0

[pid 6214] set\_robust\_list(0x7fe07e3929a0, 24 <unfinished ...>

[pid 6212] **futex**(0x7fe07e392990, FUTEX\_WAIT\_BITSET|FUTEX\_CLOCK\_REALTIME, 6214, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 6214] <... set\_robust\_list resumed>) = 0

[pid 6214] rt\_sigprocmask(SIG\_SETMASK, [], NULL, 8) = 0

[pid 6214] rt\_sigprocmask(SIG\_BLOCK, ~[RT\_1], NULL, 8) = 0

[pid 6214] madvise(0x7fe07db92000, 8368128, MADV\_DONTNEED) = 0

[pid 6214] exit(0) = ?

[pid 6212] <... **futex** resumed>) = 0

[pid 6214] +++ exited with 0 +++

**futex**(0x7fe07f0ef748, FUTEX\_WAKE\_PRIVATE, 2147483647) = 0

**openat**(AT\_FDCWD, "output4.txt", O\_WRONLY|O\_CREAT|O\_TRUNC, 0666) = 3

**write**(3, "4\n", 2) = 2

**write**(3, "1933384 5310515 6983887 7154451\n", 32) = 32

**close**(3) = 0

exit\_group(0) = ?

+++ exited with 0 +++

### Лабораторная работа №3.

mmap(NULL, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_ANONYMOUS, -1, 0) = 0x7f5fae1a2000

mmap(NULL, 25258, PROT\_READ, MAP\_PRIVATE, 3, 0) = 0x7f5fae19b000

mmap(NULL, 2543808, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7f5fadf2d000

mmap(0x7f5fadfd2000, 1216512, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0xa5000) = 0x7f5fadfd2000

mmap(0x7f5fae0fb000, 581632, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x1ce000) = 0x7f5fae0fb000

mmap(0x7f5fae189000, 57344, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x25c000) = 0x7f5fae189000

mmap(0x7f5fae197000, 12480, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_ANONYMOUS, -1, 0) = 0x7f5fae197000

mmap(NULL, 909560, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7f5fade4e000

mmap(0x7f5fade5e000, 471040, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x10000) = 0x7f5fade5e000

mmap(0x7f5faded1000, 368640, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x83000) = 0x7f5faded1000

mmap(0x7f5fadf2b000, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0xdc000) = 0x7f5fadf2b000

mmap(NULL, 181160, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7f5fade21000

mmap(0x7f5fade25000, 143360, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x4000) = 0x7f5fade25000

mmap(0x7f5fade48000, 16384, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x27000) = 0x7f5fade48000

mmap(0x7f5fade4c000, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x2b000) = 0x7f5fade4c000

mmap(NULL, 1970000, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7f5fadc40000

mmap(0x7f5fadc66000, 1396736, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x26000) = 0x7f5fadc66000

mmap(0x7f5faddbb000, 339968, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x17b000) = 0x7f5faddbb000

mmap(0x7f5fade0e000, 24576, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x1ce000) = 0x7f5fade0e000

mmap(0x7f5fade14000, 53072, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_ANONYMOUS, -1, 0) = 0x7f5fade14000

```
mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1,  
0) = 0x7f5fad3e000
```

```
mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1,  
0) = 0x7f5fad3c000
```

```
munmap(0x7f5fae19b000, 25258)      = 0
```

```
openat(AT_FDCWD, "/dev/shm/shm_child1",  
O_RDWR|O_CREAT|O_NOFOLLOW|O_CLOEXEC, 0666) = 5
```

```
openat(AT_FDCWD, "/dev/shm/shm_child2",  
O_RDWR|O_CREAT|O_NOFOLLOW|O_CLOEXEC, 0666) = 6
```

```
mmap(NULL, 1096, PROT_READ|PROT_WRITE, MAP_SHARED, 5, 0) = 0x7f5fae1a1000
```

```
mmap(NULL, 1096, PROT_READ|PROT_WRITE, MAP_SHARED, 6, 0) = 0x7f5fae1a0000
```

```
munmap(0x7f5fae1a1000, 1096)      = 0
```

```
munmap(0x7f5fae1a0000, 1096)      = 0
```

## Лабораторная работа №4.

### Program 1:

```
1507  execve("./TestProgram1", ["/TestProgram1"], 0x7ffd16befdc8 /* 26 vars */) = 0
```

```
1507  brk(NULL) = 0x2c4f5000
```

```
1507  mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7fe146add000
```

```
1507  readlink("/proc/self/exe", "/workspaces/os_base/lab4/src/Tes"..., 4096) = 41
```

```
1507  access("/etc/ld.so.preload", R_OK) = -1 ENOENT (No such file or directory)
```

```
1507  openat(AT_FDCWD, "/workspaces/os_base/lab4/src/glibc-hwcaps/x86-64-v4/libSinIntegral_Rect.so", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)
```

```
1507  newfstatat(AT_FDCWD, "/workspaces/os_base/lab4/src/glibc-hwcaps/x86-64-v4", 0x7fff9bc615b0, 0) = -1 ENOENT (No such file or directory)
```

```
1507  openat(AT_FDCWD, "/workspaces/os_base/lab4/src/glibc-hwcaps/x86-64-v3/libSinIntegral_Rect.so", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)
```

```
1507  newfstatat(AT_FDCWD, "/workspaces/os_base/lab4/src/glibc-hwcaps/x86-64-v3", 0x7fff9bc615b0, 0) = -1 ENOENT (No such file or directory)
```

```
1507  openat(AT_FDCWD, "/workspaces/os_base/lab4/src/glibc-hwcaps/x86-64-v2/libSinIntegral_Rect.so", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)
```

```
1507  newfstatat(AT_FDCWD, "/workspaces/os_base/lab4/src/glibc-hwcaps/x86-64-v2", 0x7fff9bc615b0, 0) = -1 ENOENT (No such file or directory)
```

```
1507  openat(AT_FDCWD, "/workspaces/os_base/lab4/src/tls/x86_64/x86_64/libSinIntegral_Rect.so", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)
```

```
1507  newfstatat(AT_FDCWD, "/workspaces/os_base/lab4/src/tls/x86_64/x86_64", 0x7fff9bc615b0, 0) = -1 ENOENT (No such file or directory)
```

```
1507  openat(AT_FDCWD, "/workspaces/os_base/lab4/src/tls/x86_64/libSinIntegral_Rect.so", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)
```

```
1507  newfstatat(AT_FDCWD, "/workspaces/os_base/lab4/src/tls/x86_64", 0x7fff9bc615b0, 0) = -1 ENOENT (No such file or directory)
```

```
1507  openat(AT_FDCWD, "/workspaces/os_base/lab4/src/tls/x86_64/libSinIntegral_Rect.so", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)
```

```
1507  newfstatat(AT_FDCWD, "/workspaces/os_base/lab4/src/tls/x86_64", 0x7fff9bc615b0, 0) = -1 ENOENT (No such file or directory)
```

```
1507  openat(AT_FDCWD, "/workspaces/os_base/lab4/src/tls/libSinIntegral_Rect.so", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)
```

```
1507  newfstatat(AT_FDCWD, "/workspaces/os_base/lab4/src/tls", 0x7fff9bc615b0, 0) = -1 ENOENT (No such file or directory)
```

**1507 openat(AT\_FDCWD, "/workspaces/os\_base/lab4/src/x86\_64/x86\_64/libSinIntegral\_Rect.so", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)**

1507 newfstatat(AT\_FDCWD, "/workspaces/os\_base/lab4/src/x86\_64/x86\_64", 0x7fff9bc615b0, 0) = -1 ENOENT (No such file or directory)

**1507 openat(AT\_FDCWD, "/workspaces/os\_base/lab4/src/x86\_64/libSinIntegral\_Rect.so", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)**

1507 newfstatat(AT\_FDCWD, "/workspaces/os\_base/lab4/src/x86\_64", 0x7fff9bc615b0, 0) = -1 ENOENT (No such file or directory)

**1507 openat(AT\_FDCWD, "/workspaces/os\_base/lab4/src/x86\_64/libSinIntegral\_Rect.so", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)**

1507 newfstatat(AT\_FDCWD, "/workspaces/os\_base/lab4/src/x86\_64", 0x7fff9bc615b0, 0) = -1 ENOENT (No such file or directory)

**1507 openat(AT\_FDCWD, "/workspaces/os\_base/lab4/src/libSinIntegral\_Rect.so", O\_RDONLY|O\_CLOEXEC) = 3**

1507 read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\0\0\0\0\0\0\0"..., 832) = 832

1507 newfstatat(3, "", {st\_mode=S\_IFREG|0755, st\_size=16048, ...}, AT\_EMPTY\_PATH) = 0

**1507 mmap(NULL, 16456, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7fe146ad8000**

**1507 mmap(0x7fe146ad9000, 4096, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x1000) = 0x7fe146ad9000**

**1507 mmap(0x7fe146ada000, 4096, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x2000) = 0x7fe146ada000**

1507 mmap(0x7fe146adb000, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x2000) = 0x7fe146adb000

1507 close(3) = 0

**1507 openat(AT\_FDCWD, "/workspaces/os\_base/lab4/src/libSort\_Bubble.so", O\_RDONLY|O\_CLOEXEC) = 3**

1507 read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\0\0\0\0\0\0\0"..., 832) = 832

1507 newfstatat(3, "", {st\_mode=S\_IFREG|0755, st\_size=15984, ...}, AT\_EMPTY\_PATH) = 0

**1507 mmap(NULL, 16448, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7fe146ad3000**

**1507 mmap(0x7fe146ad4000, 4096, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x1000) = 0x7fe146ad4000**

**1507 mmap(0x7fe146ad5000, 4096, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x2000) = 0x7fe146ad5000**

**1507 mmap(0x7fe146ad6000, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x2000) = 0x7fe146ad6000**

1507 close(3) = 0

```

1507 openat(AT_FDCWD, "/workspaces/os_base/lab4/src/libstdc++.so.6",
O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)

1507 openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXEC) = 3

1507 newfstatat(3, "", {st_mode=S_IFREG|0644, st_size=25258, ...}, AT_EMPTY_PATH) = 0

1507 mmap(NULL, 25258, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7fe146acc000

1507 close(3) = 0

1507 openat(AT_FDCWD, "/usr/local/lib64/libstdc++.so.6", O_RDONLY|O_CLOEXEC) = 3

1507 read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\0\0\0\0\0\0"..., 832) = 832

1507 newfstatat(3, "", {st_mode=S_IFREG|0755, st_size=2530008, ...}, AT_EMPTY_PATH) = 0

1507 mmap(NULL, 2543808, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7fe14685e000

1507 mmap(0x7fe146903000, 1216512, PROT_READ|PROT_EXEC,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0xa5000) = 0x7fe146903000

1507 mmap(0x7fe146a2c000, 581632, PROT_READ,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1ce000) = 0x7fe146a2c000

1507 mmap(0x7fe146aba000, 57344, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x25c000) = 0x7fe146aba000

1507 mmap(0x7fe146ac8000, 12480, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7fe146ac8000

1507 close(3) = 0

1507 openat(AT_FDCWD, "/workspaces/os_base/lab4/src/libm.so.6",
O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)

1507 openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libm.so.6", O_RDONLY|O_CLOEXEC) = 3

1507 read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\0\0\0\0\0\0"..., 832) = 832

1507 newfstatat(3, "", {st_mode=S_IFREG|0644, st_size=907784, ...}, AT_EMPTY_PATH) = 0

1507 mmap(NULL, 909560, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7fe14677f000

1507 mmap(0x7fe14678f000, 471040, PROT_READ|PROT_EXEC,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x10000) = 0x7fe14678f000

1507 mmap(0x7fe146802000, 368640, PROT_READ,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x83000) = 0x7fe146802000

1507 mmap(0x7fe14685c000, 8192, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0xdc000) = 0x7fe14685c000

1507 close(3) = 0

1507 openat(AT_FDCWD, "/workspaces/os_base/lab4/src/libgcc_s.so.1",
O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)

1507 openat(AT_FDCWD, "/usr/local/lib64/libgcc_s.so.1", O_RDONLY|O_CLOEXEC) = 3

```



```

1507 read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\0\0\0\0\0"..., 832) = 832

1507 newfstatat(3, "", {st_mode=S_IFREG|0644, st_size=906528, ...}, AT_EMPTY_PATH) = 0

1507 mmap(NULL, 181160, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7fe146752000

1507 mmap(0x7fe146756000, 143360, PROT_READ|PROT_EXEC,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x4000) = 0x7fe146756000

1507 mmap(0x7fe146779000, 16384, PROT_READ,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x27000) = 0x7fe146779000

1507 mmap(0x7fe14677d000, 8192, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x2b000) = 0x7fe14677d000

1507 close(3) = 0

1507 openat(AT_FDCWD, "/workspaces/os_base/lab4/src/libc.so.6",
O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)

1507 openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libc.so.6", O_RDONLY|O_CLOEXEC) = 3

1507 read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\20t\2\0\0\0\0"..., 832) = 832

1507 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

1507 newfstatat(3, "", {st_mode=S_IFREG|0755, st_size=1922136, ...}, AT_EMPTY_PATH) = 0

1507 mmap(NULL, 8192, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7fe146750000

1507 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

1507 mmap(NULL, 1970000, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7fe14656f000

1507 mmap(0x7fe146595000, 1396736, PROT_READ|PROT_EXEC,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x26000) = 0x7fe146595000

1507 mmap(0x7fe1466ea000, 339968, PROT_READ,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x17b000) = 0x7fe1466ea000

1507 mmap(0x7fe14673d000, 24576, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1ce000) = 0x7fe14673d000

1507 mmap(0x7fe146743000, 53072, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7fe146743000

1507 close(3) = 0

1507 mmap(NULL, 12288, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7fe14656c000

1507 arch_prctl(ARCH_SET_FS, 0x7fe14656c740) = 0

1507 set_tid_address(0x7fe14656ca10) = 1507

1507 set_robust_list(0x7fe14656ca20, 24) = 0

```

```

1507 rseq(0x7fe14656d060, 0x20, 0, 0x53053053) = 0
1507 mprotect(0x7fe14673d000, 16384, PROT_READ) = 0
1507 mprotect(0x7fe14677d000, 4096, PROT_READ) = 0
1507 mprotect(0x7fe14685c000, 4096, PROT_READ) = 0
1507 mprotect(0x7fe146aba000, 45056, PROT_READ) = 0
1507 mprotect(0x7fe146ad6000, 4096, PROT_READ) = 0
1507 mprotect(0x7fe146adb000, 4096, PROT_READ) = 0
1507 mprotect(0x403000, 4096, PROT_READ) = 0
1507 mprotect(0x7fe146b0f000, 8192, PROT_READ) = 0
1507 prlimit64(0, RLIMIT_STACK, NULL, {rlim_cur=8192*1024,
rlim_max=RLIM64_INFINITY}) = 0
1507 munmap(0x7fe146acc000, 25258) = 0
1507 futex(0x7fe146ac873c, FUTEX_WAKE_PRIVATE, 2147483647) = 0
1507 getRandom("\xd6\x56\xa4\x40\xb7\xf0\xd4\x1a", 8, GRND_NONBLOCK) = 8
1507 brk(NULL) = 0x2c4f5000
1507 brk(0x2c516000) = 0x2c516000
1507 newfstatat(1, "", {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0), ...},
AT_EMPTY_PATH) = 0
1507 write(1, "\320\222\320\262\320\265\320\264\320\270\321\202\320\265
\320\272\320\276\320\274\320\260\320\275\320\264\321\203 (0"... , 160) = 160
1507 newfstatat(0, "", {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0), ...},
AT_EMPTY_PATH) = 0
1507 read(0, 0x2c5076c0, 1024) = ? ERESTARTSYS (To be restarted if SA_RESTART is
set)
1507 --- SIGINT {si_signo=SIGINT, si_code=SI_KERNEL} ---
1507 +++ killed by SIGINT +++

```

## Program 2:

```

1748 execve("./TestProgram2", ["./TestProgram2"], 0x7ffd248f8728 /* 26 vars */) = 0
1748 brk(NULL) = 0x2db1000
1748 mmap(NULL, 8192, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7f30d5b8e000
1748 readlink("/proc/self/exe", "/workspaces/os_base/lab4/src/Tes"... , 4096) = 41
1748 access("/etc/ld.so.preload", R_OK) = -1 ENOENT (No such file or directory)
1748 openat(AT_FDCWD, "/workspaces/os_base/lab4/src/glibc-hwcap/x86-64-
v4/libstdc++.so.6", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)

```

1748 newfstatat(AT\_FDCWD, "/workspaces/os\_base/lab4/src/glibc-hwcaps/x86-64-v4", 0x7fff4063340, 0) = -1 ENOENT (No such file or directory)

1748 openat(AT\_FDCWD, "/workspaces/os\_base/lab4/src/glibc-hwcaps/x86-64-v3/libstdc++.so.6", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

1748 newfstatat(AT\_FDCWD, "/workspaces/os\_base/lab4/src/glibc-hwcaps/x86-64-v3", 0x7fff4063340, 0) = -1 ENOENT (No such file or directory)

1748 openat(AT\_FDCWD, "/workspaces/os\_base/lab4/src/glibc-hwcaps/x86-64-v2/libstdc++.so.6", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

1748 newfstatat(AT\_FDCWD, "/workspaces/os\_base/lab4/src/glibc-hwcaps/x86-64-v2", 0x7fff4063340, 0) = -1 ENOENT (No such file or directory)

1748 openat(AT\_FDCWD, "/workspaces/os\_base/lab4/src/tls/x86\_64/x86\_64/libstdc++.so.6", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

1748 newfstatat(AT\_FDCWD, "/workspaces/os\_base/lab4/src/tls/x86\_64/x86\_64", 0x7fff4063340, 0) = -1 ENOENT (No such file or directory)

1748 openat(AT\_FDCWD, "/workspaces/os\_base/lab4/src/tls/x86\_64/libstdc++.so.6", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

1748 newfstatat(AT\_FDCWD, "/workspaces/os\_base/lab4/src/tls/x86\_64", 0x7fff4063340, 0) = -1 ENOENT (No such file or directory)

1748 openat(AT\_FDCWD, "/workspaces/os\_base/lab4/src/tls/x86\_64/libstdc++.so.6", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

1748 newfstatat(AT\_FDCWD, "/workspaces/os\_base/lab4/src/tls/x86\_64", 0x7fff4063340, 0) = -1 ENOENT (No such file or directory)

1748 openat(AT\_FDCWD, "/workspaces/os\_base/lab4/src/tls/libstdc++.so.6", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

1748 newfstatat(AT\_FDCWD, "/workspaces/os\_base/lab4/src/tls", 0x7fff4063340, 0) = -1 ENOENT (No such file or directory)

1748 openat(AT\_FDCWD, "/workspaces/os\_base/lab4/src/x86\_64/x86\_64/libstdc++.so.6", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

1748 newfstatat(AT\_FDCWD, "/workspaces/os\_base/lab4/src/x86\_64/x86\_64", 0x7fff4063340, 0) = -1 ENOENT (No such file or directory)

1748 openat(AT\_FDCWD, "/workspaces/os\_base/lab4/src/x86\_64/libstdc++.so.6", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

1748 newfstatat(AT\_FDCWD, "/workspaces/os\_base/lab4/src/x86\_64", 0x7fff4063340, 0) = -1 ENOENT (No such file or directory)

1748 openat(AT\_FDCWD, "/workspaces/os\_base/lab4/src/x86\_64/libstdc++.so.6", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

1748 newfstatat(AT\_FDCWD, "/workspaces/os\_base/lab4/src/x86\_64", 0x7fff4063340, 0) = -1 ENOENT (No such file or directory)

1748 openat(AT\_FDCWD, "/workspaces/os\_base/lab4/src/libstdc++.so.6", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

```

1748 newfstatat(AT_FDCWD, "/workspaces/os_base/lab4/src", {st_mode=S_IFDIR|0777,
st_size=4096, ...}, 0) = 0

1748 openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXEC) = 3

1748 newfstatat(3, "", {st_mode=S_IFREG|0644, st_size=25258, ...}, AT_EMPTY_PATH) = 0

1748 mmap(NULL, 25258, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7f30d5b87000

1748 close(3) = 0

1748 openat(AT_FDCWD, "/usr/local/lib64/libstdc++.so.6", O_RDONLY|O_CLOEXEC) = 3

1748 read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\0\0\0\0\0\0"..., 832) = 832

1748 newfstatat(3, "", {st_mode=S_IFREG|0755, st_size=2530008, ...}, AT_EMPTY_PATH) = 0

1748 mmap(NULL, 2543808, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f30d5919000

1748 mmap(0x7f30d59be000, 1216512, PROT_READ|PROT_EXEC,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0xa5000) = 0x7f30d59be000

1748 mmap(0x7f30d5ae7000, 581632, PROT_READ,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1ce000) = 0x7f30d5ae7000

1748 mmap(0x7f30d5b75000, 57344, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x25c000) = 0x7f30d5b75000

1748 mmap(0x7f30d5b83000, 12480, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7f30d5b83000

1748 close(3) = 0

1748 openat(AT_FDCWD, "/workspaces/os_base/lab4/src/libm.so.6",
O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)

1748 openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libm.so.6", O_RDONLY|O_CLOEXEC) = 3

1748 read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\0\0\0\0\0\0"..., 832) = 832

1748 newfstatat(3, "", {st_mode=S_IFREG|0644, st_size=907784, ...}, AT_EMPTY_PATH) = 0

1748 mmap(NULL, 909560, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f30d583a000

1748 mmap(0x7f30d584a000, 471040, PROT_READ|PROT_EXEC,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x10000) = 0x7f30d584a000

1748 mmap(0x7f30d58bd000, 368640, PROT_READ,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x83000) = 0x7f30d58bd000

1748 mmap(0x7f30d5917000, 8192, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0xdc000) = 0x7f30d5917000

1748 close(3) = 0

1748 openat(AT_FDCWD, "/workspaces/os_base/lab4/src/libgcc_s.so.1",
O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)

1748 openat(AT_FDCWD, "/usr/local/lib64/libgcc_s.so.1", O_RDONLY|O_CLOEXEC) = 3

```

```

1748 read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\0\0\0\0\0\0"..., 832) = 832

1748 newfstatat(3, "", {st_mode=S_IFREG|0644, st_size=906528, ...}, AT_EMPTY_PATH) = 0

1748 mmap(NULL, 181160, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f30d580d000

1748 mmap(0x7f30d5811000, 143360, PROT_READ|PROT_EXEC,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x4000) = 0x7f30d5811000

1748 mmap(0x7f30d5834000, 16384, PROT_READ,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x27000) = 0x7f30d5834000

1748 mmap(0x7f30d5838000, 8192, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x2b000) = 0x7f30d5838000

1748 close(3) = 0

1748 openat(AT_FDCWD, "/workspaces/os_base/lab4/src/libc.so.6",
O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)

1748 openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libc.so.6", O_RDONLY|O_CLOEXEC) = 3

1748 read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\20t\2\0\0\0\0"..., 832) = 832

1748 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

1748 newfstatat(3, "", {st_mode=S_IFREG|0755, st_size=1922136, ...}, AT_EMPTY_PATH) = 0

1748 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

1748 mmap(NULL, 1970000, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f30d562c000

1748 mmap(0x7f30d5652000, 1396736, PROT_READ|PROT_EXEC,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x26000) = 0x7f30d5652000

1748 mmap(0x7f30d57a7000, 339968, PROT_READ,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x17b000) = 0x7f30d57a7000

1748 mmap(0x7f30d57fa000, 24576, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1ce000) = 0x7f30d57fa000

1748 mmap(0x7f30d5800000, 53072, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7f30d5800000

1748 close(3) = 0

1748 mmap(NULL, 8192, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7f30d562a000

1748 mmap(NULL, 12288, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7f30d5627000

1748 arch_prctl(ARCH_SET_FS, 0x7f30d5627740) = 0

1748 set_tid_address(0x7f30d5627a10) = 1748

1748 set_robust_list(0x7f30d5627a20, 24) = 0

```

```

1748 rseq(0x7f30d5628060, 0x20, 0, 0x53053053) = 0
1748 mprotect(0x7f30d57fa000, 16384, PROT_READ) = 0
1748 mprotect(0x7f30d5838000, 4096, PROT_READ) = 0
1748 mprotect(0x7f30d5917000, 4096, PROT_READ) = 0
1748 mprotect(0x7f30d5b75000, 45056, PROT_READ) = 0
1748 mprotect(0x403000, 4096, PROT_READ) = 0
1748 mprotect(0x7f30d5bc0000, 8192, PROT_READ) = 0
1748 prlimit64(0, RLIMIT_STACK, NULL, {rlim_cur=8192*1024,
rlim_max=RLIM64_INFINITY}) = 0
1748 munmap(0x7f30d5b87000, 25258) = 0
1748 futex(0x7f30d5b8373c, FUTEX_WAKE_PRIVATE, 2147483647) = 0
1748 getRandom("\xd6\x85\x2c\xdc\xbc\xd0\x11\x78", 8, GRND_NONBLOCK) = 8
1748 brk(NULL) = 0x2db1000
1748 brk(0x2dd2000) = 0x2dd2000
1748 openat(AT_FDCWD, "./libSinIntegral_Rect.so", O_RDONLY|O_CLOEXEC) = 3
1748 read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\0\0\0\0\0\0\0"..., 832) = 832
1748 newfstatat(3, "", {st_mode=S_IFREG|0755, st_size=16048, ...}, AT_EMPTY_PATH) = 0
1748 getcwd("/workspaces/os_base/lab4/src", 128) = 29
1748 mmap(NULL, 16456, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f30d5b89000
1748 mmap(0x7f30d5b8a000, 4096, PROT_READ|PROT_EXEC,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1000) = 0x7f30d5b8a000
1748 mmap(0x7f30d5b8b000, 4096, PROT_READ,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x2000) = 0x7f30d5b8b000
1748 mmap(0x7f30d5b8c000, 8192, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x2000) = 0x7f30d5b8c000
1748 close(3) = 0
1748 mprotect(0x7f30d5b8c000, 4096, PROT_READ) = 0
1748 openat(AT_FDCWD, "./libSort_Bubble.so", O_RDONLY|O_CLOEXEC) = 3
1748 read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\0\0\0\0\0\0\0"..., 832) = 832
1748 newfstatat(3, "", {st_mode=S_IFREG|0755, st_size=15984, ...}, AT_EMPTY_PATH) = 0
1748 getcwd("/workspaces/os_base/lab4/src", 128) = 29
1748 mmap(NULL, 16448, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x7f30d5622000

```

**1748 mmap(0x7f30d5623000, 4096, PROT\_READ|PROT\_EXEC,  
MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x1000) = 0x7f30d5623000**

**1748 mmap(0x7f30d5624000, 4096, PROT\_READ,  
MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x2000) = 0x7f30d5624000**

**1748 mmap(0x7f30d5625000, 8192, PROT\_READ|PROT\_WRITE,  
MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x2000) = 0x7f30d5625000**

1748 close(3) = 0

1748 mprotect(0x7f30d5625000, 4096, PROT\_READ) = 0

1748 newfstatat(1, "", {st\_mode=S\_IFCHR|0620, st\_rdev=makedev(0x88, 0), ...},  
AT\_EMPTY\_PATH) = 0

1748 write(1, "\320\222\320\262\320\265\320\264\320\270\321\202\320\265  
\320\272\320\276\320\274\320\260\320\275\320\264\321\203(0 "..., 159) = 159

1748 newfstatat(0, "", {st\_mode=S\_IFCHR|0620, st\_rdev=makedev(0x88, 0), ...},  
AT\_EMPTY\_PATH) = 0

1748 read(0, "0\n", 1024) = 2

1748 munmap(0x7f30d5b89000, 16456) = 0

1748 munmap(0x7f30d5622000, 16448) = 0

**1748 openat(AT\_FDCWD, "./libSinIntegral\_Trapezoid.so", O\_RDONLY|O\_CLOEXEC) =  
3**

1748 read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\0\0\0\0\0\0\0"... , 832) = 832

1748 newfstatat(3, "", {st\_mode=S\_IFREG|0755, st\_size=16056, ...}, AT\_EMPTY\_PATH) = 0

1748 getcwd("/workspaces/os\_base/lab4/src", 128) = 29

**1748 mmap(NULL, 16456, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) =  
0x7f30d5b89000**

**1748 mmap(0x7f30d5b8a000, 4096, PROT\_READ|PROT\_EXEC,  
MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x1000) = 0x7f30d5b8a000**

**1748 mmap(0x7f30d5b8b000, 4096, PROT\_READ,  
MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x2000) = 0x7f30d5b8b000**

**1748 mmap(0x7f30d5b8c000, 8192, PROT\_READ|PROT\_WRITE,  
MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x2000) = 0x7f30d5b8c000**

1748 close(3) = 0

1748 mprotect(0x7f30d5b8c000, 4096, PROT\_READ) = 0

**1748 openat(AT\_FDCWD, "./libSort\_Quick.so", O\_RDONLY|O\_CLOEXEC) = 3**

1748 read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\0\0\0\0\0\0\0"... , 832) = 832

1748 newfstatat(3, "", {st\_mode=S\_IFREG|0755, st\_size=16344, ...}, AT\_EMPTY\_PATH) = 0

1748 getcwd("/workspaces/os\_base/lab4/src", 128) = 29

**1748 mmap(NULL, 16456, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7f30d5622000**

**1748 mmap(0x7f30d5623000, 4096, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x1000) = 0x7f30d5623000**

**1748 mmap(0x7f30d5624000, 4096, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x2000) = 0x7f30d5624000**

**1748 mmap(0x7f30d5625000, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x2000) = 0x7f30d5625000**

1748 close(3) = 0

1748 mprotect(0x7f30d5625000, 4096, PROT\_READ) = 0

1748 write(1, "\320\240\320\265\320\260\320\273\320\270\320\267\320\260\321\206\320\270\320\270\320\277\320\265\321\200\320\265\320\272\320"..., 45) = 45

1748 write(1, "\320\222\320\262\320\265\320\264\320\270\321\202\320\265\320\272\320\276\320\274\320\260\320\275\320\264\321\203(0 "..., 159) = 159

1748 read(0, 0x2dc56e0, 1024) = ? ERESTARTSYS (To be restarted if SA\_RESTART is set)

1748 --- SIGINT {si\_signo=SIGINT, si\_code=SI\_KERNEL} ---

1748 +++ killed by SIGINT +++



### Лабораторная работа 5-7.

```
19856 pselect6(1, [0], NULL, NULL, {tv_sec=0, tv_nsec=0}, NULL) = 0 (Timeout)
19856 pselect6(1, [0], NULL, NULL, {tv_sec=0, tv_nsec=0}, NULL) = 0 (Timeout)
19856 pselect6(1, [0], NULL, NULL, {tv_sec=0, tv_nsec=0}, NULL) = 0 (Timeout)
19856 pselect6(1, [0], NULL, NULL, {tv_sec=0, tv_nsec=0}, NULL) = 0 (Timeout)
19856 pselect6(1, [0], NULL, NULL, {tv_sec=0, tv_nsec=0}, NULL) = 0 (Timeout)
19856 pselect6(1, [0], NULL, NULL, {tv_sec=0, tv_nsec=0}, NULL) = 0 (Timeout)
19856 pselect6(1, [0], NULL, NULL, {tv_sec=0, tv_nsec=0}, NULL) = 0 (Timeout)
19856 pselect6(1, [0], NULL, NULL, {tv_sec=0, tv_nsec=0}, NULL) = 0 (Timeout)
19856 pselect6(1, [0], NULL, NULL, {tv_sec=0, tv_nsec=0}, NULL) = 0 (Timeout)
19856 pselect6(1, [0], NULL, NULL, {tv_sec=0, tv_nsec=0}, NULL) = 0 (Timeout)
19856 pselect6(1, [0], NULL, NULL, {tv_sec=0, tv_nsec=0}, NULL) = 0 (Timeout)
19856 pselect6(1, [0], NULL, NULL, {tv_sec=0, tv_nsec=0}, NULL) = 0 (Timeout)
19856 pselect6(1, [0], NULL, NULL, {tv_sec=0, tv_nsec=0}, NULL) = 0 (Timeout)
19856 pselect6(1, [0], NULL, NULL, {tv_sec=0, tv_nsec=0}, NULL) = 0 (Timeout)
19856 pselect6(1, [0], NULL, NULL, {tv_sec=0, tv_nsec=0}, NULL) = 0 (Timeout)
19856 pselect6(1, [0], NULL, NULL, {tv_sec=0, tv_nsec=0}, NULL) = 0 (Timeout)
19856 pselect6(1, [0], NULL, NULL, {tv_sec=0, tv_nsec=0}, NULL) = 0 (Timeout)
19856 pselect6(1, [0], NULL, NULL, {tv_sec=0, tv_nsec=0}, NULL) = 0 (Timeout)
19856 pselect6(1, [0], NULL, NULL, {tv_sec=0, tv_nsec=0}, NULL) = 0 (Timeout)
19856 pselect6(1, [0], NULL, NULL, {tv_sec=0, tv_nsec=0}, NULL) = 0 (Timeout)
19856 pselect6(1, [0], NULL, NULL, {tv_sec=0, tv_nsec=0}, NULL) = 0 (Timeout)
19856 pselect6(1, [0], NULL, NULL, {tv_sec=0, tv_nsec=0}, NULL) = 0 (Timeout)
19856 pselect6(1, [0], NULL, NULL, {tv_sec=0, tv_nsec=0}, NULL) = 1 (in [0], left
{tv_sec=0, tv_nsec=0})
19856 socket(AF_NETLINK, SOCK_RAW|SOCK_CLOEXEC, NETLINK_ROUTE)
= 9
19856 bind(9, {sa_family=AF_NETLINK, nl_pid=0, nl_groups=00000000}, 12) = 0
```

**19856 sendto(9, [{nlmsg\_len=20, nlmsg\_type=RTM\_GETLINK, nlmsg\_flags=NLM\_F\_REQUEST|NLM\_F\_DUMP, nlmsg\_seq=1735248578, nlmsg\_pid=0}, {ifi\_family=AF\_UNSPEC, ...}], 20, 0, {sa\_family=AF\_NETLINK, nl\_pid=0, nl\_groups=00000000}, 12) = 20**

**19856 sendto(9, [{nlmsg\_len=20, nlmsg\_type=RTM\_GETADDR, nlmsg\_flags=NLM\_F\_REQUEST|NLM\_F\_DUMP, nlmsg\_seq=1735248579, nlmsg\_pid=0}, {ifa\_family=AF\_UNSPEC, ...}], 20, 0, {sa\_family=AF\_NETLINK, nl\_pid=0, nl\_groups=00000000}, 12) = 20**

**19856 socket(AF\_INET, SOCK\_STREAM|SOCK\_CLOEXEC, IPPROTO\_TCP) = 9**

**19856 bind(9, {sa\_family=AF\_INET, sin\_port=htons(5560), sin\_addr=inet\_addr("127.0.0.1")}, 16) = 0**

**19875 socket(AF\_INET, SOCK\_STREAM|SOCK\_CLOEXEC, IPPROTO\_TCP) = 9**

**19875 connect(9, {sa\_family=AF\_INET, sin\_port=htons(5560), sin\_addr=inet\_addr("127.0.0.1")}, 16) = -1 EINPROGRESS (Operation now in progress)**

**19873 recvfrom(10, 0x7f33cc0012f8, 12, 0, NULL, NULL) = -1 EAGAIN (Resource temporarily unavailable)**

**19873 sendto(10, "\377\0\0\0\0\0\0\1\177", 10, 0, NULL, 0 <unfinished ...>**

**19875 recvfrom(9, 0x7f5a90001be8, 12, 0, NULL, NULL) = -1 EAGAIN (Resource temporarily unavailable)**

**19873 <... sendto resumed> = 10**

**19875 sendto(9, "\377\0\0\0\0\0\0\1\177", 10, 0, NULL, 0) = 10**

**19873 recvfrom(10, <unfinished ...>**

**19875 recvfrom(9, <unfinished ...>**

**19873 <... recvfrom resumed> "\377\0\0\0\0\0\0\1\177", 12, 0, NULL, NULL) = 10**

**19875 <... recvfrom resumed> "\377\0\0\0\0\0\0\1\177", 12, 0, NULL, NULL) = 10**

**19873 recvfrom(10, <unfinished ...>**

**19875 recvfrom(9, <unfinished ...>**

**19873 <... recvfrom resumed> 0x7f33cc001302, 2, 0, NULL, NULL) = -1 EAGAIN (Resource temporarily unavailable)**

**19875 <... recvfrom resumed> 0x7f5a90001bf2, 2, 0, NULL, NULL) = -1 EAGAIN (Resource temporarily unavailable)**

**19873 sendto(10, "\3", 1, 0, NULL, 0 <unfinished ...>**

**19875 sendto(9, "\3", 1, 0, NULL, 0 <unfinished ...>**

```
19875 recvfrom(9, <unfinished ...>
```



## **Вывод**

В процессе выполнения лабораторных работ по курсу операционных систем мне особенно понравилось использовать возможности утилиты strace. Она способствовала более глубокому пониманию внутренней работы функций, применяемых при программировании, а также помогала в отладке, указывая на места возникновения ошибок. Благодаря множеству флагов и дополнительных функций, strace является мощным инструментом, знание которого крайне важно.