Московский Авиационный Институт

(Национальный Исследовательский Университет)

Институт №8 “Компьютерные науки и прикладная математика”

Кафедра №806 “Вычислительная математика и программирование”

# Лабораторная работа №3 по курсу

# «Операционные системы»

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

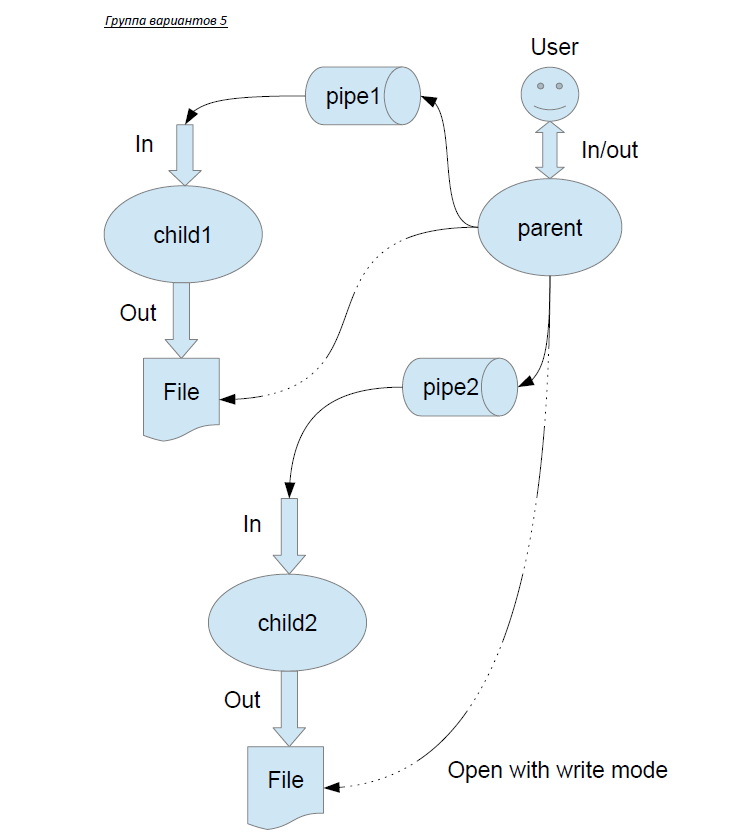
Дата: 06.01.25

Москва, 2025

**Постановка задачи**

# Постановка задачи

**Вариант 20.**



Пользователь вводит строки. Далее эти строки передаются от родительского процесса в дочерний. Дочерний процесс инвертирование эти строки, а полученный результат выводит в файл.

# Общий метод и алгоритм решения

Использованные системные вызовы:

* mmap – отображение файла в память
* fork – создание дочернего процесса
* execl – замена исполняемого кода
* sem\_open – создание/подключение к семафору
* sem\_post – поднятие семафора
* sem\_wait – опускание семафора
* wait – ожидание завершения процесса
* kill – завершение процесса
* sem\_unlink - уничтожает именованный семафор
* shm\_open – открывает объект разделяемой памяти
* ftruncate - укорачивает файл до указанной длины
* sem\_close – закрывает именованый семафор
* munmap – снимает отражение файла

# Код программы

**parent.cpp**

#include "parent.h"

#include <iostream>

#include <string>

#include <unistd.h>

#include <sys/wait.h>

#include <sys/mman.h>

#include <fcntl.h>

#include <cstring>

#include <semaphore.h>

sem\_t \*s\_parent, \*s\_child1, \*s\_child2;

const size\_t SHARED\_MEMORY\_SIZE = 1024;

const char\* SHM\_NAME1 = "/shm\_child1";

const char\* SHM\_NAME2 = "/shm\_child2";

const char\* SEM\_PARENT\_NAME = "/s\_parent";

const char\* SEM\_CHILD1\_NAME = "/s\_child1";

const char\* SEM\_CHILD2\_NAME = "/s\_child2";

int main(int argc, char\* argv[]) {

    return Parent(argc, argv, std::cin);

}

int Parent(int argc, char\* argv[], std::istream& in) {

    if (argc < 3) {

        std::cerr << "Enter the file names correctly" << std::endl;

        return 1;

    }

    // Создаем семафоры

    s\_parent = sem\_open(SEM\_PARENT\_NAME, O\_CREAT, 0666, 0);

    s\_child1 = sem\_open(SEM\_CHILD1\_NAME, O\_CREAT, 0666, 0);

    s\_child2 = sem\_open(SEM\_CHILD2\_NAME, O\_CREAT, 0666, 0);

    if (s\_parent == SEM\_FAILED || s\_child1 == SEM\_FAILED || s\_child2 == SEM\_FAILED) {

        perror("sem\_open");

        return 1;

    }

    std::string filename1 = argv[1];

    std::string filename2 = argv[2];

    int shm\_fd1 = shm\_open(SHM\_NAME1, O\_CREAT | O\_RDWR, 0666);

    int shm\_fd2 = shm\_open(SHM\_NAME2, O\_CREAT | O\_RDWR, 0666);

    if (shm\_fd1 == -1 || shm\_fd2 == -1) {

        perror("shm\_open");

        return 1;

    }

    ftruncate(shm\_fd1, SHARED\_MEMORY\_SIZE);

    ftruncate(shm\_fd2, SHARED\_MEMORY\_SIZE);

    void\* shared\_memory1 = mmap(nullptr, SHARED\_MEMORY\_SIZE, PROT\_WRITE | PROT\_READ, MAP\_SHARED, shm\_fd1, 0);

    void\* shared\_memory2 = mmap(nullptr, SHARED\_MEMORY\_SIZE, PROT\_WRITE | PROT\_READ, MAP\_SHARED, shm\_fd2, 0);

    if (shared\_memory1 == MAP\_FAILED || shared\_memory2 == MAP\_FAILED) {

        perror("mmap");

        return 1;

    }

    pid\_t pid1 = fork();

    if (pid1 == -1) {

        perror("fork");

        return 1;

    }

    if (pid1 == 0) {

        execl("./child1", "child1", filename1.c\_str(), SHM\_NAME1, SEM\_PARENT\_NAME, SEM\_CHILD1\_NAME, nullptr);

        perror("execl");

        return 1;

    }

    pid\_t pid2 = fork();

    if (pid2 == -1) {

        perror("fork");

        return 1;

    }

    if (pid2 == 0) {

        execl("./child2", "child2", filename2.c\_str(), SHM\_NAME2, SEM\_PARENT\_NAME, SEM\_CHILD2\_NAME, nullptr);

        perror("execl");

        return 1;

    }

    memset(shared\_memory1, 0, SHARED\_MEMORY\_SIZE);

    memset(shared\_memory2, 0, SHARED\_MEMORY\_SIZE);

    std::string input;

    while (true) {

        std::getline(in, input);

        if (input == "quit") break;

        if (input.length() > 10) {

            // Отправляем данные в shared\_memory2 и сигнализируем child2

            strncpy(static\_cast<char\*>(shared\_memory2), input.c\_str(), SHARED\_MEMORY\_SIZE - 1);

            sem\_post(s\_child2); // Пробуждаем child2

            std::cout << "Parent: Sent data to child2: " << input << std::endl;

            sem\_wait(s\_parent); // Родитель засыпает, ждет сигнала от child2

            std::cout << "Parent: Woke up after child2 processed data." << std::endl;

        } else {

            // Отправляем данные в shared\_memory1 и сигнализируем child1

            strncpy(static\_cast<char\*>(shared\_memory1), input.c\_str(), SHARED\_MEMORY\_SIZE - 1);

            sem\_post(s\_child1); // Пробуждаем child1

            std::cout << "Parent: Sent data to child1: " << input << std::endl;

            sem\_wait(s\_parent);

            std::cout << "Parent: Woke up after child1 processed data." << std::endl;

        }

    }

    strncpy(static\_cast<char\*>(shared\_memory1), "", SHARED\_MEMORY\_SIZE - 1);

    strncpy(static\_cast<char\*>(shared\_memory2), "", SHARED\_MEMORY\_SIZE - 1);

    sem\_post(s\_child1);

    sem\_post(s\_child2);

    int status;

    waitpid(pid1, &status, 0);

    waitpid(pid2, &status, 0);

    // Освобождаем ресурсы

    munmap(shared\_memory1, SHARED\_MEMORY\_SIZE);

    munmap(shared\_memory2, SHARED\_MEMORY\_SIZE);

    shm\_unlink(SHM\_NAME1);

    shm\_unlink(SHM\_NAME2);

    sem\_close(s\_parent);

    sem\_close(s\_child1);

    sem\_close(s\_child2);

    sem\_unlink(SEM\_PARENT\_NAME);

    sem\_unlink(SEM\_CHILD1\_NAME);

    sem\_unlink(SEM\_CHILD2\_NAME);

    return 0;

}

**Child1.cpp**

#include <iostream>

#include <string>

#include <fstream>

#include <fcntl.h>

#include <sys/mman.h>

#include <unistd.h>

#include <cstring>

#include <algorithm>

#include <semaphore.h>

const size\_t SHARED\_MEMORY\_SIZE = 1024;

int main(int argc, char\* argv[]) {

    if (argc < 5) {

        std::cerr << "Not enough arguments" << std::endl;

        return 1;

    }

    std::string filename = argv[1];

    const char\* shm\_name = argv[2];

    const char\* sem\_parent\_name = argv[3];

    const char\* sem\_child\_name = argv[4];

    sem\_t\* s\_parent = sem\_open(sem\_parent\_name, 0);

    sem\_t\* s\_child1 = sem\_open(sem\_child\_name, 0);

    if (s\_parent == SEM\_FAILED || s\_child1 == SEM\_FAILED) {

        perror("sem\_open");

        return 1;

    }

    int shm\_fd = shm\_open(shm\_name, O\_RDWR, 0666);

    if (shm\_fd == -1) {

        perror("shm\_open");

        return 1;

    }

    void\* shared\_memory = mmap(nullptr, SHARED\_MEMORY\_SIZE, PROT\_READ, MAP\_SHARED, shm\_fd, 0);

    if (shared\_memory == MAP\_FAILED) {

        perror("mmap");

        return 1;

    }

    std::ofstream file(filename);

    if (!file) {

        std::cerr << "Failed to open file" << std::endl;

        return 1;

    }

    while (true) {

        sem\_wait(s\_child1);

        std::string data(static\_cast<char\*>(shared\_memory));

        if (data.empty()) {

            break;

        }

        std::cout << "Child1: Received data: " << data << std::endl;

        std::reverse(data.begin(), data.end());

        file << data << std::endl;

        sem\_post(s\_parent);

        std::cout << "Child1: Processed data: " << data << std::endl;

    }

    file.close();

    munmap(shared\_memory, SHARED\_MEMORY\_SIZE);

    sem\_close(s\_parent);

    sem\_close(s\_child1);

    return 0;

}

**Child2.cpp**

#include <iostream>

#include <string>

#include <fstream>

#include <fcntl.h>

#include <sys/mman.h>

#include <unistd.h>

#include <cstring>

#include <algorithm>

#include <semaphore.h>

const size\_t SHARED\_MEMORY\_SIZE = 1024;

int main(int argc, char\* argv[]) {

    if (argc < 5) {

        std::cerr << "Not enough arguments" << std::endl;

        return 1;

    }

    std::string filename = argv[1];

    const char\* shm\_name = argv[2];

    const char\* sem\_parent\_name = argv[3];

    const char\* sem\_child\_name = argv[4];

    sem\_t\* s\_parent = sem\_open(sem\_parent\_name, 0);

    sem\_t\* s\_child2 = sem\_open(sem\_child\_name, 0);

    if (s\_parent == SEM\_FAILED || s\_child2 == SEM\_FAILED) {

        perror("sem\_open");

        return 1;

    }

    int shm\_fd = shm\_open(shm\_name, O\_RDWR, 0666);

    if (shm\_fd == -1) {

        perror("shm\_open");

        return 1;

    }

    void\* shared\_memory = mmap(nullptr, SHARED\_MEMORY\_SIZE, PROT\_READ, MAP\_SHARED, shm\_fd, 0);

    if (shared\_memory == MAP\_FAILED) {

        perror("mmap");

        return 1;

    }

    std::ofstream file(filename);

    if (!file) {

        std::cerr << "Failed to open file" << std::endl;

        return 1;

    }

    while (true) {

        sem\_wait(s\_child2);

        std::string data(static\_cast<char\*>(shared\_memory));

        if (data.empty()) {

            break;

        }

        std::cout << "Child2: Received data: " << data << std::endl;

        std::reverse(data.begin(), data.end());

        file << data << std::endl;

        std::cout << "Child2: Processed data: " << data << std::endl;

        sem\_post(s\_parent);

    }

    file.close();

    munmap(shared\_memory, SHARED\_MEMORY\_SIZE);

    sem\_close(s\_parent);

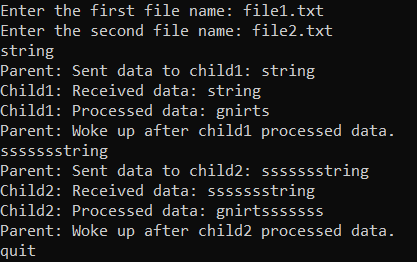
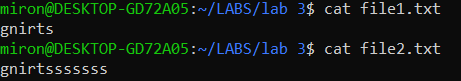
    sem\_close(s\_child2);

    return 0;

}

# Протокол работы программы

**Тестирование:**

**Strace:**

execve("./parent", ["./parent"], 0x7fffc04e2408 /\* 27 vars \*/) = 0

brk(NULL) = 0x563e9fb22000

arch\_prctl(0x3001 /\* ARCH\_??? \*/, 0x7fff9c727810) = -1 EINVAL (Invalid argument)

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

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

fstat(3, {st\_mode=S\_IFREG|0644, st\_size=33773, ...}) = 0

mmap(NULL, 33773, PROT\_READ, MAP\_PRIVATE, 3, 0) = 0x7f812eb79000

close(3) = 0

openat(AT\_FDCWD, "/lib/x86\_64-linux-gnu/librt.so.1", O\_RDONLY|O\_CLOEXEC) = 3

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

fstat(3, {st\_mode=S\_IFREG|0644, st\_size=35960, ...}) = 0

mmap(NULL, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_ANONYMOUS, -1, 0) = 0x7f812eb77000

mmap(NULL, 39904, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7f812eb6d000

mmap(0x7f812eb6f000, 16384, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x2000) = 0x7f812eb6f000

mmap(0x7f812eb73000, 8192, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x6000) = 0x7f812eb73000

mmap(0x7f812eb75000, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x7000) = 0x7f812eb75000

close(3) = 0

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

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

fstat(3, {st\_mode=S\_IFREG|0644, st\_size=1956992, ...}) = 0

mmap(NULL, 1972224, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7f812e98b000

mprotect(0x7f812ea21000, 1290240, PROT\_NONE) = 0

mmap(0x7f812ea21000, 987136, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x96000) = 0x7f812ea21000

mmap(0x7f812eb12000, 299008, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x187000) = 0x7f812eb12000

mmap(0x7f812eb5c000, 57344, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x1d0000) = 0x7f812eb5c000

mmap(0x7f812eb6a000, 10240, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_ANONYMOUS, -1, 0) = 0x7f812eb6a000

close(3) = 0

openat(AT\_FDCWD, "/lib/x86\_64-linux-gnu/libgcc\_s.so.1", O\_RDONLY|O\_CLOEXEC) = 3

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

fstat(3, {st\_mode=S\_IFREG|0644, st\_size=104984, ...}) = 0

mmap(NULL, 107592, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7f812e970000

mmap(0x7f812e973000, 73728, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x3000) = 0x7f812e973000

mmap(0x7f812e985000, 16384, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x15000) = 0x7f812e985000

mmap(0x7f812e989000, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x18000) = 0x7f812e989000

close(3) = 0

openat(AT\_FDCWD, "/lib/x86\_64-linux-gnu/libpthread.so.0", O\_RDONLY|O\_CLOEXEC) = 3

read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\220q\0\0\0\0\0\0"..., 832) = 832

pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\232e\273F\236E\241\306\373\317\372\345\270\*/\327"..., 68, 824) = 68

fstat(3, {st\_mode=S\_IFREG|0755, st\_size=157224, ...}) = 0

pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\232e\273F\236E\241\306\373\317\372\345\270\*/\327"..., 68, 824) = 68

mmap(NULL, 140408, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7f812e94d000

mmap(0x7f812e953000, 69632, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x6000) = 0x7f812e953000

mmap(0x7f812e964000, 24576, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x17000) = 0x7f812e964000

mmap(0x7f812e96a000, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x1c000) = 0x7f812e96a000

mmap(0x7f812e96c000, 13432, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_ANONYMOUS, -1, 0) = 0x7f812e96c000

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\300A\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\7\2C\n\357\_\243\335\2449\206V>\237\374\304"..., 68, 880) = 68

fstat(3, {st\_mode=S\_IFREG|0755, st\_size=2029592, ...}) = 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

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\7\2C\n\357\_\243\335\2449\206V>\237\374\304"..., 68, 880) = 68

mmap(NULL, 2037344, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7f812e75b000

mmap(0x7f812e77d000, 1540096, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x22000) = 0x7f812e77d000

mmap(0x7f812e8f5000, 319488, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x19a000) = 0x7f812e8f5000

mmap(0x7f812e943000, 24576, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x1e7000) = 0x7f812e943000

mmap(0x7f812e949000, 13920, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_ANONYMOUS, -1, 0) = 0x7f812e949000

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\0\3\0>\0\1\0\0\0\300\323\0\0\0\0\0\0"..., 832) = 832

fstat(3, {st\_mode=S\_IFREG|0644, st\_size=1369384, ...}) = 0

mmap(NULL, 1368336, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7f812e60c000

mmap(0x7f812e619000, 684032, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0xd000) = 0x7f812e619000

mmap(0x7f812e6c0000, 626688, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0xb4000) = 0x7f812e6c0000

mmap(0x7f812e759000, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x14c000) = 0x7f812e759000

close(3) = 0

mmap(NULL, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_ANONYMOUS, -1, 0) = 0x7f812e60a000

mmap(NULL, 12288, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_ANONYMOUS, -1, 0) = 0x7f812e607000

arch\_prctl(ARCH\_SET\_FS, 0x7f812e607740) = 0

mprotect(0x7f812e943000, 16384, PROT\_READ) = 0

mprotect(0x7f812e759000, 4096, PROT\_READ) = 0

mprotect(0x7f812e96a000, 4096, PROT\_READ) = 0

mprotect(0x7f812e989000, 4096, PROT\_READ) = 0

mprotect(0x7f812eb5c000, 45056, PROT\_READ) = 0

mprotect(0x7f812eb75000, 4096, PROT\_READ) = 0

mprotect(0x563e9f2a1000, 4096, PROT\_READ) = 0

mprotect(0x7f812ebaf000, 4096, PROT\_READ) = 0

munmap(0x7f812eb79000, 33773) = 0

set\_tid\_address(0x7f812e607a10) = 956

set\_robust\_list(0x7f812e607a20, 24) = 0

rt\_sigaction(SIGRTMIN, {sa\_handler=0x7f812e953bf0, sa\_mask=[], sa\_flags=SA\_RESTORER|SA\_SIGINFO, sa\_restorer=0x7f812e961420}, NULL, 8) = 0

rt\_sigaction(SIGRT\_1, {sa\_handler=0x7f812e953c90, sa\_mask=[], sa\_flags=SA\_RESTORER|SA\_RESTART|SA\_SIGINFO, sa\_restorer=0x7f812e961420}, NULL, 8) = 0

rt\_sigprocmask(SIG\_UNBLOCK, [RTMIN RT\_1], NULL, 8) = 0

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

brk(NULL) = 0x563e9fb22000

brk(0x563e9fb43000) = 0x563e9fb43000

futex(0x7f812eb6a6bc, FUTEX\_WAKE\_PRIVATE, 2147483647) = 0

futex(0x7f812eb6a6c8, FUTEX\_WAKE\_PRIVATE, 2147483647) = 0

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

write(1, "Enter the first file name: ", 27Enter the first file name: ) = 27

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

read(0, file1.txt

"file1.txt\n", 1024) = 10

write(1, "Enter the second file name: ", 28Enter the second file name: ) = 28

read(0, file2.txt

"file2.txt\n", 1024) = 10

statfs("/dev/shm/", {f\_type=TMPFS\_MAGIC, f\_bsize=4096, f\_blocks=492036, f\_bfree=492036, f\_bavail=492036, f\_files=492036, f\_ffree=492035, f\_fsid={val=[2396858144, 2263180149]}, f\_namelen=255, f\_frsize=4096, f\_flags=ST\_VALID|ST\_NOSUID|ST\_NODEV|ST\_NOATIME}) = 0

futex(0x7f812e96f390, FUTEX\_WAKE\_PRIVATE, 2147483647) = 0

**openat(AT\_FDCWD, "/dev/shm/sem.s\_parent", O\_RDWR|O\_NOFOLLOW) = -1 ENOENT (No such file or directory)**

getpid() = 956

lstat("/dev/shm/2Mrt5s", 0x7fff9c7274e0) = -1 ENOENT (No such file or directory)

**openat(AT\_FDCWD, "/dev/shm/2Mrt5s", O\_RDWR|O\_CREAT|O\_EXCL, 0666) = 3**

write(3, "\0\0\0\0\0\0\0\0\200\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0", 32) = 32

**mmap(NULL, 32, PROT\_READ|PROT\_WRITE, MAP\_SHARED, 3, 0) = 0x7f812ebae000**

**link("/dev/shm/2Mrt5s", "/dev/shm/sem.s\_parent") = 0**

fstat(3, {st\_mode=S\_IFREG|0644, st\_size=32, ...}) = 0

**unlink("/dev/shm/2Mrt5s")** = 0

close(3) = 0

**openat(AT\_FDCWD, "/dev/shm/sem.s\_child1", O\_RDWR|O\_NOFOLLOW) = -1 ENOENT (No such file or directory)**

getpid() = 956

lstat("/dev/shm/qwJSqs", 0x7fff9c7274e0) = -1 ENOENT (No such file or directory)

openat(AT\_FDCWD, "/dev/shm/qwJSqs", O\_RDWR|O\_CREAT|O\_EXCL, 0666) = 3

write(3, "\0\0\0\0\0\0\0\0\200\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0", 32) = 32

**mmap(NULL, 32, PROT\_READ|PROT\_WRITE, MAP\_SHARED, 3, 0) = 0x7f812eb81000**

link("/dev/shm/qwJSqs", "/dev/shm/sem.s\_child1") = 0

fstat(3, {st\_mode=S\_IFREG|0644, st\_size=32, ...}) = 0

unlink("/dev/shm/qwJSqs") = 0

close(3) = 0

**openat(AT\_FDCWD, "/dev/shm/sem.s\_child2", O\_RDWR|O\_NOFOLLOW) = -1 ENOENT (No such file or directory)**

getpid() = 956

lstat("/dev/shm/sWTcvw", 0x7fff9c7274e0) = -1 ENOENT (No such file or directory)

**openat(AT\_FDCWD, "/dev/shm/sWTcvw", O\_RDWR|O\_CREAT|O\_EXCL, 0666) = 3**

write(3, "\0\0\0\0\0\0\0\0\200\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0\0", 32) = 32

mmap(NULL, 32, PROT\_READ|PROT\_WRITE, MAP\_SHARED, 3, 0) = 0x7f812eb80000

link("/dev/shm/sWTcvw", "/dev/shm/sem.s\_child2") = 0

fstat(3, {st\_mode=S\_IFREG|0644, st\_size=32, ...}) = 0

unlink("/dev/shm/sWTcvw") = 0

close(3) = 0

**openat(AT\_FDCWD, "/dev/shm/shm\_child1", O\_RDWR|O\_CREAT|O\_NOFOLLOW|O\_CLOEXEC, 0666) = 3**

**openat(AT\_FDCWD, "/dev/shm/shm\_child2", O\_RDWR|O\_CREAT|O\_NOFOLLOW|O\_CLOEXEC, 0666) = 4**

ftruncate(3, 1024) = 0

ftruncate(4, 1024) = 0

mmap(NULL, 1024, PROT\_READ|PROT\_WRITE, MAP\_SHARED, 3, 0) = 0x7f812eb7f000

mmap(NULL, 1024, PROT\_READ|PROT\_WRITE, MAP\_SHARED, 4, 0) = 0x7f812eb7e000

clone(child\_stack=NULL, flags=CLONE\_CHILD\_CLEARTID|CLONE\_CHILD\_SETTID|SIGCHLDstrace: Process 959 attached

, child\_tidptr=0x7f812e607a10) = 959

[pid 959] set\_robust\_list(0x7f812e607a20, 24 <unfinished ...>

[pid 956] clone(child\_stack=NULL, flags=CLONE\_CHILD\_CLEARTID|CLONE\_CHILD\_SETTID|SIGCHLD <unfinished ...>

[pid 959] <... set\_robust\_list resumed>) = 0

[pid 959] execve("./child1", ["child1", "file1.txt", "/shm\_child1", "/s\_parent", "/s\_child1"], 0x7fff9c7278f8 /\* 27 vars \*/strace: Process 960 attached

<unfinished ...>

[pid 956] <... clone resumed>, child\_tidptr=0x7f812e607a10) = 960

[pid 960] set\_robust\_list(0x7f812e607a20, 24 <unfinished ...>

[pid 956] read(0, <unfinished ...>

[pid 960] <... set\_robust\_list resumed>) = 0

[pid 960] execve("./child2", ["child2", "file2.txt", "/shm\_child2", "/s\_parent", "/s\_child2"], 0x7fff9c7278f8 /\* 27 vars \*/ <unfinished ...>

[pid 959] <... execve resumed>) = 0

[pid 959] brk(NULL) = 0x55ebc57dd000

[pid 960] <... execve resumed>) = 0

[pid 959] arch\_prctl(0x3001 /\* ARCH\_??? \*/, 0x7ffd9b8e28e0 <unfinished ...>

[pid 960] brk(NULL <unfinished ...>

[pid 959] <... arch\_prctl resumed>) = -1 EINVAL (Invalid argument)

[pid 960] <... brk resumed>) = 0x5567b4e99000

[pid 959] access("/etc/ld.so.preload", R\_OK <unfinished ...>

[pid 960] arch\_prctl(0x3001 /\* ARCH\_??? \*/, 0x7ffe91850860 <unfinished ...>

[pid 959] <... access resumed>) = -1 ENOENT (No such file or directory)

[pid 960] <... arch\_prctl resumed>) = -1 EINVAL (Invalid argument)

[pid 959] openat(AT\_FDCWD, "/etc/ld.so.cache", O\_RDONLY|O\_CLOEXEC <unfinished ...>

[pid 960] access("/etc/ld.so.preload", R\_OK <unfinished ...>

[pid 959] <... openat resumed>) = 3

[pid 960] <... access resumed>) = -1 ENOENT (No such file or directory)

[pid 959] fstat(3, <unfinished ...>

[pid 960] openat(AT\_FDCWD, "/etc/ld.so.cache", O\_RDONLY|O\_CLOEXEC <unfinished ...>

[pid 959] <... fstat resumed>{st\_mode=S\_IFREG|0644, st\_size=33773, ...}) = 0

[pid 960] <... openat resumed>) = 3

[pid 959] mmap(NULL, 33773, PROT\_READ, MAP\_PRIVATE, 3, 0 <unfinished ...>

[pid 960] fstat(3, <unfinished ...>

[pid 959] <... mmap resumed>) = 0x7f146369f000

[pid 960] <... fstat resumed>{st\_mode=S\_IFREG|0644, st\_size=33773, ...}) = 0

[pid 959] close(3 <unfinished ...>

[pid 960] mmap(NULL, 33773, PROT\_READ, MAP\_PRIVATE, 3, 0) = 0x7fb0d12af000

[pid 959] <... close resumed>) = 0

[pid 960] close(3 <unfinished ...>

[pid 959] openat(AT\_FDCWD, "/lib/x86\_64-linux-gnu/librt.so.1", O\_RDONLY|O\_CLOEXEC <unfinished ...>

[pid 960] <... close resumed>) = 0

[pid 959] <... openat resumed>) = 3

[pid 960] openat(AT\_FDCWD, "/lib/x86\_64-linux-gnu/librt.so.1", O\_RDONLY|O\_CLOEXEC <unfinished ...>

[pid 959] read(3, <unfinished ...>

[pid 960] <... openat resumed>) = 3

[pid 959] <... read resumed>"\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

[pid 960] read(3, <unfinished ...>

[pid 959] fstat(3, <unfinished ...>

[pid 960] <... read resumed>"\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

[pid 959] <... fstat resumed>{st\_mode=S\_IFREG|0644, st\_size=35960, ...}) = 0

[pid 960] fstat(3, <unfinished ...>

[pid 959] mmap(NULL, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_ANONYMOUS, -1, 0 <unfinished ...>

[pid 960] <... fstat resumed>{st\_mode=S\_IFREG|0644, st\_size=35960, ...}) = 0

[pid 959] <... mmap resumed>) = 0x7f146369d000

[pid 960] mmap(NULL, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_ANONYMOUS, -1, 0 <unfinished ...>

[pid 959] mmap(NULL, 39904, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0 <unfinished ...>

[pid 960] <... mmap resumed>) = 0x7fb0d12ad000

[pid 959] <... mmap resumed>) = 0x7f1463693000

[pid 960] mmap(NULL, 39904, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7fb0d12a3000

[pid 959] mmap(0x7f1463695000, 16384, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x2000 <unfinished ...>

[pid 960] mmap(0x7fb0d12a5000, 16384, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x2000 <unfinished ...>

[pid 959] <... mmap resumed>) = 0x7f1463695000

[pid 960] <... mmap resumed>) = 0x7fb0d12a5000

[pid 959] mmap(0x7f1463699000, 8192, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x6000 <unfinished ...>

[pid 960] mmap(0x7fb0d12a9000, 8192, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x6000 <unfinished ...>

[pid 959] <... mmap resumed>) = 0x7f1463699000

[pid 960] <... mmap resumed>) = 0x7fb0d12a9000

[pid 959] mmap(0x7f146369b000, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x7000 <unfinished ...>

[pid 960] mmap(0x7fb0d12ab000, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x7000 <unfinished ...>

[pid 959] <... mmap resumed>) = 0x7f146369b000

[pid 960] <... mmap resumed>) = 0x7fb0d12ab000

[pid 960] close(3 <unfinished ...>

[pid 959] close(3 <unfinished ...>

[pid 960] <... close resumed>) = 0

[pid 959] <... close resumed>) = 0

[pid 960] openat(AT\_FDCWD, "/lib/x86\_64-linux-gnu/libstdc++.so.6", O\_RDONLY|O\_CLOEXEC <unfinished ...>

[pid 959] openat(AT\_FDCWD, "/lib/x86\_64-linux-gnu/libstdc++.so.6", O\_RDONLY|O\_CLOEXEC <unfinished ...>

[pid 960] <... openat resumed>) = 3

[pid 959] <... openat resumed>) = 3

[pid 960] read(3, <unfinished ...>

[pid 959] read(3, <unfinished ...>

[pid 960] <... read resumed>"\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0 \341\t\0\0\0\0\0"..., 832) = 832

[pid 959] <... read resumed>"\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0 \341\t\0\0\0\0\0"..., 832) = 832

[pid 960] fstat(3, <unfinished ...>

[pid 959] fstat(3, <unfinished ...>

[pid 960] <... fstat resumed>{st\_mode=S\_IFREG|0644, st\_size=1956992, ...}) = 0

[pid 959] <... fstat resumed>{st\_mode=S\_IFREG|0644, st\_size=1956992, ...}) = 0

[pid 960] mmap(NULL, 1972224, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0 <unfinished ...>

[pid 959] mmap(NULL, 1972224, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0 <unfinished ...>

[pid 960] <... mmap resumed>) = 0x7fb0d10c1000

[pid 959] <... mmap resumed>) = 0x7f14634b1000

[pid 960] mprotect(0x7fb0d1157000, 1290240, PROT\_NONE <unfinished ...>

[pid 959] mprotect(0x7f1463547000, 1290240, PROT\_NONE <unfinished ...>

[pid 960] <... mprotect resumed>) = 0

[pid 959] <... mprotect resumed>) = 0

[pid 960] mmap(0x7fb0d1157000, 987136, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x96000 <unfinished ...>

[pid 959] mmap(0x7f1463547000, 987136, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x96000 <unfinished ...>

[pid 960] <... mmap resumed>) = 0x7fb0d1157000

[pid 959] <... mmap resumed>) = 0x7f1463547000

[pid 960] mmap(0x7fb0d1248000, 299008, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x187000 <unfinished ...>

[pid 959] mmap(0x7f1463638000, 299008, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x187000 <unfinished ...>

[pid 960] <... mmap resumed>) = 0x7fb0d1248000

[pid 959] <... mmap resumed>) = 0x7f1463638000

[pid 960] mmap(0x7fb0d1292000, 57344, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x1d0000) = 0x7fb0d1292000

[pid 959] mmap(0x7f1463682000, 57344, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x1d0000 <unfinished ...>

[pid 960] mmap(0x7fb0d12a0000, 10240, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_ANONYMOUS, -1, 0) = 0x7fb0d12a0000

[pid 959] <... mmap resumed>) = 0x7f1463682000

[pid 960] close(3 <unfinished ...>

[pid 959] mmap(0x7f1463690000, 10240, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_ANONYMOUS, -1, 0 <unfinished ...>

[pid 960] <... close resumed>) = 0

[pid 959] <... mmap resumed>) = 0x7f1463690000

[pid 960] openat(AT\_FDCWD, "/lib/x86\_64-linux-gnu/libgcc\_s.so.1", O\_RDONLY|O\_CLOEXEC <unfinished ...>

[pid 959] close(3 <unfinished ...>

[pid 960] <... openat resumed>) = 3

[pid 959] <... close resumed>) = 0

[pid 960] read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\3405\0\0\0\0\0\0"..., 832) = 832

[pid 959] openat(AT\_FDCWD, "/lib/x86\_64-linux-gnu/libgcc\_s.so.1", O\_RDONLY|O\_CLOEXEC <unfinished ...>

[pid 960] fstat(3, <unfinished ...>

[pid 959] <... openat resumed>) = 3

[pid 960] <... fstat resumed>{st\_mode=S\_IFREG|0644, st\_size=104984, ...}) = 0

[pid 959] read(3, <unfinished ...>

[pid 960] mmap(NULL, 107592, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0 <unfinished ...>

[pid 959] <... read resumed>"\177ELF\2\1\1\0\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\3405\0\0\0\0\0\0"..., 832) = 832

[pid 960] <... mmap resumed>) = 0x7fb0d10a6000

[pid 959] fstat(3, <unfinished ...>

[pid 960] mmap(0x7fb0d10a9000, 73728, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x3000 <unfinished ...>

[pid 959] <... fstat resumed>{st\_mode=S\_IFREG|0644, st\_size=104984, ...}) = 0

[pid 960] <... mmap resumed>) = 0x7fb0d10a9000

[pid 959] mmap(NULL, 107592, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0 <unfinished ...>

[pid 960] mmap(0x7fb0d10bb000, 16384, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x15000 <unfinished ...>

[pid 959] <... mmap resumed>) = 0x7f1463496000

[pid 960] <... mmap resumed>) = 0x7fb0d10bb000

[pid 959] mmap(0x7f1463499000, 73728, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x3000 <unfinished ...>

[pid 960] mmap(0x7fb0d10bf000, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x18000 <unfinished ...>

[pid 959] <... mmap resumed>) = 0x7f1463499000

[pid 960] <... mmap resumed>) = 0x7fb0d10bf000

[pid 959] mmap(0x7f14634ab000, 16384, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x15000 <unfinished ...>

[pid 960] close(3 <unfinished ...>

[pid 959] <... mmap resumed>) = 0x7f14634ab000

[pid 960] <... close resumed>) = 0

[pid 959] mmap(0x7f14634af000, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x18000 <unfinished ...>

[pid 960] openat(AT\_FDCWD, "/lib/x86\_64-linux-gnu/libpthread.so.0", O\_RDONLY|O\_CLOEXEC <unfinished ...>

[pid 959] <... mmap resumed>) = 0x7f14634af000

[pid 960] <... openat resumed>) = 3

[pid 959] close(3 <unfinished ...>

[pid 960] read(3, <unfinished ...>

[pid 959] <... close resumed>) = 0

[pid 960] <... read resumed>"\177ELF\2\1\1\0\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\220q\0\0\0\0\0\0"..., 832) = 832

[pid 959] openat(AT\_FDCWD, "/lib/x86\_64-linux-gnu/libpthread.so.0", O\_RDONLY|O\_CLOEXEC <unfinished ...>

[pid 960] pread64(3, <unfinished ...>

[pid 959] <... openat resumed>) = 3

[pid 960] <... pread64 resumed>"\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\232e\273F\236E\241\306\373\317\372\345\270\*/\327"..., 68, 824) = 68

[pid 959] read(3, <unfinished ...>

[pid 960] fstat(3, <unfinished ...>

[pid 959] <... read resumed>"\177ELF\2\1\1\0\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\220q\0\0\0\0\0\0"..., 832) = 832

[pid 960] <... fstat resumed>{st\_mode=S\_IFREG|0755, st\_size=157224, ...}) = 0

[pid 959] pread64(3, <unfinished ...>

[pid 960] pread64(3, <unfinished ...>

[pid 959] <... pread64 resumed>"\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\232e\273F\236E\241\306\373\317\372\345\270\*/\327"..., 68, 824) = 68

[pid 960] <... pread64 resumed>"\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\232e\273F\236E\241\306\373\317\372\345\270\*/\327"..., 68, 824) = 68

[pid 959] fstat(3, <unfinished ...>

[pid 960] mmap(NULL, 140408, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0 <unfinished ...>

[pid 959] <... fstat resumed>{st\_mode=S\_IFREG|0755, st\_size=157224, ...}) = 0

[pid 960] <... mmap resumed>) = 0x7fb0d1083000

[pid 959] pread64(3, <unfinished ...>

[pid 960] mmap(0x7fb0d1089000, 69632, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x6000 <unfinished ...>

[pid 959] <... pread64 resumed>"\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\232e\273F\236E\241\306\373\317\372\345\270\*/\327"..., 68, 824) = 68

[pid 960] <... mmap resumed>) = 0x7fb0d1089000

[pid 959] mmap(NULL, 140408, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0 <unfinished ...>

[pid 960] mmap(0x7fb0d109a000, 24576, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x17000 <unfinished ...>

[pid 959] <... mmap resumed>) = 0x7f1463473000

[pid 960] <... mmap resumed>) = 0x7fb0d109a000

[pid 959] mmap(0x7f1463479000, 69632, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x6000 <unfinished ...>

[pid 960] mmap(0x7fb0d10a0000, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x1c000 <unfinished ...>

[pid 959] <... mmap resumed>) = 0x7f1463479000

[pid 960] <... mmap resumed>) = 0x7fb0d10a0000

[pid 959] mmap(0x7f146348a000, 24576, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x17000 <unfinished ...>

[pid 960] mmap(0x7fb0d10a2000, 13432, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_ANONYMOUS, -1, 0 <unfinished ...>

[pid 959] <... mmap resumed>) = 0x7f146348a000

[pid 960] <... mmap resumed>) = 0x7fb0d10a2000

[pid 959] mmap(0x7f1463490000, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x1c000 <unfinished ...>

[pid 960] close(3 <unfinished ...>

[pid 959] <... mmap resumed>) = 0x7f1463490000

[pid 960] <... close resumed>) = 0

[pid 959] mmap(0x7f1463492000, 13432, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_ANONYMOUS, -1, 0 <unfinished ...>

[pid 960] openat(AT\_FDCWD, "/lib/x86\_64-linux-gnu/libc.so.6", O\_RDONLY|O\_CLOEXEC <unfinished ...>

[pid 959] <... mmap resumed>) = 0x7f1463492000

[pid 960] <... openat resumed>) = 3

[pid 959] close(3 <unfinished ...>

[pid 960] read(3, <unfinished ...>

[pid 959] <... close resumed>) = 0

[pid 960] <... read resumed>"\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\300A\2\0\0\0\0\0"..., 832) = 832

[pid 960] pread64(3, <unfinished ...>

[pid 959] openat(AT\_FDCWD, "/lib/x86\_64-linux-gnu/libc.so.6", O\_RDONLY|O\_CLOEXEC <unfinished ...>

[pid 960] <... 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"..., 784, 64) = 784

[pid 959] <... openat resumed>) = 3

[pid 960] pread64(3, <unfinished ...>

[pid 959] read(3, <unfinished ...>

[pid 960] <... 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 959] <... read resumed>"\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\300A\2\0\0\0\0\0"..., 832) = 832

[pid 960] pread64(3, <unfinished ...>

[pid 959] pread64(3, <unfinished ...>

[pid 960] <... pread64 resumed>"\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\7\2C\n\357\_\243\335\2449\206V>\237\374\304"..., 68, 880) = 68

[pid 959] <... 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"..., 784, 64) = 784

[pid 960] fstat(3, {st\_mode=S\_IFREG|0755, st\_size=2029592, ...}) = 0

[pid 959] pread64(3, <unfinished ...>

[pid 960] pread64(3, <unfinished ...>

[pid 959] <... 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 960] <... 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"..., 784, 64) = 784

[pid 959] pread64(3, <unfinished ...>

[pid 960] pread64(3, <unfinished ...>

[pid 959] <... pread64 resumed>"\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\7\2C\n\357\_\243\335\2449\206V>\237\374\304"..., 68, 880) = 68

[pid 960] <... 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 960] pread64(3, <unfinished ...>

[pid 959] fstat(3, <unfinished ...>

[pid 960] <... pread64 resumed>"\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\7\2C\n\357\_\243\335\2449\206V>\237\374\304"..., 68, 880) = 68

[pid 959] <... fstat resumed>{st\_mode=S\_IFREG|0755, st\_size=2029592, ...}) = 0

[pid 960] mmap(NULL, 2037344, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0 <unfinished ...>

[pid 959] pread64(3, <unfinished ...>

[pid 960] <... mmap resumed>) = 0x7fb0d0e91000

[pid 959] <... 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"..., 784, 64) = 784

[pid 960] mmap(0x7fb0d0eb3000, 1540096, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x22000 <unfinished ...>

[pid 959] pread64(3, <unfinished ...>

[pid 960] <... mmap resumed>) = 0x7fb0d0eb3000

[pid 959] <... 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 960] mmap(0x7fb0d102b000, 319488, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x19a000) = 0x7fb0d102b000

[pid 959] pread64(3, <unfinished ...>

[pid 960] mmap(0x7fb0d1079000, 24576, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x1e7000 <unfinished ...>

[pid 959] <... pread64 resumed>"\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\7\2C\n\357\_\243\335\2449\206V>\237\374\304"..., 68, 880) = 68

[pid 960] <... mmap resumed>) = 0x7fb0d1079000

[pid 959] mmap(NULL, 2037344, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0 <unfinished ...>

[pid 960] mmap(0x7fb0d107f000, 13920, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_ANONYMOUS, -1, 0 <unfinished ...>

[pid 959] <... mmap resumed>) = 0x7f1463281000

[pid 960] <... mmap resumed>) = 0x7fb0d107f000

[pid 959] mmap(0x7f14632a3000, 1540096, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x22000 <unfinished ...>

[pid 960] close(3 <unfinished ...>

[pid 959] <... mmap resumed>) = 0x7f14632a3000

[pid 960] <... close resumed>) = 0

[pid 959] mmap(0x7f146341b000, 319488, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x19a000 <unfinished ...>

[pid 960] openat(AT\_FDCWD, "/lib/x86\_64-linux-gnu/libm.so.6", O\_RDONLY|O\_CLOEXEC <unfinished ...>

[pid 959] <... mmap resumed>) = 0x7f146341b000

[pid 960] <... openat resumed>) = 3

[pid 959] mmap(0x7f1463469000, 24576, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x1e7000 <unfinished ...>

[pid 960] read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\300\323\0\0\0\0\0\0"..., 832) = 832

[pid 959] <... mmap resumed>) = 0x7f1463469000

[pid 960] fstat(3, <unfinished ...>

[pid 959] mmap(0x7f146346f000, 13920, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_ANONYMOUS, -1, 0 <unfinished ...>

[pid 960] <... fstat resumed>{st\_mode=S\_IFREG|0644, st\_size=1369384, ...}) = 0

[pid 959] <... mmap resumed>) = 0x7f146346f000

[pid 960] mmap(NULL, 1368336, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0 <unfinished ...>

[pid 959] close(3 <unfinished ...>

[pid 960] <... mmap resumed>) = 0x7fb0d0d42000

[pid 959] <... close resumed>) = 0

[pid 960] mmap(0x7fb0d0d4f000, 684032, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0xd000 <unfinished ...>

[pid 959] openat(AT\_FDCWD, "/lib/x86\_64-linux-gnu/libm.so.6", O\_RDONLY|O\_CLOEXEC <unfinished ...>

[pid 960] <... mmap resumed>) = 0x7fb0d0d4f000

[pid 959] <... openat resumed>) = 3

[pid 960] mmap(0x7fb0d0df6000, 626688, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0xb4000 <unfinished ...>

[pid 959] read(3, <unfinished ...>

[pid 960] <... mmap resumed>) = 0x7fb0d0df6000

[pid 959] <... read resumed>"\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\300\323\0\0\0\0\0\0"..., 832) = 832

[pid 960] mmap(0x7fb0d0e8f000, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x14c000 <unfinished ...>

[pid 959] fstat(3, <unfinished ...>

[pid 960] <... mmap resumed>) = 0x7fb0d0e8f000

[pid 959] <... fstat resumed>{st\_mode=S\_IFREG|0644, st\_size=1369384, ...}) = 0

[pid 960] close(3) = 0

[pid 959] mmap(NULL, 1368336, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0 <unfinished ...>

[pid 960] mmap(NULL, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_ANONYMOUS, -1, 0 <unfinished ...>

[pid 959] <... mmap resumed>) = 0x7f1463132000

[pid 960] <... mmap resumed>) = 0x7fb0d0d40000

[pid 959] mmap(0x7f146313f000, 684032, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0xd000 <unfinished ...>

[pid 960] mmap(NULL, 12288, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_ANONYMOUS, -1, 0 <unfinished ...>

[pid 959] <... mmap resumed>) = 0x7f146313f000

[pid 960] <... mmap resumed>) = 0x7fb0d0d3d000

[pid 959] mmap(0x7f14631e6000, 626688, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0xb4000 <unfinished ...>

[pid 960] arch\_prctl(ARCH\_SET\_FS, 0x7fb0d0d3d740 <unfinished ...>

[pid 959] <... mmap resumed>) = 0x7f14631e6000

[pid 960] <... arch\_prctl resumed>) = 0

[pid 959] mmap(0x7f146327f000, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x14c000 <unfinished ...>

[pid 960] mprotect(0x7fb0d1079000, 16384, PROT\_READ <unfinished ...>

[pid 959] <... mmap resumed>) = 0x7f146327f000

[pid 960] <... mprotect resumed>) = 0

[pid 959] close(3 <unfinished ...>

[pid 960] mprotect(0x7fb0d0e8f000, 4096, PROT\_READ <unfinished ...>

[pid 959] <... close resumed>) = 0

[pid 960] <... mprotect resumed>) = 0

[pid 959] mmap(NULL, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_ANONYMOUS, -1, 0 <unfinished ...>

[pid 960] mprotect(0x7fb0d10a0000, 4096, PROT\_READ <unfinished ...>

[pid 959] <... mmap resumed>) = 0x7f1463130000

[pid 960] <... mprotect resumed>) = 0

[pid 959] mmap(NULL, 12288, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_ANONYMOUS, -1, 0 <unfinished ...>

[pid 960] mprotect(0x7fb0d10bf000, 4096, PROT\_READ <unfinished ...>

[pid 959] <... mmap resumed>) = 0x7f146312d000

[pid 960] <... mprotect resumed>) = 0

[pid 959] arch\_prctl(ARCH\_SET\_FS, 0x7f146312d740) = 0

[pid 959] mprotect(0x7f1463469000, 16384, PROT\_READ) = 0

[pid 960] mprotect(0x7fb0d1292000, 45056, PROT\_READ <unfinished ...>

[pid 959] mprotect(0x7f146327f000, 4096, PROT\_READ <unfinished ...>

[pid 960] <... mprotect resumed>) = 0

[pid 959] <... mprotect resumed>) = 0

[pid 960] mprotect(0x7fb0d12ab000, 4096, PROT\_READ <unfinished ...>

[pid 959] mprotect(0x7f1463490000, 4096, PROT\_READ <unfinished ...>

[pid 960] <... mprotect resumed>) = 0

[pid 959] <... mprotect resumed>) = 0

[pid 960] mprotect(0x5567b4641000, 4096, PROT\_READ <unfinished ...>

[pid 959] mprotect(0x7f14634af000, 4096, PROT\_READ <unfinished ...>

[pid 960] <... mprotect resumed>) = 0

[pid 959] <... mprotect resumed>) = 0

[pid 960] mprotect(0x7fb0d12e5000, 4096, PROT\_READ) = 0

[pid 960] munmap(0x7fb0d12af000, 33773) = 0

[pid 960] set\_tid\_address(0x7fb0d0d3da10 <unfinished ...>

[pid 959] mprotect(0x7f1463682000, 45056, PROT\_READ <unfinished ...>

[pid 960] <... set\_tid\_address resumed>) = 960

[pid 960] set\_robust\_list(0x7fb0d0d3da20, 24 <unfinished ...>

[pid 959] <... mprotect resumed>) = 0

[pid 960] <... set\_robust\_list resumed>) = 0

[pid 959] mprotect(0x7f146369b000, 4096, PROT\_READ <unfinished ...>

[pid 960] rt\_sigaction(SIGRTMIN, {sa\_handler=0x7fb0d1089bf0, sa\_mask=[], sa\_flags=SA\_RESTORER|SA\_SIGINFO, sa\_restorer=0x7fb0d1097420}, <unfinished ...>

[pid 959] <... mprotect resumed>) = 0

[pid 960] <... rt\_sigaction resumed>NULL, 8) = 0

[pid 960] rt\_sigaction(SIGRT\_1, {sa\_handler=0x7fb0d1089c90, sa\_mask=[], sa\_flags=SA\_RESTORER|SA\_RESTART|SA\_SIGINFO, sa\_restorer=0x7fb0d1097420}, <unfinished ...>

[pid 959] mprotect(0x55ebc4a6f000, 4096, PROT\_READ <unfinished ...>

[pid 960] <... rt\_sigaction resumed>NULL, 8) = 0

[pid 959] <... mprotect resumed>) = 0

[pid 960] rt\_sigprocmask(SIG\_UNBLOCK, [RTMIN RT\_1], <unfinished ...>

[pid 959] mprotect(0x7f14636d5000, 4096, PROT\_READ <unfinished ...>

[pid 960] <... rt\_sigprocmask resumed>NULL, 8) = 0

[pid 959] <... mprotect resumed>) = 0

[pid 960] prlimit64(0, RLIMIT\_STACK, NULL, <unfinished ...>

[pid 959] munmap(0x7f146369f000, 33773 <unfinished ...>

[pid 960] <... prlimit64 resumed>{rlim\_cur=8192\*1024, rlim\_max=RLIM64\_INFINITY}) = 0

[pid 959] <... munmap resumed>) = 0

[pid 959] set\_tid\_address(0x7f146312da10 <unfinished ...>

[pid 960] brk(NULL <unfinished ...>

[pid 959] <... set\_tid\_address resumed>) = 959

[pid 960] <... brk resumed>) = 0x5567b4e99000

[pid 960] brk(0x5567b4eba000 <unfinished ...>

[pid 959] set\_robust\_list(0x7f146312da20, 24 <unfinished ...>

[pid 960] <... brk resumed>) = 0x5567b4eba000

[pid 959] <... set\_robust\_list resumed>) = 0

[pid 960] futex(0x7fb0d12a06bc, FUTEX\_WAKE\_PRIVATE, 2147483647 <unfinished ...>

[pid 959] rt\_sigaction(SIGRTMIN, {sa\_handler=0x7f1463479bf0, sa\_mask=[], sa\_flags=SA\_RESTORER|SA\_SIGINFO, sa\_restorer=0x7f1463487420}, <unfinished ...>

[pid 960] <... futex resumed>) = 0

[pid 959] <... rt\_sigaction resumed>NULL, 8) = 0

[pid 960] futex(0x7fb0d12a06c8, FUTEX\_WAKE\_PRIVATE, 2147483647 <unfinished ...>

[pid 959] rt\_sigaction(SIGRT\_1, {sa\_handler=0x7f1463479c90, sa\_mask=[], sa\_flags=SA\_RESTORER|SA\_RESTART|SA\_SIGINFO, sa\_restorer=0x7f1463487420}, <unfinished ...>

[pid 960] <... futex resumed>) = 0

[pid 959] <... rt\_sigaction resumed>NULL, 8) = 0

[pid 960] statfs("/dev/shm/", <unfinished ...>

[pid 959] rt\_sigprocmask(SIG\_UNBLOCK, [RTMIN RT\_1], <unfinished ...>

[pid 960] <... statfs resumed>{f\_type=TMPFS\_MAGIC, f\_bsize=4096, f\_blocks=492036, f\_bfree=492031, f\_bavail=492031, f\_files=492036, f\_ffree=492030, f\_fsid={val=[2396858144, 2263180149]}, f\_namelen=255, f\_frsize=4096, f\_flags=ST\_VALID|ST\_NOSUID|ST\_NODEV|ST\_NOATIME}) = 0

[pid 959] <... rt\_sigprocmask resumed>NULL, 8) = 0

[pid 960] futex(0x7fb0d10a5390, FUTEX\_WAKE\_PRIVATE, 2147483647) = 0

[pid 959] prlimit64(0, RLIMIT\_STACK, NULL, <unfinished ...>

[pid 960] openat(AT\_FDCWD, "/dev/shm/sem.s\_parent", O\_RDWR|O\_NOFOLLOW <unfinished ...>

[pid 959] <... prlimit64 resumed>{rlim\_cur=8192\*1024, rlim\_max=RLIM64\_INFINITY}) = 0

[pid 960] <... openat resumed>) = 3

[pid 960] fstat(3, <unfinished ...>

[pid 959] brk(NULL <unfinished ...>

[pid 960] <... fstat resumed>{st\_mode=S\_IFREG|0644, st\_size=32, ...}) = 0

[pid 959] <... brk resumed>) = 0x55ebc57dd000

[pid 960] mmap(NULL, 32, PROT\_READ|PROT\_WRITE, MAP\_SHARED, 3, 0) = 0x7fb0d12e4000

[pid 959] brk(0x55ebc57fe000 <unfinished ...>

[pid 960] close(3 <unfinished ...>

[pid 959] <... brk resumed>) = 0x55ebc57fe000

[pid 960] <... close resumed>) = 0

[pid 960] openat(AT\_FDCWD, "/dev/shm/sem.s\_child2", O\_RDWR|O\_NOFOLLOW <unfinished ...>

[pid 959] futex(0x7f14636906bc, FUTEX\_WAKE\_PRIVATE, 2147483647 <unfinished ...>

[pid 960] <... openat resumed>) = 3

[pid 959] <... futex resumed>) = 0

[pid 960] fstat(3, {st\_mode=S\_IFREG|0644, st\_size=32, ...}) = 0

[pid 959] futex(0x7f14636906c8, FUTEX\_WAKE\_PRIVATE, 2147483647 <unfinished ...>

[pid 960] mmap(NULL, 32, PROT\_READ|PROT\_WRITE, MAP\_SHARED, 3, 0 <unfinished ...>

[pid 959] <... futex resumed>) = 0

[pid 960] <... mmap resumed>) = 0x7fb0d12b7000

[pid 960] close(3 <unfinished ...>

[pid 959] statfs("/dev/shm/", <unfinished ...>

[pid 960] <... close resumed>) = 0

[pid 959] <... statfs resumed>{f\_type=TMPFS\_MAGIC, f\_bsize=4096, f\_blocks=492036, f\_bfree=492031, f\_bavail=492031, f\_files=492036, f\_ffree=492030, f\_fsid={val=[2396858144, 2263180149]}, f\_namelen=255, f\_frsize=4096, f\_flags=ST\_VALID|ST\_NOSUID|ST\_NODEV|ST\_NOATIME}) = 0

**[pid 960] openat(AT\_FDCWD, "/dev/shm/shm\_child2", O\_RDWR|O\_NOFOLLOW|O\_CLOEXEC <unfinished ...>**

[pid 959] futex(0x7f1463495390, FUTEX\_WAKE\_PRIVATE, 2147483647 <unfinished ...>

[pid 960] <... openat resumed>) = 3

[pid 959] <... futex resumed>) = 0

[pid 960] mmap(NULL, 1024, PROT\_READ, MAP\_SHARED, 3, 0 <unfinished ...>

[pid 959] openat(AT\_FDCWD, "/dev/shm/sem.s\_parent", O\_RDWR|O\_NOFOLLOW <unfinished ...>

[pid 960] <... mmap resumed>) = 0x7fb0d12b6000

[pid 959] <... openat resumed>) = 3

[pid 960] openat(AT\_FDCWD, "file2.txt", O\_WRONLY|O\_CREAT|O\_TRUNC, 0666 <unfinished ...>

[pid 959] fstat(3, <unfinished ...>

[pid 960] <... openat resumed>) = 4

[pid 959] <... fstat resumed>{st\_mode=S\_IFREG|0644, st\_size=32, ...}) = 0

[pid 960] futex(0x7fb0d12b7000, FUTEX\_WAIT\_BITSET|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 959] mmap(NULL, 32, PROT\_READ|PROT\_WRITE, MAP\_SHARED, 3, 0) = 0x7f14636d4000

[pid 959] close(3) = 0

**[pid 959] openat(AT\_FDCWD, "/dev/shm/sem.s\_child1", O\_RDWR|O\_NOFOLLOW) = 3**

[pid 959] fstat(3, {st\_mode=S\_IFREG|0644, st\_size=32, ...}) = 0

[pid 959] mmap(NULL, 32, PROT\_READ|PROT\_WRITE, MAP\_SHARED, 3, 0) = 0x7f14636a7000

[pid 959] close(3) = 0

[pid 959] openat(AT\_FDCWD, "/dev/shm/shm\_child1", O\_RDWR|O\_NOFOLLOW|O\_CLOEXEC) = 3

[pid 959] mmap(NULL, 1024, PROT\_READ, MAP\_SHARED, 3, 0) = 0x7f14636a6000

[pid 959] openat(AT\_FDCWD, "file1.txt", O\_WRONLY|O\_CREAT|O\_TRUNC, 0666) = 4

[pid 959] futex(0x7f14636a7000, FUTEX\_WAIT\_BITSET|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANYstring

<unfinished ...>

[pid 956] <... read resumed>"string\n", 1024) = 7

[pid 956] futex(0x7f812eb81000, FUTEX\_WAKE, 1) = 1

[pid 959] <... futex resumed>) = 0

[pid 956] write(1, "Parent: Sent data to child1: str"..., 36 <unfinished ...>

[pid 959] fstat(1, Parent: Sent data to child1: string

<unfinished ...>

[pid 956] <... write resumed>) = 36

[pid 959] <... fstat resumed>{st\_mode=S\_IFCHR|0620, st\_rdev=makedev(0x88, 0), ...}) = 0

[pid 956] futex(0x7f812ebae000, FUTEX\_WAIT\_BITSET|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 959] write(1, "Child1: Received data: string\n", 30Child1: Received data: string

) = 30

[pid 959] write(4, "gnirts\n", 7) = 7

[pid 959] futex(0x7f14636d4000, FUTEX\_WAKE, 1 <unfinished ...>

[pid 956] <... futex resumed>) = 0

[pid 959] <... futex resumed>) = 1

[pid 956] write(1, "Parent: Woke up after child1 pro"..., 45 <unfinished ...>

[pid 959] write(1, "Child1: Processed data: gnirts\n", 31Parent: Woke up after child1 processed data.

<unfinished ...>

[pid 956] <... write resumed>) = 45

Child1: Processed data: gnirts

[pid 959] <... write resumed>) = 31

[pid 956] read(0, <unfinished ...>

[pid 959] futex(0x7f14636a7000, FUTEX\_WAIT\_BITSET|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANYsssstring

<unfinished ...>

[pid 956] <... read resumed>"sssstring\n", 1024) = 10

[pid 956] futex(0x7f812eb81000, FUTEX\_WAKE, 1) = 1

[pid 959] <... futex resumed>) = 0

[pid 956] write(1, "Parent: Sent data to child1: sss"..., 39 <unfinished ...>

[pid 959] write(1, "Child1: Received data: sssstring"..., 33Parent: Sent data to child1: sssstring

Child1: Received data: sssstring

<unfinished ...>

[pid 956] <... write resumed>) = 39

[pid 959] <... write resumed>) = 33

[pid 956] futex(0x7f812ebae000, FUTEX\_WAIT\_BITSET|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 959] write(4, "gnirtssss\n", 10) = 10

[pid 959] futex(0x7f14636d4000, FUTEX\_WAKE, 1 <unfinished ...>

[pid 956] <... futex resumed>) = 0

[pid 959] <... futex resumed>) = 1

[pid 956] write(1, "Parent: Woke up after child1 pro"..., 45 <unfinished ...>

[pid 959] write(1, "Child1: Processed data: gnirtsss"..., 34Parent: Woke up after child1 processed data.

<unfinished ...>

Child1: Processed data: gnirtssss

[pid 956] <... write resumed>) = 45

[pid 959] <... write resumed>) = 34

[pid 956] read(0, <unfinished ...>

[pid 959] futex(0x7f14636a7000, FUTEX\_WAIT\_BITSET|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANYquit

<unfinished ...>

[pid 956] <... read resumed>"quit\n", 1024) = 5

[pid 956] futex(0x7f812eb81000, FUTEX\_WAKE, 1) = 1

[pid 959] <... futex resumed>) = 0

[pid 956] futex(0x7f812eb80000, FUTEX\_WAKE, 1 <unfinished ...>

[pid 959] close(4 <unfinished ...>

[pid 956] <... futex resumed>) = 1

[pid 960] <... futex resumed>) = 0

[pid 956] wait4(959, <unfinished ...>

[pid 959] <... close resumed>) = 0

[pid 960] close(4 <unfinished ...>

[pid 959] munmap(0x7f14636a6000, 1024 <unfinished ...>

[pid 960] <... close resumed>) = 0

[pid 959] <... munmap resumed>) = 0

[pid 960] munmap(0x7fb0d12b6000, 1024) = 0

[pid 959] munmap(0x7f14636d4000, 32 <unfinished ...>

[pid 960] munmap(0x7fb0d12e4000, 32 <unfinished ...>

[pid 959] <... munmap resumed>) = 0

[pid 960] <... munmap resumed>) = 0

[pid 959] munmap(0x7f14636a7000, 32 <unfinished ...>

[pid 960] munmap(0x7fb0d12b7000, 32 <unfinished ...>

[pid 959] <... munmap resumed>) = 0

[pid 960] <... munmap resumed>) = 0

[pid 959] exit\_group(0 <unfinished ...>

[pid 960] exit\_group(0 <unfinished ...>

[pid 959] <... exit\_group resumed>) = ?

[pid 960] <... exit\_group resumed>) = ?

[pid 960] +++ exited with 0 +++

[pid 959] +++ exited with 0 +++

<... wait4 resumed>[{WIFEXITED(s) && WEXITSTATUS(s) == 0}], 0, NULL) = 959

--- SIGCHLD {si\_signo=SIGCHLD, si\_code=CLD\_EXITED, si\_pid=960, si\_uid=1000, si\_status=0, si\_utime=0, si\_stime=0} ---

wait4(960, [{WIFEXITED(s) && WEXITSTATUS(s) == 0}], 0, NULL) = 960

**munmap(0x7f812eb7f000, 1024) = 0**

**munmap(0x7f812eb7e000, 1024) = 0**

**unlink("/dev/shm/shm\_child1") = 0**

**unlink("/dev/shm/shm\_child2") = 0**

**munmap(0x7f812ebae000, 32) = 0**

**munmap(0x7f812eb81000, 32) = 0**

**munmap(0x7f812eb80000, 32) = 0**

**unlink("/dev/shm/sem.s\_parent") = 0**

**unlink("/dev/shm/sem.s\_child1") = 0**

**unlink("/dev/shm/sem.s\_child2") = 0**

# Вывод

В ходе лабораторной работе я приобрел базовые навыки по работе с разделяемой памятью в си. Я научился создавать объект разделяемой памяти, записывать в него данные и читать их из него. Также я узнал о работе с семафорами, научился использовать их для синхронизации при работе с разделяемой памятью. Помимо этого, я узнал о файловых системах и памяти в целом.