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Кафедра №806 “Вычислительная математика и программирование”

**Лабораторная работа №3 по курсу**  
**«Операционные системы»**

Группа: М8О-214БВ-24

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# Постановка задачи

## Вариант 8.

Родительский процесс создает дочерний процесс. Первой строчкой пользователь в консоль родительского процесса вводит имя файла, которое будет использовано для открытия файла с таким именем на чтение. Стандартный поток ввода дочернего процесса переопределяется открытым файлом. Дочерний процесс читает команды из стандартного потока ввода. Стандартный поток вывода дочернего процесса перенаправляется в `pipe1`. Родительский процесс читает из `pipe1` и прочитанное выводит в свой стандартный поток вывода. Родительский и дочерний процесс должны быть представлены разными программами.

В файле записаны команды вида: «число число число<newline>». Дочерний процесс производит деление первого числа команда, на последующие числа в команде, а результат выводит в стандартный поток вывода. Если происходит деление на 0, то тогда дочерний и родительский процесс завершают свою работу. Проверка деления на 0 должна осуществляться на стороне дочернего процесса. Числа имеют тип `int`. Количество чисел может быть произвольным.

Реализовать задачу с использованием `shared memory` и `memory mapping`.

## Общий метод и алгоритм решения

### Использованные системные вызовы:

- **`pid_t fork(void)`** – создает дочерний процесс.
- **`ssize_t write(int fd, void *buf, size_t count)`**– записывает файлы из буфера в файловый дескриптор.
- **`ssize_t read(int fd, void *buf, size_t count)`** – читает файлы из файлового дескриптора в буфер.
- **`int open(const char *pathname, int flags, mode_t mode)`** – открывает\создает файл.
- **`int close(int fd)`** – закрывает файл.
- **`int execl(const char *path, const char *arg0, ..., NULL)`** – запуск другой программы, замещая текущий процесс.
- **`int sem_wait(sem_t *)`** – уменьшает значение семафора на 1 (ожидает, если оно равно 0).
- **`int sem_open(const char name, int oflag, mode_t mode, unsigned int value)`** – создаёт или открывает именованный семафор и возвращает его дескриптор.
- **`int sem_post(sem_t sem)`** – увеличивает значение семафора на 1, разблокируя ожидающий процесс.
- **`pid_t waitpid(pid_t pid, int status, int options)`** – ожидает завершения определённого дочернего процесса `pid`, возвращает его идентификатор и записывает код завершения в `status`.
- **`int sem_unlink(const char name)`** – удаляет именованный семафор из системы.
- **`int sem_close(sem_t sem)`** – закрывает доступ к именованному семафору в текущем процессе.
- **`int shm_open(const char name, int oflag, mode_t mode)`** – создаёт или открывает объект разделяемой памяти (`shared memory`) и возвращает файловый дескриптор.
- **`int shm_unlink(const char name)`** – удаляет именованный объект разделяемой памяти из системы.

- **void mmap(void addr, size\_t length, int prot, int flags, int fd, off\_t offset)** – отображает объект (например, файл или shared memory) в адресное пространство процесса и возвращает указатель на начало области.
- **int munmap(void addr, size\_t length)** – снимает отображение ранее созданного с помощью mmap(), освобождая память.
- **void exit (int status)** – завершения выполнения процесса и возвращение статуса.

#### Алгоритм решения:

Родитель создаёт разделяемую память и семафор, запрашивает имя файла и создаёт дочерний процесс. Дочерний процесс открывает файл, построчно читает его, парсит числа и выполняет целочисленное деление. При делении на ноль или некорректном формате выводит ошибку. Если строка корректна, результат записывается в разделяемую память, доступ к которой синхронизируется семафором. Родитель ожидает данные, читает результаты из памяти и выводит на экран. После обработки всех строк дочерний процесс помещает INT\_MAX в память для уведомления родителя о завершении. Родитель при получении INT\_MAX завершает цикл, закрывает семафор и память, завершает программу.

## Код программы

### client.c

```
#include <fcntl.h>

#include <errno.h>

#include <limits.h>

#include <semaphore.h>

#include <stdlib.h>

#include <sys/mman.h>

#include <sys/wait.h>

#include <unistd.h>

#include <stdio.h>

#define SHM_SIZE 4096

const char SHM_NAME[] = "/div_sh_memory";

const char SEM_NAME[] = "/div_semaphore";

int main() {

    int shared_mem = shm_open(SHM_NAME, O_RDWR | O_CREAT | O_TRUNC, 0666);
```

```

if (shared_mem == -1) {

    const char message[] = "error: cant create shared memory\n";

    write(STDERR_FILENO, message, sizeof(message) - 1);

    exit(EXIT_FAILURE);

}


if (ftruncate(shared_mem, SHM_SIZE) != 0) {

    const char message[] = "error: cant resize shared memory\n";

    write(STDERR_FILENO, message, sizeof(message) - 1);

    exit(EXIT_FAILURE);

}


char* const shared_mem_buffer = mmap(NULL, SHM_SIZE, PROT_READ | PROT_WRITE,
MAP_SHARED, shared_mem, 0);

if (shared_mem_buffer == MAP_FAILED) {

    const char message[] = "error: cant map shared memory\n";

    write(STDERR_FILENO, message, sizeof(message) - 1);

    exit(EXIT_FAILURE);

}


int* length = (int*)shared_mem_buffer;

*length = 0;


sem_t* semaphore = sem_open(SEM_NAME, O_CREAT | O_RDWR, 0666, 1);

if (semaphore == SEM_FAILED) {

    const char message[] = "error: cant create semaphore\n";

    write(STDERR_FILENO, message, sizeof(message) - 1);

    exit(EXIT_FAILURE);

}

```

```

char file_path[128];

const char message[] = "input file : ";

write(STDOUT_FILENO, message, sizeof(message) - 1);


int result = read(STDIN_FILENO, file_path, sizeof(file_path) - 1);

if (result <= 0) {

    const char error_message[] = "error: cant read filename\n";

    write(STDERR_FILENO, error_message, sizeof(error_message) - 1);

    exit(EXIT_FAILURE);

}

file_path[result - 1] = 0;


pid_t child = fork();


if (child == 0) {

    execl("./server", "server", file_path, NULL);

    const char message[] = "error: cant execute server\n";

    write(STDERR_FILENO, message, sizeof(message) - 1);

    exit(EXIT_FAILURE);

}

else if (child == -1) {

    const char message[] = "error: cant fork\n";

    write(STDERR_FILENO, message, sizeof(message) - 1);

    exit(EXIT_FAILURE);

}


int running = 1;

while(running) {

    sem_wait(semaphore);

```

```

int* current_length = (int*)shared_mem_buffer;

char* data = shared_mem_buffer + sizeof(int);


if (*current_length == INT_MAX) {
    running = 0;
}

else if (*current_length > 0) {
    write(STDOUT_FILENO, data, *current_length);
    *current_length = 0;
}


sem_post(semaphore);

usleep(1000);
}


waitpid(child, NULL, 0);


sem_close(semaphore);
sem_unlink(SEM_NAME);
munmap(shared_mem_buffer, SHM_SIZE);
shm_unlink(SHM_NAME);
close(shared_mem);


return 0;
}

```

### **server.c**

```

#include <fcntl.h>

#include <errno.h>

#include <limits.h>

#include <semaphore.h>

```

```
#include <stdlib.h>
```

```
#include <sys/mman.h>
```

```
#include <unistd.h>
```

```
#include <stdio.h>
```

```
#include <string.h>
```

```
#include <ctype.h>
```

```
#define SHM_SIZE 4096
```

```
const char SHM_NAME[] = "/div_sh_memory";
```

```
const char SEM_NAME[] = "/div_semaphore";
```

```
int main(int argc, char** argv) {
```

```
    if (argc < 2) {
```

```
        const char message[] = "error: not enough arguments\n";
```

```
        write(STDERR_FILENO, message, sizeof(message) - 1);
```

```
        exit(EXIT_FAILURE);
```

```
    }
```

```
    const char* filename = argv[1];
```

```
    int shared_mem = shm_open(SHM_NAME, O_RDWR, 0666);
```

```
    if (shared_mem == -1) {
```

```
        const char message[] = "error: cant open shared memory\n";
```

```
        write(STDERR_FILENO, message, sizeof(message) - 1);
```

```
        exit(EXIT_FAILURE);
```

```
    }
```

```
    char* const shared_mem_buffer = mmap(NULL, SHM_SIZE, PROT_READ | PROT_WRITE,  
    MAP_SHARED, shared_mem, 0);
```

```
if (shared_mem_buffer == MAP_FAILED) {  
    const char message[] = "error: cant map shared memory\n";  
    write(STDERR_FILENO, message, sizeof(message) - 1);  
    exit(EXIT_FAILURE);  
}
```

```
sem_t* semaphore = sem_open(SEM_NAME, O_RDWR);  
if (semaphore == SEM_FAILED) {  
    const char message[] = "error: cant open semaphore\n";  
    write(STDERR_FILENO, message, sizeof(message) - 1);  
    exit(EXIT_FAILURE);  
}
```

```
FILE* file = fopen(filename, "r");  
if (file == NULL) {  
    const char message[] = "error: cant open file\n";  
    write(STDERR_FILENO, message, sizeof(message) - 1);  
    exit(EXIT_FAILURE);  
}
```

```
char line[256];  
while (fgets(line, sizeof(line), file) != NULL) {  
    line[strcspn(line, "\n")] = 0;  
  
    if (strlen(line) == 0) {  
        continue;  
    }  
}
```

```
//parse int
```

```
int numbers[100];
```

```
int count = 0;

char* token = strtok(line, " ");

int valid = 1;

int division_by_zero = 0;


while (token != NULL && count < 100) {

    char* p = token;


    if (*p == '-') p++;


    if (*p == '\0') {

        valid = 0;

        break;

    }


    int has_digits = 0;

    while (*p) {

        if (!isdigit(*p)) {

            valid = 0;

            break;

        }

        has_digits = 1;

        p++;

    }


    if (!valid || !has_digits) break;


    numbers[count] = atoi(token);

    count++;

    token = strtok(NULL, " ");
```

```
}
```

```
if (!valid || count < 2) {  
    const char error_msg[] = "error: invalid input\n";  
    sem_wait(semaphore);  
    int* length = (int*)shared_mem_buffer;  
    char* data = shared_mem_buffer + sizeof(int);  
    *length = sizeof(error_msg) - 1;  
    memcpy(data, error_msg, sizeof(error_msg) - 1);  
    sem_post(semaphore);  
}
```

```
else {  
    int result = numbers[0];  
    for (int i = 1; i < count; i++) {  
        if (numbers[i] == 0) {  
            division_by_zero = 1;  
            break;  
        }  
        result /= numbers[i];  
    }  
}
```

```
if (division_by_zero) {  
    const char error_msg[] = "error: division by zero\n";  
    sem_wait(semaphore);  
    int* length = (int*)shared_mem_buffer;  
    char* data = shared_mem_buffer + sizeof(int);  
    *length = sizeof(error_msg) - 1;  
    memcpy(data, error_msg, sizeof(error_msg) - 1);  
    sem_post(semaphore);  
}
```

```

else {

    char result_str[64];

    int len = snprintf(result_str, sizeof(result_str), "%d\n", result);


    sem_wait(semaphore);

    int* length = (int*)shared_mem_buffer;

    char* data = shared_mem_buffer + sizeof(int);

    *length = len;

    memcpy(data, result_str, len);

    sem_post(semaphore);

}

}

usleep(1000);

}

fclose(file);


sem_wait(semaphore);

int* length = (int*)shared_mem_buffer;

*length = INT_MAX;

sem_post(semaphore);


sem_close(semaphore);

munmap(shared_mem_buffer, SHM_SIZE);

close(shared_mem);

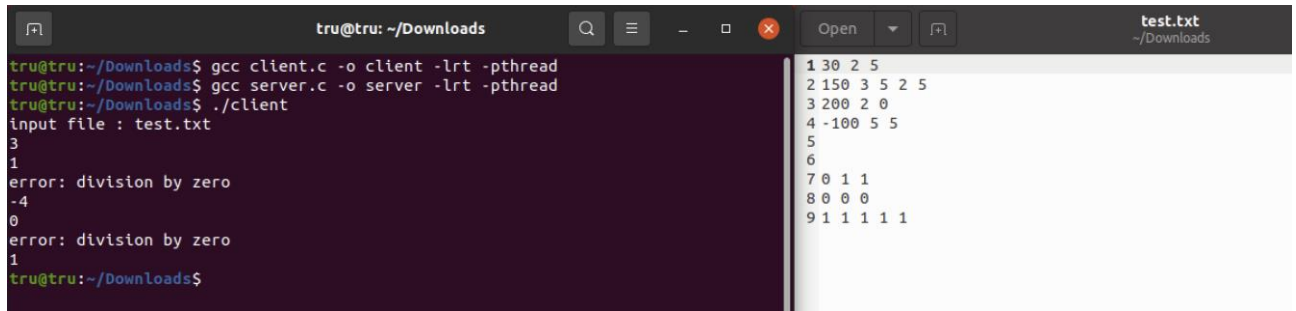
return 0;

}

```

# Протокол работы программы

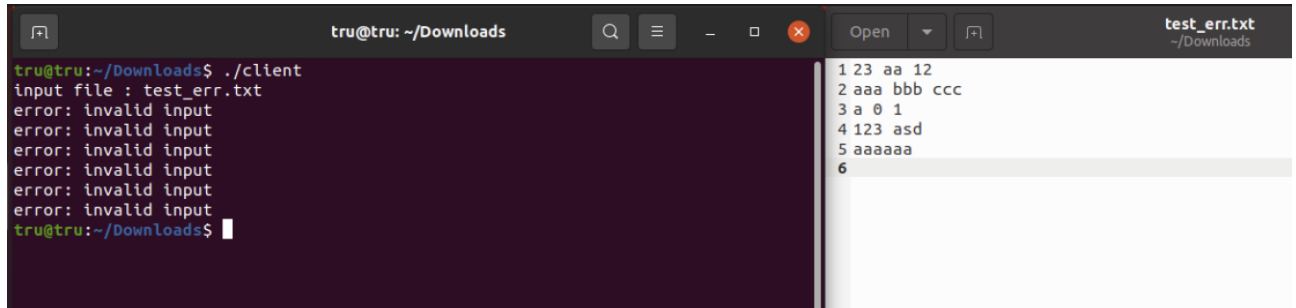
## Тесты:



```
tru@tru: ~/Downloads
tru@tru:~/Downloads$ gcc client.c -o client -lrt -pthread
tru@tru:~/Downloads$ gcc server.c -o server -lrt -pthread
tru@tru:~/Downloads$ ./client
input file : test.txt
3
1
error: division by zero
-4
0
error: division by zero
1
tru@tru:~/Downloads$
```

test.txt  
~/Downloads

```
1 30 2 5
2 150 3 5 2 5
3 200 2 0
4 -100 5 5
5
6
7 0 1 1
8 0 0 0
9 1 1 1 1 1
```



```
tru@tru:~/Downloads$ ./client
input file : test_err.txt
error: invalid input
error: invalid input
error: invalid input
error: invalid input
error: invalid input
error: invalid input
tru@tru:~/Downloads$
```

test\_err.txt  
~/Downloads

```
1 23 aa 12
2 aaa bbb ccc
3 a 0 1
4 123 asd
5 aaaaaa
6
```

## Strace:

```
tru@tru:~/Downloads$ strace -f ./client
```

```
execve("./client", ["/.client"], 0xffff89435b8 /* 76 vars */) = 0
```

```
brk(NULL) = 0xaaaacc648000
```

```
mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0xffff953bb000
```

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

```
openat(AT_FDCWD, "/home/tru/catkin_ws/devel/lib/tls/aarch64/atomics/librt.so.1", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)
```

```
newfstatat(AT_FDCWD, "/home/tru/catkin_ws/devel/lib/tls/aarch64/atomics", 0xffffe6292380, 0) = -1 ENOENT (No such file or directory)
```

```
openat(AT_FDCWD, "/home/tru/catkin_ws/devel/lib/tls/aarch64/librt.so.1", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)
```

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newfstatat(AT_FDCWD, "/home/tru/catkin_ws/devel/lib/tls/aarch64", 0xffffe6292380, 0) = -1 ENOENT (No such file or directory)
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openat(AT_FDCWD, "/home/tru/catkin_ws/devel/lib/tls/atomics/librt.so.1", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)
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```
newfstatat(AT_FDCWD, "/home/tru/catkin_ws/devel/lib/tls/atomics", 0xffffe6292380, 0) = -1 ENOENT (No such file or directory)
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```
openat(AT_FDCWD, "/home/tru/catkin_ws/devel/lib/tls/librt.so.1", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)
```

```
newfstatat(AT_FDCWD, "/home/tru/catkin_ws/devel/lib/tls", 0xffffe6292380, 0) = -1 ENOENT (No such file or directory)
```

openat(AT\_FDCWD, "/home/tru/catkin\_ws/devel/lib/aarch64/atomics/librt.so.1",  
O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

newfstatat(AT\_FDCWD, "/home/tru/catkin\_ws/devel/lib/aarch64/atomics", 0xffffe6292380, 0) = -1  
ENOENT (No such file or directory)

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O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

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ENOENT (No such file or directory)

openat(AT\_FDCWD, "/home/tru/catkin\_ws/devel/lib/atomics/librt.so.1",  
O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

newfstatat(AT\_FDCWD, "/home/tru/catkin\_ws/devel/lib/atomics", 0xffffe6292380, 0) = -1  
ENOENT (No such file or directory)

openat(AT\_FDCWD, "/home/tru/catkin\_ws/devel/lib/librt.so.1", O\_RDONLY|O\_CLOEXEC) = -1  
ENOENT (No such file or directory)

newfstatat(AT\_FDCWD, "/home/tru/catkin\_ws/devel/lib", {st\_mode=S\_IFDIR|0775,  
st\_size=12288, ...}, 0) = 0

openat(AT\_FDCWD, "/opt/ros/noetic/lib/tls/aarch64/atomics/librt.so.1",  
O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

newfstatat(AT\_FDCWD, "/opt/ros/noetic/lib/tls/aarch64/atomics", 0xffffe6292380, 0) = -1  
ENOENT (No such file or directory)

openat(AT\_FDCWD, "/opt/ros/noetic/lib/tls/aarch64/librt.so.1", O\_RDONLY|O\_CLOEXEC) = -1  
ENOENT (No such file or directory)

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ENOENT (No such file or directory)

newfstatat(AT\_FDCWD, "/opt/ros/noetic/lib/tls/atomics", 0xffffe6292380, 0) = -1 ENOENT (No  
such file or directory)

openat(AT\_FDCWD, "/opt/ros/noetic/lib/tls/librt.so.1", O\_RDONLY|O\_CLOEXEC) = -1  
ENOENT (No such file or directory)

newfstatat(AT\_FDCWD, "/opt/ros/noetic/lib/tls", 0xffffe6292380, 0) = -1 ENOENT (No such file  
or directory)

openat(AT\_FDCWD, "/opt/ros/noetic/lib/aarch64/atomics/librt.so.1", O\_RDONLY|O\_CLOEXEC)  
= -1 ENOENT (No such file or directory)

newfstatat(AT\_FDCWD, "/opt/ros/noetic/lib/aarch64/atomics", 0xffffe6292380, 0) = -1 ENOENT  
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openat(AT\_FDCWD, "/opt/ros/noetic/lib/librt.so.1", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

newfstatat(AT\_FDCWD, "/opt/ros/noetic/lib", {st\_mode=S\_IFDIR|0755, st\_size=12288, ...}, 0) = 0

openat(AT\_FDCWD, "/home/tru/catkin\_ws/install/lib/mavlink\_sitl\_gazebo/plugins/tls/aarch64/atomics/librt.so.1", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

newfstatat(AT\_FDCWD, "/home/tru/catkin\_ws/install/lib/mavlink\_sitl\_gazebo/plugins/tls/aarch64/atomics", 0xffffe6292380, 0) = -1 ENOENT (No such file or directory)

openat(AT\_FDCWD, "/home/tru/catkin\_ws/install/lib/mavlink\_sitl\_gazebo/plugins/tls/aarch64/librt.so.1", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

newfstatat(AT\_FDCWD, "/home/tru/catkin\_ws/install/lib/mavlink\_sitl\_gazebo/plugins/tls/aarch64", 0xffffe6292380, 0) = -1 ENOENT (No such file or directory)

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newfstatat(AT\_FDCWD, "/home/tru/catkin\_ws/install/lib/mavlink\_sitl\_gazebo/plugins/tls", 0xffffe6292380, 0) = -1 ENOENT (No such file or directory)

openat(AT\_FDCWD, "/home/tru/catkin\_ws/install/lib/mavlink\_sitl\_gazebo/plugins/aarch64/atomics/librt.so.1", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

newfstatat(AT\_FDCWD, "/home/tru/catkin\_ws/install/lib/mavlink\_sitl\_gazebo/plugins/aarch64/atomics", 0xffffe6292380, 0) = -1 ENOENT (No such file or directory)

openat(AT\_FDCWD, "/home/tru/catkin\_ws/install/lib/mavlink\_sitl\_gazebo/plugins/aarch64/librt.so.1", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

newfstatat(AT\_FDCWD, "/home/tru/catkin\_ws/install/lib/mavlink\_sitl\_gazebo/plugins/aarch64", 0xffffe6292380, 0) = -1 ENOENT (No such file or directory)

openat(AT\_FDCWD, "/home/tru/catkin\_ws/install/lib/mavlink\_sitl\_gazebo/plugins/atomics/librt.so.1", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

newfstatat(AT\_FDCWD, "/home/tru/catkin\_ws/install/lib/mavlink\_sitl\_gazebo/plugins/atomics", 0xffffe6292380, 0) = -1 ENOENT (No such file or directory)

openat(AT\_FDCWD, "/home/tru/catkin\_ws/install/lib/mavlink\_sitl\_gazebo/plugins/librt.so.1", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

newfstatat(AT\_FDCWD, "/home/tru/catkin\_ws/install/lib/mavlink\_sitl\_gazebo/plugins", 0xffffe6292380, 0) = -1 ENOENT (No such file or directory)

openat(AT\_FDCWD, "/usr/share/gazebo-11/../../lib/aarch64-linux-gnu/gazebo-11/plugins/tls/aarch64/atomics/librt.so.1", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

newfstatat(AT\_FDCWD, "/usr/share/gazebo-11/../../lib/aarch64-linux-gnu/gazebo-11/plugins/tls/aarch64/atomics", 0xffffe6292380, 0) = -1 ENOENT (No such file or directory)

openat(AT\_FDCWD, "/usr/share/gazebo-11/../../lib/aarch64-linux-gnu/gazebo-11/plugins/tls/aarch64/librt.so.1", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

newfstatat(AT\_FDCWD, "/usr/share/gazebo-11/../../lib/aarch64-linux-gnu/gazebo-11/plugins/tls/aarch64", 0xffffe6292380, 0) = -1 ENOENT (No such file or directory)

openat(AT\_FDCWD, "/usr/share/gazebo-11/../../lib/aarch64-linux-gnu/gazebo-11/plugins/tls/atomics/librt.so.1", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

newfstatat(AT\_FDCWD, "/usr/share/gazebo-11/../../lib/aarch64-linux-gnu/gazebo-11/plugins/tls/atomics", 0xffffe6292380, 0) = -1 ENOENT (No such file or directory)

openat(AT\_FDCWD, "/usr/share/gazebo-11/../../lib/aarch64-linux-gnu/gazebo-11/plugins/tls/librt.so.1", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

newfstatat(AT\_FDCWD, "/usr/share/gazebo-11/../../lib/aarch64-linux-gnu/gazebo-11/plugins/tls", 0xffffe6292380, 0) = -1 ENOENT (No such file or directory)

openat(AT\_FDCWD, "/usr/share/gazebo-11/../../lib/aarch64-linux-gnu/gazebo-11/plugins/aarch64/atomics/librt.so.1", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

newfstatat(AT\_FDCWD, "/usr/share/gazebo-11/../../lib/aarch64-linux-gnu/gazebo-11/plugins/aarch64/atomics", 0xffffe6292380, 0) = -1 ENOENT (No such file or directory)

openat(AT\_FDCWD, "/usr/share/gazebo-11/../../lib/aarch64-linux-gnu/gazebo-11/plugins/aarch64/librt.so.1", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

newfstatat(AT\_FDCWD, "/usr/share/gazebo-11/../../lib/aarch64-linux-gnu/gazebo-11/plugins/aarch64", 0xffffe6292380, 0) = -1 ENOENT (No such file or directory)

openat(AT\_FDCWD, "/usr/share/gazebo-11/../../lib/aarch64-linux-gnu/gazebo-11/plugins/atomics/librt.so.1", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

newfstatat(AT\_FDCWD, "/usr/share/gazebo-11/../../lib/aarch64-linux-gnu/gazebo-11/plugins/atomics", 0xffffe6292380, 0) = -1 ENOENT (No such file or directory)

openat(AT\_FDCWD, "/usr/share/gazebo-11/../../lib/aarch64-linux-gnu/gazebo-11/plugins/librt.so.1", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

newfstatat(AT\_FDCWD, "/usr/share/gazebo-11/../../lib/aarch64-linux-gnu/gazebo-11/plugins", {st\_mode=S\_IFDIR|0755, st\_size=4096, ...}, 0) = 0

openat(AT\_FDCWD, "tls/aarch64/atomics/librt.so.1", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT  
(No such file or directory)

openat(AT\_FDCWD, "tls/aarch64/librt.so.1", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No  
such file or directory)

openat(AT\_FDCWD, "tls/atomics/librt.so.1", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No  
such file or directory)

openat(AT\_FDCWD, "tls/librt.so.1", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or  
directory)

openat(AT\_FDCWD, "aarch64/atomics/librt.so.1", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT  
(No such file or directory)

openat(AT\_FDCWD, "aarch64/librt.so.1", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such  
file or directory)

openat(AT\_FDCWD, "atomics/librt.so.1", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such  
file or directory)

openat(AT\_FDCWD, "librt.so.1", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or  
directory)

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

fstat(3, {st\_mode=S\_IFREG|0644, st\_size=247550, ...}) = 0

mmap(NULL, 247550, PROT\_READ, MAP\_PRIVATE, 3, 0) = 0xffff95352000

close(3) = 0

openat(AT\_FDCWD, "/lib/aarch64-linux-gnu/librt.so.1", O\_RDONLY|O\_CLOEXEC) = 3

read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\0\3\0\267\0\1\0\0\0\0\37\0\0\0\0\0"..., 832) = 832

fstat(3, {st\_mode=S\_IFREG|0644, st\_size=31584, ...}) = 0

mmap(NULL, 95032, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0)  
= 0xffff9533a000

mprotect(0xffff95341000, 61440, PROT\_NONE) = 0

mmap(0xffff95350000, 8192, PROT\_READ|PROT\_WRITE,  
MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x6000) = 0xffff95350000

close(3) = 0

openat(AT\_FDCWD, "/home/tru/catkin\_ws/devel/lib/libpthread.so.0",  
O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

openat(AT\_FDCWD, "/opt/ros/noetic/lib/libpthread.so.0", O\_RDONLY|O\_CLOEXEC) = -1  
ENOENT (No such file or directory)

openat(AT\_FDCWD, "/usr/share/gazebo-11/../../lib/aarch64-linux-gnu/gazebo-  
11/plugins/libpthread.so.0", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

openat(AT\_FDCWD, "tls/aarch64/atomics/libpthread.so.0", O\_RDONLY|O\_CLOEXEC) = -1  
ENOENT (No such file or directory)

openat(AT\_FDCWD, "tls/aarch64/libpthread.so.0", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT  
(No such file or directory)

openat(AT\_FDCWD, "tls/atomics/libpthread.so.0", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT  
(No such file or directory)

openat(AT\_FDCWD, "tls/libpthread.so.0", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such  
file or directory)

openat(AT\_FDCWD, "aarch64/atomics/libpthread.so.0", O\_RDONLY|O\_CLOEXEC) = -1  
ENOENT (No such file or directory)

openat(AT\_FDCWD, "aarch64/libpthread.so.0", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No  
such file or directory)

openat(AT\_FDCWD, "atomics/libpthread.so.0", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No  
such file or directory)

openat(AT\_FDCWD, "libpthread.so.0", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file  
or directory)

openat(AT\_FDCWD, "/lib/aarch64-linux-gnu/libpthread.so.0", O\_RDONLY|O\_CLOEXEC) = 3

read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\3\0\267\0\1\0\0\0Ha\0\0\0\0\0"... , 832) = 832

fstat(3, {st\_mode=S\_IFREG|0755, st\_size=164304, ...}) = 0

mmap(NULL, 197624, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0)  
= 0xffff95309000

mprotect(0xffff95325000, 61440, PROT\_NONE) = 0

mmap(0xffff95334000, 8192, PROT\_READ|PROT\_WRITE,  
MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x1b000) = 0xffff95334000

mmap(0xffff95336000, 13304, PROT\_READ|PROT\_WRITE,  
MAP\_PRIVATE|MAP\_FIXED|MAP\_ANONYMOUS, -1, 0) = 0xffff95336000

close(3) = 0

openat(AT\_FDCWD, "/home/tru/catkin\_ws/devel/lib/libc.so.6", O\_RDONLY|O\_CLOEXEC) = -1  
ENOENT (No such file or directory)

openat(AT\_FDCWD, "/opt/ros/noetic/lib/libc.so.6", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT  
(No such file or directory)

openat(AT\_FDCWD, "/usr/share/gazebo-11/../../lib/aarch64-linux-gnu/gazebo-  
11/plugins/libc.so.6", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

openat(AT\_FDCWD, "tls/aarch64/atomics/libc.so.6", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT  
(No such file or directory)

openat(AT\_FDCWD, "tls/aarch64/libc.so.6", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No  
such file or directory)

openat(AT\_FDCWD, "tls/atomics/libc.so.6", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No  
such file or directory)

openat(AT\_FDCWD, "tls/libc.so.6", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or  
directory)

openat(AT\_FDCWD, "aarch64/atomics/libc.so.6", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT  
(No such file or directory)

openat(AT\_FDCWD, "aarch64/libc.so.6", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

openat(AT\_FDCWD, "atomics/libc.so.6", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

openat(AT\_FDCWD, "libc.so.6", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

openat(AT\_FDCWD, "/lib/aarch64-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\267\0\1\0\0\0\17\2\0\0\0\0"..., 832) = 832

fstat(3, {st\_mode=S\_IFREG|0755, st\_size=1450832, ...}) = 0

mmap(NULL, 1519552, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0xffff95196000

mprotect(0xffff952f1000, 61440, PROT\_NONE) = 0

mmap(0xffff95300000, 24576, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x15a000) = 0xffff95300000

mmap(0xffff95306000, 12224, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_ANONYMOUS, -1, 0) = 0xffff95306000

close(3) = 0

mmap(NULL, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_ANONYMOUS, -1, 0) = 0xffff953b9000

mprotect(0xffff95300000, 16384, PROT\_READ) = 0

mprotect(0xffff95334000, 4096, PROT\_READ) = 0

mprotect(0xffff95350000, 4096, PROT\_READ) = 0

mprotect(0xaaabe4f1000, 4096, PROT\_READ) = 0

mprotect(0xffff953c0000, 4096, PROT\_READ) = 0

munmap(0xffff95352000, 247550) = 0

set\_tid\_address(0xffff953b90e0) = 9027

set\_robust\_list(0xffff953b90f0, 24) = 0

rt\_sigaction(SIGRTMIN, {sa\_handler=0xffff9530ebd0, sa\_mask=[], sa\_flags=SA\_SIGINFO}, NULL, 8) = 0

rt\_sigaction(SIGRT\_1, {sa\_handler=0xffff9530ec90, sa\_mask=[], sa\_flags=SA\_RESTART|SA\_SIGINFO}, 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

statfs("/dev/shm/", {f\_type=TMPFS\_MAGIC, f\_bsize=4096, f\_blocks=500223, f\_bfree=500221, f\_bavail=500221, f\_files=500223, f\_ffree=500220, f\_fsid={val=[2955874884, 2081308020]}, f\_namelen=255, f\_fsize=4096, f\_flags=ST\_VALID|ST\_NOSUID|ST\_NODEV}) = 0

futex(0xffff95339348, FUTEX\_WAKE\_PRIVATE, 2147483647) = 0

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

**ftruncate(3, 4096) = 0**

mmap(NULL, 4096, PROT\_READ|PROT\_WRITE, MAP\_SHARED, 3, 0) = 0xffff953b8000

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

**getpid() = 9027**

**newfstatat(AT\_FDCWD, "/dev/shm/JIjU4L", 0xffffe6293318, AT\_SYMLINK\_NOFOLLOW) = -1  
ENOENT (No such file or directory)**

**openat(AT\_FDCWD, "/dev/shm/JIjU4L", O\_RDWR|O\_CREAT|O\_EXCL, 0666) = 4**

write(4, "\1\0\0\0\0\0\0\0\200\0", 32) = 32

**mmap(NULL, 32, PROT\_READ|PROT\_WRITE, MAP\_SHARED, 4, 0) = 0xffff953b7000**

linkat(AT\_FDCWD, "/dev/shm/JIjU4L", AT\_FDCWD, "/dev/shm/sem.div\_semaphore", 0) = 0

fstat(4, {st\_mode=S\_IFREG|0664, st\_size=32, ...}) = 0

brk(NULL) = 0xaaaacc648000

brk(0xaaaacc669000) = 0xaaaacc669000

unlinkat(AT\_FDCWD, "/dev/shm/JIjU4L", 0) = 0

close(4) = 0

**write(1, "input file : ", 13input file : ) = 13**

**read(0, test.txt**

**"test.txt\n", 127) = 9**

**clone(child\_stack=NULL,  
flags=CLONE\_CHILD\_CLEARTID|CLONE\_CHILD\_SETTID|SIGCHLDstrace: Process 9028  
attached**

**, child\_tidptr=0xffff953b90e0) = 9028**

[pid 9027] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=0, tv\_nsec=1000000},  
<unfinished ...>

[pid 9028] set\_robust\_list(0xffff953b90f0, 24) = 0

[pid 9028] execve("./server", ["server", "test.txt"], 0xffffe6293768 /\* 76 vars \*/ <unfinished ...>

[pid 9027] <... clock\_nanosleep resumed>NULL) = 0

[pid 9027] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=0, tv\_nsec=1000000},  
<unfinished ...>

[pid 9028] <... execve resumed> = 0

[pid 9028] brk(NULL) = 0xaaab0f3a9000

[pid 9027] <... clock\_nanosleep resumed>NULL) = 0

[pid 9028] mmap(NULL, 8192, PROT\_READ|PROT\_WRITE,  
MAP\_PRIVATE|MAP\_ANONYMOUS, -1, 0 <unfinished ...>

[pid 9027] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=0, tv\_nsec=1000000},  
<unfinished ...>

[pid 9028] <... mmap resumed> = 0xfffffa73ef000

[pid 9028] faccessat(AT\_FDCWD, "/etc/ld.so.preload", R\_OK) = -1 ENOENT (No such file or  
directory)

[pid 9028] openat(AT\_FDCWD, "/home/tru/catkin\_ws/devel/lib/tls/aarch64/atomics/librt.so.1",  
O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 9028] newfstatat(AT\_FDCWD, "/home/tru/catkin\_ws/devel/lib/tls/aarch64/atomics",  
<unfinished ...>

[pid 9027] <... clock\_nanosleep resumed>NULL) = 0

[pid 9028] <... newfstatat resumed>0xfffff099d5a0, 0) = -1 ENOENT (No such file or directory)

[pid 9027] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=0, tv\_nsec=1000000},  
<unfinished ...>

[pid 9028] openat(AT\_FDCWD, "/home/tru/catkin\_ws/devel/lib/tls/aarch64/librt.so.1",  
O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 9028] newfstatat(AT\_FDCWD, "/home/tru/catkin\_ws/devel/lib/tls/aarch64", 0xfffff099d5a0,  
0) = -1 ENOENT (No such file or directory)

[pid 9027] <... clock\_nanosleep resumed>NULL) = 0

[pid 9028] openat(AT\_FDCWD, "/home/tru/catkin\_ws/devel/lib/tls/atomics/librt.so.1",  
O\_RDONLY|O\_CLOEXEC <unfinished ...>

[pid 9027] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=0, tv\_nsec=1000000},  
<unfinished ...>

[pid 9028] <... openat resumed> = -1 ENOENT (No such file or directory)

[pid 9028] newfstatat(AT\_FDCWD, "/home/tru/catkin\_ws/devel/lib/tls/atomics", 0xfffff099d5a0,  
0) = -1 ENOENT (No such file or directory)

[pid 9028] openat(AT\_FDCWD, "/home/tru/catkin\_ws/devel/lib/tls/librt.so.1",  
O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 9027] <... clock\_nanosleep resumed>NULL) = 0

[pid 9028] newfstatat(AT\_FDCWD, "/home/tru/catkin\_ws/devel/lib/tls", <unfinished ...>

[pid 9027] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=0, tv\_nsec=1000000},  
<unfinished ...>

[pid 9028] <... newfstatat resumed>0xfffff099d5a0, 0) = -1 ENOENT (No such file or directory)

[pid 9028] openat(AT\_FDCWD, "/home/tru/catkin\_ws/devel/lib/aarch64/atomics/librt.so.1",  
O\_RDONLY|O\_CLOEXEC <unfinished ...>

[pid 9027] <... clock\_nanosleep resumed>NULL) = 0

[pid 9028] <... openat resumed> = -1 ENOENT (No such file or directory)

[pid 9027] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=0, tv\_nsec=1000000},  
<unfinished ...>

[pid 9028] newfstatat(AT\_FDCWD, "/home/tru/catkin\_ws/devel/lib/aarch64/atomics",  
0xffffffff099d5a0, 0) = -1 ENOENT (No such file or directory)

[pid 9028] openat(AT\_FDCWD, "/home/tru/catkin\_ws/devel/lib/aarch64/librt.so.1",  
O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 9028] newfstatat(AT\_FDCWD, "/home/tru/catkin\_ws/devel/lib/aarch64", <unfinished ...>

[pid 9027] <... clock\_nanosleep resumed>NULL) = 0

[pid 9027] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=0, tv\_nsec=1000000},  
<unfinished ...>

[pid 9028] <... newfstatat resumed>0xffffffff099d5a0, 0) = -1 ENOENT (No such file or directory)

[pid 9028] openat(AT\_FDCWD, "/home/tru/catkin\_ws/devel/lib/atomics/librt.so.1",  
O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 9028] newfstatat(AT\_FDCWD, "/home/tru/catkin\_ws/devel/lib/atomics", 0xffffffff099d5a0, 0)  
= -1 ENOENT (No such file or directory)

[pid 9027] <... clock\_nanosleep resumed>NULL) = 0

[pid 9028] openat(AT\_FDCWD, "/home/tru/catkin\_ws/devel/lib/librt.so.1",  
O\_RDONLY|O\_CLOEXEC <unfinished ...>

[pid 9027] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=0, tv\_nsec=1000000},  
<unfinished ...>

[pid 9028] <... openat resumed> = -1 ENOENT (No such file or directory)

[pid 9028] newfstatat(AT\_FDCWD, "/home/tru/catkin\_ws/devel/lib", {st\_mode=S\_IFDIR|0775,  
st\_size=12288, ...}, 0) = 0

[pid 9028] openat(AT\_FDCWD, "/opt/ros/noetic/lib/tls/aarch64/atomics/librt.so.1",  
O\_RDONLY|O\_CLOEXEC <unfinished ...>

[pid 9027] <... clock\_nanosleep resumed>NULL) = 0

[pid 9028] <... openat resumed> = -1 ENOENT (No such file or directory)

[pid 9027] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=0, tv\_nsec=1000000},  
<unfinished ...>

[pid 9028] newfstatat(AT\_FDCWD, "/opt/ros/noetic/lib/tls/aarch64/atomics", 0xffffffff099d5a0, 0) =  
-1 ENOENT (No such file or directory)

[pid 9028] openat(AT\_FDCWD, "/opt/ros/noetic/lib/tls/aarch64/librt.so.1",  
O\_RDONLY|O\_CLOEXEC <unfinished ...>

[pid 9027] <... clock\_nanosleep resumed>NULL) = 0

[pid 9028] <... openat resumed> = -1 ENOENT (No such file or directory)

[pid 9027] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=0, tv\_nsec=1000000},  
<unfinished ...>

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[pid 9028] newfstatat(AT_FDCWD, "/opt/ros/noetic/lib/tls/aarch64", <unfinished ...>

[pid 9027] <... clock_nanosleep resumed>NULL) = 0

[pid 9028] <... newfstatat resumed>0xfffff099d5a0, 0) = -1 ENOENT (No such file or directory)

[pid 9027] clock_nanosleep(CLOCK_REALTIME, 0, {tv_sec=0, tv_nsec=1000000},
<unfinished ...>

[pid 9028] openat(AT_FDCWD, "/opt/ros/noetic/lib/tls/atomics/librt.so.1",
O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 9028] newfstatat(AT_FDCWD, "/opt/ros/noetic/lib/tls/atomics", 0xfffff099d5a0, 0) = -1
ENOENT (No such file or directory)

[pid 9027] <... clock_nanosleep resumed>NULL) = 0

[pid 9028] openat(AT_FDCWD, "/opt/ros/noetic/lib/tls/librt.so.1", O_RDONLY|O_CLOEXEC
<unfinished ...>

[pid 9027] clock_nanosleep(CLOCK_REALTIME, 0, {tv_sec=0, tv_nsec=1000000},
<unfinished ...>

[pid 9028] <... openat resumed>    = -1 ENOENT (No such file or directory)

[pid 9027] <... clock_nanosleep resumed>NULL) = 0

[pid 9028] newfstatat(AT_FDCWD, "/opt/ros/noetic/lib/tls", <unfinished ...>

[pid 9027] clock_nanosleep(CLOCK_REALTIME, 0, {tv_sec=0, tv_nsec=1000000},
<unfinished ...>

[pid 9028] <... newfstatat resumed>0xfffff099d5a0, 0) = -1 ENOENT (No such file or directory)

[pid 9028] openat(AT_FDCWD, "/opt/ros/noetic/lib/aarch64/atomics/librt.so.1",
O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 9028] newfstatat(AT_FDCWD, "/opt/ros/noetic/lib/aarch64/atomics", <unfinished ...>

[pid 9027] <... clock_nanosleep resumed>NULL) = 0

[pid 9027] clock_nanosleep(CLOCK_REALTIME, 0, {tv_sec=0, tv_nsec=1000000},
<unfinished ...>

[pid 9028] <... newfstatat resumed>0xfffff099d5a0, 0) = -1 ENOENT (No such file or directory)

[pid 9028] openat(AT_FDCWD, "/opt/ros/noetic/lib/aarch64/librt.so.1",
O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 9028] newfstatat(AT_FDCWD, "/opt/ros/noetic/lib/aarch64", 0xfffff099d5a0, 0) = -1
ENOENT (No such file or directory)

[pid 9027] <... clock_nanosleep resumed>NULL) = 0

[pid 9028] openat(AT_FDCWD, "/opt/ros/noetic/lib/atomics/librt.so.1",
O_RDONLY|O_CLOEXEC <unfinished ...>

[pid 9027] clock_nanosleep(CLOCK_REALTIME, 0, {tv_sec=0, tv_nsec=1000000},
<unfinished ...>

[pid 9028] <... openat resumed>    = -1 ENOENT (No such file or directory)

```

[pid 9028] newfstatat(AT\_FDCWD, "/opt/ros/noetic/lib/atomics", 0xffffffff099d5a0, 0) = -1  
ENOENT (No such file or directory)

[pid 9028] openat(AT\_FDCWD, "/opt/ros/noetic/lib/librt.so.1", O\_RDONLY|O\_CLOEXEC) = -1  
ENOENT (No such file or directory)

[pid 9028] newfstatat(AT\_FDCWD, "/opt/ros/noetic/lib", {st\_mode=S\_IFDIR|0755,  
st\_size=12288, ...}, 0) = 0

[pid 9027] <... clock\_nanosleep resumed>NULL) = 0

[pid 9028] openat(AT\_FDCWD,  
"/home/tru/catkin\_ws/install/lib/mavlink\_sitl\_gazebo/plugins/tls/aarch64/atomics/librt.so.1",  
O\_RDONLY|O\_CLOEXEC <unfinished ...>

[pid 9027] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=0, tv\_nsec=1000000},  
<unfinished ...>

[pid 9028] <... openat resumed> = -1 ENOENT (No such file or directory)

[pid 9028] newfstatat(AT\_FDCWD,  
"/home/tru/catkin\_ws/install/lib/mavlink\_sitl\_gazebo/plugins/tls/aarch64/atomics", 0xffffffff099d5a0, 0) =  
-1 ENOENT (No such file or directory)

[pid 9028] openat(AT\_FDCWD,  
"/home/tru/catkin\_ws/install/lib/mavlink\_sitl\_gazebo/plugins/tls/aarch64/librt.so.1",  
O\_RDONLY|O\_CLOEXEC <unfinished ...>

[pid 9027] <... clock\_nanosleep resumed>NULL) = 0

[pid 9028] <... openat resumed> = -1 ENOENT (No such file or directory)

[pid 9027] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=0, tv\_nsec=1000000},  
<unfinished ...>

[pid 9028] newfstatat(AT\_FDCWD,  
"/home/tru/catkin\_ws/install/lib/mavlink\_sitl\_gazebo/plugins/tls/aarch64", 0xffffffff099d5a0, 0) = -1  
ENOENT (No such file or directory)

[pid 9028] openat(AT\_FDCWD,  
"/home/tru/catkin\_ws/install/lib/mavlink\_sitl\_gazebo/plugins/tls/atomics/librt.so.1",  
O\_RDONLY|O\_CLOEXEC <unfinished ...>

[pid 9027] <... clock\_nanosleep resumed>NULL) = 0

[pid 9027] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=0, tv\_nsec=1000000},  
<unfinished ...>

[pid 9028] <... openat resumed> = -1 ENOENT (No such file or directory)

[pid 9028] newfstatat(AT\_FDCWD,  
"/home/tru/catkin\_ws/install/lib/mavlink\_sitl\_gazebo/plugins/tls/atomics", 0xffffffff099d5a0, 0) = -1  
ENOENT (No such file or directory)

[pid 9028] openat(AT\_FDCWD,  
"/home/tru/catkin\_ws/install/lib/mavlink\_sitl\_gazebo/plugins/tls/librt.so.1",  
O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 9027] <... clock\_nanosleep resumed>NULL) = 0

[pid 9027] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=0, tv\_nsec=1000000},  
<unfinished ...>

[pid 9028] newfstatat(AT\_FDCWD,  
"/home/tru/catkin\_ws/install/lib/mavlink\_sitl\_gazebo/plugins/tls", 0xffffffff099d5a0, 0) = -1 ENOENT (No  
such file or directory)

[pid 9028] openat(AT\_FDCWD,  
"/home/tru/catkin\_ws/install/lib/mavlink\_sitl\_gazebo/plugins/aarch64/atomics/librt.so.1",  
O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 9028] newfstatat(AT\_FDCWD,  
"/home/tru/catkin\_ws/install/lib/mavlink\_sitl\_gazebo/plugins/aarch64/atomics", <unfinished ...>

[pid 9027] <... clock\_nanosleep resumed>NULL) = 0

[pid 9028] <... newfstatat resumed>0xffffffff099d5a0, 0) = -1 ENOENT (No such file or directory)

[pid 9027] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=0, tv\_nsec=1000000},  
<unfinished ...>

[pid 9028] openat(AT\_FDCWD,  
"/home/tru/catkin\_ws/install/lib/mavlink\_sitl\_gazebo/plugins/aarch64/librt.so.1",  
O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 9028] newfstatat(AT\_FDCWD,  
"/home/tru/catkin\_ws/install/lib/mavlink\_sitl\_gazebo/plugins/aarch64", 0xffffffff099d5a0, 0) = -1  
ENOENT (No such file or directory)

[pid 9028] openat(AT\_FDCWD,  
"/home/tru/catkin\_ws/install/lib/mavlink\_sitl\_gazebo/plugins/atomics/librt.so.1",  
O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 9028] newfstatat(AT\_FDCWD,  
"/home/tru/catkin\_ws/install/lib/mavlink\_sitl\_gazebo/plugins/atomics", <unfinished ...>

[pid 9027] <... clock\_nanosleep resumed>NULL) = 0

[pid 9027] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=0, tv\_nsec=1000000},  
<unfinished ...>

[pid 9028] <... newfstatat resumed>0xffffffff099d5a0, 0) = -1 ENOENT (No such file or directory)

[pid 9028] openat(AT\_FDCWD,  
"/home/tru/catkin\_ws/install/lib/mavlink\_sitl\_gazebo/plugins/librt.so.1", O\_RDONLY|O\_CLOEXEC) =  
-1 ENOENT (No such file or directory)

[pid 9028] newfstatat(AT\_FDCWD,  
"/home/tru/catkin\_ws/install/lib/mavlink\_sitl\_gazebo/plugins", <unfinished ...>

[pid 9027] <... clock\_nanosleep resumed>NULL) = 0

[pid 9028] <... newfstatat resumed>0xffffffff099d5a0, 0) = -1 ENOENT (No such file or directory)

[pid 9027] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=0, tv\_nsec=1000000},  
<unfinished ...>

[pid 9028] openat(AT\_FDCWD, "/usr/share/gazebo-11/../../lib/aarch64-linux-gnu/gazebo-  
11/plugins/tls/aarch64/atomics/librt.so.1", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or  
directory)

[pid 9028] newfstatat(AT\_FDCWD, "/usr/share/gazebo-11/../../lib/aarch64-linux-gnu/gazebo-11/plugins/tls/aarch64/atomics", 0xfffff099d5a0, 0) = -1 ENOENT (No such file or directory)

[pid 9028] openat(AT\_FDCWD, "/usr/share/gazebo-11/../../lib/aarch64-linux-gnu/gazebo-11/plugins/tls/aarch64/librt.so.1", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 9027] <... clock\_nanosleep resumed>NULL) = 0

[pid 9028] newfstatat(AT\_FDCWD, "/usr/share/gazebo-11/../../lib/aarch64-linux-gnu/gazebo-11/plugins/tls/aarch64", <unfinished ...>

[pid 9027] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=0, tv\_nsec=1000000}, <unfinished ...>

[pid 9028] <... newfstatat resumed>0xfffff099d5a0, 0) = -1 ENOENT (No such file or directory)

[pid 9028] openat(AT\_FDCWD, "/usr/share/gazebo-11/../../lib/aarch64-linux-gnu/gazebo-11/plugins/tls/atomics/librt.so.1", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 9028] newfstatat(AT\_FDCWD, "/usr/share/gazebo-11/../../lib/aarch64-linux-gnu/gazebo-11/plugins/tls/atomics", 0xfffff099d5a0, 0) = -1 ENOENT (No such file or directory)

[pid 9028] openat(AT\_FDCWD, "/usr/share/gazebo-11/../../lib/aarch64-linux-gnu/gazebo-11/plugins/tls/librt.so.1", O\_RDONLY|O\_CLOEXEC <unfinished ...>

[pid 9027] <... clock\_nanosleep resumed>NULL) = 0

[pid 9027] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=0, tv\_nsec=1000000}, <unfinished ...>

[pid 9028] <... openat resumed> = -1 ENOENT (No such file or directory)

[pid 9028] newfstatat(AT\_FDCWD, "/usr/share/gazebo-11/../../lib/aarch64-linux-gnu/gazebo-11/plugins/tls", 0xfffff099d5a0, 0) = -1 ENOENT (No such file or directory)

[pid 9028] openat(AT\_FDCWD, "/usr/share/gazebo-11/../../lib/aarch64-linux-gnu/gazebo-11/plugins/aarch64/atomics/librt.so.1", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 9028] newfstatat(AT\_FDCWD, "/usr/share/gazebo-11/../../lib/aarch64-linux-gnu/gazebo-11/plugins/aarch64/atomics", <unfinished ...>

[pid 9027] <... clock\_nanosleep resumed>NULL) = 0

[pid 9028] <... newfstatat resumed>0xfffff099d5a0, 0) = -1 ENOENT (No such file or directory)

[pid 9027] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=0, tv\_nsec=1000000}, <unfinished ...>

[pid 9028] openat(AT\_FDCWD, "/usr/share/gazebo-11/../../lib/aarch64-linux-gnu/gazebo-11/plugins/aarch64/librt.so.1", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 9028] newfstatat(AT\_FDCWD, "/usr/share/gazebo-11/../../lib/aarch64-linux-gnu/gazebo-11/plugins/aarch64", 0xfffff099d5a0, 0) = -1 ENOENT (No such file or directory)

[pid 9028] openat(AT\_FDCWD, "/usr/share/gazebo-11/../../lib/aarch64-linux-gnu/gazebo-11/plugins/atomics/librt.so.1", O\_RDONLY|O\_CLOEXEC <unfinished ...>

[pid 9027] <... clock\_nanosleep resumed>NULL) = 0

[pid 9028] <... openat resumed> = -1 ENOENT (No such file or directory)

[pid 9027] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=0, tv\_nsec=1000000},  
<unfinished ...>

[pid 9028] newfstatat(AT\_FDCWD, "/usr/share/gazebo-11/../../lib/aarch64-linux-gnu/gazebo-11/plugins/atomics", 0xfffff099d5a0, 0) = -1 ENOENT (No such file or directory)

[pid 9028] openat(AT\_FDCWD, "/usr/share/gazebo-11/../../lib/aarch64-linux-gnu/gazebo-11/plugins/librt.so.1", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 9028] newfstatat(AT\_FDCWD, "/usr/share/gazebo-11/../../lib/aarch64-linux-gnu/gazebo-11/plugins", {st\_mode=S\_IFDIR|0755, st\_size=4096, ...}, 0) = 0

[pid 9027] <... clock\_nanosleep resumed>NULL) = 0

[pid 9027] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=0, tv\_nsec=1000000},  
<unfinished ...>

[pid 9028] openat(AT\_FDCWD, "tls/aarch64/atomics/librt.so.1", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 9028] openat(AT\_FDCWD, "tls/aarch64/librt.so.1", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 9028] openat(AT\_FDCWD, "tls/atomics/librt.so.1", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 9028] openat(AT\_FDCWD, "tls/librt.so.1", O\_RDONLY|O\_CLOEXEC <unfinished ...>

[pid 9027] <... clock\_nanosleep resumed>NULL) = 0

[pid 9028] <... openat resumed> = -1 ENOENT (No such file or directory)

[pid 9027] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=0, tv\_nsec=1000000},  
<unfinished ...>

[pid 9028] openat(AT\_FDCWD, "aarch64/atomics/librt.so.1", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 9028] openat(AT\_FDCWD, "aarch64/librt.so.1", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 9027] <... clock\_nanosleep resumed>NULL) = 0

[pid 9028] openat(AT\_FDCWD, "atomics/librt.so.1", O\_RDONLY|O\_CLOEXEC <unfinished ...>

[pid 9027] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=0, tv\_nsec=1000000},  
<unfinished ...>

[pid 9028] <... openat resumed> = -1 ENOENT (No such file or directory)

[pid 9028] openat(AT\_FDCWD, "librt.so.1", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

**[pid 9028] openat(AT\_FDCWD, "/etc/ld.so.cache", O\_RDONLY|O\_CLOEXEC) = 3**

[pid 9028] fstat(3, {st\_mode=S\_IFREG|0644, st\_size=247550, ...}) = 0

[pid 9027] <... clock\_nanosleep resumed>NULL) = 0

```

[pid 9028] mmap(NULL, 247550, PROT_READ, MAP_PRIVATE, 3, 0 <unfinished ...>

[pid 9027] clock_nanosleep(CLOCK_REALTIME, 0, {tv_sec=0, tv_nsec=1000000},
<unfinished ...>

[pid 9028] <... mmap resumed>      = 0xffffa7386000

[pid 9028] close(3)                = 0

[pid 9028] openat(AT_FDCWD, "/lib/aarch64-linux-gnu/librt.so.1",
O_RDONLY|O_CLOEXEC) = 3

[pid 9028] read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\3\0\267\0\1\0\0\0\0\37\0\0\0\0\0"..., 832) =
832

[pid 9028] fstat(3, {st_mode=S_IFREG|0644, st_size=31584, ...}) = 0

[pid 9027] <... clock_nanosleep resumed>NULL) = 0

[pid 9028] mmap(NULL, 95032, PROT_READ|PROT_EXEC,
MAP_PRIVATE|MAP_DENYWRITE, 3, 0 <unfinished ...>

[pid 9027] clock_nanosleep(CLOCK_REALTIME, 0, {tv_sec=0, tv_nsec=1000000},
<unfinished ...>

[pid 9028] <... mmap resumed>      = 0xffffa736e000

[pid 9028] mprotect(0xffffa7375000, 61440, PROT_NONE) = 0

[pid 9028] mmap(0xffffa7384000, 8192, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x6000) = 0xffffa7384000

[pid 9028] close(3)                = 0

[pid 9028] openat(AT_FDCWD, "/home/tru/catkin_ws/devel/lib/libpthread.so.0",
O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 9027] <... clock_nanosleep resumed>NULL) = 0

[pid 9028] openat(AT_FDCWD, "/opt/ros/noetic/lib/libpthread.so.0", O_RDONLY|O_CLOEXEC
<unfinished ...>

[pid 9027] clock_nanosleep(CLOCK_REALTIME, 0, {tv_sec=0, tv_nsec=1000000},
<unfinished ...>

[pid 9028] <... openat resumed>    = -1 ENOENT (No such file or directory)

[pid 9028] openat(AT_FDCWD, "/usr/share/gazebo-11/../../lib/aarch64-linux-gnu/gazebo-
11/plugins/libpthread.so.0", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 9028] openat(AT_FDCWD, "tls/aarch64/atomics/libpthread.so.0",
O_RDONLY|O_CLOEXEC <unfinished ...>

[pid 9027] <... clock_nanosleep resumed>NULL) = 0

[pid 9028] <... openat resumed>    = -1 ENOENT (No such file or directory)

[pid 9027] clock_nanosleep(CLOCK_REALTIME, 0, {tv_sec=0, tv_nsec=1000000},
<unfinished ...>

[pid 9028] openat(AT_FDCWD, "tls/aarch64/libpthread.so.0", O_RDONLY|O_CLOEXEC) = -1
ENOENT (No such file or directory)

```

[pid 9028] openat(AT\_FDCWD, "tls/atomics/libpthread.so.0", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 9028] openat(AT\_FDCWD, "tls/libpthread.so.0", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 9028] openat(AT\_FDCWD, "aarch64/atomics/libpthread.so.0", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 9028] openat(AT\_FDCWD, "aarch64/libpthread.so.0", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 9028] openat(AT\_FDCWD, "atomics/libpthread.so.0", O\_RDONLY|O\_CLOEXEC  
<unfinished ...>

[pid 9027] <... clock\_nanosleep resumed>NULL) = 0

[pid 9028] <... openat resumed> = -1 ENOENT (No such file or directory)

[pid 9027] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=0, tv\_nsec=1000000},  
<unfinished ...>

[pid 9028] openat(AT\_FDCWD, "libpthread.so.0", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT  
(No such file or directory)

[pid 9028] openat(AT\_FDCWD, "/lib/aarch64-linux-gnu/libpthread.so.0",  
O\_RDONLY|O\_CLOEXEC) = 3

[pid 9028] read(3, "\177ELF\2\1\1\0\0\0\0\0\0\0\3\0\267\0\1\0\0\0Ha\0\0\0\0\0"..., 832) =  
832

[pid 9027] <... clock\_nanosleep resumed>NULL) = 0

[pid 9028] fstat(3, <unfinished ...>

[pid 9027] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=0, tv\_nsec=1000000},  
<unfinished ...>

[pid 9028] <... fstat resumed>{st\_mode=S\_IFREG|0755, st\_size=164304, ...}) = 0

[pid 9028] mmap(NULL, 197624, PROT\_READ|PROT\_EXEC,  
MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0xfffffa733d000

[pid 9028] mprotect(0xfffffa7359000, 61440, PROT\_NONE) = 0

[pid 9028] mmap(0xfffffa7368000, 8192, PROT\_READ|PROT\_WRITE,  
MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x1b000) = 0xfffffa7368000

[pid 9028] mmap(0xfffffa736a000, 13304, PROT\_READ|PROT\_WRITE,  
MAP\_PRIVATE|MAP\_FIXED|MAP\_ANONYMOUS, -1, 0) = 0xfffffa736a000

[pid 9027] <... clock\_nanosleep resumed>NULL) = 0

[pid 9028] close(3 <unfinished ...>

[pid 9027] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=0, tv\_nsec=1000000},  
<unfinished ...>

[pid 9028] <... close resumed> = 0

[pid 9028] openat(AT\_FDCWD, "/home/tru/catkin\_ws/devel/lib/libc.so.6",  
O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 9028] openat(AT\_FDCWD, "/opt/ros/noetic/lib/libc.so.6", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 9028] openat(AT\_FDCWD, "/usr/share/gazebo-11/../../lib/aarch64-linux-gnu/gazebo-11/plugins/libc.so.6", O\_RDONLY|O\_CLOEXEC <unfinished ...>

[pid 9027] <... clock\_nanosleep resumed>NULL) = 0

[pid 9028] <... openat resumed> = -1 ENOENT (No such file or directory)

[pid 9028] openat(AT\_FDCWD, "tls/aarch64/atomics/libc.so.6", O\_RDONLY|O\_CLOEXEC <unfinished ...>

[pid 9027] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=0, tv\_nsec=1000000}, <unfinished ...>

[pid 9028] <... openat resumed> = -1 ENOENT (No such file or directory)

[pid 9028] openat(AT\_FDCWD, "tls/aarch64/libc.so.6", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 9028] openat(AT\_FDCWD, "tls/atomics/libc.so.6", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 9028] openat(AT\_FDCWD, "tls/libc.so.6", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 9027] <... clock\_nanosleep resumed>NULL) = 0

[pid 9028] openat(AT\_FDCWD, "aarch64/atomics/libc.so.6", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 9027] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=0, tv\_nsec=1000000}, <unfinished ...>

[pid 9028] openat(AT\_FDCWD, "aarch64/libc.so.6", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 9028] openat(AT\_FDCWD, "atomics/libc.so.6", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 9028] openat(AT\_FDCWD, "libc.so.6", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (No such file or directory)

**[pid 9028] openat(AT\_FDCWD, "/lib/aarch64-linux-gnu/libc.so.6", O\_RDONLY|O\_CLOEXEC) = 3**

[pid 9027] <... clock\_nanosleep resumed>NULL) = 0

[pid 9028] read(3, <unfinished ...>

[pid 9027] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=0, tv\_nsec=1000000}, <unfinished ...>

[pid 9028] <... read resumed>"\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\3\0\267\0\1\0\0\0\17\2\0\0\0\0"..., 832) = 832

[pid 9028] fstat(3, {st\_mode=S\_IFREG|0755, st\_size=1450832, ...}) = 0

[pid 9028] mmap(NULL, 1519552, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0xfffffa71ca000

```

[pid 9028] mprotect(0xffffa7325000, 61440, PROT_NONE <unfinished ...>

[pid 9027] <... clock_nanosleep resumed>NULL) = 0

[pid 9028] <... mprotect resumed>)    = 0

[pid 9027] clock_nanosleep(CLOCK_REALTIME, 0, {tv_sec=0, tv_nsec=1000000},
<unfinished ...>

[pid 9028] mmap(0xffffa7334000, 24576, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x15a000) = 0xffffa7334000

[pid 9028] mmap(0xffffa733a000, 12224, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0xffffa733a000

[pid 9028] close(3)                = 0

[pid 9028] mmap(NULL, 8192, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_ANONYMOUS, -1, 0 <unfinished ...>

[pid 9027] <... clock_nanosleep resumed>NULL) = 0

[pid 9028] <... mmap resumed>)      = 0xffffa73ed000

[pid 9027] clock_nanosleep(CLOCK_REALTIME, 0, {tv_sec=0, tv_nsec=1000000},
<unfinished ...>

[pid 9028] mprotect(0xffffa7334000, 16384, PROT_READ) = 0

[pid 9028] mprotect(0xffffa7368000, 4096, PROT_READ) = 0

[pid 9028] mprotect(0xffffa7384000, 4096, PROT_READ) = 0

[pid 9028] mprotect(0xaaad8641000, 4096, PROT_READ) = 0

[pid 9028] mprotect(0xffffa73f4000, 4096, PROT_READ) = 0

[pid 9027] <... clock_nanosleep resumed>NULL) = 0

[pid 9028] munmap(0xffffa7386000, 247550 <unfinished ...>

[pid 9027] clock_nanosleep(CLOCK_REALTIME, 0, {tv_sec=0, tv_nsec=1000000},
<unfinished ...>

[pid 9028] <... munmap resumed>)    = 0

[pid 9028] set_tid_address(0xffffa73ed0e0) = 9028

[pid 9028] set_robust_list(0xffffa73ed0f0, 24) = 0

[pid 9028] rt_sigaction(SIGRTMIN, {sa_handler=0xffffa7342bd0, sa_mask=[],
sa_flags=SA_SIGINFO}, NULL, 8) = 0

[pid 9028] rt_sigaction(SIGRT_1, {sa_handler=0xffffa7342c90, sa_mask=[],
sa_flags=SA_RESTART|SA_SIGINFO}, NULL, 8) = 0

[pid 9027] <... clock_nanosleep resumed>NULL) = 0

[pid 9028] rt_sigprocmask(SIG_UNBLOCK, [RTMIN RT_1], NULL, 8) = 0

[pid 9027] clock_nanosleep(CLOCK_REALTIME, 0, {tv_sec=0, tv_nsec=1000000},
<unfinished ...>

```

[pid 9028] prlimit64(0, RLIMIT\_STACK, NULL, {rlim\_cur=8192\*1024, rlim\_max=RLIM64\_INFINITY}) = 0

[pid 9028] statfs("/dev/shm/", {f\_type=TMPFS\_MAGIC, f\_bsize=4096, f\_blocks=500223, f\_bfree=500219, f\_bavail=500219, f\_files=500223, f\_ffree=500218, f\_fsid={ val=[2955874884, 2081308020]}, f\_namelen=255, f\_frsize=4096, f\_flags=ST\_VALID|ST\_NOSUID|ST\_NODEV}) = 0

**[pid 9028] futex(0xffffa736d348, FUTEX\_WAKE\_PRIVATE, 2147483647) = 0**

[pid 9028] openat(AT\_FDCWD, "/dev/shm/div\_sh\_memory", O\_RDWR|O\_NOFOLLOW|O\_CLOEXEC) = 3

[pid 9028] mmap(NULL, 4096, PROT\_READ|PROT\_WRITE, MAP\_SHARED, 3, 0) = 0xffffa73ec000

[pid 9027] <... clock\_nanosleep resumed>NULL) = 0

[pid 9028] openat(AT\_FDCWD, "/dev/shm/sem.div\_semaphore", O\_RDWR|O\_NOFOLLOW  
<unfinished ...>

[pid 9027] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=0, tv\_nsec=1000000},  
<unfinished ...>

[pid 9028] <... openat resumed> = 4

[pid 9028] fstat(4, {st\_mode=S\_IFREG|0664, st\_size=32, ...}) = 0

[pid 9028] brk(NULL) = 0xaaab0f3a9000

[pid 9028] brk(0xaaab0f3ca000) = 0xaaab0f3ca000

[pid 9028] mmap(NULL, 32, PROT\_READ|PROT\_WRITE, MAP\_SHARED, 4, 0) = 0xffffa73eb000

[pid 9027] <... clock\_nanosleep resumed>NULL) = 0

[pid 9027] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=0, tv\_nsec=1000000},  
<unfinished ...>

[pid 9028] close(4) = 0

[pid 9028] openat(AT\_FDCWD, "test.txt", O\_RDONLY) = 4

[pid 9028] fstat(4, {st\_mode=S\_IFREG|0664, st\_size=60, ...}) = 0

[pid 9028] read(4, "30 2 5\n150 3 5 2 5\n200 2 0\n100 "..., 4096) = 60

[pid 9027] <... clock\_nanosleep resumed>NULL) = 0

[pid 9028] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=0, tv\_nsec=1000000},  
<unfinished ...>

[pid 9027] write(1, "3\n", 23

) = 2

[pid 9027] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=0, tv\_nsec=1000000},  
<unfinished ...>

[pid 9028] <... clock\_nanosleep resumed>NULL) = 0

[pid 9028] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=0, tv\_nsec=1000000},  
<unfinished ...>

[pid 9027] <... clock\_nanosleep resumed>NULL) = 0

[pid 9027] write(1, "1\n", 21

) = 2

[pid 9027] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=0, tv\_nsec=1000000},  
<unfinished ...>

[pid 9028] <... clock\_nanosleep resumed>NULL) = 0

[pid 9028] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=0, tv\_nsec=1000000},  
<unfinished ...>

[pid 9027] <... clock\_nanosleep resumed>NULL) = 0

[pid 9027] write(1, "error: division by zero\n", 24error: division by zero

) = 24

[pid 9027] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=0, tv\_nsec=1000000},  
<unfinished ...>

[pid 9028] <... clock\_nanosleep resumed>NULL) = 0

[pid 9028] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=0, tv\_nsec=1000000},  
<unfinished ...>

[pid 9027] <... clock\_nanosleep resumed>NULL) = 0

[pid 9027] write(1, "-4\n", 3 <unfinished ...>

[pid 9028] <... clock\_nanosleep resumed>NULL) = 0

-4

[pid 9027] <... write resumed> = 3

**[pid 9028] futex(0xffffa73eb000, FUTEX\_WAIT\_BITSET|FUTEX\_CLOCK\_REALTIME,  
0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>**

**[pid 9027] futex(0xffff953b7000, FUTEX\_WAKE, 1) = 1**

[pid 9028] <... futex resumed> = 0

[pid 9027] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=0, tv\_nsec=1000000},  
<unfinished ...>

[pid 9028] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=0, tv\_nsec=1000000},  
<unfinished ...>

[pid 9027] <... clock\_nanosleep resumed>NULL) = 0

[pid 9027] write(1, "0\n", 20

) = 2

[pid 9027] clock\_nanosleep(CLOCK\_REALTIME, 0, {tv\_sec=0, tv\_nsec=1000000},  
<unfinished ...>

```

[pid 9028] <... clock_nanosleep resumed>NULL) = 0
[pid 9028] clock_nanosleep(CLOCK_REALTIME, 0, {tv_sec=0, tv_nsec=1000000},
<unfinished ...>
[pid 9027] <... clock_nanosleep resumed>NULL) = 0
[pid 9028] <... clock_nanosleep resumed>NULL) = 0
[pid 9027] write(1, "1\n", 2 <unfinished ...>
[pid 9028] clock_nanosleep(CLOCK_REALTIME, 0, {tv_sec=0, tv_nsec=1000000}, 1
<unfinished ...>
[pid 9027] <... write resumed>      = 2
[pid 9027] clock_nanosleep(CLOCK_REALTIME, 0, {tv_sec=0, tv_nsec=1000000},
<unfinished ...>
[pid 9028] <... clock_nanosleep resumed>NULL) = 0
[pid 9028] read(4, "", 4096)      = 0
[pid 9028] close(4)                = 0
[pid 9028] munmap(0xffffa73eb000, 32) = 0
[pid 9028] munmap(0xffffa73ec000, 4096) = 0
[pid 9027] <... clock_nanosleep resumed>NULL) = 0
[pid 9028] close(3 <unfinished ...>
[pid 9027] clock_nanosleep(CLOCK_REALTIME, 0, {tv_sec=0, tv_nsec=1000000},
<unfinished ...>
[pid 9028] <... close resumed>      = 0
[pid 9028] exit_group(0)            = ?
[pid 9028] +++ exited with 0 +++
<... clock_nanosleep resumed>NULL) = ? ERESTART_RESTARTBLOCK (Interrupted by
signal)
--- SIGCHLD {si_signo=SIGCHLD, si_code=CLD_EXITED, si_pid=9028, si_uid=1000,
si_status=0, si_utime=0, si_stime=0} ---
restart_syscall(<... resuming interrupted clock_nanosleep ...>) = 0
wait4(9028, NULL, 0, NULL)          = 9028
munmap(0xffff953b7000, 32)          = 0
unlinkat(AT_FDCWD, "/dev/shm/sem.div_semaphore", 0) = 0
munmap(0xffff953b8000, 4096)        = 0
unlinkat(AT_FDCWD, "/dev/shm/div_sh_memory", 0) = 0
close(3)                            = 0

```

```
exit_group(0)          = ?
```

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

```
tru@tru:~/Downloads$
```

## Вывод

В ходе лабораторной работы изучены механизмы межпроцессного взаимодействия с использованием разделяемой памяти и семафоров в Linux. Реализована программа из родительского и дочернего процессов, взаимодействующих через именованную разделяемую память. Для синхронизации доступа использовались именованные семафоры.