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

Лабораторная работа №1 по курсу
«Операционные системы»

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Оценка: _____

Дата: 19.12.25

Москва, 2025

Постановка задачи

Вариант 18.

Составить и отладить программу на языке Си, осуществляющую работу с процессами и взаимодействие между ними в одной из двух операционных систем. В результате работы программа (основной процесс) должен создать для решение задачи один или несколько дочерних процессов. Взаимодействие между процессами осуществляется через системные сигналы/события и/или каналы (pipe). Необходимо обрабатывать системные ошибки, которые могут возникнуть в результате работы.

Группа вариантов 5: родительский процесс создает два дочерних процесса. Первой строкой пользователь в консоль родительского процесса вводит имя файла, которое будет использовано для открытия File с таким именем на запись для child1. Аналогично для второй строки и процесса child2. Родительский и дочерний процесс должны быть представлены разными программами. Родительский процесс принимает от пользователя строки произвольной длины и пересылает их в pipe1 или в pipe2 в зависимости от правила фильтрации. Процесс child1 и child2 производят работу над строками. Процессы пишут результаты своей работы в стандартный вывод.

Вариант 18: правило фильтрации: нечетные строки отправляются в pipe1, четные в pipe2. Дочерние процессы удаляют все гласные из строк.

Общий метод и алгоритм решения

Использованные системные вызовы:

- `fork()` — создает новый процесс; используется дважды для создания двух дочерних процессов child1 и child2
- `pipe()` — создает канал для межпроцессного взаимодействия; используется дважды для создания pipe1 (child1) и pipe2 (child2)
- `dup2()` — переназначает файловые дескрипторы; дочерние процессы перенаправляют стандартный ввод на свои каналы
- `execl()` — заменяет код текущего процесса новой программой child, которая удаляет гласные из строк
- `waitpid()` — приостанавливает родительский процесс до завершения дочерних
- `write()` — записывает данные в канал; родитель отправляет строки дочерним процессам
- `getline()` — читает строки произвольной длины от пользователя и из каналов
- `open()` — открывает выходные файлы для записи обработанных строк
- `close()` — закрывает неиспользуемые концы каналов, сигнализируя о завершении передачи
- `exit()` — завершает процессы с кодом возврата

Алгоритм:

Родитель создает два канала через `pipe()` и два дочерних процесса через `fork()`

1. Каждый дочерний процесс перенаправляет свой стандартный ввод на соответствующий канал с помощью `dup2()` и запускает программу `child` через `execl()`
2. Родитель читает строки от пользователя с помощью `getline()` и отправляет нечетные строки в `pipe1`, четные — в `pipe2` через `write()`
3. Дочерние процессы читают строки из стандартного ввода (перенаправленного канала), удаляют гласные буквы и записывают результат в свои файлы
4. После завершения ввода (EOF) родитель закрывает каналы с помощью `close()` и ожидает завершения дочерних процессов через `waitpid()`
5. Родитель выводит статус завершения и содержимое результирующих файлов, затем завершает работу

Код программы

parent.c

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

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

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

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

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

```
#include <errno.h>
```

```
static ssize_t write_all(int fd, const void *buf, size_t count) {
```

```
    const char *p = buf;
```

```
    size_t left = count;
```

```
    while (left > 0) {
```

```
        ssize_t w = write(fd, p, left);
```

```
        if (w < 0) {
```

```
            if (errno == EINTR) continue;
```

```
            return -1;
```

```
        }
```

```
        left -= (size_t)w;
```

```
        p += w;
```

```
    }
```

```
    return (ssize_t)count;
```

```
}
```

```
int main() {  
    char *filename1 = NULL, *filename2 = NULL;  
    size_t fncap = 0;  
    ssize_t r;  
  
    printf("Введите имя файла для child1: ");  
    fflush(stdout);  
    r = getline(&filename1, &fncap, stdin);  
    if (r <= 0) {  
        perror("Ошибка чтения имени файла 1");  
        free(filename1);  
        return 1;  
    }  
    if (filename1[r-1] == '\n') filename1[r-1] = '\0';  
  
    printf("Введите имя файла для child2: ");  
    fflush(stdout);  
    fncap = 0;  
    r = getline(&filename2, &fncap, stdin);  
    if (r <= 0) {  
        perror("Ошибка чтения имени файла 2");  
        free(filename1);  
        free(filename2);  
        return 1;  
    }  
    if (filename2[r-1] == '\n') filename2[r-1] = '\0';  
  
    int pipe1[2], pipe2[2];
```

```
if (pipe(pipe1) == -1) {  
    perror("Ошибка создания pipe1");  
    free(filename1);  
    free(filename2);  
    return 1;  
}
```

```
if (pipe(pipe2) == -1) {  
    perror("Ошибка создания pipe2");  
    close(pipe1[0]);  
    close(pipe1[1]);  
    free(filename1);  
    free(filename2);  
    return 1;  
}
```

```
printf("\n=== Начало обработки строк ===\n");  
printf("Вводите строки (Ctrl+D для завершения ввода):\n");  
printf("-----\n");
```

```
pid_t pid1 = fork();  
if (pid1 < 0) {  
    perror("Ошибка fork для child1");  
    close(pipe1[0]); close(pipe1[1]); close(pipe2[0]); close(pipe2[1]);  
    free(filename1); free(filename2);  
    return 1;  
}
```

```
if (pid1 == 0) {  
    if (dup2(pipe1[0], STDIN_FILENO) == -1) {  
        perror("child1: ошибка dup2");  
    }
```

```

        _exit(1);
    }

    close(pipe1[0]); close(pipe1[1]);
    close(pipe2[0]); close(pipe2[1]);

    execl("./child", "child", filename1, (char *)NULL);
    perror("child1: ошибка execl");
    _exit(1);
}

close(pipe1[0]);

pid_t pid2 = fork();
if (pid2 < 0) {
    perror("Ошибка fork для child2");
    close(pipe1[1]); close(pipe2[0]); close(pipe2[1]);
    free(filename1); free(filename2);
    return 1;
}

if (pid2 == 0) {
    if (dup2(pipe2[0], STDIN_FILENO) == -1) {
        perror("child2: ошибка dup2");
        _exit(1);
    }

    close(pipe2[0]); close(pipe2[1]);
    close(pipe1[0]); close(pipe1[1]);

    execl("./child", "child", filename2, (char *)NULL);
    perror("child2: ошибка execl");
}

```

```

    _exit(1);
}

close(pipe2[0]);

char *line = NULL;
size_t linecap = 0;
long lineno = 0;

while (getline(&line, &linecap, stdin) != -1) {
    ++lineno;

    int target_fd = (lineno % 2 == 1) ? pipe1[1] : pipe2[1];
    const char *child_name = (lineno % 2 == 1) ? "child1" : "child2";

    if (write_all(target_fd, line, strlen(line)) == -1) {
        fprintf(stderr, "Ошибка записи в %s: %s\n", child_name, strerror(errno));
    }

    size_t len = strlen(line);
    if (len > 0 && line[len-1] == '\n') line[len-1] = '\0';
    printf("[%s] Строка %ld: %s\n", child_name, lineno, line);
}

free(line);

printf("\n[INFO] Конец ввода (EOF)\n");
printf("\n-----\n");
printf("Ожидание завершения дочерних процессов...\n");

```

```

close(pipe1[1]);

close(pipe2[1]);


int status1, status2;

if (waitpid(pid1, &status1, 0) == -1) perror("Ошибка waitpid для child1");
if (waitpid(pid2, &status2, 0) == -1) perror("Ошибка waitpid для child2");


printf("\n=== РЕЗУЛЬТАТЫ РАБОТЫ ===\n");
printf("child1 завершился с кодом: %d\n", WEXITSTATUS(status1));
printf("child2 завершился с кодом: %d\n", WEXITSTATUS(status2));
printf("\nРезультаты записаны в файлы:\n");
printf("• %s (child1, нечетные строки)\n", filename1);
printf("• %s (child2, четные строки)\n", filename2);


printf("\n--- Содержимое %s ---\n", filename1);
char cmd[1024];
snprintf(cmd, sizeof(cmd), "cat %s 2>/dev/null", filename1);
system(cmd);


printf("\n--- Содержимое %s ---\n", filename2);
snprintf(cmd, sizeof(cmd), "cat %s 2>/dev/null", filename2);
system(cmd);


free(filename1);
free(filename2);

printf("\nРодительский процесс завершен.\n");

return 0;

}

```

child.c


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

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

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

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

```
int is_vowel(char c) {
```

```
    c = tolower(c);
```

```
    return (c == 'a' || c == 'e' || c == 'i' ||
```

```
            c == 'o' || c == 'u' || c == 'y');
```

```
}
```

```
void remove_vowels(char *str) {
```

```
    char *src = str;
```

```
    char *dst = str;
```

```
    while (*src) {
```

```
        if (!is_vowel(*src)) {
```

```
            *dst = *src;
```

```
            dst++;
```

```
        }
```

```
        src++;
```

```
    }
```

```
    *dst = '\0';
```

```
}
```

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

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

```
        fprintf(stderr, "Использование: %s output_filename\n", argv[0]);
```

```
        return 1;
```

```
    }
```

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

FILE *out = fopen(outname, "w");

if (!out) {
    perror("Ошибка открытия файла");
    return 1;
}

char *line = NULL;
size_t cap = 0;

while (getline(&line, &cap, stdin) != -1) {
    size_t len = strlen(line);
    if (len > 0 && line[len-1] == '\n') {
        line[len-1] = '\0';
        len--;
    }

    char original[1024];
    if (len >= sizeof(original)) len = sizeof(original) - 1;
    strncpy(original, line, len);
    original[len] = '\0';

    remove_vowels(line);

    printf("%s\n", line);
    fflush(stdout);

    fprintf(out, "%s\n", line);
    fflush(out);
}
```

```
}

free(line);

fclose(out);

return 0;

}
```

Протокол работы программы

Тестирование:

```
$ make
```

```
gcc -Wall -Wextra -std=c99 -D_POSIX_C_SOURCE=200809L parent.c -o parent
```

```
gcc -Wall -Wextra -std=c99 -D_POSIX_C_SOURCE=200809L child.c -o child
```

```
$ ./parent
```

Введите имя файла для child1: file01.txt

Введите имя файла для child2: file02.txt

==== Начало обработки строк ====

Вводите строки (Ctrl+D для завершения ввода):

Hello World

[child1] Строка 1: Hello World

Hll Wrld

Operating System

[child2] Строка 2: Operating System

prtng Sstm

Test String

[child1] Строка 3: Test String

Tst Strng

[INFO] Конец ввода (EOF)

Ожидание завершения дочерних процессов...

==== РЕЗУЛЬТАТЫ РАБОТЫ ====

child1 завершился с кодом: 0

child2 завершился с кодом: 0

Результаты записаны в файлы:

- file01.txt (child1, нечетные строки)
- file02.txt (child2, четные строки)

--- Содержимое file01.txt ---

Hll Wrld

Tst Strng

--- Содержимое file02.txt ---

prtnng Sstm

Родительский процесс завершен.

Strace:

\$ strace -f ./parent -f

execve("./parent", ["/parent", "-f"], 0x7fff4a72830 /* 27 vars */) = 0

brk(NULL) = 0x5f0b4f33a000

mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x748393a85000

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=41635, ...}) = 0

mmap(NULL, 41635, PROT_READ, MAP_PRIVATE, 3, 0) = 0x748393a7a000

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\3\0>\0\1\0\0\0\220\243\2\0\0\0\0"..., 832) = 832

```

pread64(3, "\6\0\0\0\4\0\0\0@\0\0\0\0\0\0@\0\0\0\0\0\0@\0\0\0\0\0\0"..., 784, 64) = 784
fstat(3, {st_mode=S_IFREG|0755, st_size=2125328, ...}) = 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"..., 784, 64) = 784
mmap(NULL, 2170256, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x748393800000

mmap(0x748393828000, 1605632, PROT_READ|PROT_EXEC,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x28000) = 0x748393828000

mmap(0x7483939b0000, 323584, PROT_READ,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1b0000) = 0x7483939b0000

mmap(0x7483939ff000, 24576, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1fe000) = 0x7483939ff000

mmap(0x748393a05000, 52624, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x748393a05000

close(3) = 0

mmap(NULL, 12288, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1,
0) = 0x748393a77000

arch_precl(ARCH_SET_FS, 0x748393a77740) = 0

set_tid_address(0x748393a77a10) = 1431

set_robust_list(0x748393a77a20, 24) = 0

rseq(0x748393a78060, 0x20, 0, 0x53053053) = 0

mprotect(0x7483939ff000, 16384, PROT_READ) = 0

mprotect(0x5f0b4be37000, 4096, PROT_READ) = 0

mprotect(0x748393abd000, 8192, PROT_READ) = 0

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

munmap(0x748393a7a000, 41635) = 0

fstat(1, {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0x2), ...}) = 0

getrandom("\x1b\x14\xfa\xec\xd5\xbd\x6b\x27", 8, GRND_NONBLOCK) = 8

brk(NULL) = 0x5f0b4f33a000

brk(0x5f0b4f35b000) = 0x5f0b4f35b000

write(1, "\320\222\320\262\320\265\320\264\320\270\321\202\320\265 \320\270\320\274\321\217
\321\204\320\260\320\271\320\273\320\260"..., 48Введите имя файла для child1: ) = 48

fstat(0, {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0x2), ...}) = 0

```

```

read(0, file1.txt
"file1.txt\n", 1024)      = 10

write(1, "\320\222\320\262\320\265\320\264\320\270\321\202\320\265 \320\270\320\274\321\217
\321\204\320\260\320\271\320\273\320\260"..., 48Введите имя файла для child2: ) = 48

read(0, file2.txt
"file2.txt\n", 1024)      = 10

pipe2([3, 4], 0)          = 0
pipe2([5, 6], 0)          = 0

write(1, "\n", 1
)                          = 1

write(1, "=== \320\235\320\260\321\207\320\260\320\273\320\276
\320\276\320\261\321\200\320\260\320\261\320\276\321\202\320"..., 51=== Начало обработки строк
===

) = 51

write(1, "\320\222\320\262\320\276\320\264\320\270\321\202\320\265
\321\201\321\202\321\200\320\276\320\272\320\270 (Ctrl"..., 77Вводите строки (Ctrl+D для
завершения ввода):

) = 77

write(1, "-----"..., 45-----

) = 45

clone(child_stack=NULL,
flags=CLONE_CHILD_CLEARTID|CLONE_CHILD_SETTID|SIGCHLDstrace: Process 1432
attached

, child_tidptr=0x748393a77a10) = 1432

[pid 1432] set_robust_list(0x748393a77a20, 24 <unfinished ...>

[pid 1431] close(3 <unfinished ...>

[pid 1432] <... set_robust_list resumed>) = 0

[pid 1431] <... close resumed>      = 0

[pid 1431] clone(child_stack=NULL,
flags=CLONE_CHILD_CLEARTID|CLONE_CHILD_SETTID|SIGCHLD <unfinished ...>

[pid 1432] dup2(3, 0)              = 0

[pid 1432] close(3)                = 0

strace: Process 1433 attached

```

```

[pid 1431] <... clone resumed>, child_tidptr=0x748393a77a10) = 1433
[pid 1432] close(4 <unfinished ...>
[pid 1431] close(5 <unfinished ...>
[pid 1433] set_robust_list(0x748393a77a20, 24 <unfinished ...>
[pid 1431] <... close resumed>)      = 0
[pid 1432] <... close resumed>)      = 0
[pid 1431] read(0, <unfinished ...>
[pid 1433] <... set_robust_list resumed>) = 0
[pid 1432] close(5 <unfinished ...>
[pid 1433] dup2(5, 0 <unfinished ...>
[pid 1432] <... close resumed>)      = 0
[pid 1433] <... dup2 resumed>)       = 0
[pid 1432] close(6 <unfinished ...>
[pid 1433] close(5 <unfinished ...>
[pid 1432] <... close resumed>)      = 0
[pid 1433] <... close resumed>)      = 0
[pid 1432] execve("./child", ["child", "file1.txt"], 0x7ffd91b7e790 /* 27 vars */ <unfinished ...>
[pid 1433] close(6)                  = 0
[pid 1433] close(3)                  = -1 EBADF (Bad file descriptor)
[pid 1433] close(4)                  = 0
[pid 1433] execve("./child", ["child", "file2.txt"], 0x7ffd91b7e790 /* 27 vars */) = 0
[pid 1432] <... execve resumed>)     = 0
[pid 1433] brk(NULL <unfinished ...>
[pid 1432] brk(NULL <unfinished ...>
[pid 1433] <... brk resumed>)        = 0x5684271b7000
[pid 1432] <... brk resumed>)        = 0x6198e6c7c000
[pid 1433] mmap(NULL, 8192, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7119f23df000
[pid 1432] mmap(NULL, 8192, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_ANONYMOUS, -1, 0 <unfinished ...>
[pid 1433] access("/etc/ld.so.preload", R_OK <unfinished ...>

```

```

[pid 1432] <... mmap resumed>)      = 0x7560713e3000
[pid 1433] <... access resumed>)    = -1 ENOENT (No such file or directory)
[pid 1432] access("/etc/ld.so.preload", R_OK <unfinished ...>
[pid 1433] openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXEC <unfinished ...>
[pid 1432] <... access resumed>)    = -1 ENOENT (No such file or directory)
[pid 1433] <... openat resumed>)    = 3
[pid 1432] openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXEC <unfinished ...>
[pid 1433] fstat(3, <unfinished ...>
[pid 1432] <... openat resumed>)    = 3
[pid 1433] <... fstat resumed>{st_mode=S_IFREG|0644, st_size=41635, ...}) = 0
[pid 1432] fstat(3, <unfinished ...>
[pid 1433] mmap(NULL, 41635, PROT_READ, MAP_PRIVATE, 3, 0 <unfinished ...>
[pid 1432] <... fstat resumed>{st_mode=S_IFREG|0644, st_size=41635, ...}) = 0
[pid 1433] <... mmap resumed>)      = 0x7119f23d4000
[pid 1432] mmap(NULL, 41635, PROT_READ, MAP_PRIVATE, 3, 0 <unfinished ...>
[pid 1433] close(3)                  = 0
[pid 1432] <... mmap resumed>)      = 0x7560713d8000
[pid 1433] openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libc.so.6", O_RDONLY|O_CLOEXEC
<unfinished ...>
[pid 1432] close(3 <unfinished ...>
[pid 1433] <... openat resumed>)    = 3
[pid 1432] <... close resumed>)    = 0
[pid 1433] read(3, <unfinished ...>
[pid 1432] openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libc.so.6", O_RDONLY|O_CLOEXEC
<unfinished ...>
[pid 1433] <... read
resumed>"\177ELF\2\1\1\3\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\220\243\2\0\0\0\0"..., 832) = 832
[pid 1432] <... openat resumed>)    = 3
[pid 1433] pread64(3, <unfinished ...>
[pid 1432] read(3, <unfinished ...>

```


[pid 1433] <... 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 1432] <... read
resumed>"\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\220\243\2\0\0\0\0\0"..., 832) = 832

[pid 1433] fstat(3, {st_mode=S_IFREG|0755, st_size=2125328, ...}) = 0

[pid 1432] pread64(3, <unfinished ...>

[pid 1433] pread64(3, <unfinished ...>

[pid 1432] <... 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 1433] <... 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 1432] fstat(3, <unfinished ...>

[pid 1433] mmap(NULL, 2170256, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0
<unfinished ...>

[pid 1432] <... fstat resumed>{st_mode=S_IFREG|0755, st_size=2125328, ...}) = 0

[pid 1433] <... mmap resumed>) = 0x7119f2000000

[pid 1432] pread64(3, <unfinished ...>

[pid 1433] mmap(0x7119f2028000, 1605632, PROT_READ|PROT_EXEC,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x28000 <unfinished ...>

[pid 1432] <... 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 1433] <... mmap resumed>) = 0x7119f2028000

[pid 1432] mmap(NULL, 2170256, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0
<unfinished ...>

[pid 1433] mmap(0x7119f21b0000, 323584, PROT_READ,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1b0000 <unfinished ...>

[pid 1432] <... mmap resumed>) = 0x756071000000

[pid 1433] <... mmap resumed>) = 0x7119f21b0000

[pid 1432] mmap(0x756071028000, 1605632, PROT_READ|PROT_EXEC,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x28000 <unfinished ...>

[pid 1433] mmap(0x7119f21ff000, 24576, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1fe000 <unfinished ...>

[pid 1432] <... mmap resumed>) = 0x756071028000

[pid 1433] <... mmap resumed>) = 0x7119f21ff000

[pid 1432] mmap(0x7560711b0000, 323584, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1b0000 <unfinished ...>

[pid 1433] mmap(0x7119f2205000, 52624, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0 <unfinished ...>

[pid 1432] <... mmap resumed> = 0x7560711b0000

[pid 1433] <... mmap resumed> = 0x7119f2205000

[pid 1432] mmap(0x7560711ff000, 24576, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1fe000 <unfinished ...>

[pid 1433] close(3 <unfinished ...>

[pid 1432] <... mmap resumed> = 0x7560711ff000

[pid 1433] <... close resumed> = 0

[pid 1432] mmap(0x756071205000, 52624, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0 <unfinished ...>

[pid 1433] mmap(NULL, 12288, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0 <unfinished ...>

[pid 1432] <... mmap resumed> = 0x756071205000

[pid 1433] <... mmap resumed> = 0x7119f23d1000

[pid 1432] close(3 <unfinished ...>

[pid 1433] arch_prctl(ARCH_SET_FS, 0x7119f23d1740 <unfinished ...>

[pid 1432] <... close resumed> = 0

[pid 1433] <... arch_prctl resumed> = 0

[pid 1432] mmap(NULL, 12288, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0 <unfinished ...>

[pid 1433] set_tid_address(0x7119f23d1a10 <unfinished ...>

[pid 1432] <... mmap resumed> = 0x7560713d5000

[pid 1433] <... set_tid_address resumed> = 1433

[pid 1432] arch_prctl(ARCH_SET_FS, 0x7560713d5740 <unfinished ...>

[pid 1433] set_robust_list(0x7119f23d1a20, 24 <unfinished ...>

[pid 1432] <... arch_prctl resumed> = 0

[pid 1433] <... set_robust_list resumed> = 0

[pid 1432] set_tid_address(0x7560713d5a10 <unfinished ...>

[pid 1433] rseq(0x7119f23d2060, 0x20, 0, 0x53053053 <unfinished ...>

```

[pid 1432] <... set_tid_address resumed>) = 1432
[pid 1433] <... rseq resumed>)      = 0
[pid 1432] set_robust_list(0x7560713d5a20, 24) = 0
[pid 1433] mprotect(0x7119f21ff000, 16384, PROT_READ <unfinished ...>
[pid 1432] rseq(0x7560713d6060, 0x20, 0, 0x53053053 <unfinished ...>
[pid 1433] <... mprotect resumed>)   = 0
[pid 1432] <... rseq resumed>)      = 0
[pid 1433] mprotect(0x5683fa9d3000, 4096, PROT_READ) = 0
[pid 1432] mprotect(0x7560711ff000, 16384, PROT_READ <unfinished ...>
[pid 1433] mprotect(0x7119f2417000, 8192, PROT_READ <unfinished ...>
[pid 1432] <... mprotect resumed>)   = 0
[pid 1433] <... mprotect resumed>)   = 0
[pid 1432] mprotect(0x6198dee8f000, 4096, PROT_READ <unfinished ...>
[pid 1433] prlimit64(0, RLIMIT_STACK, NULL, <unfinished ...>
[pid 1432] <... mprotect resumed>)   = 0
[pid 1433] <... prlimit64 resumed>{rlim_cur=8192*1024, rlim_max=RLIM64_INFINITY}) = 0
[pid 1432] mprotect(0x75607141b000, 8192, PROT_READ <unfinished ...>
[pid 1433] munmap(0x7119f23d4000, 41635 <unfinished ...>
[pid 1432] <... mprotect resumed>)   = 0
[pid 1433] <... munmap resumed>)     = 0
[pid 1432] prlimit64(0, RLIMIT_STACK, NULL, <unfinished ...>
[pid 1433] getrandom(<unfinished ...>
[pid 1432] <... prlimit64 resumed>{rlim_cur=8192*1024, rlim_max=RLIM64_INFINITY}) = 0
[pid 1433] <... getrandom resumed>"\x17\x53\x5b\x4b\x58\x8e\xa7\xf5", 8,
GRND_NONBLOCK) = 8
[pid 1432] munmap(0x7560713d8000, 41635 <unfinished ...>
[pid 1433] brk(NULL <unfinished ...>
[pid 1432] <... munmap resumed>)     = 0
[pid 1433] <... brk resumed>)       = 0x5684271b7000
[pid 1432] getrandom(<unfinished ...>

```

[pid 1433] brk(0x5684271d8000 <unfinished ...>

[pid 1432] <... getrandom resumed>"\x52\xac\x32\x9c\x3f\xf0\xc6\x88", 8,
GRND_NONBLOCK) = 8

[pid 1433] <... brk resumed> = 0x5684271d8000

[pid 1432] brk(NULL <unfinished ...>

[pid 1433] openat(AT_FDCWD, "file2.txt", O_WRONLY|O_CREAT|O_TRUNC, 0666
<unfinished ...>

[pid 1432] <... brk resumed> = 0x6198e6c7c000

[pid 1432] brk(0x6198e6c9d000) = 0x6198e6c9d000

[pid 1432] openat(AT_FDCWD, "file1.txt", O_WRONLY|O_CREAT|O_TRUNC, 0666
<unfinished ...>

[pid 1433] <... openat resumed> = 3

[pid 1432] <... openat resumed> = 3

[pid 1433] fstat(0, <unfinished ...>

[pid 1432] fstat(0, <unfinished ...>

[pid 1433] <... fstat resumed>{st_mode=S_IFIFO|0600, st_size=0, ...}) = 0

[pid 1432] <... fstat resumed>{st_mode=S_IFIFO|0600, st_size=0, ...}) = 0

[pid 1433] read(0, <unfinished ...>

[pid 1432] read(0, Hello World

<unfinished ...>

[pid 1431] <... read resumed>"Hello World\n", 1024) = 12

[pid 1431] write(4, "Hello World\n", 12) = 12

[pid 1432] <... read resumed>"Hello World\n", 4096) = 12

[pid 1431] write(1, "[child1] \320\241\321\202\321\200\320\276\320\272\320\260 1: Hello W"...,
37 <unfinished ...>

[child1] Crpoka 1: Hello World

[pid 1432] fstat(3, <unfinished ...>

[pid 1431] <... write resumed> = 37

[pid 1431] read(0, <unfinished ...>

[pid 1432] <... fstat resumed>{st_mode=S_IFREG|0777, st_size=0, ...}) = 0

[pid 1432] write(3, "Hll Wrld\n", 9) = 9

```

[pid 1432] read(0, Test String
<unfinished ...>

[pid 1431] <... read resumed>"Test String\n", 1024) = 12

[pid 1431] write(6, "Test String\n", 12) = 12

[pid 1433] <... read resumed>"Test String\n", 4096) = 12

[pid 1431] write(1, "[child2] \320\241\321\202\321\200\320\276\320\272\320\260 2: Test St"...,
37 <unfinished ...>

[pid 1433] fstat(3, [child2] Строка 2: Test String
<unfinished ...>

[pid 1431] <... write resumed>)      = 37

[pid 1431] read(0, <unfinished ...>

[pid 1433] <... fstat resumed>{st_mode=S_IFREG|0777, st_size=0, ...}) = 0

[pid 1433] write(3, "Tst Strng\n", 10) = 10

[pid 1433] read(0, Operating System
<unfinished ...>

[pid 1431] <... read resumed>"Operating System\n", 1024) = 17

[pid 1431] write(4, "Operating System\n", 17) = 17

[pid 1432] <... read resumed>"Operating System\n", 4096) = 17

[pid 1431] write(1, "[child1] \320\241\321\202\321\200\320\276\320\272\320\260 3: Operati"...,
42 <unfinished ...>

[child1] Строка 3: Operating System

[pid 1432] write(3, "prtnng Sstm\n", 11 <unfinished ...>

[pid 1431] <... write resumed>)      = 42

[pid 1431] read(0, <unfinished ...>

[pid 1432] <... write resumed>)      = 11

[pid 1432] read(0, <unfinished ...>

[pid 1431] <... read resumed>"", 1024) = 0

[pid 1431] write(1, "\n", 1
)      = 1

[pid 1431] write(1, "[INFO] \320\232\320\276\320\275\320\265\321\206
\320\262\320\262\320\276\320\264\320\260 (EO"..., 35[INFO] Конец ввода (EOF)

```

) = 35

[pid 1431] write(1, "\n", 1

) = 1

[pid 1431] write(1, "-----" ..., 45-----

) = 45

[pid 1431] write(1, "\320\236\320\266\320\270\320\264\320\260\320\275\320\270\320\265
\320\267\320\260\320\262\320\265\321\200\321\210\320\265\320" ..., 77Ожидание завершения
дочерних процессов...

) = 77

[pid 1431] close(4) = 0

[pid 1432] <... read resumed>"" , 4096) = 0

[pid 1431] close(6 <unfinished ...>

[pid 1432] close(3 <unfinished ...>

[pid 1431] <... close resumed>) = 0

[pid 1433] <... read resumed>"" , 4096) = 0

[pid 1431] wait4(1432, <unfinished ...>

[pid 1433] close(3 <unfinished ...>

[pid 1432] <... close resumed>) = 0

[pid 1432] exit_group(0 <unfinished ...>

[pid 1433] <... close resumed>) = 0

[pid 1432] <... exit_group resumed>) = ?

[pid 1433] exit_group(0) = ?

[pid 1432] +++ exited with 0 +++

[pid 1431] <... wait4 resumed>[{WIFEXITED(s) && WEXITSTATUS(s) == 0}], 0, NULL) =
1432

[pid 1431] --- SIGCHLD {si_signo=SIGCHLD, si_code=CLD_EXITED, si_pid=1432,
si_uid=1000, si_status=0, si_etime=0, si_stime=0} ---

[pid 1433] +++ exited with 0 +++

--- SIGCHLD {si_signo=SIGCHLD, si_code=CLD_EXITED, si_pid=1433, si_uid=1000,
si_status=0, si_etime=0, si_stime=0} ---

wait4(1433, [{WIFEXITED(s) && WEXITSTATUS(s) == 0}], 0, NULL) = 1433

write(1, "\n", 1

```

)
    = 1

write(1, "===
\320\240\320\225\320\227\320\243\320\233\320\254\320\242\320\220\320\242\320\253
\320\240\320\220\320\221\320"..., 42=== РЕЗУЛЬТАТЫ РАБОТЫ ===

) = 42

write(1, "child1
\320\267\320\260\320\262\320\265\321\200\321\210\320\270\320\273\321\201\321\217 \321\201
\320"..., 45child1 завершился с кодом: 0

) = 45

write(1, "child2
\320\267\320\260\320\262\320\265\321\200\321\210\320\270\320\273\321\201\321\217 \321\201
\320"..., 45child2 завершился с кодом: 0

) = 45

write(1, "\n", 1

)
    = 1

write(1, "\320\240\320\265\320\267\321\203\320\273\321\214\321\202\320\260\321\202\321\213
\320\267\320\260\320\277\320\270\321\201\320"..., 53Результаты записаны в файлы:

) = 53

write(1, "\342\200\242 file1.txt (child1, \320\275\320\265\321\207\320\265\321"..., 54• file1.txt
(child1, нечетные строки)

) = 54

write(1, "\342\200\242 file2.txt (child2, \321\207\320\265\321\202\320\275\321"..., 50• file2.txt
(child2, четные строки)

) = 50

write(1, "\n---
\320\241\320\276\320\264\320\265\321\200\320\266\320\270\320\274\320\276\320\265 file1."..., 40

--- Содержимое file1.txt ---

) = 40

rt_sigaction(SIGINT, {sa_handler=SIG_IGN, sa_mask=[], sa_flags=SA_RESTORER,
sa_restorer=0x748393845330}, {sa_handler=SIG_DFL, sa_mask=[], sa_flags=0}, 8) = 0

rt_sigaction(SIGQUIT, {sa_handler=SIG_IGN, sa_mask=[], sa_flags=SA_RESTORER,
sa_restorer=0x748393845330}, {sa_handler=SIG_DFL, sa_mask=[], sa_flags=0}, 8) = 0

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

mmap(NULL, 36864, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_ANONYMOUS|MAP_STACK, -1, 0) = 0x748393a7c000

```

```

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

clone3({flags=CLONE_VM|CLONE_VFORK|CLONE_CLEAR_SIGHAND,
exit_signal=SIGCHLD, stack=0x748393a7c000, stack_size=0x9000}, 88strace: Process 1436 attached

<unfinished ...>

[pid 1436] rt_sigprocmask(SIG_BLOCK, NULL, ~[KILL STOP], 8) = 0

[pid 1436] rt_sigaction(SIGINT, {sa_handler=SIG_DFL, sa_mask=[], sa_flags=SA_RESTORER,
sa_restorer=0x748393845330}, NULL, 8) = 0

[pid 1436] rt_sigaction(SIGQUIT, {sa_handler=SIG_DFL, sa_mask=[],
sa_flags=SA_RESTORER, sa_restorer=0x748393845330}, NULL, 8) = 0

[pid 1436] rt_sigprocmask(SIG_SETMASK, [], NULL, 8) = 0

[pid 1436] execve("/bin/sh", ["sh", "-c", "--", "cat file1.txt 2>/dev/null"], 0x7ffd91b7e790 /* 27
vars */ <unfinished ...>

[pid 1431] <... clone3 resumed>    = 1436

[pid 1431] munmap(0x748393a7c000, 36864) = 0

[pid 1436] <... execve resumed>    = 0

[pid 1431] rt_sigprocmask(SIG_SETMASK, [CHLD], <unfinished ...>

[pid 1436] brk(NULL <unfinished ...>

[pid 1431] <... rt_sigprocmask resumed>NULL, 8) = 0

[pid 1436] <... brk resumed>      = 0x60091bca0000

[pid 1431] wait4(1436, <unfinished ...>

[pid 1436] mmap(NULL, 8192, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7b0a34e4b000

[pid 1436] access("/etc/ld.so.preload", R_OK) = -1 ENOENT (No such file or directory)

[pid 1436] openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXEC) = 3

[pid 1436] fstat(3, {st_mode=S_IFREG|0644, st_size=41635, ...}) = 0

[pid 1436] mmap(NULL, 41635, PROT_READ, MAP_PRIVATE, 3, 0) = 0x7b0a34e40000

[pid 1436] close(3)                = 0

[pid 1436] openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libc.so.6", O_RDONLY|O_CLOEXEC) =
3

[pid 1436] read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\220\243\2\0\0\0\0\0"..., 832) =
832

[pid 1436] pread64(3, "\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"..., 784,
64) = 784

```


[pid 1436] fstat(3, {st_mode=S_IFREG|0755, st_size=2125328, ...}) = 0

[pid 1436] pread64(3, "\6\0\0\4\0\0\0@\0\0\0\0\0\0@\0\0\0\0\0\0@\0\0\0\0\0\0"..., 784, 64) = 784

[pid 1436] mmap(NULL, 2170256, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x7b0a34c00000

[pid 1436] mmap(0x7b0a34c28000, 1605632, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x28000) = 0x7b0a34c28000

[pid 1436] mmap(0x7b0a34db0000, 323584, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1b0000) = 0x7b0a34db0000

[pid 1436] mmap(0x7b0a34dff000, 24576, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1fe000) = 0x7b0a34dff000

[pid 1436] mmap(0x7b0a34e05000, 52624, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x7b0a34e05000

[pid 1436] close(3) = 0

[pid 1436] mmap(NULL, 12288, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x7b0a34e3d000

[pid 1436] arch_prctl(ARCH_SET_FS, 0x7b0a34e3d740) = 0

[pid 1436] set_tid_address(0x7b0a34e3da10) = 1436

[pid 1436] set_robust_list(0x7b0a34e3da20, 24) = 0

[pid 1436] rseq(0x7b0a34e3e060, 0x20, 0, 0x53053053) = 0

[pid 1436] mprotect(0x7b0a34dff000, 16384, PROT_READ) = 0

[pid 1436] mprotect(0x6008e1422000, 8192, PROT_READ) = 0

[pid 1436] mprotect(0x7b0a34e83000, 8192, PROT_READ) = 0

[pid 1436] prlimit64(0, RLIMIT_STACK, NULL, {rlim_cur=8192*1024, rlim_max=RLIM64_INFINITY}) = 0

[pid 1436] munmap(0x7b0a34e40000, 41635) = 0

[pid 1436] getuid() = 1000

[pid 1436] getgid() = 1000

[pid 1436] getpid() = 1436

[pid 1436] rt_sigaction(SIGCHLD, {sa_handler=0x6008e1417cd0, sa_mask=~[RTMIN RT_1], sa_flags=SA_RESTORER, sa_restorer=0x7b0a34c45330}, NULL, 8) = 0

[pid 1436] geteuid() = 1000

[pid 1436] getrandom("\xec\x7d\x95\xfc\x02\x34\x7e\x94", 8, GRND_NONBLOCK) = 8

```

[pid 1436] brk(NULL) = 0x60091bca0000

[pid 1436] brk(0x60091bcc1000) = 0x60091bcc1000

[pid 1436] getppid() = 1431

[pid 1436] newfstatat(AT_FDCWD, "/mnt/c/Dev/Projects/OS_Labs/lab1",
{st_mode=S_IFDIR|0777, st_size=4096, ...}, 0) = 0

[pid 1436] newfstatat(AT_FDCWD, ".", {st_mode=S_IFDIR|0777, st_size=4096, ...}, 0) = 0

[pid 1436] geteuid() = 1000

[pid 1436] getegid() = 1000

[pid 1436] rt_sigaction(SIGINT, NULL, {sa_handler=SIG_DFL, sa_mask=[], sa_flags=0}, 8) = 0

[pid 1436] rt_sigaction(SIGINT, {sa_handler=0x6008e1417cd0, sa_mask=~[RTMIN RT_1],
sa_flags=SA_RESTORER, sa_restorer=0x7b0a34c45330}, NULL, 8) = 0

[pid 1436] rt_sigaction(SIGQUIT, NULL, {sa_handler=SIG_DFL, sa_mask=[], sa_flags=0}, 8) =
0

[pid 1436] rt_sigaction(SIGQUIT, {sa_handler=SIG_DFL, sa_mask=~[RTMIN RT_1],
sa_flags=SA_RESTORER, sa_restorer=0x7b0a34c45330}, NULL, 8) = 0

[pid 1436] rt_sigaction(SIGTERM, NULL, {sa_handler=SIG_DFL, sa_mask=[], sa_flags=0}, 8) =
0

[pid 1436] rt_sigaction(SIGTERM, {sa_handler=SIG_DFL, sa_mask=~[RTMIN RT_1],
sa_flags=SA_RESTORER, sa_restorer=0x7b0a34c45330}, NULL, 8) = 0

[pid 1436] openat(AT_FDCWD, "/dev/null", O_WRONLY|O_CREAT|O_TRUNC, 0666) = 3

[pid 1436] fcntl(2, F_DUPFD, 10) = 10

[pid 1436] close(2) = 0

[pid 1436] fcntl(10, F_SETFD, FD_CLOEXEC) = 0

[pid 1436] dup2(3, 2) = 2

[pid 1436] close(3) = 0

[pid 1436] newfstatat(AT_FDCWD, "/usr/local/sbin/cat", 0x7fff701c480, 0) = -1 ENOENT (No
such file or directory)

[pid 1436] newfstatat(AT_FDCWD, "/usr/local/bin/cat", 0x7fff701c480, 0) = -1 ENOENT (No
such file or directory)

[pid 1436] newfstatat(AT_FDCWD, "/usr/sbin/cat", 0x7fff701c480, 0) = -1 ENOENT (No such
file or directory)

[pid 1436] newfstatat(AT_FDCWD, "/usr/bin/cat", {st_mode=S_IFREG|0755, st_size=39384, ...},
0) = 0

[pid 1436] rt_sigprocmask(SIG_SETMASK, ~[RTMIN RT_1], NULL, 8) = 0

```

```

[pid 1436] vfork(strace: Process 1437 attached
<unfinished ...>

[pid 1437] rt_sigprocmask(SIG_SETMASK, [], ~[KILL STOP RTMIN RT_1], 8) = 0

[pid 1437] execve("/usr/bin/cat", ["cat", "file1.txt"], 0x60091bca09e8 /* 27 vars */ <unfinished
...>

[pid 1436] <... vfork resumed>)      = 1437

[pid 1436] rt_sigprocmask(SIG_SETMASK, [], ~[KILL STOP RTMIN RT_1], 8) = 0

[pid 1437] <... execve resumed>)      = 0

[pid 1436] wait4(-1, <unfinished ...>

[pid 1437] brk(NULL)                  = 0x5bce79d4000

[pid 1437] mmap(NULL, 8192, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x786b64d0e000

[pid 1437] access("/etc/ld.so.preload", R_OK) = -1 ENOENT (No such file or directory)

[pid 1437] openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXEC) = 3

[pid 1437] fstat(3, {st_mode=S_IFREG|0644, st_size=41635, ...}) = 0

[pid 1437] mmap(NULL, 41635, PROT_READ, MAP_PRIVATE, 3, 0) = 0x786b64d03000

[pid 1437] close(3)                    = 0

[pid 1437] openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libc.so.6", O_RDONLY|O_CLOEXEC) =
3

[pid 1437] read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\220\243\2\0\0\0\0\0"..., 832) =
832

[pid 1437] pread64(3, "\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"..., 784,
64) = 784

[pid 1437] fstat(3, {st_mode=S_IFREG|0755, st_size=2125328, ...}) = 0

[pid 1437] pread64(3, "\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"..., 784,
64) = 784

[pid 1437] mmap(NULL, 2170256, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0x786b64a00000

[pid 1437] mmap(0x786b64a28000, 1605632, PROT_READ|PROT_EXEC,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x28000) = 0x786b64a28000

[pid 1437] mmap(0x786b64bb0000, 323584, PROT_READ,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1b0000) = 0x786b64bb0000

[pid 1437] mmap(0x786b64bf0000, 24576, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1fe000) = 0x786b64bf0000

```

[pid 1437] mmap(0x786b64c05000, 52624, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x786b64c05000

[pid 1437] close(3) = 0

[pid 1437] mmap(NULL, 12288, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x786b64d00000

[pid 1437] arch_prctl(ARCH_SET_FS, 0x786b64d00740) = 0

[pid 1437] set_tid_address(0x786b64d00a10) = 1437

[pid 1437] set_robust_list(0x786b64d00a20, 24) = 0

[pid 1437] rseq(0x786b64d01060, 0x20, 0, 0x53053053) = 0

[pid 1437] mprotect(0x786b64bff000, 16384, PROT_READ) = 0

[pid 1437] mprotect(0x5bccbd7ee000, 4096, PROT_READ) = 0

[pid 1437] mprotect(0x786b64d46000, 8192, PROT_READ) = 0

[pid 1437] prlimit64(0, RLIMIT_STACK, NULL, {rlim_cur=8192*1024, rlim_max=RLIM64_INFINITY}) = 0

[pid 1437] munmap(0x786b64d03000, 41635) = 0

[pid 1437] getrandom("\x16\x78\x0e\x8c\x78\xb0\x8f\x40", 8, GRND_NONBLOCK) = 8

[pid 1437] brk(NULL) = 0x5bcce79d4000

[pid 1437] brk(0x5bcce79f5000) = 0x5bcce79f5000

[pid 1437] openat(AT_FDCWD, "/usr/lib/locale/locale-archive", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 1437] openat(AT_FDCWD, "/usr/share/locale/locale.alias", O_RDONLY|O_CLOEXEC) = 3

[pid 1437] fstat(3, {st_mode=S_IFREG|0644, st_size=2996, ...}) = 0

[pid 1437] read(3, "# Locale name alias data base.\n#"... , 4096) = 2996

[pid 1437] read(3, "", 4096) = 0

[pid 1437] close(3) = 0

[pid 1437] openat(AT_FDCWD, "/usr/lib/locale/C.UTF-8/LC_IDENTIFICATION", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 1437] openat(AT_FDCWD, "/usr/lib/locale/C.utf8/LC_IDENTIFICATION", O_RDONLY|O_CLOEXEC) = 3

[pid 1437] fstat(3, {st_mode=S_IFREG|0644, st_size=258, ...}) = 0

[pid 1437] mmap(NULL, 258, PROT_READ, MAP_PRIVATE, 3, 0) = 0x786b64d0d000

[pid 1437] close(3) = 0

[pid 1437] openat(AT_FDCWD, "/usr/lib/x86_64-linux-gnu/gconv/gconv-modules.cache",
O_RDONLY|O_CLOEXEC) = 3

[pid 1437] fstat(3, {st_mode=S_IFREG|0644, st_size=27028, ...}) = 0

[pid 1437] mmap(NULL, 27028, PROT_READ, MAP_SHARED, 3, 0) = 0x786b64d06000

[pid 1437] close(3) = 0

[pid 1437] futex(0x786b64c0472c, FUTEX_WAKE_PRIVATE, 2147483647) = 0

[pid 1437] openat(AT_FDCWD, "/usr/lib/locale/C.UTF-8/LC_MEASUREMENT",
O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 1437] openat(AT_FDCWD, "/usr/lib/locale/C.utf8/LC_MEASUREMENT",
O_RDONLY|O_CLOEXEC) = 3

[pid 1437] fstat(3, {st_mode=S_IFREG|0644, st_size=23, ...}) = 0

[pid 1437] mmap(NULL, 23, PROT_READ, MAP_PRIVATE, 3, 0) = 0x786b64d05000

[pid 1437] close(3) = 0

[pid 1437] openat(AT_FDCWD, "/usr/lib/locale/C.UTF-8/LC_TELEPHONE",
O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 1437] openat(AT_FDCWD, "/usr/lib/locale/C.utf8/LC_TELEPHONE",
O_RDONLY|O_CLOEXEC) = 3

[pid 1437] fstat(3, {st_mode=S_IFREG|0644, st_size=47, ...}) = 0

[pid 1437] mmap(NULL, 47, PROT_READ, MAP_PRIVATE, 3, 0) = 0x786b64d04000

[pid 1437] close(3) = 0

[pid 1437] openat(AT_FDCWD, "/usr/lib/locale/C.UTF-8/LC_ADDRESS",
O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 1437] openat(AT_FDCWD, "/usr/lib/locale/C.utf8/LC_ADDRESS",
O_RDONLY|O_CLOEXEC) = 3

[pid 1437] fstat(3, {st_mode=S_IFREG|0644, st_size=127, ...}) = 0

[pid 1437] mmap(NULL, 127, PROT_READ, MAP_PRIVATE, 3, 0) = 0x786b64d03000

[pid 1437] close(3) = 0

[pid 1437] openat(AT_FDCWD, "/usr/lib/locale/C.UTF-8/LC_NAME",
O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 1437] openat(AT_FDCWD, "/usr/lib/locale/C.utf8/LC_NAME", O_RDONLY|O_CLOEXEC)
= 3

[pid 1437] fstat(3, {st_mode=S_IFREG|0644, st_size=62, ...}) = 0

[pid 1437] mmap(NULL, 62, PROT_READ, MAP_PRIVATE, 3, 0) = 0x786b64cff000

[pid 1437] close(3) = 0

[pid 1437] openat(AT_FDCWD, "/usr/lib/locale/C.UTF-8/LC_PAPER",
O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 1437] openat(AT_FDCWD, "/usr/lib/locale/C.utf8/LC_PAPER",
O_RDONLY|O_CLOEXEC) = 3

[pid 1437] fstat(3, {st_mode=S_IFREG|0644, st_size=34, ...}) = 0

[pid 1437] mmap(NULL, 34, PROT_READ, MAP_PRIVATE, 3, 0) = 0x786b64cfe000

[pid 1437] close(3) = 0

[pid 1437] openat(AT_FDCWD, "/usr/lib/locale/C.UTF-8/LC_MESSAGES",
O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 1437] openat(AT_FDCWD, "/usr/lib/locale/C.utf8/LC_MESSAGES",
O_RDONLY|O_CLOEXEC) = 3

[pid 1437] fstat(3, {st_mode=S_IFDIR|0755, st_size=4096, ...}) = 0

[pid 1437] close(3) = 0

[pid 1437] openat(AT_FDCWD, "/usr/lib/locale/C.utf8/LC_MESSAGES/SYS_LC_MESSAGES",
O_RDONLY|O_CLOEXEC) = 3

[pid 1437] fstat(3, {st_mode=S_IFREG|0644, st_size=48, ...}) = 0

[pid 1437] mmap(NULL, 48, PROT_READ, MAP_PRIVATE, 3, 0) = 0x786b64cfd000

[pid 1437] close(3) = 0

[pid 1437] openat(AT_FDCWD, "/usr/lib/locale/C.UTF-8/LC_MONETARY",
O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 1437] openat(AT_FDCWD, "/usr/lib/locale/C.utf8/LC_MONETARY",
O_RDONLY|O_CLOEXEC) = 3

[pid 1437] fstat(3, {st_mode=S_IFREG|0644, st_size=270, ...}) = 0

[pid 1437] mmap(NULL, 270, PROT_READ, MAP_PRIVATE, 3, 0) = 0x786b64cfc000

[pid 1437] close(3) = 0

[pid 1437] openat(AT_FDCWD, "/usr/lib/locale/C.UTF-8/LC_COLLATE",
O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 1437] openat(AT_FDCWD, "/usr/lib/locale/C.utf8/LC_COLLATE",
O_RDONLY|O_CLOEXEC) = 3

[pid 1437] fstat(3, {st_mode=S_IFREG|0644, st_size=1406, ...}) = 0

[pid 1437] mmap(NULL, 1406, PROT_READ, MAP_PRIVATE, 3, 0) = 0x786b64cfb000

[pid 1437] close(3) = 0

```

[pid 1437] openat(AT_FDCWD, "/usr/lib/locale/C.UTF-8/LC_TIME",
O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 1437] openat(AT_FDCWD, "/usr/lib/locale/C.utf8/LC_TIME", O_RDONLY|O_CLOEXEC)
= 3

[pid 1437] fstat(3, {st_mode=S_IFREG|0644, st_size=3360, ...}) = 0

[pid 1437] mmap(NULL, 3360, PROT_READ, MAP_PRIVATE, 3, 0) = 0x786b64cfa000

[pid 1437] close(3) = 0

[pid 1437] openat(AT_FDCWD, "/usr/lib/locale/C.UTF-8/LC_NUMERIC",
O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 1437] openat(AT_FDCWD, "/usr/lib/locale/C.utf8/LC_NUMERIC",
O_RDONLY|O_CLOEXEC) = 3

[pid 1437] fstat(3, {st_mode=S_IFREG|0644, st_size=50, ...}) = 0

[pid 1437] mmap(NULL, 50, PROT_READ, MAP_PRIVATE, 3, 0) = 0x786b64cf9000

[pid 1437] close(3) = 0

[pid 1437] openat(AT_FDCWD, "/usr/lib/locale/C.UTF-8/LC_CTYPE",
O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 1437] openat(AT_FDCWD, "/usr/lib/locale/C.utf8/LC_CTYPE",
O_RDONLY|O_CLOEXEC) = 3

[pid 1437] fstat(3, {st_mode=S_IFREG|0644, st_size=360460, ...}) = 0

[pid 1437] mmap(NULL, 360460, PROT_READ, MAP_PRIVATE, 3, 0) = 0x786b64ca0000

[pid 1437] close(3) = 0

[pid 1437] fstat(1, {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0x2), ...}) = 0

[pid 1437] openat(AT_FDCWD, "file1.txt", O_RDONLY) = 3

[pid 1437] fstat(3, {st_mode=S_IFREG|0777, st_size=20, ...}) = 0

[pid 1437] fadvise64(3, 0, 0, POSIX_FADV_SEQUENTIAL) = 0

[pid 1437] mmap(NULL, 139264, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x786b64c7e000

[pid 1437] read(3, "Hll Wrld\nprtnng Sstm\n", 131072) = 20

[pid 1437] write(1, "Hll Wrld\nprtnng Sstm\n", 20Hll Wrld
prtnng Sstm
) = 20

[pid 1437] read(3, "", 131072) = 0

```

```

[pid 1437] munmap(0x786b64c7e000, 139264) = 0

[pid 1437] close(3)          = 0

[pid 1437] close(1)          = 0

[pid 1437] close(2)          = 0

[pid 1437] exit_group(0)     = ?

[pid 1437] +++ exited with 0 +++

[pid 1436] <... wait4 resumed>[{WIFEXITED(s) && WEXITSTATUS(s) == 0}], 0, NULL) =
1437

[pid 1436] --- SIGCHLD {si_signo=SIGCHLD, si_code=CLD_EXITED, si_pid=1437,
si_uid=1000, si_status=0, si_utime=0, si_stime=1 /* 0.01 s */} ---

[pid 1436] rt_sigreturn({mask=[]})  = 1437

[pid 1436] wait4(-1, 0x7fff701c3dc, WNOHANG, NULL) = -1 ECHILD (No child processes)

[pid 1436] dup2(10, 2)        = 2

[pid 1436] close(10)          = 0

[pid 1436] exit_group(0)     = ?

[pid 1436] +++ exited with 0 +++

<... wait4 resumed>[{WIFEXITED(s) && WEXITSTATUS(s) == 0}], 0, NULL) = 1436

rt_sigaction(SIGINT, {sa_handler=SIG_DFL, sa_mask=[], sa_flags=SA_RESTORER,
sa_restorer=0x748393845330}, NULL, 8) = 0

rt_sigaction(SIGQUIT, {sa_handler=SIG_DFL, sa_mask=[], sa_flags=SA_RESTORER,
sa_restorer=0x748393845330}, NULL, 8) = 0

rt_sigprocmask(SIG_SETMASK, [], NULL, 8) = 0

--- SIGCHLD {si_signo=SIGCHLD, si_code=CLD_EXITED, si_pid=1436, si_uid=1000,
si_status=0, si_utime=0, si_stime=0} ---

write(1, "\n---
\320\241\320\276\320\264\320\265\321\200\320\266\320\270\320\274\320\276\320\265 file2." ..., 40
--- Содержимое file2.txt ---

) = 40

rt_sigaction(SIGINT, {sa_handler=SIG_IGN, sa_mask=[], sa_flags=SA_RESTORER,
sa_restorer=0x748393845330}, {sa_handler=SIG_DFL, sa_mask=[], sa_flags=SA_RESTORER,
sa_restorer=0x748393845330}, 8) = 0

rt_sigaction(SIGQUIT, {sa_handler=SIG_IGN, sa_mask=[], sa_flags=SA_RESTORER,
sa_restorer=0x748393845330}, {sa_handler=SIG_DFL, sa_mask=[], sa_flags=SA_RESTORER,
sa_restorer=0x748393845330}, 8) = 0

```



```

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

mmap(NULL, 36864, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_ANONYMOUS|MAP_STACK, -1, 0) = 0x748393a7c000

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

clone3({flags=CLONE_VM|CLONE_VFORK|CLONE_CLEAR_SIGHAND,
exit_signal=SIGCHLD, stack=0x748393a7c000, stack_size=0x9000}, 88strace: Process 1438 attached

<unfinished ...>

[pid 1438] rt_sigprocmask(SIG_BLOCK, NULL, ~[KILL STOP], 8) = 0

[pid 1438] rt_sigaction(SIGINT, {sa_handler=SIG_DFL, sa_mask=[], sa_flags=SA_RESTORER,
sa_restorer=0x748393845330}, NULL, 8) = 0

[pid 1438] rt_sigaction(SIGQUIT, {sa_handler=SIG_DFL, sa_mask=[],
sa_flags=SA_RESTORER, sa_restorer=0x748393845330}, NULL, 8) = 0

[pid 1438] rt_sigprocmask(SIG_SETMASK, [], NULL, 8) = 0

[pid 1438] execve("/bin/sh", ["sh", "-c", "--", "cat file2.txt 2>/dev/null"], 0x7ffd91b7e790 /* 27
vars */ <unfinished ...>

[pid 1431] <... clone3 resumed>)    = 1438

[pid 1431] munmap(0x748393a7c000, 36864) = 0

[pid 1438] <... execve resumed>)    = 0

[pid 1431] rt_sigprocmask(SIG_SETMASK, [CHLD], <unfinished ...>

[pid 1438] brk(NULL <unfinished ...>

[pid 1431] <... rt_sigprocmask resumed>NULL, 8) = 0

[pid 1438] <... brk resumed>)      = 0x6293387d0000

[pid 1431] wait4(1438, <unfinished ...>

[pid 1438] mmap(NULL, 8192, PROT_READ|PROT_WRITE,
MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x723410035000

[pid 1438] access("/etc/ld.so.preload", R_OK) = -1 ENOENT (No such file or directory)

[pid 1438] openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXEC) = 3

[pid 1438] fstat(3, {st_mode=S_IFREG|0644, st_size=41635, ...}) = 0

[pid 1438] mmap(NULL, 41635, PROT_READ, MAP_PRIVATE, 3, 0) = 0x72341002a000

[pid 1438] close(3)                = 0

[pid 1438] openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libc.so.6", O_RDONLY|O_CLOEXEC) =

```

[pid 1438] read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\3\0>\0\1\0\0\0\220\243\2\0\0\0\0\0"..., 832) = 832

[pid 1438] pread64(3, "\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"..., 784, 64) = 784

[pid 1438] fstat(3, {st_mode=S_IFREG|0755, st_size=2125328, ...}) = 0

[pid 1438] pread64(3, "\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"..., 784, 64) = 784

[pid 1438] mmap(NULL, 2170256, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x72340fe00000

[pid 1438] mmap(0x72340fe28000, 1605632, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x28000) = 0x72340fe28000

[pid 1438] mmap(0x72340ffb0000, 323584, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1b0000) = 0x72340ffb0000

[pid 1438] mmap(0x72340ffff000, 24576, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1fe000) = 0x72340ffff000

[pid 1438] mmap(0x723410005000, 52624, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x723410005000

[pid 1438] close(3) = 0

[pid 1438] mmap(NULL, 12288, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x723410027000

[pid 1438] arch_prctl(ARCH_SET_FS, 0x723410027740) = 0

[pid 1438] set_tid_address(0x723410027a10) = 1438

[pid 1438] set_robust_list(0x723410027a20, 24) = 0

[pid 1438] rseq(0x723410028060, 0x20, 0, 0x53053053) = 0

[pid 1438] mprotect(0x72340ffff000, 16384, PROT_READ) = 0

[pid 1438] mprotect(0x62931ef01000, 8192, PROT_READ) = 0

[pid 1438] mprotect(0x72341006d000, 8192, PROT_READ) = 0

[pid 1438] prlimit64(0, RLIMIT_STACK, NULL, {rlim_cur=8192*1024, rlim_max=RLIM64_INFINITY}) = 0

[pid 1438] munmap(0x72341002a000, 41635) = 0

[pid 1438] getuid() = 1000

[pid 1438] getgid() = 1000

[pid 1438] getpid() = 1438

```

[pid 1438] rt_sigaction(SIGCHLD, {sa_handler=0x62931eef6cd0, sa_mask=~[RTMIN RT_1],
sa_flags=SA_RESTORER, sa_restorer=0x72340fe45330}, NULL, 8) = 0

[pid 1438] geteuid()                = 1000

[pid 1438] getRandom("\xd2\xca\x04\x85\x5d\x91\xd9\x53", 8, GRND_NONBLOCK) = 8

[pid 1438] brk(NULL)                 = 0x6293387d0000

[pid 1438] brk(0x6293387f1000)       = 0x6293387f1000

[pid 1438] getppid()                 = 1431

[pid 1438] newfstatat(AT_FDCWD, "/mnt/c/Dev/Projects/OS_Labs/lab1",
{st_mode=S_IFDIR|0777, st_size=4096, ...}, 0) = 0

[pid 1438] newfstatat(AT_FDCWD, ".", {st_mode=S_IFDIR|0777, st_size=4096, ...}, 0) = 0

[pid 1438] geteuid()                = 1000

[pid 1438] getegid()                 = 1000

[pid 1438] rt_sigaction(SIGINT, NULL, {sa_handler=SIG_DFL, sa_mask=[], sa_flags=0}, 8) = 0

[pid 1438] rt_sigaction(SIGINT, {sa_handler=0x62931eef6cd0, sa_mask=~[RTMIN RT_1],
sa_flags=SA_RESTORER, sa_restorer=0x72340fe45330}, NULL, 8) = 0

[pid 1438] rt_sigaction(SIGQUIT, NULL, {sa_handler=SIG_DFL, sa_mask=[], sa_flags=0}, 8) =
0

[pid 1438] rt_sigaction(SIGQUIT, {sa_handler=SIG_DFL, sa_mask=~[RTMIN RT_1],
sa_flags=SA_RESTORER, sa_restorer=0x72340fe45330}, NULL, 8) = 0

[pid 1438] rt_sigaction(SIGTERM, NULL, {sa_handler=SIG_DFL, sa_mask=[], sa_flags=0}, 8) =
0

[pid 1438] rt_sigaction(SIGTERM, {sa_handler=SIG_DFL, sa_mask=~[RTMIN RT_1],
sa_flags=SA_RESTORER, sa_restorer=0x72340fe45330}, NULL, 8) = 0

[pid 1438] openat(AT_FDCWD, "/dev/null", O_WRONLY|O_CREAT|O_TRUNC, 0666) = 3

[pid 1438] fcntl(2, F_DUPFD, 10)     = 10

[pid 1438] close(2)                   = 0

[pid 1438] fcntl(10, F_SETFD, FD_CLOEXEC) = 0

[pid 1438] dup2(3, 2)                 = 2

[pid 1438] close(3)                   = 0

[pid 1438] newfstatat(AT_FDCWD, "/usr/local/sbin/cat", 0x7ffcd925c2e0, 0) = -1 ENOENT (No
such file or directory)

[pid 1438] newfstatat(AT_FDCWD, "/usr/local/bin/cat", 0x7ffcd925c2e0, 0) = -1 ENOENT (No
such file or directory)

```

[pid 1438] newfstatat(AT_FDCWD, "/usr/sbin/cat", 0x7ffcd925c2e0, 0) = -1 ENOENT (No such file or directory)

[pid 1438] newfstatat(AT_FDCWD, "/usr/bin/cat", {st_mode=S_IFREG|0755, st_size=39384, ...}, 0) = 0

[pid 1438] rt_sigprocmask(SIG_SETMASK, ~[RTMIN RT_1], NULL, 8) = 0

[pid 1438] vfork(strace: Process 1439 attached

<unfinished ...>

[pid 1439] rt_sigprocmask(SIG_SETMASK, [], ~[KILL STOP RTMIN RT_1], 8) = 0

[pid 1439] execve("/usr/bin/cat", ["cat", "file2.txt"], 0x6293387d09e8 /* 27 vars */ <unfinished ...>

[pid 1438] <... vfork resumed> = 1439

[pid 1438] rt_sigprocmask(SIG_SETMASK, [], <unfinished ...>

[pid 1439] <... execve resumed> = 0

[pid 1438] <... rt_sigprocmask resumed>~[KILL STOP RTMIN RT_1], 8) = 0

[pid 1439] brk(NULL <unfinished ...>

[pid 1438] wait4(-1, <unfinished ...>

[pid 1439] <... brk resumed> = 0x564ff41bb000

[pid 1439] mmap(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x76af92e10000

[pid 1439] access("/etc/ld.so.preload", R_OK) = -1 ENOENT (No such file or directory)

[pid 1439] openat(AT_FDCWD, "/etc/ld.so.cache", O_RDONLY|O_CLOEXEC) = 3

[pid 1439] fstat(3, {st_mode=S_IFREG|0644, st_size=41635, ...}) = 0

[pid 1439] mmap(NULL, 41635, PROT_READ, MAP_PRIVATE, 3, 0) = 0x76af92e05000

[pid 1439] close(3) = 0

[pid 1439] openat(AT_FDCWD, "/lib/x86_64-linux-gnu/libc.so.6", O_RDONLY|O_CLOEXEC) = 3

[pid 1439] read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\3\0\0\0\1\0\0\0\220\243\2\0\0\0\0"..., 832) = 832

[pid 1439] pread64(3, "\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"..., 784, 64) = 784

[pid 1439] fstat(3, {st_mode=S_IFREG|0755, st_size=2125328, ...}) = 0

[pid 1439] pread64(3, "\6\0\0\0\4\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0@\0\0\0\0\0\0\0"..., 784, 64) = 784

[pid 1439] mmap(NULL, 2170256, PROT_READ, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0x76af92a00000

[pid 1439] mmap(0x76af92a28000, 1605632, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x28000) = 0x76af92a28000

[pid 1439] mmap(0x76af92bb0000, 323584, PROT_READ, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1b0000) = 0x76af92bb0000

[pid 1439] mmap(0x76af92bff000, 24576, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1fe000) = 0x76af92bff000

[pid 1439] mmap(0x76af92c05000, 52624, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0x76af92c05000

[pid 1439] close(3) = 0

[pid 1439] mmap(NULL, 12288, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x76af92e02000

[pid 1439] arch_prctl(ARCH_SET_FS, 0x76af92e02740) = 0

[pid 1439] set_tid_address(0x76af92e02a10) = 1439

[pid 1439] set_robust_list(0x76af92e02a20, 24) = 0

[pid 1439] rseq(0x76af92e03060, 0x20, 0, 0x53053053) = 0

[pid 1439] mprotect(0x76af92bff000, 16384, PROT_READ) = 0

[pid 1439] mprotect(0x564fc8424000, 4096, PROT_READ) = 0

[pid 1439] mprotect(0x76af92e48000, 8192, PROT_READ) = 0

[pid 1439] prlimit64(0, RLIMIT_STACK, NULL, {rlim_cur=8192*1024, rlim_max=RLIM64_INFINITY}) = 0

[pid 1439] munmap(0x76af92e05000, 41635) = 0

[pid 1439] getrandom("\x69\xc2\x74\x4f\x0a\x33\xcc\xd5", 8, GRND_NONBLOCK) = 8

[pid 1439] brk(NULL) = 0x564ff41bb000

[pid 1439] brk(0x564ff41dc000) = 0x564ff41dc000

[pid 1439] openat(AT_FDCWD, "/usr/lib/locale/locale-archive", O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 1439] openat(AT_FDCWD, "/usr/share/locale/locale.alias", O_RDONLY|O_CLOEXEC) = 3

[pid 1439] fstat(3, {st_mode=S_IFREG|0644, st_size=2996, ...}) = 0

[pid 1439] read(3, "# Locale name alias data base.\n#", 4096) = 2996

[pid 1439] read(3, "", 4096) = 0

[pid 1439] close(3) = 0

[pid 1439] openat(AT_FDCWD, "/usr/lib/locale/C.UTF-8/LC_IDENTIFICATION",
O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 1439] openat(AT_FDCWD, "/usr/lib/locale/C.utf8/LC_IDENTIFICATION",
O_RDONLY|O_CLOEXEC) = 3

[pid 1439] fstat(3, {st_mode=S_IFREG|0644, st_size=258, ...}) = 0

[pid 1439] mmap(NULL, 258, PROT_READ, MAP_PRIVATE, 3, 0) = 0x76af92e0f000

[pid 1439] close(3) = 0

[pid 1439] openat(AT_FDCWD, "/usr/lib/x86_64-linux-gnu/gconv/gconv-modules.cache",
O_RDONLY|O_CLOEXEC) = 3

[pid 1439] fstat(3, {st_mode=S_IFREG|0644, st_size=27028, ...}) = 0

[pid 1439] mmap(NULL, 27028, PROT_READ, MAP_SHARED, 3, 0) = 0x76af92e08000

[pid 1439] close(3) = 0

[pid 1439] futex(0x76af92c0472c, FUTEX_WAKE_PRIVATE, 2147483647) = 0

[pid 1439] openat(AT_FDCWD, "/usr/lib/locale/C.UTF-8/LC_MEASUREMENT",
O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 1439] openat(AT_FDCWD, "/usr/lib/locale/C.utf8/LC_MEASUREMENT",
O_RDONLY|O_CLOEXEC) = 3

[pid 1439] fstat(3, {st_mode=S_IFREG|0644, st_size=23, ...}) = 0

[pid 1439] mmap(NULL, 23, PROT_READ, MAP_PRIVATE, 3, 0) = 0x76af92e07000

[pid 1439] close(3) = 0

[pid 1439] openat(AT_FDCWD, "/usr/lib/locale/C.UTF-8/LC_TELEPHONE",
O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 1439] openat(AT_FDCWD, "/usr/lib/locale/C.utf8/LC_TELEPHONE",
O_RDONLY|O_CLOEXEC) = 3

[pid 1439] fstat(3, {st_mode=S_IFREG|0644, st_size=47, ...}) = 0

[pid 1439] mmap(NULL, 47, PROT_READ, MAP_PRIVATE, 3, 0) = 0x76af92e06000

[pid 1439] close(3) = 0

[pid 1439] openat(AT_FDCWD, "/usr/lib/locale/C.UTF-8/LC_ADDRESS",
O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 1439] openat(AT_FDCWD, "/usr/lib/locale/C.utf8/LC_ADDRESS",
O_RDONLY|O_CLOEXEC) = 3

[pid 1439] fstat(3, {st_mode=S_IFREG|0644, st_size=127, ...}) = 0

[pid 1439] mmap(NULL, 127, PROT_READ, MAP_PRIVATE, 3, 0) = 0x76af92e05000

[pid 1439] close(3) = 0

[pid 1439] openat(AT_FDCWD, "/usr/lib/locale/C.UTF-8/LC_NAME",
O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 1439] openat(AT_FDCWD, "/usr/lib/locale/C.utf8/LC_NAME", O_RDONLY|O_CLOEXEC)
= 3

[pid 1439] fstat(3, {st_mode=S_IFREG|0644, st_size=62, ...}) = 0

[pid 1439] mmap(NULL, 62, PROT_READ, MAP_PRIVATE, 3, 0) = 0x76af92e01000

[pid 1439] close(3) = 0

[pid 1439] openat(AT_FDCWD, "/usr/lib/locale/C.UTF-8/LC_PAPER",
O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 1439] openat(AT_FDCWD, "/usr/lib/locale/C.utf8/LC_PAPER",
O_RDONLY|O_CLOEXEC) = 3

[pid 1439] fstat(3, {st_mode=S_IFREG|0644, st_size=34, ...}) = 0

[pid 1439] mmap(NULL, 34, PROT_READ, MAP_PRIVATE, 3, 0) = 0x76af92e00000

[pid 1439] close(3) = 0

[pid 1439] openat(AT_FDCWD, "/usr/lib/locale/C.UTF-8/LC_MESSAGES",
O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 1439] openat(AT_FDCWD, "/usr/lib/locale/C.utf8/LC_MESSAGES",
O_RDONLY|O_CLOEXEC) = 3

[pid 1439] fstat(3, {st_mode=S_IFDIR|0755, st_size=4096, ...}) = 0

[pid 1439] close(3) = 0

[pid 1439] openat(AT_FDCWD, "/usr/lib/locale/C.utf8/LC_MESSAGES/SYS_LC_MESSAGES",
O_RDONLY|O_CLOEXEC) = 3

[pid 1439] fstat(3, {st_mode=S_IFREG|0644, st_size=48, ...}) = 0

[pid 1439] mmap(NULL, 48, PROT_READ, MAP_PRIVATE, 3, 0) = 0x76af92dff000

[pid 1439] close(3) = 0

[pid 1439] openat(AT_FDCWD, "/usr/lib/locale/C.UTF-8/LC_MONETARY",
O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 1439] openat(AT_FDCWD, "/usr/lib/locale/C.utf8/LC_MONETARY",
O_RDONLY|O_CLOEXEC) = 3

[pid 1439] fstat(3, {st_mode=S_IFREG|0644, st_size=270, ...}) = 0

[pid 1439] mmap(NULL, 270, PROT_READ, MAP_PRIVATE, 3, 0) = 0x76af92dfe000

[pid 1439] close(3) = 0

[pid 1439] openat(AT_FDCWD, "/usr/lib/locale/C.UTF-8/LC_COLLATE",
O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 1439] openat(AT_FDCWD, "/usr/lib/locale/C.utf8/LC_COLLATE",
O_RDONLY|O_CLOEXEC) = 3

[pid 1439] fstat(3, {st_mode=S_IFREG|0644, st_size=1406, ...}) = 0

[pid 1439] mmap(NULL, 1406, PROT_READ, MAP_PRIVATE, 3, 0) = 0x76af92dfd000

[pid 1439] close(3) = 0

[pid 1439] openat(AT_FDCWD, "/usr/lib/locale/C.UTF-8/LC_TIME",
O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 1439] openat(AT_FDCWD, "/usr/lib/locale/C.utf8/LC_TIME", O_RDONLY|O_CLOEXEC)
= 3

[pid 1439] fstat(3, {st_mode=S_IFREG|0644, st_size=3360, ...}) = 0

[pid 1439] mmap(NULL, 3360, PROT_READ, MAP_PRIVATE, 3, 0) = 0x76af92dfc000

[pid 1439] close(3) = 0

[pid 1439] openat(AT_FDCWD, "/usr/lib/locale/C.UTF-8/LC_NUMERIC",
O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 1439] openat(AT_FDCWD, "/usr/lib/locale/C.utf8/LC_NUMERIC",
O_RDONLY|O_CLOEXEC) = 3

[pid 1439] fstat(3, {st_mode=S_IFREG|0644, st_size=50, ...}) = 0

[pid 1439] mmap(NULL, 50, PROT_READ, MAP_PRIVATE, 3, 0) = 0x76af92dfb000

[pid 1439] close(3) = 0

[pid 1439] openat(AT_FDCWD, "/usr/lib/locale/C.UTF-8/LC_CTYPE",
O_RDONLY|O_CLOEXEC) = -1 ENOENT (No such file or directory)

[pid 1439] openat(AT_FDCWD, "/usr/lib/locale/C.utf8/LC_CTYPE",
O_RDONLY|O_CLOEXEC) = 3

[pid 1439] fstat(3, {st_mode=S_IFREG|0644, st_size=360460, ...}) = 0

[pid 1439] mmap(NULL, 360460, PROT_READ, MAP_PRIVATE, 3, 0) = 0x76af92da2000

[pid 1439] close(3) = 0

[pid 1439] fstat(1, {st_mode=S_IFCHR|0620, st_rdev=makedev(0x88, 0x2), ...}) = 0

[pid 1439] openat(AT_FDCWD, "file2.txt", O_RDONLY) = 3

[pid 1439] fstat(3, {st_mode=S_IFREG|0777, st_size=10, ...}) = 0

[pid 1439] fadvise64(3, 0, 0, POSIX_FADV_SEQUENTIAL) = 0


```
[pid 1439] mmap(NULL, 139264, PROT_READ|PROT_WRITE,  
MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0x76af92d80000
```

```
[pid 1439] read(3, "Tst Strng\n", 131072) = 10
```

```
[pid 1439] write(1, "Tst Strng\n", 10Tst Strng
```

```
) = 10
```

```
[pid 1439] read(3, "", 131072) = 0
```

```
[pid 1439] munmap(0x76af92d80000, 139264) = 0
```

```
[pid 1439] close(3) = 0
```

```
[pid 1439] close(1) = 0
```

```
[pid 1439] close(2) = 0
```

```
[pid 1439] exit_group(0) = ?
```

```
[pid 1439] +++ exited with 0 +++
```

```
[pid 1438] <... wait4 resumed>[{WIFEXITED(s) && WEXITSTATUS(s) == 0}], 0, NULL) =  
1439
```

```
[pid 1438] --- SIGCHLD {si_signo=SIGCHLD, si_code=CLD_EXITED, si_pid=1439,  
si_uid=1000, si_status=0, si_etime=0, si_stime=0} ---
```

```
[pid 1438] rt_sigreturn({mask=[]}) = 1439
```

```
[pid 1438] wait4(-1, 0x7ffcd925c23c, WNOHANG, NULL) = -1 ECHILD (No child processes)
```

```
[pid 1438] dup2(10, 2) = 2
```

```
[pid 1438] close(10) = 0
```

```
[pid 1438] exit_group(0) = ?
```

```
[pid 1438] +++ exited with 0 +++
```

```
<... wait4 resumed>[{WIFEXITED(s) && WEXITSTATUS(s) == 0}], 0, NULL) = 1438
```

```
rt_sigaction(SIGINT, {sa_handler=SIG_DFL, sa_mask=[], sa_flags=SA_RESTORER,  
sa_restorer=0x748393845330}, NULL, 8) = 0
```

```
rt_sigaction(SIGQUIT, {sa_handler=SIG_DFL, sa_mask=[], sa_flags=SA_RESTORER,  
sa_restorer=0x748393845330}, NULL, 8) = 0
```

```
rt_sigprocmask(SIG_SETMASK, [], NULL, 8) = 0
```

```
--- SIGCHLD {si_signo=SIGCHLD, si_code=CLD_EXITED, si_pid=1438, si_uid=1000,  
si_status=0, si_etime=0, si_stime=0} ---
```

```
write(1, "\n", 1
```

```
) = 1
```

```

write(1,
"\320\240\320\276\320\264\320\270\321\202\320\265\320\273\321\214\321\201\320\272\320\270\320\2
71 \320\277\321\200\320\276\321"..., 58Родительский процесс завершен.

) = 58

exit_group(0)                = ?

+++ exited with 0 +++

```

Вывод

Лабораторная работа продемонстрировала использование системных вызовов для создания процессов и обмена данными через каналы. Родительский процесс создает двух дочерних, распределяет строки по четности, а дочерние процессы удаляют гласные буквы и записывают результаты в файлы. Программа демонстрирует корректное межпроцессное взаимодействие и обработку системных ошибок.