Московский Авиационный Институт

(Национальный Исследовательский Университет)

Институт №8 “Компьютерные науки и прикладная математика”

Кафедра №806 “Вычислительная математика и программирование”

**Лабораторная работа №4 по курсу**

**«Операционные системы»**

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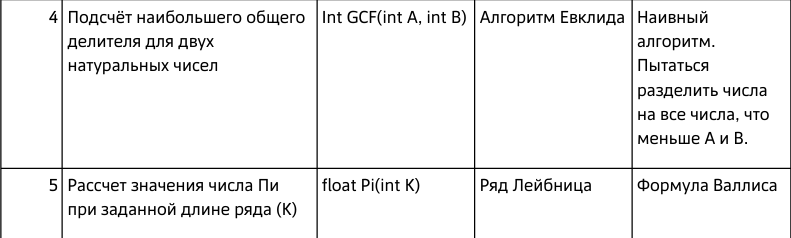
Оценка: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Дата: 15.12.2023

Москва, 2023

**Постановка задачи**

Необходимо реализовать две динамические библиотеки:



**Общий метод и алгоритм решения**

Использованные системные вызовы:

* **void \*dlopen(const char** \*filename**, int** flag**) -** загружает динамическую библиотеку, имя которой указано в строке *filename*, и возвращает прямой указатель на начало динамической библиотеки**.**
* **void \*dlsym(void \***handle**, char** \*symbol**) -** использует указатель на динамическую библиотеку, возвращаемую dlopen, и оканчивающееся нулем символьное имя, а затем возвращает адрес, указывающий, откуда загружается этот символ
* **int dlclose(void** \*handle***)*** *-* уменьшает на единицу счетчик ссылок на указатель динамической библиотеки *handle*.

**Описание CmakeLists.txt**

cmake\_minimum\_required(VERSION 3.10)

set(CMAKE\_CXX\_STANDARD 20)

set(CMAKE\_CSS\_STANDART\_REQUIRED ON)

project (prog1)

add\_library(Lib1 SHARED lib1/lib1.cpp)

# Создается библиотека с именем `lib1` с параметром `SHARED`, который означает, что эта библиотека может быть использована другими программами

add\_library(Lib1::lib1 ALIAS Lib1)

# Создается другое имя библиотеки, которое так же может быть использовано

target\_include\_directories(Lib1 PUBLIC ${PROJECT\_SOURCE\_DIR}/Lib1)

# Создает зависимость между директорией Lib1 и библиотекой Lib1

add\_executable(${PROJECT\_NAME} prog1.cpp)

target\_link\_libraries(${PROJECT\_NAME} PRIVATE Lib1::lib1)

project (prog2)

add\_library(Lib1\_1 SHARED lib1/lib1.cpp)

add\_library(Lib1\_1::lib1\_1 ALIAS Lib1\_1)

target\_include\_directories(Lib1 PUBLIC ${PROJECT\_SOURCE\_DIR}/Lib1)

add\_library(Lib2 SHARED lib2/lib2.cpp)

add\_library(Lib2::lib2 ALIAS Lib2)

target\_include\_directories(Lib2 PUBLIC ${PROJECT\_SOURCE\_DIR}/Lib2)

add\_executable(${PROJECT\_NAME} prog2.cpp)

target\_link\_libraries(${PROJECT\_NAME} PRIVATE Lib1\_1::lib1\_1 Lib2::lib2)

**Код программы**

**prog1.cpp**

#include <iostream>

#include "./lib1/lib1.h"

void info() {

std::cout << "Please select: K arg1, arg2" << std::endl;

std::cout << "K - selected function from library" << std::endl;

std::cout << "K - complete the execution" << std::endl;

std::cout << "K = 1 - Evklid's algorithm; arg1, arg2 - numbers" << std::endl;

std::cout << "K = 2 - Leibniz series; arg1 - row length" << std::endl;

}

int main() {

info();

int K, arg1, arg2;

while (scanf("%d", &K) != EOF) {

if (K != 1 && K != 2 && K != 0) {

std::cout << "You can only choose '0' or '1' or '2' for K" << std::endl;

return 1;

}

if (K == 1) {

std::cin >> arg1 >> arg2;

int res1 = NOD(arg1, arg2);

std::cout << "Result of Evklid's algorithm working - " << res1 << std::endl;

}

else if (K == 2) {

std::cin >> arg1;

float res2 = Pi(arg1);

std::cout << "Result of Leibniz series algorithm working - " << res2 << std::endl;

}

else {

std::cout << "Bye Bye" << std::endl;

return 0;

}

}

return 0;

}

**prog2.cpp**

#include <iostream>

#include <dlfcn.h>

#include <stdlib.h>

#include "./lib1/lib1.h"

#include "./lib2/lib2.h"

void info() {

std::cout << "Please select: K arg1, arg2" << std::endl;

std::cout << "K - selected function from library" << std::endl;

std::cout << "K = -1 - complete the execution" << std::endl;

std::cout << "K = 0 - change the library" << std::endl;

std::cout << "K = 1 - NOD algorithm; arg1, arg2 - numbers" << std::endl;

std::cout << "K = 2 - Pi algorithm; arg1 - row length" << std::endl;

}

int main() {

info();

char\* libraries[] = {"libLib1.so", "libLib2.so"};

int selectedLibrary = 0;

int K, arg1, arg2;

void \*cur\_lib;

cur\_lib = dlopen(libraries[selectedLibrary], RTLD\_LAZY);

if (cur\_lib == NULL) {

std::cout << "Library loading error" << std::endl;

return 1;

}

typedef int(\*func\_ptr1)(int, int);

typedef float(\*func\_ptr2)(int);

func\_ptr1 NOD;

func\_ptr2 PI;

NOD = reinterpret\_cast<func\_ptr1>(dlsym(cur\_lib, "NOD"));

PI = reinterpret\_cast<func\_ptr2>(dlsym(cur\_lib, "Pi"));

while(scanf("%d", &K) != EOF) {

if (K != -1 && K != 0 && K != 1 && K != 2) {

std::cout << "You can only choose '-1' or '0' or '1' or '2' for K" << std::endl;

return 1;

}

if (K == 0) {

std::cout << "Your library has been changed" << std::endl;

dlclose(cur\_lib);

selectedLibrary = 1 - selectedLibrary;

void\* cur\_lib = dlopen(libraries[selectedLibrary], RTLD\_LAZY);

if (cur\_lib == NULL) {

std::cout << "Library loading error" << std::endl;

return 1;

}

NOD = reinterpret\_cast<func\_ptr1>(dlsym(cur\_lib, "NOD"));

PI = reinterpret\_cast<func\_ptr2>(dlsym(cur\_lib, "Pi"));

}

else if (K == 1) {

std::cin >> arg1 >> arg2;

int res1 = NOD(arg1, arg2);

std::cout << "Result of NOD finding algorithm working - " << res1 << std::endl;

}

else if (K == 2) {

std::cin >> arg1;

float res2 = PI(arg1);

std::cout << "Result of Pi finding algorithm working - " << res2 << std::endl;

}

else {

std::cout << "Bye Bye" << std::endl;

return 0;

}

}

return 0;

}

**lib1.h**

#ifndef LIB1\_H

#define LIB1\_H

extern "C" {

int NOD(int a, int b);

float Pi(int k);

}

#endif

**lib1.cpp**

#include "lib1.h"

int NOD(int a, int b) {

while (a != b) {

if (a > b) a = a - b;

else if (b > a) b = b - a;

else return a;

}

return a;

}

float Pi(int k) {

float znam = 3.0;

float slag;

float sum = 1;

int c = 0;

for (int i = 0; i < k; i++) {

slag = (1.0 / znam);

c += 1;

if (c % 2 != 0) {

sum -= slag;

}

else {

sum += slag;

}

znam += 2;

}

return sum \* 4.0;

}

**lib2.h**

#ifndef LIB2\_H

#define LIB2\_H

#include <cmath>

#include <vector>

extern "C" {

int NOD(int a, int b);

float Pi(int k);

}

#endif

**lib2.cpp**

#include "lib2.h"

int NOD(int a, int b) {

std::vector<int> container;

int max;

double num1 = static\_cast<double>(a);

double num2 = static\_cast<double>(b);

if (a > b) max = a;

else if (a < b) max = b;

else return a;

for (int i = 1; i <= max; i++) {

if (floor(num1 / i) == num1 / i && floor(num2 / i) == num2 / i) {

container.push\_back(i);

}

i++;

}

int result = container[container.size() - 1];

return result;

}

float Pi(int k) {

float pi = 1;

float znam = 1.0;

float chisl = 2.0;

for (int i = 0; i < k; i++) {

if (i % 2 != 0) znam += 2;

if (i % 2 == 0 && i != 0) chisl += 2;

pi = pi \* (chisl / znam);

}

return pi \* 2.0;

}

**Протокол работы программы**

stepan@stepan-ASUS:~/Рабочий стол/учеба/prog 3 sem/OSI/laba4/build$ ./prog1

Please select: K arg1, arg2

K - selected function from library

K - complete the execution

K = 1 - Evklid's algorithm; arg1, arg2 - numbers

K = 2 - Leibniz series; arg1 - row length

1 243 54

Result of Evklid's algorithm working - 27

2 2000

Result of Leibniz series algorithm working - 3.14209

0

Bye Bye

stepan@stepan-ASUS:~/Рабочий стол/учеба/prog 3 sem/OSI/laba4/build$ ./prog2

Please select: K arg1, arg2

K - selected function from library

K = -1 - complete the execution

K = 0 - change the library

K = 1 - NOD algorithm; arg1, arg2 - numbers

K = 2 - Pi algorithm; arg1 - row length

1 243 54

Result of NOD finding algorithm working - 27

2 2000

Result of Pi finding algorithm working - 3.14209

0

Your library has been changed

1 243 54

Result of NOD finding algorithm working - 27

2 2000

Result of Pi finding algorithm working - 3.14082

-1

Bye Bye

**Strace:**

**Первая программа:**

stepan@stepan-ASUS:~/Рабочий стол/учеба/prog 3 sem/OSI/laba4/build$ strace -f ./prog1

execve("./prog1", ["./prog1"], 0x7ffdeb9e36b8 /\* 60 vars \*/) = 0

brk(NULL) = 0x55d07dc8b000

arch\_prctl(0x3001 /\* ARCH\_??? \*/, 0x7ffc8f5b3dc0) = -1 EINVAL (Недопустимый аргумент)

mmap(NULL, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_ANONYMOUS, -1, 0) = 0x7ff4dfba7000

access("/etc/ld.so.preload", R\_OK) = -1 ENOENT (Нет такого файла или каталога)

openat(AT\_FDCWD, "/home/stepan/\320\240\320\260\320\261\320\276\321\207\320\270\320\271 \321\201\321\202\320\276\320\273/\321\203\321\207\320\265\320\261\320\260/prog 3 sem/OSI/laba4/build/glibc-hwcaps/x86-64-v3/libLib1.so", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT\_FDCWD, "/home/stepan/\320\240\320\260\320\261\320\276\321\207\320\270\320\271 \321\201\321\202\320\276\320\273/\321\203\321\207\320\265\320\261\320\260/prog 3 sem/OSI/laba4/build/glibc-hwcaps/x86-64-v3", 0x7ffc8f5b2fe0, 0) = -1 ENOENT (Нет такого файла или каталога)

openat(AT\_FDCWD, "/home/stepan/\320\240\320\260\320\261\320\276\321\207\320\270\320\271 \321\201\321\202\320\276\320\273/\321\203\321\207\320\265\320\261\320\260/prog 3 sem/OSI/laba4/build/glibc-hwcaps/x86-64-v2/libLib1.so", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT\_FDCWD, "/home/stepan/\320\240\320\260\320\261\320\276\321\207\320\270\320\271 \321\201\321\202\320\276\320\273/\321\203\321\207\320\265\320\261\320\260/prog 3 sem/OSI/laba4/build/glibc-hwcaps/x86-64-v2", 0x7ffc8f5b2fe0, 0) = -1 ENOENT (Нет такого файла или каталога)

openat(AT\_FDCWD, "/home/stepan/\320\240\320\260\320\261\320\276\321\207\320\270\320\271 \321\201\321\202\320\276\320\273/\321\203\321\207\320\265\320\261\320\260/prog 3 sem/OSI/laba4/build/tls/x86\_64/x86\_64/libLib1.so", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT\_FDCWD, "/home/stepan/\320\240\320\260\320\261\320\276\321\207\320\270\320\271 \321\201\321\202\320\276\320\273/\321\203\321\207\320\265\320\261\320\260/prog 3 sem/OSI/laba4/build/tls/x86\_64/x86\_64", 0x7ffc8f5b2fe0, 0) = -1 ENOENT (Нет такого файла или каталога)

openat(AT\_FDCWD, "/home/stepan/\320\240\320\260\320\261\320\276\321\207\320\270\320\271 \321\201\321\202\320\276\320\273/\321\203\321\207\320\265\320\261\320\260/prog 3 sem/OSI/laba4/build/tls/x86\_64/libLib1.so", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT\_FDCWD, "/home/stepan/\320\240\320\260\320\261\320\276\321\207\320\270\320\271 \321\201\321\202\320\276\320\273/\321\203\321\207\320\265\320\261\320\260/prog 3 sem/OSI/laba4/build/tls/x86\_64", 0x7ffc8f5b2fe0, 0) = -1 ENOENT (Нет такого файла или каталога)

openat(AT\_FDCWD, "/home/stepan/\320\240\320\260\320\261\320\276\321\207\320\270\320\271 \321\201\321\202\320\276\320\273/\321\203\321\207\320\265\320\261\320\260/prog 3 sem/OSI/laba4/build/tls/x86\_64/libLib1.so", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT\_FDCWD, "/home/stepan/\320\240\320\260\320\261\320\276\321\207\320\270\320\271 \321\201\321\202\320\276\320\273/\321\203\321\207\320\265\320\261\320\260/prog 3 sem/OSI/laba4/build/tls/x86\_64", 0x7ffc8f5b2fe0, 0) = -1 ENOENT (Нет такого файла или каталога)

openat(AT\_FDCWD, "/home/stepan/\320\240\320\260\320\261\320\276\321\207\320\270\320\271 \321\201\321\202\320\276\320\273/\321\203\321\207\320\265\320\261\320\260/prog 3 sem/OSI/laba4/build/tls/libLib1.so", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT\_FDCWD, "/home/stepan/\320\240\320\260\320\261\320\276\321\207\320\270\320\271 \321\201\321\202\320\276\320\273/\321\203\321\207\320\265\320\261\320\260/prog 3 sem/OSI/laba4/build/tls", 0x7ffc8f5b2fe0, 0) = -1 ENOENT (Нет такого файла или каталога)

openat(AT\_FDCWD, "/home/stepan/\320\240\320\260\320\261\320\276\321\207\320\270\320\271 \321\201\321\202\320\276\320\273/\321\203\321\207\320\265\320\261\320\260/prog 3 sem/OSI/laba4/build/x86\_64/x86\_64/libLib1.so", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT\_FDCWD, "/home/stepan/\320\240\320\260\320\261\320\276\321\207\320\270\320\271 \321\201\321\202\320\276\320\273/\321\203\321\207\320\265\320\261\320\260/prog 3 sem/OSI/laba4/build/x86\_64/x86\_64", 0x7ffc8f5b2fe0, 0) = -1 ENOENT (Нет такого файла или каталога)

openat(AT\_FDCWD, "/home/stepan/\320\240\320\260\320\261\320\276\321\207\320\270\320\271 \321\201\321\202\320\276\320\273/\321\203\321\207\320\265\320\261\320\260/prog 3 sem/OSI/laba4/build/x86\_64/libLib1.so", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT\_FDCWD, "/home/stepan/\320\240\320\260\320\261\320\276\321\207\320\270\320\271 \321\201\321\202\320\276\320\273/\321\203\321\207\320\265\320\261\320\260/prog 3 sem/OSI/laba4/build/x86\_64", 0x7ffc8f5b2fe0, 0) = -1 ENOENT (Нет такого файла или каталога)

openat(AT\_FDCWD, "/home/stepan/\320\240\320\260\320\261\320\276\321\207\320\270\320\271 \321\201\321\202\320\276\320\273/\321\203\321\207\320\265\320\261\320\260/prog 3 sem/OSI/laba4/build/x86\_64/libLib1.so", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT\_FDCWD, "/home/stepan/\320\240\320\260\320\261\320\276\321\207\320\270\320\271 \321\201\321\202\320\276\320\273/\321\203\321\207\320\265\320\261\320\260/prog 3 sem/OSI/laba4/build/x86\_64", 0x7ffc8f5b2fe0, 0) = -1 ENOENT (Нет такого файла или каталога)

**openat(AT\_FDCWD, "/home/stepan/\320\240\320\260\320\261\320\276\321\207\320\270\320\271 \321\201\321\202\320\276\320\273/\321\203\321\207\320\265\320\261\320\260/prog 3 sem/OSI/laba4/build/libLib1.so", O\_RDONLY|O\_CLOEXEC) = 3**

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

newfstatat(3, "", {st\_mode=S\_IFREG|0775, st\_size=15232, ...}, AT\_EMPTY\_PATH) = 0

mmap(NULL, 16424, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7ff4dfba2000

mmap(0x7ff4dfba3000, 4096, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x1000) = 0x7ff4dfba3000

mmap(0x7ff4dfba4000, 4096, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x2000) = 0x7ff4dfba4000

mmap(0x7ff4dfba5000, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x2000) = 0x7ff4dfba5000

close(3) = 0

openat(AT\_FDCWD, "/home/stepan/\320\240\320\260\320\261\320\276\321\207\320\270\320\271 \321\201\321\202\320\276\320\273/\321\203\321\207\320\265\320\261\320\260/prog 3 sem/OSI/laba4/build/libstdc++.so.6", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

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

newfstatat(3, "", {st\_mode=S\_IFREG|0644, st\_size=88803, ...}, AT\_EMPTY\_PATH) = 0

mmap(NULL, 88803, PROT\_READ, MAP\_PRIVATE, 3, 0) = 0x7ff4dfb8c000

close(3) = 0

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

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

newfstatat(3, "", {st\_mode=S\_IFREG|0644, st\_size=2260296, ...}, AT\_EMPTY\_PATH) = 0

mmap(NULL, 2275520, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7ff4df800000

mprotect(0x7ff4df89a000, 1576960, PROT\_NONE) = 0

mmap(0x7ff4df89a000, 1118208, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x9a000) = 0x7ff4df89a000

mmap(0x7ff4df9ab000, 454656, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x1ab000) = 0x7ff4df9ab000

mmap(0x7ff4dfa1b000, 57344, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x21a000) = 0x7ff4dfa1b000

mmap(0x7ff4dfa29000, 10432, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_ANONYMOUS, -1, 0) = 0x7ff4dfa29000

close(3) = 0

openat(AT\_FDCWD, "/home/stepan/\320\240\320\260\320\261\320\276\321\207\320\270\320\271 \321\201\321\202\320\276\320\273/\321\203\321\207\320\265\320\261\320\260/prog 3 sem/OSI/laba4/build/libc.so.6", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

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

read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0P\237\2\0\0\0\0\0"..., 832) = 832

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

pread64(3, "\4\0\0\0 \0\0\0\5\0\0\0GNU\0\2\0\0\300\4\0\0\0\3\0\0\0\0\0\0\0"..., 48, 848) = 48

pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\244;\374\204(\337f#\315I\214\234\f\256\271\32"..., 68, 896) = 68

newfstatat(3, "", {st\_mode=S\_IFREG|0755, st\_size=2216304, ...}, AT\_EMPTY\_PATH) = 0

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

mmap(NULL, 2260560, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7ff4df400000

mmap(0x7ff4df428000, 1658880, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x28000) = 0x7ff4df428000

mmap(0x7ff4df5bd000, 360448, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x1bd000) = 0x7ff4df5bd000

mmap(0x7ff4df615000, 24576, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x214000) = 0x7ff4df615000

mmap(0x7ff4df61b000, 52816, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_ANONYMOUS, -1, 0) = 0x7ff4df61b000

close(3) = 0

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

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

newfstatat(3, "", {st\_mode=S\_IFREG|0644, st\_size=940560, ...}, AT\_EMPTY\_PATH) = 0

mmap(NULL, 942344, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7ff4dfaa5000

mmap(0x7ff4dfab3000, 507904, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0xe000) = 0x7ff4dfab3000

mmap(0x7ff4dfb2f000, 372736, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x8a000) = 0x7ff4dfb2f000

mmap(0x7ff4dfb8a000, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0xe4000) = 0x7ff4dfb8a000

close(3) = 0

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

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

newfstatat(3, "", {st\_mode=S\_IFREG|0644, st\_size=125488, ...}, AT\_EMPTY\_PATH) = 0

mmap(NULL, 127720, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7ff4dfa85000

mmap(0x7ff4dfa88000, 94208, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x3000) = 0x7ff4dfa88000

mmap(0x7ff4dfa9f000, 16384, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x1a000) = 0x7ff4dfa9f000

mmap(0x7ff4dfaa3000, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x1d000) = 0x7ff4dfaa3000

close(3) = 0

mmap(NULL, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_ANONYMOUS, -1, 0) = 0x7ff4dfa83000

mmap(NULL, 12288, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_ANONYMOUS, -1, 0) = 0x7ff4dfa80000

arch\_prctl(ARCH\_SET\_FS, 0x7ff4dfa80740) = 0

set\_tid\_address(0x7ff4dfa80a10) = 6275

set\_robust\_list(0x7ff4dfa80a20, 24) = 0

rseq(0x7ff4dfa810e0, 0x20, 0, 0x53053053) = 0

mprotect(0x7ff4df615000, 16384, PROT\_READ) = 0

mprotect(0x7ff4dfaa3000, 4096, PROT\_READ) = 0

mprotect(0x7ff4dfb8a000, 4096, PROT\_READ) = 0

mprotect(0x7ff4dfa1b000, 45056, PROT\_READ) = 0

mprotect(0x7ff4dfba5000, 4096, PROT\_READ) = 0

mprotect(0x55d07c026000, 4096, PROT\_READ) = 0

mprotect(0x7ff4dfbe1000, 8192, PROT\_READ) = 0

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

munmap(0x7ff4dfb8c000, 88803) = 0

getrandom("\x02\x52\xdc\xb2\xe5\xe1\x2d\x35", 8, GRND\_NONBLOCK) = 8

brk(NULL) = 0x55d07dc8b000

brk(0x55d07dcac000) = 0x55d07dcac000

futex(0x7ff4dfa2977c, FUTEX\_WAKE\_PRIVATE, 2147483647) = 0

newfstatat(1, "", {st\_mode=S\_IFCHR|0620, st\_rdev=makedev(0x88, 0x1), ...}, AT\_EMPTY\_PATH) = 0

write(1, "Please select: K arg1, arg2\n", 28Please select: K arg1, arg2

) = 28

write(1, "K - selected function from libra"..., 35K - selected function from library

) = 35

write(1, "K - complete the execution\n", 27K - complete the execution

) = 27

write(1, "K = 1 - Evklid's algorithm; arg1"..., 49K = 1 - Evklid's algorithm; arg1, arg2 - numbers

) = 49

write(1, "K = 2 - Leibniz series; arg1 - r"..., 42K = 2 - Leibniz series; arg1 - row length

) = 42

newfstatat(0, "", {st\_mode=S\_IFCHR|0620, st\_rdev=makedev(0x88, 0x1), ...}, AT\_EMPTY\_PATH) = 0

read(0, 1 243 54

"1 243 54\n", 1024) = 9

write(1, "Result of Evklid's algorithm wor"..., 42Result of Evklid's algorithm working - 27

) = 42

read(0, 2 2000

"2 2000\n", 1024) = 7

write(1, "Result of Leibniz series algorit"..., 53Result of Leibniz series algorithm working - 3.14209

) = 53

read(0, 0

"0\n", 1024) = 2

write(1, "Bye Bye\n", 8Bye Bye

) = 8

lseek(0, -1, SEEK\_CUR) = -1 ESPIPE (Недопустимая операция смещения)

exit\_group(0) = ?

+++ exited with 0 +++

**Вторая программа:**

stepan@stepan-ASUS:~/Рабочий стол/учеба/prog 3 sem/OSI/laba4/build$ strace -f ./prog2

execve("./prog2", ["./prog2"], 0x7ffed6377be8 /\* 60 vars \*/) = 0

brk(NULL) = 0x562cf5354000

arch\_prctl(0x3001 /\* ARCH\_??? \*/, 0x7fff26ae12b0) = -1 EINVAL (Недопустимый аргумент)

mmap(NULL, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_ANONYMOUS, -1, 0) = 0x7f142e980000

access("/etc/ld.so.preload", R\_OK) = -1 ENOENT (Нет такого файла или каталога)

openat(AT\_FDCWD, "/home/stepan/\320\240\320\260\320\261\320\276\321\207\320\270\320\271 \321\201\321\202\320\276\320\273/\321\203\321\207\320\265\320\261\320\260/prog 3 sem/OSI/laba4/build/glibc-hwcaps/x86-64-v3/libstdc++.so.6", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT\_FDCWD, "/home/stepan/\320\240\320\260\320\261\320\276\321\207\320\270\320\271 \321\201\321\202\320\276\320\273/\321\203\321\207\320\265\320\261\320\260/prog 3 sem/OSI/laba4/build/glibc-hwcaps/x86-64-v3", 0x7fff26ae04d0, 0) = -1 ENOENT (Нет такого файла или каталога)

openat(AT\_FDCWD, "/home/stepan/\320\240\320\260\320\261\320\276\321\207\320\270\320\271 \321\201\321\202\320\276\320\273/\321\203\321\207\320\265\320\261\320\260/prog 3 sem/OSI/laba4/build/glibc-hwcaps/x86-64-v2/libstdc++.so.6", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT\_FDCWD, "/home/stepan/\320\240\320\260\320\261\320\276\321\207\320\270\320\271 \321\201\321\202\320\276\320\273/\321\203\321\207\320\265\320\261\320\260/prog 3 sem/OSI/laba4/build/glibc-hwcaps/x86-64-v2", 0x7fff26ae04d0, 0) = -1 ENOENT (Нет такого файла или каталога)

openat(AT\_FDCWD, "/home/stepan/\320\240\320\260\320\261\320\276\321\207\320\270\320\271 \321\201\321\202\320\276\320\273/\321\203\321\207\320\265\320\261\320\260/prog 3 sem/OSI/laba4/build/tls/x86\_64/x86\_64/libstdc++.so.6", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT\_FDCWD, "/home/stepan/\320\240\320\260\320\261\320\276\321\207\320\270\320\271 \321\201\321\202\320\276\320\273/\321\203\321\207\320\265\320\261\320\260/prog 3 sem/OSI/laba4/build/tls/x86\_64/x86\_64", 0x7fff26ae04d0, 0) = -1 ENOENT (Нет такого файла или каталога)

openat(AT\_FDCWD, "/home/stepan/\320\240\320\260\320\261\320\276\321\207\320\270\320\271 \321\201\321\202\320\276\320\273/\321\203\321\207\320\265\320\261\320\260/prog 3 sem/OSI/laba4/build/tls/x86\_64/libstdc++.so.6", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT\_FDCWD, "/home/stepan/\320\240\320\260\320\261\320\276\321\207\320\270\320\271 \321\201\321\202\320\276\320\273/\321\203\321\207\320\265\320\261\320\260/prog 3 sem/OSI/laba4/build/tls/x86\_64", 0x7fff26ae04d0, 0) = -1 ENOENT (Нет такого файла или каталога)

openat(AT\_FDCWD, "/home/stepan/\320\240\320\260\320\261\320\276\321\207\320\270\320\271 \321\201\321\202\320\276\320\273/\321\203\321\207\320\265\320\261\320\260/prog 3 sem/OSI/laba4/build/tls/x86\_64/libstdc++.so.6", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT\_FDCWD, "/home/stepan/\320\240\320\260\320\261\320\276\321\207\320\270\320\271 \321\201\321\202\320\276\320\273/\321\203\321\207\320\265\320\261\320\260/prog 3 sem/OSI/laba4/build/tls/x86\_64", 0x7fff26ae04d0, 0) = -1 ENOENT (Нет такого файла или каталога)

openat(AT\_FDCWD, "/home/stepan/\320\240\320\260\320\261\320\276\321\207\320\270\320\271 \321\201\321\202\320\276\320\273/\321\203\321\207\320\265\320\261\320\260/prog 3 sem/OSI/laba4/build/tls/libstdc++.so.6", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT\_FDCWD, "/home/stepan/\320\240\320\260\320\261\320\276\321\207\320\270\320\271 \321\201\321\202\320\276\320\273/\321\203\321\207\320\265\320\261\320\260/prog 3 sem/OSI/laba4/build/tls", 0x7fff26ae04d0, 0) = -1 ENOENT (Нет такого файла или каталога)

openat(AT\_FDCWD, "/home/stepan/\320\240\320\260\320\261\320\276\321\207\320\270\320\271 \321\201\321\202\320\276\320\273/\321\203\321\207\320\265\320\261\320\260/prog 3 sem/OSI/laba4/build/x86\_64/x86\_64/libstdc++.so.6", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT\_FDCWD, "/home/stepan/\320\240\320\260\320\261\320\276\321\207\320\270\320\271 \321\201\321\202\320\276\320\273/\321\203\321\207\320\265\320\261\320\260/prog 3 sem/OSI/laba4/build/x86\_64/x86\_64", 0x7fff26ae04d0, 0) = -1 ENOENT (Нет такого файла или каталога)

openat(AT\_FDCWD, "/home/stepan/\320\240\320\260\320\261\320\276\321\207\320\270\320\271 \321\201\321\202\320\276\320\273/\321\203\321\207\320\265\320\261\320\260/prog 3 sem/OSI/laba4/build/x86\_64/libstdc++.so.6", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT\_FDCWD, "/home/stepan/\320\240\320\260\320\261\320\276\321\207\320\270\320\271 \321\201\321\202\320\276\320\273/\321\203\321\207\320\265\320\261\320\260/prog 3 sem/OSI/laba4/build/x86\_64", 0x7fff26ae04d0, 0) = -1 ENOENT (Нет такого файла или каталога)

openat(AT\_FDCWD, "/home/stepan/\320\240\320\260\320\261\320\276\321\207\320\270\320\271 \321\201\321\202\320\276\320\273/\321\203\321\207\320\265\320\261\320\260/prog 3 sem/OSI/laba4/build/x86\_64/libstdc++.so.6", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT\_FDCWD, "/home/stepan/\320\240\320\260\320\261\320\276\321\207\320\270\320\271 \321\201\321\202\320\276\320\273/\321\203\321\207\320\265\320\261\320\260/prog 3 sem/OSI/laba4/build/x86\_64", 0x7fff26ae04d0, 0) = -1 ENOENT (Нет такого файла или каталога)

openat(AT\_FDCWD, "/home/stepan/\320\240\320\260\320\261\320\276\321\207\320\270\320\271 \321\201\321\202\320\276\320\273/\321\203\321\207\320\265\320\261\320\260/prog 3 sem/OSI/laba4/build/libstdc++.so.6", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

newfstatat(AT\_FDCWD, "/home/stepan/\320\240\320\260\320\261\320\276\321\207\320\270\320\271 \321\201\321\202\320\276\320\273/\321\203\321\207\320\265\320\261\320\260/prog 3 sem/OSI/laba4/build", {st\_mode=S\_IFDIR|0775, st\_size=4096, ...}, 0) = 0

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

newfstatat(3, "", {st\_mode=S\_IFREG|0644, st\_size=88803, ...}, AT\_EMPTY\_PATH) = 0

mmap(NULL, 88803, PROT\_READ, MAP\_PRIVATE, 3, 0) = 0x7f142e96a000

close(3) = 0

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

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

newfstatat(3, "", {st\_mode=S\_IFREG|0644, st\_size=2260296, ...}, AT\_EMPTY\_PATH) = 0

mmap(NULL, 2275520, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7f142e600000

mprotect(0x7f142e69a000, 1576960, PROT\_NONE) = 0

mmap(0x7f142e69a000, 1118208, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x9a000) = 0x7f142e69a000

mmap(0x7f142e7ab000, 454656, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x1ab000) = 0x7f142e7ab000

mmap(0x7f142e81b000, 57344, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x21a000) = 0x7f142e81b000

mmap(0x7f142e829000, 10432, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_ANONYMOUS, -1, 0) = 0x7f142e829000

close(3) = 0

openat(AT\_FDCWD, "/home/stepan/\320\240\320\260\320\261\320\276\321\207\320\270\320\271 \321\201\321\202\320\276\320\273/\321\203\321\207\320\265\320\261\320\260/prog 3 sem/OSI/laba4/build/libc.so.6", O\_RDONLY|O\_CLOEXEC) = -1 ENOENT (Нет такого файла или каталога)

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

read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\0P\237\2\0\0\0\0\0"..., 832) = 832

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

pread64(3, "\4\0\0\0 \0\0\0\5\0\0\0GNU\0\2\0\0\300\4\0\0\0\3\0\0\0\0\0\0\0"..., 48, 848) = 48

pread64(3, "\4\0\0\0\24\0\0\0\3\0\0\0GNU\0\244;\374\204(\337f#\315I\214\234\f\256\271\32"..., 68, 896) = 68

newfstatat(3, "", {st\_mode=S\_IFREG|0755, st\_size=2216304, ...}, AT\_EMPTY\_PATH) = 0

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

mmap(NULL, 2260560, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7f142e200000

mmap(0x7f142e228000, 1658880, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x28000) = 0x7f142e228000

mmap(0x7f142e3bd000, 360448, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x1bd000) = 0x7f142e3bd000

mmap(0x7f142e415000, 24576, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x214000) = 0x7f142e415000

mmap(0x7f142e41b000, 52816, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_ANONYMOUS, -1, 0) = 0x7f142e41b000

close(3) = 0

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

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

newfstatat(3, "", {st\_mode=S\_IFREG|0644, st\_size=940560, ...}, AT\_EMPTY\_PATH) = 0

mmap(NULL, 942344, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7f142e883000

mmap(0x7f142e891000, 507904, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0xe000) = 0x7f142e891000

mmap(0x7f142e90d000, 372736, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x8a000) = 0x7f142e90d000

mmap(0x7f142e968000, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0xe4000) = 0x7f142e968000

close(3) = 0

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

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

newfstatat(3, "", {st\_mode=S\_IFREG|0644, st\_size=125488, ...}, AT\_EMPTY\_PATH) = 0

mmap(NULL, 127720, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7f142e863000

mmap(0x7f142e866000, 94208, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x3000) = 0x7f142e866000

mmap(0x7f142e87d000, 16384, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x1a000) = 0x7f142e87d000

mmap(0x7f142e881000, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x1d000) = 0x7f142e881000

close(3) = 0

mmap(NULL, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_ANONYMOUS, -1, 0) = 0x7f142e861000

arch\_prctl(ARCH\_SET\_FS, 0x7f142e8623c0) = 0

set\_tid\_address(0x7f142e862690) = 6418

set\_robust\_list(0x7f142e8626a0, 24) = 0

rseq(0x7f142e862d60, 0x20, 0, 0x53053053) = 0

mprotect(0x7f142e415000, 16384, PROT\_READ) = 0

mprotect(0x7f142e881000, 4096, PROT\_READ) = 0

mprotect(0x7f142e968000, 4096, PROT\_READ) = 0

mmap(NULL, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_ANONYMOUS, -1, 0) = 0x7f142e85f000

mprotect(0x7f142e81b000, 45056, PROT\_READ) = 0

mprotect(0x562cf473f000, 4096, PROT\_READ) = 0

mprotect(0x7f142e9ba000, 8192, PROT\_READ) = 0

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

munmap(0x7f142e96a000, 88803) = 0

getrandom("\x56\x30\x51\x81\x6e\xdd\x21\x4a", 8, GRND\_NONBLOCK) = 8

brk(NULL) = 0x562cf5354000

brk(0x562cf5375000) = 0x562cf5375000

futex(0x7f142e82977c, FUTEX\_WAKE\_PRIVATE, 2147483647) = 0

newfstatat(1, "", {st\_mode=S\_IFCHR|0620, st\_rdev=makedev(0x88, 0x1), ...}, AT\_EMPTY\_PATH) = 0

write(1, "Please select: K arg1, arg2\n", 28Please select: K arg1, arg2

) = 28

write(1, "K - selected function from libra"..., 35K - selected function from library

) = 35

write(1, "K = -1 - complete the execution\n", 32K = -1 - complete the execution

) = 32

write(1, "K = 0 - change the library\n", 27K = 0 - change the library

) = 27

write(1, "K = 1 - NOD algorithm; arg1, arg"..., 44K = 1 - NOD algorithm; arg1, arg2 - numbers

) = 44

write(1, "K = 2 - Pi algorithm; arg1 - row"..., 40K = 2 - Pi algorithm; arg1 - row length

) = 40

**openat(AT\_FDCWD, "/home/stepan/\320\240\320\260\320\261\320\276\321\207\320\270\320\271 \321\201\321\202\320\276\320\273/\321\203\321\207\320\265\320\261\320\260/prog 3 sem/OSI/laba4/build/libLib1.so", O\_RDONLY|O\_CLOEXEC) = 3**

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

newfstatat(3, "", {st\_mode=S\_IFREG|0775, st\_size=15232, ...}, AT\_EMPTY\_PATH) = 0

mmap(NULL, 16424, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7f142e97b000

mmap(0x7f142e97c000, 4096, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x1000) = 0x7f142e97c000

mmap(0x7f142e97d000, 4096, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x2000) = 0x7f142e97d000

mmap(0x7f142e97e000, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x2000) = 0x7f142e97e000

close(3) = 0

mprotect(0x7f142e97e000, 4096, PROT\_READ) = 0

newfstatat(0, "", {st\_mode=S\_IFCHR|0620, st\_rdev=makedev(0x88, 0x1), ...}, AT\_EMPTY\_PATH) = 0

read(0, 1 243 54

"1 243 54\n", 1024) = 9

write(1, "Result of NOD finding algorithm "..., 45Result of NOD finding algorithm working - 27

) = 45

read(0, 2 2000

"2 2000\n", 1024) = 7

write(1, "Result of Pi finding algorithm w"..., 49Result of Pi finding algorithm working - 3.14209

) = 49

read(0, 0

"0\n", 1024) = 2

write(1, "Your library has been changed\n", 30Your library has been changed

) = 30

munmap(0x7f142e97b000, 16424) = 0

**openat(AT\_FDCWD, "/home/stepan/\320\240\320\260\320\261\320\276\321\207\320\270\320\271 \321\201\321\202\320\276\320\273/\321\203\321\207\320\265\320\261\320\260/prog 3 sem/OSI/laba4/build/libLib2.so", O\_RDONLY|O\_CLOEXEC) = 3**

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

newfstatat(3, "", {st\_mode=S\_IFREG|0775, st\_size=28984, ...}, AT\_EMPTY\_PATH) = 0

mmap(NULL, 25112, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7f142e979000

mmap(0x7f142e97b000, 8192, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x2000) = 0x7f142e97b000

mmap(0x7f142e97d000, 4096, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x4000) = 0x7f142e97d000

mmap(0x7f142e97e000, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x4000) = 0x7f142e97e000

close(3) = 0

mprotect(0x7f142e97e000, 4096, PROT\_READ) = 0

read(0, 1 243 54

"1 243 54\n", 1024) = 9

write(1, "Result of NOD finding algorithm "..., 45Result of NOD finding algorithm working - 27

) = 45

read(0, 2 2000

"2 2000\n", 1024) = 7

write(1, "Result of Pi finding algorithm w"..., 49Result of Pi finding algorithm working - 3.14082

) = 49

read(0, -1

"-1\n", 1024) = 3

write(1, "Bye Bye\n", 8Bye Bye

) = 8

lseek(0, -1, SEEK\_CUR) = -1 ESPIPE (Недопустимая операция смещения)

exit\_group(0) = ?

+++ exited with 0 +++

**Вывод**

В ходе выполнения данной лабораторной работы я научился работать с динамическими библиотеками 2-мя способами. В дальнейшем это пригодится мне в написании более сложных и больших программ. Во время работы вознилки некие трудности, связанные с особенностями языка С++, однако мне удалось разобраться с ними и теперь моя программа работает.