Московский Авиационный Институт (Национальный Исследовательский Университет)

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

# Лабораторная работа №2 по курсу

**«Операционные системы»**

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# Постановка задачи

**Общее задание.** Составить программу на языке Си, обрабатывающую данные в многопоточном режиме. При обработке использовать стандартные средства создания потоков операционной системы (Windows/Unix). Ограничение максимального количества потоков, работающих в один момент времени, должно быть задано ключом запуска вашей программы. Так же необходимо уметь продемонстрировать количество потоков, используемое вашей программой с помощью стандартных средств операционной системы. В отчете привести исследование зависимости ускорения и

эффективности алгоритма от входных данных и количества потоков. Получившиеся результаты необходимо объяснить.

**Вариант 18.** Найти образец в строке наивным алгоритмом.

# Общий метод и алгоритм решения

## Использованные системные вызовы:

* **malloc** — выделяет память в куче для динамических массивов и структур.
* **free** — освобождает память, ранее выделенную с помощью malloc.
* **pthread\_create** — создает новый поток и запускает выполнение функции в этом потоке.
* **pthread\_join** — ожидает завершения выполнения указанного потока.
* **pthread\_exit** — завершает выполнение текущего потока.
* **clock** — получает текущее время с точностью до микросекунд.
* **srand** — инициализирует генератор случайных чисел.
* **rand** — генерирует псевдослучайное число.
* **time** — возвращает текущее время в секундах (используется для инициализации генератора случайных чисел).
* **atoi** — преобразует строку в целое число (используется для преобразования аргумента командной строки в число потоков).

## Алгоритм работы программы:

1. Инициализация и ввод данных:
   * Программа начинает с обработки аргументов командной строки. Она ожидает один аргумент — максимальное количество потоков, которые будут использоваться для поиска подстроки.
   * Затем программа запрашивает у пользователя длину строки, в которой будет производиться поиск.
   * Далее программа инициализирует генератор случайных чисел с помощью функции srand и заполняет сотроку случайными символами с помощью функции rand.
   * Далее программа c помощью функции rand определяет длину, начальный и конечный индексы подстроки.
   * Для оценки правильности работы алгоритма выполняется поиск подстроки с помощью функции strstr по тем же заданным строке и подстроке.
   * Перед началом поиска подстроки программа записывает текущее время с помощью функции clock
2. Многопоточный поиск подстроки:
   * Программа вызывает функцию nps, которая выполняет поиск подстроки в строке с использованием наивного алгоритма
   * Программа инициализирует барьер (примитив синхронизации потоков).
   * Программа создает массив структур ThreadData и массив дескрипторов потоков pthread\_t,выделяет под них память с помощью malloc.
   * Программа рассчитывает, с какого индекса будет начинать поиск подстроки каждый из потоков, создает потоки с помощью функции pthread\_create.
   * Каждый поток выполняет функцию npsThread, которая вызывает функицю find\_substr, которая реализует наивный поиск подстроки для каждого потока.
   * Выполняется наивный поиск подстроки внутри потоков (пункт 3)
   * После создания всех потоков программа ожидает их завершения с помощью функции pthread\_join.
   * С помощью функции free программа освобождает память, выделенную для массива структур и дексрипторов.
   * Программа уничтожает барьер для синхронизации потоков.
3. Наивный поиск подстроки внутри потоков:
   * Функция find\_substr выполняет наивный поиск подстроки на (n+i\*m)-ом индексе строки, где n — номер потока в цикле, m — количество используемых потоков, i — целое число, инкремент цикла.
   * После каждого проверенного индекса, поток встает у барьера, чтобы дождаться выполнения аналогичной работы другими потоками, чтобы синхронизовать работу.
   * Также при проверке каждого нового индекса поток проверяет, была ли уже найдена искомая подстрока ранее, проверяя переменную found. Если да, то заканчивает свое выполнение.
4. Завершение поиска подстроки и измерение времени:
   * После завершения поиска подстроки программа снова записывает текущее время с помощью функции clock и вычисляет время, затраченное на сортировку.
5. Вывод статистики:
   * Программа выводит результат поиска подстроки — индекс, на котором впервые подстрока встречается в строке, в случае отсутствия подстроки в строке результатом поиска будет -1.
   * Затем программа выводит время, затраченное на поиск подстроки, и количество использованных потоков.

# Код программы

**nps.c**

#include "pthread.h"

#include "stdio.h"

#include "stdlib.h"

#include "string.h"

#include "time.h"

#include "unistd.h"

#define MAX(a, b) ((a) >= (b) ? (a) : (b))

#define MIN(a, b) ((a) <= (b) ? (a) : (b))

long long found = 0;

typedef struct {

pthread\_mutex\_t mutex;

pthread\_cond\_t cond;

int count;

int required;

} barrier\_t;

void barrier\_init(barrier\_t \*barrier, int required) {

pthread\_mutex\_init(&barrier->mutex, NULL);

pthread\_cond\_init(&barrier->cond, NULL);

barrier->count = 0;

barrier->required = required;

}

void barrier\_wait(barrier\_t \*barrier) {

pthread\_mutex\_lock(&barrier->mutex);

barrier->count++;

if (barrier->count == barrier->required) {

barrier->count = 0;

pthread\_cond\_broadcast(&barrier->cond);

} else {

pthread\_cond\_wait(&barrier->cond, &barrier->mutex);

}

pthread\_mutex\_unlock(&barrier->mutex);

}

void barrier\_free(barrier\_t \*barrier) {

barrier->count = 0;

pthread\_cond\_broadcast(&barrier->cond);

pthread\_mutex\_unlock(&barrier->mutex);

}

typedef struct {

char \*str;

char \*substr;

long long left;

long long max\_threads;

long long nps\_result;

} ThreadData;

barrier\_t barrier;

long long find\_substr(char \*str, char \*substr, long long left, long long max\_threads) {

long long str\_len = strlen(str);

long long substr\_len = strlen(substr);

long long result = -1;

long long j = 0;

for (long long i = left; i < str\_len; i += max\_threads) {

if (found) {

break;

}

if (i + j > str\_len) {

break;

}

for (j = 0; j < substr\_len; j++) {

if (substr[j] != str[i + j]) {

break;

}

}

if (j == substr\_len) {

found = 1;

pthread\_cond\_broadcast(&barrier.cond);

return i;

}

barrier\_wait(&barrier);

}

return result;

}

void \*npsThread(void \*arg) {

ThreadData \*data = (ThreadData \*)arg;

long long nps\_result = find\_substr(data->str, data->substr, data->left, data->max\_threads);

data->nps\_result = nps\_result;

pthread\_exit(NULL);

}

long long nps(char \*str, char \*substr, long long max\_threads) {

barrier\_init(&barrier, max\_threads);

pthread\_t \*threads = (pthread\_t \*)malloc(max\_threads \* sizeof(pthread\_t));

ThreadData \*threadData = (ThreadData \*)malloc(max\_threads \* sizeof(ThreadData));

size\_t str\_len = strlen(str);

size\_t substr\_len = strlen(substr);

for (long long i = 0; i < max\_threads; i++) {

threadData[i].str = str;

threadData[i].substr = substr;

threadData[i].left = i;

threadData[i].max\_threads = max\_threads;

threadData[i].nps\_result = -1;

}

for (long long i = 0; i < max\_threads; i++) {

pthread\_create(&threads[i], NULL, npsThread, (void \*)&threadData[i]);

}

long long nps\_result = str\_len;

for (long long i = 0; i < max\_threads; i++) {

pthread\_join(threads[i], NULL);

if ((threadData[i].nps\_result != -1) && (threadData[i].nps\_result < nps\_result)) {

nps\_result = threadData[i].nps\_result;

}

}

if (nps\_result == str\_len) {

nps\_result = -1;

}

free(threads);

free(threadData);

barrier\_free(&barrier);

return nps\_result;

}

void timer\_nps\_launch(char \*str, char \*substr, long long max\_threads) {

clock\_t start = clock();

long long nps\_result = nps(str, substr, max\_threads);

clock\_t end = clock();

double elapsed\_time = ((double)(end - start)) / CLOCKS\_PER\_SEC;

printf("Подстрока впервые встречается на индексе: %lld\n", nps\_result);

printf("Время затраченное на поиск подстроки: %.6f секунд\n", elapsed\_time);

printf("Максимальное количество потоков: %lld\n\n", max\_threads);

found = 0;

}

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

// NPS - native pattern search

if (argc < 2) {

fprintf(stderr, "Ошибка: не указано количество потоков\n");

return 1;

}

long long max\_threads = atoi(argv[1]);

if (max\_threads < 1) {

fprintf(stderr, "Ошибка: некорректное количество потоков\n");

return 1;

}

long long str\_len;

printf("Введите длину строки: ");

scanf("%lld", &str\_len);

if (str\_len < 1) {

fprintf(stderr, "Ошибка: некорректная длина строки\n");

return 1;

}

char \*str = (char \*)malloc(str\_len \* sizeof(char));

srand(time(NULL));

long long custom\_substr\_len = 100;

long long substr\_len = MAX(1, MIN(str\_len, custom\_substr\_len));

long long substr\_end = (str\_len - str\_len / 10) + rand() % (MAX(1, str\_len / 10));

long long substr\_start = substr\_end - substr\_len;

printf("\nДлины строки и подстроки: %lld %lld\n\n", str\_len, substr\_len);

char \*substr = (char \*)malloc(substr\_len \* sizeof(char));

for (long long i = 0; i < str\_len; i++) {

str[i] = (rand() % 96) + ' ';

}

for (long long i = 0; i < substr\_len; i++) {

substr[i] = str[substr\_start + i]; // Подстрока всегда должна найтись

// substr[i] = (rand() % 96) + ' '; // Подстрока может и не найтись (-1)

}

printf("Результат однопоточной strstr: %ld \n\n", (MAX(-1, strstr(str, substr) - str)));

timer\_nps\_launch(str, substr, max\_threads);

return 0;

}

# Протокол работы программы

# Тестирование:

## ./nps 5

## Введите длину строки: 1000

## Длины строки и подстроки: 1000 100

## Результат однопоточной strstr: 76

## Подстрока впервые встречается на индексе: 76

## Время затраченное на поиск подстроки: 0.002603 секунд

## Максимальное количество потоков: 5

## Strace:

strace -f ./nps 5

execve("./nps", ["./nps", "5"], 0x7ffd67b5fb00 /\* 77 vars \*/) = 0

brk(NULL) = 0x5630db2a8000

arch\_prctl(0x3001 /\* ARCH\_??? \*/, 0x7ffc59d08bc0) = -1 EINVAL (Invalid argument)

mmap(NULL, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_ANONYMOUS, -1, 0) = 0x7f22c276f000

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

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

newfstatat(3, "", {st\_mode=S\_IFREG|0644, st\_size=166595, ...}, AT\_EMPTY\_PATH) = 0

mmap(NULL, 166595, PROT\_READ, MAP\_PRIVATE, 3, 0) = 0x7f22c2746000

close(3) = 0

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

read(3, "\177ELF\2\1\1\3\0\0\0\0\0\0\0\0\3\0>\0\1\0\0\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\315A\vq\17\17\tLh2\355\331Y1\0m"..., 68, 896) = 68

newfstatat(3, "", {st\_mode=S\_IFREG|0755, st\_size=2220400, ...}, 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, 2264656, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7f22c251d000

mprotect(0x7f22c2545000, 2023424, PROT\_NONE) = 0

mmap(0x7f22c2545000, 1658880, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x28000) = 0x7f22c2545000

mmap(0x7f22c26da000, 360448, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x1bd000) = 0x7f22c26da000

mmap(0x7f22c2733000, 24576, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x215000) = 0x7f22c2733000

mmap(0x7f22c2739000, 52816, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_ANONYMOUS, -1, 0) = 0x7f22c2739000

close(3) = 0

mmap(NULL, 12288, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_ANONYMOUS, -1, 0) = 0x7f22c251a000

arch\_prctl(ARCH\_SET\_FS, 0x7f22c251a740) = 0

set\_tid\_address(0x7f22c251aa10) = 2255657

set\_robust\_list(0x7f22c251aa20, 24) = 0

rseq(0x7f22c251b0e0, 0x20, 0, 0x53053053) = 0

mprotect(0x7f22c2733000, 16384, PROT\_READ) = 0

mprotect(0x5630a26ad000, 4096, PROT\_READ) = 0

mprotect(0x7f22c27a9000, 8192, PROT\_READ) = 0

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

munmap(0x7f22c2746000, 166595) = 0

newfstatat(1, "", {st\_mode=S\_IFCHR|0620, st\_rdev=makedev(0x88, 0x3), ...}, AT\_EMPTY\_PATH) = 0

getrandom("\x28\x05\x5d\x30\x69\x30\x78\x9c", 8, GRND\_NONBLOCK) = 8

brk(NULL) = 0x5630db2a8000

brk(0x5630db2c9000) = 0x5630db2c9000

newfstatat(0, "", {st\_mode=S\_IFCHR|0620, st\_rdev=makedev(0x88, 0x3), ...}, AT\_EMPTY\_PATH) = 0

write(1, "\320\222\320\262\320\265\320\264\320\270\321\202\320\265 \320\264\320\273\320\270\320\275\321\203 \321\201\321\202\321\200"..., 40Введите длину строки: ) = 40

read(0, 1000

"1000\n", 1024) = 5

write(1, "\n", 1

) = 1

write(1, "\320\224\320\273\320\270\320\275\321\213 \321\201\321\202\321\200\320\276\320\272\320\270 \320\270 \320\277\320\276\320"..., 57Длины строки и подстроки: 1000 100

) = 57

write(1, "\320\240\320\265\320\267\321\203\320\273\321\214\321\202\320\260\321\202 \320\276\320\264\320\275\320\276\320\277\320\276\321"..., 57Результат однопоточной strstr: 76

) = 57

clock\_gettime(CLOCK\_PROCESS\_CPUTIME\_ID, {tv\_sec=0, tv\_nsec=1756359}) = 0

rt\_sigaction(SIGRT\_1, {sa\_handler=0x7f22c25ae870, sa\_mask=[], sa\_flags=SA\_RESTORER|SA\_ONSTACK|SA\_RESTART|SA\_SIGINFO, sa\_restorer=0x7f22c255f520}, NULL, 8) = 0

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

mmap(NULL, 8392704, PROT\_NONE, MAP\_PRIVATE|MAP\_ANONYMOUS|MAP\_STACK, -1, 0) = 0x7f22c1d19000

mprotect(0x7f22c1d1a000, 8388608, PROT\_READ|PROT\_WRITE) = 0

rt\_sigprocmask(SIG\_BLOCK, ~[], [], 8) = 0

clone3({flags=CLONE\_VM|CLONE\_FS|CLONE\_FILES|CLONE\_SIGHAND|CLONE\_THREAD|CLONE\_SYSVSEM|CLONE\_SETTLS|CLONE\_PARENT\_SETTID|CLONE\_CHILD\_CLEARTID, child\_tid=0x7f22c2519910, parent\_tid=0x7f22c2519910, exit\_signal=0, stack=0x7f22c1d19000, stack\_size=0x7fff00, tls=0x7f22c2519640}strace: Process 2255696 attached

=> {parent\_tid=[2255696]}, 88) = 2255696

[pid 2255696] rseq(0x7f22c2519fe0, 0x20, 0, 0x53053053 <unfinished ...>

[pid 2255657] rt\_sigprocmask(SIG\_SETMASK, [], <unfinished ...>

[pid 2255696] <... rseq resumed>) = 0

[pid 2255657] <... rt\_sigprocmask resumed>NULL, 8) = 0

[pid 2255696] set\_robust\_list(0x7f22c2519920, 24) = 0

[pid 2255657] mmap(NULL, 8392704, PROT\_NONE, MAP\_PRIVATE|MAP\_ANONYMOUS|MAP\_STACK, -1, 0 <unfinished ...>

[pid 2255696] rt\_sigprocmask(SIG\_SETMASK, [], <unfinished ...>

[pid 2255657] <... mmap resumed>) = 0x7f22c1518000

[pid 2255696] <... rt\_sigprocmask resumed>NULL, 8) = 0

[pid 2255657] mprotect(0x7f22c1519000, 8388608, PROT\_READ|PROT\_WRITE <unfinished ...>

[pid 2255696] futex(0x5630a26ae0b0, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255657] <... mprotect resumed>) = 0

[pid 2255657] rt\_sigprocmask(SIG\_BLOCK, ~[], [], 8) = 0

[pid 2255657] clone3({flags=CLONE\_VM|CLONE\_FS|CLONE\_FILES|CLONE\_SIGHAND|CLONE\_THREAD|CLONE\_SYSVSEM|CLONE\_SETTLS|CLONE\_PARENT\_SETTID|CLONE\_CHILD\_CLEARTID, child\_tid=0x7f22c1d18910, parent\_tid=0x7f22c1d18910, exit\_signal=0, stack=0x7f22c1518000, stack\_size=0x7fff00, tls=0x7f22c1d18640}strace: Process 2255697 attached

=> {parent\_tid=[2255697]}, 88) = 2255697

[pid 2255697] rseq(0x7f22c1d18fe0, 0x20, 0, 0x53053053 <unfinished ...>

[pid 2255657] rt\_sigprocmask(SIG\_SETMASK, [], <unfinished ...>

[pid 2255697] <... rseq resumed>) = 0

[pid 2255657] <... rt\_sigprocmask resumed>NULL, 8) = 0

[pid 2255657] mmap(NULL, 8392704, PROT\_NONE, MAP\_PRIVATE|MAP\_ANONYMOUS|MAP\_STACK, -1, 0 <unfinished ...>

[pid 2255697] set\_robust\_list(0x7f22c1d18920, 24 <unfinished ...>

[pid 2255657] <... mmap resumed>) = 0x7f22c0d17000

[pid 2255697] <... set\_robust\_list resumed>) = 0

[pid 2255657] mprotect(0x7f22c0d18000, 8388608, PROT\_READ|PROT\_WRITE <unfinished ...>

[pid 2255697] rt\_sigprocmask(SIG\_SETMASK, [], <unfinished ...>

[pid 2255657] <... mprotect resumed>) = 0

[pid 2255697] <... rt\_sigprocmask resumed>NULL, 8) = 0

[pid 2255657] rt\_sigprocmask(SIG\_BLOCK, ~[], <unfinished ...>

[pid 2255697] futex(0x5630a26ae0b0, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255657] <... rt\_sigprocmask resumed>[], 8) = 0

[pid 2255657] clone3({flags=CLONE\_VM|CLONE\_FS|CLONE\_FILES|CLONE\_SIGHAND|CLONE\_THREAD|CLONE\_SYSVSEM|CLONE\_SETTLS|CLONE\_PARENT\_SETTID|CLONE\_CHILD\_CLEARTID, child\_tid=0x7f22c1517910, parent\_tid=0x7f22c1517910, exit\_signal=0, stack=0x7f22c0d17000, stack\_size=0x7fff00, tls=0x7f22c1517640}strace: Process 2255698 attached

=> {parent\_tid=[2255698]}, 88) = 2255698

[pid 2255698] rseq(0x7f22c1517fe0, 0x20, 0, 0x53053053 <unfinished ...>

[pid 2255657] rt\_sigprocmask(SIG\_SETMASK, [], <unfinished ...>

[pid 2255698] <... rseq resumed>) = 0

[pid 2255657] <... rt\_sigprocmask resumed>NULL, 8) = 0

[pid 2255657] mmap(NULL, 8392704, PROT\_NONE, MAP\_PRIVATE|MAP\_ANONYMOUS|MAP\_STACK, -1, 0 <unfinished ...>

[pid 2255698] set\_robust\_list(0x7f22c1517920, 24 <unfinished ...>

[pid 2255657] <... mmap resumed>) = 0x7f22c0516000

[pid 2255698] <... set\_robust\_list resumed>) = 0

[pid 2255657] mprotect(0x7f22c0517000, 8388608, PROT\_READ|PROT\_WRITE <unfinished ...>

[pid 2255698] rt\_sigprocmask(SIG\_SETMASK, [], <unfinished ...>

[pid 2255657] <... mprotect resumed>) = 0

[pid 2255698] <... rt\_sigprocmask resumed>NULL, 8) = 0

[pid 2255657] rt\_sigprocmask(SIG\_BLOCK, ~[], <unfinished ...>

[pid 2255698] futex(0x5630a26ae0b0, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255657] <... rt\_sigprocmask resumed>[], 8) = 0

[pid 2255657] clone3({flags=CLONE\_VM|CLONE\_FS|CLONE\_FILES|CLONE\_SIGHAND|CLONE\_THREAD|CLONE\_SYSVSEM|CLONE\_SETTLS|CLONE\_PARENT\_SETTID|CLONE\_CHILD\_CLEARTID, child\_tid=0x7f22c0d16910, parent\_tid=0x7f22c0d16910, exit\_signal=0, stack=0x7f22c0516000, stack\_size=0x7fff00, tls=0x7f22c0d16640}strace: Process 2255699 attached

=> {parent\_tid=[2255699]}, 88) = 2255699

[pid 2255699] rseq(0x7f22c0d16fe0, 0x20, 0, 0x53053053 <unfinished ...>

[pid 2255657] rt\_sigprocmask(SIG\_SETMASK, [], <unfinished ...>

[pid 2255699] <... rseq resumed>) = 0

[pid 2255657] <... rt\_sigprocmask resumed>NULL, 8) = 0

[pid 2255699] set\_robust\_list(0x7f22c0d16920, 24 <unfinished ...>

[pid 2255657] mmap(NULL, 8392704, PROT\_NONE, MAP\_PRIVATE|MAP\_ANONYMOUS|MAP\_STACK, -1, 0 <unfinished ...>

[pid 2255699] <... set\_robust\_list resumed>) = 0

[pid 2255657] <... mmap resumed>) = 0x7f22bfd15000

[pid 2255699] rt\_sigprocmask(SIG\_SETMASK, [], <unfinished ...>

[pid 2255657] mprotect(0x7f22bfd16000, 8388608, PROT\_READ|PROT\_WRITE <unfinished ...>

[pid 2255699] <... rt\_sigprocmask resumed>NULL, 8) = 0

[pid 2255657] <... mprotect resumed>) = 0

[pid 2255699] futex(0x5630a26ae0b0, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255657] rt\_sigprocmask(SIG\_BLOCK, ~[], [], 8) = 0

[pid 2255657] clone3({flags=CLONE\_VM|CLONE\_FS|CLONE\_FILES|CLONE\_SIGHAND|CLONE\_THREAD|CLONE\_SYSVSEM|CLONE\_SETTLS|CLONE\_PARENT\_SETTID|CLONE\_CHILD\_CLEARTID, child\_tid=0x7f22c0515910, parent\_tid=0x7f22c0515910, exit\_signal=0, stack=0x7f22bfd15000, stack\_size=0x7fff00, tls=0x7f22c0515640}strace: Process 2255700 attached

=> {parent\_tid=[2255700]}, 88) = 2255700

[pid 2255700] rseq(0x7f22c0515fe0, 0x20, 0, 0x53053053 <unfinished ...>

[pid 2255657] rt\_sigprocmask(SIG\_SETMASK, [], <unfinished ...>

[pid 2255700] <... rseq resumed>) = 0

[pid 2255657] <... rt\_sigprocmask resumed>NULL, 8) = 0

[pid 2255700] set\_robust\_list(0x7f22c0515920, 24 <unfinished ...>

[pid 2255657] futex(0x7f22c2519910, FUTEX\_WAIT\_BITSET|FUTEX\_CLOCK\_REALTIME, 2255696, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255700] <... set\_robust\_list resumed>) = 0

[pid 2255700] rt\_sigprocmask(SIG\_SETMASK, [], NULL, 8) = 0

[pid 2255700] futex(0x5630a26ae0b0, FUTEX\_WAKE\_PRIVATE, 2147483647) = 4

[pid 2255699] <... futex resumed>) = 0

[pid 2255697] <... futex resumed>) = 0

[pid 2255696] <... futex resumed>) = 0

[pid 2255700] futex(0x5630a26ae0b4, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255699] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255697] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255699] <... futex resumed>) = 0

[pid 2255696] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255699] futex(0x5630a26ae0b4, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255697] <... futex resumed>) = 0

[pid 2255696] <... futex resumed>) = 0

[pid 2255697] futex(0x5630a26ae0b4, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255696] futex(0x5630a26ae0b4, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255698] <... futex resumed>) = 0

[pid 2255698] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1) = 0

[pid 2255698] futex(0x5630a26ae0b4, FUTEX\_WAKE\_PRIVATE, 2147483647 <unfinished ...>

[pid 2255700] <... futex resumed>) = 0

[pid 2255699] <... futex resumed>) = 0

[pid 2255698] <... futex resumed>) = 4

[pid 2255697] <... futex resumed>) = 0

[pid 2255696] <... futex resumed>) = 0

[pid 2255700] futex(0x5630a26ae060, FUTEX\_WAIT\_PRIVATE, 2, NULL <unfinished ...>

[pid 2255699] futex(0x5630a26ae060, FUTEX\_WAIT\_PRIVATE, 2, NULL <unfinished ...>

[pid 2255697] futex(0x5630a26ae060, FUTEX\_WAIT\_PRIVATE, 2, NULL <unfinished ...>

[pid 2255700] <... futex resumed>) = -1 EAGAIN (Resource temporarily unavailable)

[pid 2255699] <... futex resumed>) = -1 EAGAIN (Resource temporarily unavailable)

[pid 2255698] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255696] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255700] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255699] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255698] <... futex resumed>) = 0

[pid 2255697] <... futex resumed>) = -1 EAGAIN (Resource temporarily unavailable)

[pid 2255700] <... futex resumed>) = 0

[pid 2255699] <... futex resumed>) = 0

[pid 2255696] <... futex resumed>) = 0

[pid 2255698] futex(0x5630a26ae0b0, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255697] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255700] futex(0x5630a26ae0b0, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255699] futex(0x5630a26ae0b0, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255696] futex(0x5630a26ae0b0, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255697] <... futex resumed>) = 0

[pid 2255697] futex(0x5630a26ae0b0, FUTEX\_WAKE\_PRIVATE, 2147483647 <unfinished ...>

[pid 2255699] <... futex resumed>) = 0

[pid 2255698] <... futex resumed>) = 0

[pid 2255697] <... futex resumed>) = 4

[pid 2255699] futex(0x5630a26ae060, FUTEX\_WAIT\_PRIVATE, 2, NULL <unfinished ...>

[pid 2255698] futex(0x5630a26ae060, FUTEX\_WAIT\_PRIVATE, 2, NULL <unfinished ...>

[pid 2255696] <... futex resumed>) = 0

[pid 2255699] <... futex resumed>) = -1 EAGAIN (Resource temporarily unavailable)

[pid 2255697] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255698] <... futex resumed>) = -1 EAGAIN (Resource temporarily unavailable)

[pid 2255696] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255699] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255697] <... futex resumed>) = 0

[pid 2255698] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255696] <... futex resumed>) = 0

[pid 2255699] <... futex resumed>) = 0

[pid 2255697] futex(0x5630a26ae0b4, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255698] <... futex resumed>) = 0

[pid 2255696] futex(0x5630a26ae0b4, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255699] futex(0x5630a26ae0b4, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255698] futex(0x5630a26ae0b4, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255700] <... futex resumed>) = 0

[pid 2255700] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1) = 0

[pid 2255700] futex(0x5630a26ae0b4, FUTEX\_WAKE\_PRIVATE, 2147483647) = 4

[pid 2255699] <... futex resumed>) = 0

[pid 2255696] <... futex resumed>) = 0

[pid 2255698] <... futex resumed>) = 0

[pid 2255700] futex(0x5630a26ae0b0, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255699] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255696] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255698] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255699] <... futex resumed>) = 0

[pid 2255696] <... futex resumed>) = 0

[pid 2255698] <... futex resumed>) = 0

[pid 2255699] futex(0x5630a26ae0b0, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255696] futex(0x5630a26ae0b0, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255698] futex(0x5630a26ae0b0, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255697] <... futex resumed>) = 0

[pid 2255697] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1) = 0

[pid 2255697] futex(0x5630a26ae0b0, FUTEX\_WAKE\_PRIVATE, 2147483647 <unfinished ...>

[pid 2255700] <... futex resumed>) = 0

[pid 2255698] <... futex resumed>) = 0

[pid 2255697] <... futex resumed>) = 4

[pid 2255696] <... futex resumed>) = 0

[pid 2255700] futex(0x5630a26ae060, FUTEX\_WAIT\_PRIVATE, 2, NULL <unfinished ...>

[pid 2255697] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255698] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255696] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255700] <... futex resumed>) = -1 EAGAIN (Resource temporarily unavailable)

[pid 2255697] <... futex resumed>) = 0

[pid 2255698] <... futex resumed>) = 0

[pid 2255696] <... futex resumed>) = 0

[pid 2255700] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255698] futex(0x5630a26ae0b4, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255697] futex(0x5630a26ae0b4, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255700] <... futex resumed>) = 0

[pid 2255696] futex(0x5630a26ae0b4, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255700] futex(0x5630a26ae0b4, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255699] <... futex resumed>) = 0

[pid 2255699] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1) = 0

[pid 2255699] futex(0x5630a26ae0b4, FUTEX\_WAKE\_PRIVATE, 2147483647 <unfinished ...>

[pid 2255700] <... futex resumed>) = 0

[pid 2255699] <... futex resumed>) = 4

[pid 2255698] <... futex resumed>) = 0

[pid 2255697] <... futex resumed>) = 0

[pid 2255696] <... futex resumed>) = 0

[pid 2255700] futex(0x5630a26ae060, FUTEX\_WAIT\_PRIVATE, 2, NULL <unfinished ...>

[pid 2255699] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255698] futex(0x5630a26ae060, FUTEX\_WAIT\_PRIVATE, 2, NULL <unfinished ...>

[pid 2255697] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255700] <... futex resumed>) = -1 EAGAIN (Resource temporarily unavailable)

[pid 2255699] <... futex resumed>) = 0

[pid 2255698] <... futex resumed>) = -1 EAGAIN (Resource temporarily unavailable)

[pid 2255696] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255700] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255699] futex(0x5630a26ae0b0, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255698] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255697] <... futex resumed>) = 0

[pid 2255700] <... futex resumed>) = 0

[pid 2255696] <... futex resumed>) = 0

[pid 2255698] <... futex resumed>) = 0

[pid 2255697] futex(0x5630a26ae0b0, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255700] futex(0x5630a26ae0b0, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255696] futex(0x5630a26ae0b0, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255700] <... futex resumed>) = -1 EAGAIN (Resource temporarily unavailable)

[pid 2255698] futex(0x5630a26ae0b0, FUTEX\_WAKE\_PRIVATE, 2147483647 <unfinished ...>

[pid 2255696] <... futex resumed>) = -1 EAGAIN (Resource temporarily unavailable)

[pid 2255700] futex(0x5630a26ae060, FUTEX\_WAIT\_PRIVATE, 2, NULL <unfinished ...>

[pid 2255698] <... futex resumed>) = 2

[pid 2255697] <... futex resumed>) = 0

[pid 2255699] <... futex resumed>) = 0

[pid 2255698] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255697] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255696] futex(0x5630a26ae060, FUTEX\_WAIT\_PRIVATE, 2, NULL <unfinished ...>

[pid 2255699] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255698] <... futex resumed>) = 1

[pid 2255700] <... futex resumed>) = 0

[pid 2255699] <... futex resumed>) = 0

[pid 2255697] <... futex resumed>) = 0

[pid 2255696] <... futex resumed>) = -1 EAGAIN (Resource temporarily unavailable)

[pid 2255700] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255699] futex(0x5630a26ae0b4, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255698] futex(0x5630a26ae0b4, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255697] futex(0x5630a26ae0b4, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255696] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255700] <... futex resumed>) = 0

[pid 2255696] <... futex resumed>) = 0

[pid 2255700] futex(0x5630a26ae0b4, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255696] futex(0x5630a26ae0b4, FUTEX\_WAKE\_PRIVATE, 2147483647 <unfinished ...>

[pid 2255700] <... futex resumed>) = -1 EAGAIN (Resource temporarily unavailable)

[pid 2255699] <... futex resumed>) = 0

[pid 2255698] <... futex resumed>) = 0

[pid 2255697] <... futex resumed>) = 0

[pid 2255696] <... futex resumed>) = 3

[pid 2255700] futex(0x5630a26ae060, FUTEX\_WAIT\_PRIVATE, 2, NULL <unfinished ...>

[pid 2255699] futex(0x5630a26ae060, FUTEX\_WAIT\_PRIVATE, 2, NULL <unfinished ...>

[pid 2255698] futex(0x5630a26ae060, FUTEX\_WAIT\_PRIVATE, 2, NULL <unfinished ...>

[pid 2255697] futex(0x5630a26ae060, FUTEX\_WAIT\_PRIVATE, 2, NULL <unfinished ...>

[pid 2255696] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255700] <... futex resumed>) = -1 EAGAIN (Resource temporarily unavailable)

[pid 2255699] <... futex resumed>) = -1 EAGAIN (Resource temporarily unavailable)

[pid 2255698] <... futex resumed>) = -1 EAGAIN (Resource temporarily unavailable)

[pid 2255697] <... futex resumed>) = -1 EAGAIN (Resource temporarily unavailable)

[pid 2255700] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255699] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255696] <... futex resumed>) = 0

[pid 2255700] <... futex resumed>) = 0

[pid 2255699] <... futex resumed>) = 0

[pid 2255698] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255697] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255700] futex(0x5630a26ae0b0, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255699] futex(0x5630a26ae0b0, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255696] futex(0x5630a26ae0b0, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255698] <... futex resumed>) = 0

[pid 2255697] <... futex resumed>) = 0

[pid 2255698] futex(0x5630a26ae0b0, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255697] futex(0x5630a26ae0b0, FUTEX\_WAKE\_PRIVATE, 2147483647 <unfinished ...>

[pid 2255698] <... futex resumed>) = -1 EAGAIN (Resource temporarily unavailable)

[pid 2255699] <... futex resumed>) = 0

[pid 2255697] <... futex resumed>) = 3

[pid 2255696] <... futex resumed>) = 0

[pid 2255700] <... futex resumed>) = 0

[pid 2255699] futex(0x5630a26ae060, FUTEX\_WAIT\_PRIVATE, 2, NULL <unfinished ...>

[pid 2255698] futex(0x5630a26ae060, FUTEX\_WAIT\_PRIVATE, 2, NULL <unfinished ...>

[pid 2255697] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255700] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255699] <... futex resumed>) = -1 EAGAIN (Resource temporarily unavailable)

[pid 2255696] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255700] <... futex resumed>) = 0

[pid 2255698] <... futex resumed>) = -1 EAGAIN (Resource temporarily unavailable)

[pid 2255697] <... futex resumed>) = 0

[pid 2255700] futex(0x5630a26ae0b4, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255699] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255698] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255696] <... futex resumed>) = 0

[pid 2255699] <... futex resumed>) = 0

[pid 2255697] futex(0x5630a26ae0b4, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255698] <... futex resumed>) = 0

[pid 2255696] futex(0x5630a26ae0b4, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255699] futex(0x5630a26ae0b4, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255698] futex(0x5630a26ae0b4, FUTEX\_WAKE\_PRIVATE, 2147483647 <unfinished ...>

[pid 2255699] <... futex resumed>) = -1 EAGAIN (Resource temporarily unavailable)

[pid 2255696] <... futex resumed>) = -1 EAGAIN (Resource temporarily unavailable)

[pid 2255700] <... futex resumed>) = 0

[pid 2255699] futex(0x5630a26ae060, FUTEX\_WAIT\_PRIVATE, 2, NULL <unfinished ...>

[pid 2255698] <... futex resumed>) = 2

[pid 2255697] <... futex resumed>) = 0

[pid 2255700] futex(0x5630a26ae060, FUTEX\_WAIT\_PRIVATE, 2, NULL <unfinished ...>

[pid 2255696] futex(0x5630a26ae060, FUTEX\_WAIT\_PRIVATE, 2, NULL <unfinished ...>

[pid 2255698] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255697] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255700] <... futex resumed>) = -1 EAGAIN (Resource temporarily unavailable)

[pid 2255698] <... futex resumed>) = 1

[pid 2255696] <... futex resumed>) = -1 EAGAIN (Resource temporarily unavailable)

[pid 2255697] <... futex resumed>) = 0

[pid 2255700] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255699] <... futex resumed>) = 0

[pid 2255698] futex(0x5630a26ae0b0, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255700] <... futex resumed>) = 0

[pid 2255697] futex(0x5630a26ae0b0, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255696] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255699] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255700] futex(0x5630a26ae0b0, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255696] <... futex resumed>) = 0

[pid 2255699] <... futex resumed>) = 0

[pid 2255699] futex(0x5630a26ae0b0, FUTEX\_WAKE\_PRIVATE, 2147483647 <unfinished ...>

[pid 2255696] futex(0x5630a26ae0b0, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255700] <... futex resumed>) = 0

[pid 2255699] <... futex resumed>) = 3

[pid 2255696] <... futex resumed>) = -1 EAGAIN (Resource temporarily unavailable)

[pid 2255697] <... futex resumed>) = 0

[pid 2255700] futex(0x5630a26ae060, FUTEX\_WAIT\_PRIVATE, 2, NULL <unfinished ...>

[pid 2255699] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255700] <... futex resumed>) = -1 EAGAIN (Resource temporarily unavailable)

[pid 2255697] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255696] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255699] <... futex resumed>) = 0

[pid 2255700] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255697] <... futex resumed>) = 0

[pid 2255696] <... futex resumed>) = 0

[pid 2255699] futex(0x5630a26ae0b4, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255697] futex(0x5630a26ae0b4, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255700] <... futex resumed>) = 0

[pid 2255696] futex(0x5630a26ae0b4, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255700] futex(0x5630a26ae0b4, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255698] <... futex resumed>) = 0

[pid 2255698] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1) = 0

[pid 2255698] futex(0x5630a26ae0b4, FUTEX\_WAKE\_PRIVATE, 2147483647 <unfinished ...>

[pid 2255700] <... futex resumed>) = 0

[pid 2255699] <... futex resumed>) = 0

[pid 2255698] <... futex resumed>) = 4

[pid 2255697] <... futex resumed>) = 0

[pid 2255696] <... futex resumed>) = 0

[pid 2255700] futex(0x5630a26ae060, FUTEX\_WAIT\_PRIVATE, 2, NULL <unfinished ...>

[pid 2255699] futex(0x5630a26ae060, FUTEX\_WAIT\_PRIVATE, 2, NULL <unfinished ...>

[pid 2255698] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255700] <... futex resumed>) = -1 EAGAIN (Resource temporarily unavailable)

[pid 2255699] <... futex resumed>) = -1 EAGAIN (Resource temporarily unavailable)

[pid 2255697] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255696] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255700] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255699] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255698] <... futex resumed>) = 0

[pid 2255697] <... futex resumed>) = 0

[pid 2255700] <... futex resumed>) = 0

[pid 2255699] <... futex resumed>) = 0

[pid 2255696] <... futex resumed>) = 0

[pid 2255698] futex(0x5630a26ae0b0, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255700] futex(0x5630a26ae0b0, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255699] futex(0x5630a26ae0b0, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255697] futex(0x5630a26ae0b0, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255696] futex(0x5630a26ae0b0, FUTEX\_WAKE\_PRIVATE, 2147483647 <unfinished ...>

[pid 2255700] <... futex resumed>) = -1 EAGAIN (Resource temporarily unavailable)

[pid 2255699] <... futex resumed>) = -1 EAGAIN (Resource temporarily unavailable)

[pid 2255698] <... futex resumed>) = -1 EAGAIN (Resource temporarily unavailable)

[pid 2255697] <... futex resumed>) = -1 EAGAIN (Resource temporarily unavailable)

[pid 2255700] futex(0x5630a26ae060, FUTEX\_WAIT\_PRIVATE, 2, NULL <unfinished ...>

[pid 2255699] futex(0x5630a26ae060, FUTEX\_WAIT\_PRIVATE, 2, NULL <unfinished ...>

[pid 2255696] <... futex resumed>) = 0

[pid 2255698] futex(0x5630a26ae060, FUTEX\_WAIT\_PRIVATE, 2, NULL <unfinished ...>

[pid 2255697] futex(0x5630a26ae060, FUTEX\_WAIT\_PRIVATE, 2, NULL <unfinished ...>

[pid 2255696] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255698] <... futex resumed>) = -1 EAGAIN (Resource temporarily unavailable)

[pid 2255697] <... futex resumed>) = -1 EAGAIN (Resource temporarily unavailable)

[pid 2255700] <... futex resumed>) = 0

[pid 2255698] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255696] <... futex resumed>) = 1

[pid 2255700] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255698] <... futex resumed>) = 1

[pid 2255697] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255700] <... futex resumed>) = 0

[pid 2255699] <... futex resumed>) = 0

[pid 2255698] futex(0x5630a26ae0b4, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255696] futex(0x5630a26ae0b4, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255700] futex(0x5630a26ae0b4, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255699] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255697] <... futex resumed>) = 0

[pid 2255699] <... futex resumed>) = 0

[pid 2255697] futex(0x5630a26ae0b4, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255699] futex(0x5630a26ae0b4, FUTEX\_WAKE\_PRIVATE, 2147483647 <unfinished ...>

[pid 2255697] <... futex resumed>) = -1 EAGAIN (Resource temporarily unavailable)

[pid 2255700] <... futex resumed>) = 0

[pid 2255699] <... futex resumed>) = 3

[pid 2255698] <... futex resumed>) = 0

[pid 2255697] futex(0x5630a26ae060, FUTEX\_WAIT\_PRIVATE, 2, NULL <unfinished ...>

[pid 2255696] <... futex resumed>) = 0

[pid 2255700] futex(0x5630a26ae060, FUTEX\_WAIT\_PRIVATE, 2, NULL <unfinished ...>

[pid 2255699] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255698] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255700] <... futex resumed>) = -1 EAGAIN (Resource temporarily unavailable)

[pid 2255697] <... futex resumed>) = -1 EAGAIN (Resource temporarily unavailable)

[pid 2255696] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255700] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255699] <... futex resumed>) = 0

[pid 2255698] <... futex resumed>) = 0

[pid 2255700] <... futex resumed>) = 0

[pid 2255697] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255696] <... futex resumed>) = 0

[pid 2255700] futex(0x5630a26ae0b0, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255699] futex(0x5630a26ae0b0, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255698] futex(0x5630a26ae0b0, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255697] <... futex resumed>) = 0

[pid 2255696] futex(0x5630a26ae0b0, FUTEX\_WAIT\_BITSET\_PRIVATE|FUTEX\_CLOCK\_REALTIME, 0, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255697] futex(0x5630a26ae0b0, FUTEX\_WAKE\_PRIVATE, 2147483647 <unfinished ...>

[pid 2255696] <... futex resumed>) = -1 EAGAIN (Resource temporarily unavailable)

[pid 2255700] <... futex resumed>) = 0

[pid 2255697] <... futex resumed>) = 3

[pid 2255698] <... futex resumed>) = 0

[pid 2255696] futex(0x5630a26ae060, FUTEX\_WAIT\_PRIVATE, 2, NULL <unfinished ...>

[pid 2255700] futex(0x5630a26ae060, FUTEX\_WAIT\_PRIVATE, 2, NULL <unfinished ...>

[pid 2255697] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255700] <... futex resumed>) = -1 EAGAIN (Resource temporarily unavailable)

[pid 2255698] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255696] <... futex resumed>) = -1 EAGAIN (Resource temporarily unavailable)

[pid 2255700] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255697] <... futex resumed>) = 0

[pid 2255698] <... futex resumed>) = 0

[pid 2255700] <... futex resumed>) = 0

[pid 2255696] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255697] openat(AT\_FDCWD, "/etc/ld.so.cache", O\_RDONLY|O\_CLOEXEC <unfinished ...>

[pid 2255698] futex(0x7f22c27aba48, FUTEX\_WAIT\_PRIVATE, 2, NULL <unfinished ...>

[pid 2255696] <... futex resumed>) = 0

[pid 2255700] futex(0x7f22c27aba48, FUTEX\_WAIT\_PRIVATE, 2, NULL <unfinished ...>

[pid 2255696] futex(0x7f22c27aba48, FUTEX\_WAIT\_PRIVATE, 2, NULL <unfinished ...>

[pid 2255699] <... futex resumed>) = 0

[pid 2255697] <... openat resumed>) = 3

[pid 2255699] futex(0x5630a26ae060, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255697] newfstatat(3, "", <unfinished ...>

[pid 2255699] <... futex resumed>) = 0

[pid 2255699] futex(0x7f22c27aba48, FUTEX\_WAIT\_PRIVATE, 2, NULL <unfinished ...>

[pid 2255697] <... newfstatat resumed>{st\_mode=S\_IFREG|0644, st\_size=166595, ...}, AT\_EMPTY\_PATH) = 0

[pid 2255697] mmap(NULL, 166595, PROT\_READ, MAP\_PRIVATE, 3, 0) = 0x7f22c2746000

[pid 2255697] close(3) = 0

[pid 2255697] mmap(NULL, 134217728, PROT\_NONE, MAP\_PRIVATE|MAP\_ANONYMOUS|MAP\_NORESERVE, -1, 0) = 0x7f22b7d15000

[pid 2255697] munmap(0x7f22b7d15000, 3059712) = 0

[pid 2255697] munmap(0x7f22bc000000, 64049152) = 0

[pid 2255697] mprotect(0x7f22b8000000, 135168, PROT\_READ|PROT\_WRITE) = 0

[pid 2255697] openat(AT\_FDCWD, "/lib/x86\_64-linux-gnu/libgcc\_s.so.1", O\_RDONLY|O\_CLOEXEC) = 3

[pid 2255697] 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

[pid 2255697] newfstatat(3, "", {st\_mode=S\_IFREG|0644, st\_size=125488, ...}, AT\_EMPTY\_PATH) = 0

[pid 2255697] mmap(NULL, 127720, PROT\_READ, MAP\_PRIVATE|MAP\_DENYWRITE, 3, 0) = 0x7f22bfcf5000

[pid 2255697] mmap(0x7f22bfcf8000, 94208, PROT\_READ|PROT\_EXEC, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x3000) = 0x7f22bfcf8000

[pid 2255697] mmap(0x7f22bfd0f000, 16384, PROT\_READ, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x1a000) = 0x7f22bfd0f000

[pid 2255697] mmap(0x7f22bfd13000, 8192, PROT\_READ|PROT\_WRITE, MAP\_PRIVATE|MAP\_FIXED|MAP\_DENYWRITE, 3, 0x1d000) = 0x7f22bfd13000

[pid 2255697] close(3) = 0

[pid 2255697] mprotect(0x7f22bfd13000, 4096, PROT\_READ) = 0

[pid 2255697] munmap(0x7f22c2746000, 166595) = 0

[pid 2255697] futex(0x7f22c27aba48, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255700] <... futex resumed>) = 0

[pid 2255697] <... futex resumed>) = 1

[pid 2255700] futex(0x7f22c27aba48, FUTEX\_WAKE\_PRIVATE, 1) = 1

[pid 2255697] futex(0x7f22bfd14210, FUTEX\_WAKE\_PRIVATE, 2147483647 <unfinished ...>

[pid 2255696] <... futex resumed>) = 0

[pid 2255697] <... futex resumed>) = 0

[pid 2255696] futex(0x7f22c27aba48, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255700] rt\_sigprocmask(SIG\_BLOCK, ~[RT\_1], <unfinished ...>

[pid 2255697] rt\_sigprocmask(SIG\_BLOCK, ~[RT\_1], <unfinished ...>

[pid 2255700] <... rt\_sigprocmask resumed>NULL, 8) = 0

[pid 2255698] <... futex resumed>) = 0

[pid 2255696] <... futex resumed>) = 1

[pid 2255700] madvise(0x7f22bfd15000, 8368128, MADV\_DONTNEED <unfinished ...>

[pid 2255697] <... rt\_sigprocmask resumed>NULL, 8) = 0

[pid 2255698] futex(0x7f22c27aba48, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255696] rt\_sigprocmask(SIG\_BLOCK, ~[RT\_1], <unfinished ...>

[pid 2255700] <... madvise resumed>) = 0

[pid 2255698] <... futex resumed>) = 1

[pid 2255697] madvise(0x7f22c1518000, 8368128, MADV\_DONTNEED <unfinished ...>

[pid 2255700] exit(0 <unfinished ...>

[pid 2255699] <... futex resumed>) = 0

[pid 2255696] <... rt\_sigprocmask resumed>NULL, 8) = 0

[pid 2255700] <... exit resumed>) = ?

[pid 2255698] rt\_sigprocmask(SIG\_BLOCK, ~[RT\_1], <unfinished ...>

[pid 2255697] <... madvise resumed>) = 0

[pid 2255699] futex(0x7f22c27aba48, FUTEX\_WAKE\_PRIVATE, 1 <unfinished ...>

[pid 2255698] <... rt\_sigprocmask resumed>NULL, 8) = 0

[pid 2255696] madvise(0x7f22c1d19000, 8368128, MADV\_DONTNEED <unfinished ...>

[pid 2255700] +++ exited with 0 +++

[pid 2255699] <... futex resumed>) = 0

[pid 2255697] exit(0 <unfinished ...>

[pid 2255698] madvise(0x7f22c0d17000, 8368128, MADV\_DONTNEED <unfinished ...>

[pid 2255696] <... madvise resumed>) = 0

[pid 2255699] rt\_sigprocmask(SIG\_BLOCK, ~[RT\_1], <unfinished ...>

[pid 2255697] <... exit resumed>) = ?

[pid 2255698] <... madvise resumed>) = 0

[pid 2255696] exit(0 <unfinished ...>

[pid 2255699] <... rt\_sigprocmask resumed>NULL, 8) = 0

[pid 2255698] exit(0 <unfinished ...>

[pid 2255697] +++ exited with 0 +++

[pid 2255696] <... exit resumed>) = ?

[pid 2255699] madvise(0x7f22c0516000, 8368128, MADV\_DONTNEED <unfinished ...>

[pid 2255698] <... exit resumed>) = ?

[pid 2255699] <... madvise resumed>) = 0

[pid 2255657] <... futex resumed>) = 0

[pid 2255698] +++ exited with 0 +++

[pid 2255696] +++ exited with 0 +++

[pid 2255699] exit(0 <unfinished ...>

[pid 2255657] futex(0x7f22c0d16910, FUTEX\_WAIT\_BITSET|FUTEX\_CLOCK\_REALTIME, 2255699, NULL, FUTEX\_BITSET\_MATCH\_ANY <unfinished ...>

[pid 2255699] <... exit resumed>) = ?

[pid 2255657] <... futex resumed>) = 0

[pid 2255699] +++ exited with 0 +++

munmap(0x7f22c1d19000, 8392704) = 0

clock\_gettime(CLOCK\_PROCESS\_CPUTIME\_ID, {tv\_sec=0, tv\_nsec=4359011}) = 0

write(1, "\320\237\320\276\320\264\321\201\321\202\321\200\320\276\320\272\320\260 \320\262\320\277\320\265\321\200\320\262\321\213\320"..., 81Подстрока впервые встречается на индексе: 76

) = 81

write(1, "\320\222\321\200\320\265\320\274\321\217 \320\267\320\260\321\202\321\200\320\260\321\207\320\265\320\275\320\275\320\276\320"..., 92Время затраченное на поиск подстроки: 0.002603 секунд

) = 92

write(1, "\320\234\320\260\320\272\321\201\320\270\320\274\320\260\320\273\321\214\320\275\320\276\320\265 \320\272\320\276\320\273\320"..., 65Максимальное количество потоков: 5

) = 65

lseek(0, -1, SEEK\_CUR) = -1 ESPIPE (Illegal seek)

exit\_group(0) = ?

+++ exited with 0 +++

## Наблюдения:

Длина строки 100.000.000 символов, длина подстроки 100 символов, подстрока впервые встрчается на индексе 6.854.976

|  |  |  |  |
| --- | --- | --- | --- |
| **Число потоков** | **Время исполнения (с)** | **Ускорение** | **Эффективность** |
| 1 | 22,806084 | 1 | 1 |
| 2 | 22,558846 | 1,0109 | 0,5054 |
| 3 | 21,131713 | 1,0792 | 0,3597 |
| 4 | 20,770888 | 1,0979 | 0,2745 |
| 5 | 20,728760 | 1,1002 | 0,2200 |
| 6 | 20,566385 | 1,1089 | 0,1848 |

**Ускорение** показывает во сколько раз применение параллельного алгоритма уменьшает время решения задачи по сравнению с последовательным алгоритмом.

Ускорение определяется величиной SN=T1/TN, где Т1 - время выполнения на одном потоке, TN - время выполнения на N потоках.

**Эффективность** - величина EN = SN/N, где SN - ускорение, N - количество используемых потоков.

# Вывод

На основе тестирования программы с разным количеством потоков и объемом данных можно сделать следующие выводы:

1) Многопоточность значительно ускоряет выполнение программы при грамотном распределении нагрузки между потоками.

2) Для максимального ускорения следует выбирать оптимальное количество потоков, которое соответствует вычислительным возможностям компьютера (например, числу ядер процессора) и объему задачи.

3) Избыточное количество потоков может снижать эффективность работы из-за накладных расходов на управление потоками и синхронизацию.

Таким образом, многопоточность является эффективным инструментом для повышения производительности, если её правильно применять в зависимости от аппаратных характеристик и сложности задачи.