SUBKHANKULOV RUSTAM

MIPT - Applied Mathematics & Physics

CONTACT

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SKILLS

Languages:

C, C++, ARMv6 Assembly, x86-64 Assembly, RISC-V Assembly, Python, Verilog

Tools:

Make, Cmake, git, gdb, KCachegrind, Valgrind, qemu

Other:

STM32 microcontroller programming, DOS, LaTex, dot, SFML, MPI

Foreign languages:

English (Upper Intermediate)

ACHIEVEMENTS

All-Russian Olympiad for schoolchildren in geography

Prize-winner (2021)

MIPT 'Phystech' physics olimpiad

2st degree diploma (2021)

"Rosatom" physics olimpiad

1st degree diploma (2021)

EDUCATION

Bachelor of Applied Mathematics & Physics - 3rd year — **2021 - 2025**

MIPT, DREC - Moscow, Russia

GPA: **9.27/10.00** .
GPA in programming: **9.75/10.00**.

WORK EXPERIENCE

Junior laboratory assistant — **2023 - 2024**

ISP RAS - Moscow, Russia

Junior laboratory assistant at ISP RAS, Software Engineering Department

ASSIGNMENTS & PROJECTS

Internship at ISP RAS — **2022**

Tools: C, Make, syzkaller, svace
Supervisor: Alexey Khoroshilov(khoroshilov@ispras.ru)

The internship allowed to get an idea about the structure of the Linux kernel, to master principles of interaction with the international community of kernel developers, prepare and send patches that were included in one of the largest free software development projects security.

Course "Designing the operating system kernel" — **2022 - 2023**
GitHub
Tools: C, Make,
Supervisors: Alexey Khoroshilov(khoroshilov@ispras.ru)
Vitaly Cheptsov(cheptsov@ispras.ru)

Development of the core of the educational operating system called JOS. The basis of this course is MIT's operating system graduate class

STM32F051 microcontroller programming course — **2023**
GitHub
Tools: C, Make, ARMv6 Assembly
Supervisors: Vladislav Aleinik(valeinik@ispras.ru)

The purpose of this course is to give students a basic understanding of the design and principles of working with the STM32F051 microcontroller.

JIT-compiler **2022**
GitHub
Tools: C, Make
Supervisor: Ilya Dedinskiy (ded@ded32.ru)

JIT compiler that translates binary code intended for execution by a virtual processor into x86 architecture instructions.

Shift-reduce parser **2024**
GitHub
Tools: C++, Cmake

Shift-reduce parser for simple 'arithmetical' grammar.

Digital electronics course **2024**
GitHub
Tools: Verilog, Cmake

"Introduction to FPGA and Verilog" course at MIPT DREC.

Lexer **2024**
GitHub
Tools: C++, Cmake

Lexer for non-existent programming language, implemented with flex.

Red-Black Tree **2023**
GitHub
Tools: C++, Cmake

Red-black tree implementation with graphical dump feature and optimized methods for range queries.

LFU caching algorithm implementation **2023**
GitHub
Tools: C++, Cmake

LFU cache implementation with its comparison to 'perfect caching alogirthm'.

Hash table **2022**
GitHub
Tools: C, Make, KCachegrind, Python
Supervisor: Ilya Dedinskiy (ded@ded32.ru)

Hash table implementation with Assembly optimizations. Comparing of different hash functions using hash table.

Mandelbrot set visualization optimizations **2022**
GitHub
Tools: C, Make, SIMD
Supervisor: Ilya Dedinskiy (ded@ded32.ru)

Mandeldrot set visualization implementation with AVX optimizations.

Alpha-blending **2022**
GitHub
Tools: C, Make, SIMD
Supervisor: Ilya Dedinskiy (ded@ded32.ru)

Alpha-blending implementation with AVX optimizations.

Ray-tracing **2022**
GitHub
Tools: C++, Make
Supervisor: Ilya Dedinskiy (ded@ded32.ru)

C++ implementation of raytracing.

Computation mathematics methods **2023-2024**
GitHub
Tools: Jupyter Notebook

MIPT DREC Computational Mathematics course labs

Assembly printf implementation **2022**
GitHub
Tools: C, X86-64 Assembly
Supervisor: Ilya Dedinskiy (ded@ded32.ru)

Assembly-language implementation of the printf function, calling according to the System V AMD64 ABI convention. Also some string functions implemented in X86-64 assembly.

"Harry Potter" language compiler **2021**
GitHub
Tools: C, Make
Supervisor: Ilya Dedinskiy (ded@ded32.ru)

Compiler for my own programming language. Translating into my own assembly and generating byte-code for vurtual CPU. Syntactic and lexical analysis, AST intermediate representation

List data structure **2021**
GitHub
Tools: C, Make
Supervisor: Ilya Dedinskiy (ded@ded32.ru)

Cache-friendly doubly-linked list structure.

The "Akinator" game **2021**
GitHub
Tools: C, Make
Supervisor: Ilya Dedinskiy (ded@ded32.ru)

Parsing data base saved in text format and creating binary tree structure for the game.'Dot' graphic dump of tree.

Differentiator **2021**
GitHub
Tools: C, Make
Supervisor: Ilya Dedinskiy (ded@ded32.ru)

Parsing expressions and symbolic differentiation using binary tree. Simplification of arithmetic expressions (constant convolution).

INTERESTS

Operating systems, processor architecture, computer architecture, low-level optimizations, compilers

PERSONAL QUALITIES & SOFT SKILLS

Learning ability, communication skills, desire to learn new things, teamwork