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Software develover

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PROJECTS

Rap language

Used tools: C, x86-64 ASM, Graphviz, GDB, x64dbg, Make

https://github.com/metaironia/MyProgrammingLanguage

Rap language I have developed is a programming language where code should be written using words from russian rap music. Three main parts were developed: frontend, middle-end and backend. Frontend converts source code to AST. Middle-end optimizes math expressions in AST. Backend converts AST to assembly code and has two versions: conversion to 64-bit NASM or to assembly I had developed earlier.

Mandelbrot set drawing

Used tools: C, TXLib, GDB, Make

https://github.com/metaironia/MandelbrotSetSIMD

Program draws Mandelbrot set using Win32 GDI. Two optimizations were implemented to speed up the drawing process. The first one is advanced calculation of pixels color (calculation of color of four pixels instead of single pixel per iteration). The second one replaces calculation process with SIMD instructions.

Hash table profile-guided optimization

Used tools: C, x86-64 ASM, GDB, Visual Studio profiling tool, Make

https://github.com/metaironia/HashTable

Research of distributions of hash functions using hash table with separate chaining method for collision resolution. Project also contains three low-level optimizations of hash table which are written using SIMD, inline assembly and NASM.

Derivative calculator

Used tools: C, x86-64 ASM, GDB, Graphviz, LaTeX, Make

https://github.com/metaironia/MathEquationDifferentiator

Program takes derivative of input expression. Process of calculation of derivative is outputted to LaTeX file along with some explanations. Finally, program creates plot of derivative and Taylor series of initial expression at the end of LaTeX file.

Assembly implementation of printf

Used tools: x86-64 ASM, x64dbg

https://github.com/metaironia/AsmPrintf

Pure assembly implementation of printf function from standard C library.

EDUCATIONAL HISTORY

MIPT, Department of Radio Engineering and Cybernetics (2023 - present)

1st year, completed the course on system programming and compiler technologies

Moscow State School 57 (2019 - 2023)

Graduated from physics/math class with a Federal gold medal and Moscow gold medal

HARD SKILLS

C, Git, GDB, Graphviz, Makefile, x86-64 ASM, x64dbg, Python, Matlab, LaTeX, Visual Studio

SOFT SKILLS

Creative, adaptable, good at communication, responsible

GRADES (GPA)

Overall: 7.79/10
Programming disciplines: 8.00/10

LANGUAGES

Russian - native
English - upper intermediate (B2)

HOBBIES

Photography, writing music, football, computer games

SPHERE OF INTEREST

Game development, compiler technologies, low-level (ASM) optimizations, operating systems

ACHIEVEMENTS

"Kurchatov" physics Olympiad

Winner (2023)

All-Russian physics Olympiad

Final stage participant (2023)