Trunov Vladimir

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Education

MIPT, Dolgoprudny **Dolgoprudny, Russia**

Radio engineering and computer technology, Applied Mathematics and Physics 2021 – 2025

GPA (general) 7.58/10

Coursework:

- System programming from ISP RAS and Huawei
- C++ course (Second year ISR RAS and Huawei course)
- LLVM-practise course from Huawei

Internships: Compilers Department ISP RAS 07.2022 - 08.2022

Job experience: 09.2022 - present ISP RAS

Internships

Compilers Department ISP RAS **July 2022 - August 2022**

The topic of the internship was familiarity with the Clang-Tidy and Clang Static Analyzer infrastructure and the development of checkers.

Job experience

Compilers Department ISP RAS **September 2022 - present**

Clang-Tidy/Clang Static Analyzer **September 2022 - June 2023**

My job was related to writing C++ code checkers for various guidelines using Clang Static Analyzer and Clang Tidy.

LLVM Backend for PowerPC **June 2023 - present**

My job is to add support for new processor-specific instructions and registers. Also adding support for address sanitizers.

C projects

Programming language **December, 2021**

This project was the last one in the first semester. It uses: a binary tree, a stack, and a software processor. Recursive descent and prefix tree structure were implemented.

Binary Translator **May, 2022**

The binary translator translates the binary code of my software processor into the binary code of the x86-64 architecture processor. Support for all functions of the software processor (including input, output of numbers) has been preserved.

System programming repository **September-December, 2022**

This is a training repository for the system programming course in the 3rd semester of MIPT. The repository includes the execution of tasks related to multithreading and using the Linux API

C + Asm projects

Hash-table **April, 2022**

The hash table is implemented based on my Cache-friendly List. Various hash functions were investigated and optimizations were carried out, including writing functions in assembly language and using AVX instructions.

Pure Assembly projects

Printf asm version **March, 2022**

An analog of the Printf() library function was written. All specifiers are supported, and there is also support for an additional specifier - %b, which prints a number in binary representation.

C++ projects

My own STL structures **March, 2023**

The repository includes several structures that are an alternative to the standard containers presented in the STL. There are implementations of smart pointer, vector (which allow you to use stl algorithms) , common_type, functional in the repository.

Projects involving LLVM

LLVM Callgraph **March, 2023**

The repository is a fork from the official LLVM repository, which implements a self-written tool for collecting Callgraph, the construction is carried out using graphviz. The program can work both statically and dynamically (edges in the graph gain weights). Multi-module projects are supported.

Neurosort **July, 2023 - present**

Project now is in progress. Neurosoft tool helps to reorder function within executable file for minimizing instruction cache misses. We are still experimenting with various algorithms and metrics to find the best implementation.

Programming Language with LLVM **July, 2023 - present**

Project is in development. I try to make simple C-like language with using LLVM, so it helps me add some C++ features. The compiler will generate LLVM IR for futher optimization passes and code-gen by LLVM.

Skills

Programming languages: C/C++, x86-64 Assembly, LaTex

Knowledge: Data structures and algorithms, Concurrency paradigms, LLVM, Clang Static Analyzer, Clang-Tidy, Linux

Tools: make, CMake, gdb, git/github/gitlab, vim/nvim, perf, Qemu

Personal qualities: Quick involvement in work, the ability to study theory for a long time, sociability