

Sharadh Rajaraman

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Education

National University of Singapore

Singapore

BACHELOR OF COMPUTING (HONOURS) IN COMPUTER SCIENCE; 2ND MAJOR IN PHYSICS

Aug 2018–May 2023

- Computer science: parallel computing; real-time computer graphics; operating systems; compiler design.
- Physics: astrophysics; quantum mechanics; solid-state physics.

Skills

Experienced Languages C++, C, C#, Python, Java, \LaTeX , GLSL/HLSL

Familiar Languages OCaml, F#, Rust, Objective-C, TypeScript, PowerShell, bash

Frameworks & Tools OpenGL, DirectX, Vulkan, OpenMP, CUDA, CLion/IDEA/Rider, Visual Studio, CMake

Experience

Government Technology Agency, Singapore (GovTech)

Singapore

EMBEDDED SOFTWARE ENGINEERING INTERN (SENSORS AND IoT DIVISION: C/C++, CMAKE, STM32)

May 2022–Aug 2022

- Implemented a C++ wrapper over Linux Serial Peripheral Interface (SPI) syscall interface. Reduced wheel-reinvention, and improved linkage for other projects using C++.
- Implemented firmware on an STM32 microcontroller in C++ to emulate a Trusted Platform Module (TPM) over I²C for Raspberry Pi (rPi). Improved security on the rPi, and saved costs on purpose-built TPMs.

Civil Aviation Authority of Singapore (CAAS)

Singapore

SOFTWARE ENGINEERING INTERN (TYPESCRIPT/EXPRESS.JS, C#/ASP.NET CORE)

May 2021–Aug 2021

- Implemented a RESTful API for a UUID generator to identify flights.
- Automated a serialiser/deserialiser code generator that consumed XML schemas; migrated the codebase from TypeScript to C#.
- Inspected class structures at runtime to build a lookup table which served a RESTful API.

NUS School of Computing (SoC)

Singapore

UNDERGRADUATE TEACHING ASSISTANT

Aug 2020–Nov 2022

- CS1101S Programming Methodology, CS2100 Computer Organisation, CS3241 Computer Graphics, CS4247 Real-time Rendering.
- Conducted weekly tutorials and recitations, prepared materials and videos for students, and marked assignments.
- Set up auto-grading scripts for assignments, and automated the marking process for computer graphics assignments.

Projects

Oat Compiler

COMPILER FOR [OAT LANGUAGE](#) (OCAML, MENHIR)

- Front-end outputs a subset of LLVM IR; back-end compiles IR to a subset of x86_64 assembly.
- Includes compile-time type-checking and optimisations e.g. constant folding, dead-code elimination, and register allocation with graph colouring.

cache-sim [\(GitHub repository\)](#)

QUAD-CORE CACHE-COHERENCE SIMULATOR (C++20, CMAKE)

- Implements the MESI, MOESI, and Dragon cache-coherence protocols.
- Correctly simulates the cache-coherence behaviour of a real quad-core CPU, is configurable (cache size, associativity), and outputs statistics in .csv format.

Static Program Analyser

LEXER AND PARSER FOR A C-LIKE TOY LANGUAGE (C++17)

- The lexer is implemented with a `std::regex` state machine, and the parser is recursive-descent.
- Inserts information such as variable declarations, function calls, and control flow into a database about a given program written in the toy language.

Extracurriculars

NUS Astronomical Society (NUSAS)

Singapore

HONORARY GENERAL SECRETARY, ASTROHEAD

Sept 2018–Aug 2022

- Organised outreach events and pavement/sidewalk astronomy with public libraries and schools
- Assisted in 2019 Boxing Day solar eclipse event, managed ~5 telescopes, and introduced public to basic astronomy
- Prepared and delivered talks on topics in astronomy to club members