Maya Warrier

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Education

University of Toronto St. George, BASc Computer Engineering, SEP '17 – APR '21
27 King's College Cir, Toronto, ON M5S 3H7, Canada, +1 416-978-2011
Courses taken: Algorithms and Data Structures, Operating Systems, Computer Hardware, Probability and Applications, Probabilistic Reasoning

Skills

Languages: C# 7.x, Mono, C++11, C11, C89/ANSI C, Verilog+Tcl
Libraries: .NET Framework 4.7-4.8, .NET 5.0, WPF, STL, Boost, GTK, OpenGL
Environments: Emulation, FPGA solution design, Desktop application development

Software Developer Intern (Co-op)

MAY 2020 – SEP 2021

Rocscience Inc., Toronto

- Developed Rocscience's new file I/O library, now being used in a new key line of products.
  - I worked around C#'s inherent memory performance limitations by limiting the size of C#'s **LOH** by about **8-10 times,** thus reducing frame drop/jitter **by over 2 times.**
  - The library is completely asynchronous (using C#'s new async/await), **significantly improving** performance on multi-core machines.
- Replaced the tightly-integrated legacy Undo/Redo system that previously created several maintenance issues.
  - Moved to a state-based system from the previous change-based system, ensuring there is no unintentional loss of information when a user performs an Undo/Redo.
- Redesigned the snap system (snap to grid/vertex, etc.) to be more developer-customizable.

Software Engineering Intern

MAY 2019 – AUGUST 2019

Rocscience Inc., Toronto

Developed 3D contouring and visualization tools for Rocscience's Examine3 product.

- Migrated the legacy graphing system to Examine3 and refactored it for **easier ports** to future products.
- Designed the foundation of Examine3's system to contour, visualise, and graph field points.
- Developed a prototype system to post-process UI notifications. This was able to improve UI responsiveness by up to **70%** on certain large workflows.

Research Assistant

DEC 2017 – JAN 2019

Dr. Tamer Diraby, Dept. of Civil Engineering, University of Toronto

Worked on software tools for civil engineers using insights from Dr. Diraby's research. I co-developed "city-builder", a cross-platform 3D tool to help civil engineers design roads and cities.

- Developed a JSON-based file format (.city) to describe cities, roads, and lanes.
- Developed an API to create and manipulate lanes and roads without direct calls to the 3D renderer.

intel8080-emulator

github.com/mayawarrier/intel8080-emulator C90/ANSI C

A personal project emulating the Intel8080 microprocessor. I hope to use it to run a BASIC interpreter and Zork (one of the earliest text-based game series - written in 1977!).

- Implements all instructions, documented and undocumented.
- Passes the Kelly Smith and Supersoft Diagnostic tests originally written for the 8080.
- Has some support for IBM-PC devices/controllers.
- Written in C90 and is portable to a wide array of platforms (GCC, clang, WebAssembly, etc.)

raycast-3D-CycloneFPGA

github.com/mayawarrier/raycast-3D-CycloneFPGA Verilog

A 3D raycast renderer for Cyclone V FPGAs. Tested on a Terasic DE1_SoC prototype board.

- Designed the parallelized ray intersection DSP, resulting in a lower bound output of **~600 fps** at 160x120 pixel resolution and 3-bit color palette.
- Co-designed DSP modules for fixed point arithmetic and precomputed tables for trigonometric ratios. The tables allowed for **32 times faster** trigonometric computations.