Anirudh Prasad

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SKILLS

Languages: C | C++ | Python | Bash | Assembly

Tools and Technologies: LLVM | z/Architecture | Embedded Systems | SQL | Git | Unix/Linux | Docker

EDUCATION

University of Waterloo

Bachelors of Applied Science – Honours Computer Engineering — Apr '19

Relevant Coursework: Operating Systems, Computer Architecture, Compilers, Embedded Systems

WORK EXPERIENCE

IBM — Markham, ON

Staff Software Developer, Compilers — Feb '21 – Present

Software Developer, Compilers — Jul '19 – Feb '21

- Part of the team porting the LLVM compiler infrastructure to the IBM Z mainframe (z/OS)
- Worked with various internal and external stakeholders to come up with design proposals for adding HLASM support to LLVM, including an RFC to the LLVM community
- Drove the implementation for adding HLASM inline assembly support as the primary developer. Worked on adding support for z/OS specific inline assembly constraints, HLASM specific instructions and changes to the **core assembly lexer**, **core assembly parser** and **backend assembler**, along with **~90% test coverage**
- Added support to LLVM for other miscellaneous features such as the IBM __ptr32 type qualifier, character set conversions from EBCDIC (z/OS character encoding) to ASCII/UTF-8, and z/OS custom built-in functions
- Set up an end-to-end automation pipeline using **Python, Docker and Buildbots** to measure compiler performance using SPEC benchmarks
- Applied for a **patent** in the area of statically detecting portability errors and concerns in source code

NVIDIA — Santa Clara, CA

Embedded Software Developer, Autonomous Systems — Sept '18 - Dec '18

- Implemented a C++ publisher/subscriber communications library, supporting both aarch64 and x86_64 architectures, utilizing **C++11 multithreading/concurrency**
- Designed and implemented a service management and orchestration framework in **C++**, to enable **NVIDIA DRIVE (autonomous driving) applications** to coordinate and communicate with each other
- Executed various functional tests on the embedded NVIDIA DRIVE AGX Pegasus hardware platform

Apple — Ottawa, ON

Software Developer, Special Projects Group — Sept '17 - Dec '17

- Ported various functions of the **Newlib pthread library** to work with an **embedded real-time OS** for autonomous systems, with special emphasis on CPU affinity functions

- Implemented a fully functional **core dumping mechanism** in **C** to capture faulting threads and processes and write out core files
- Added automated **LLDB** support using **Python** to debug created core files

IBM Markham, ON
Software Developer, Compilers Jan '17 - Apr '17

- Implemented and optimized various built-in functions in **C** and **C++** for the **POWER9 processor** in a LE Linux environment
- Wrote several Perl scripts to evaluate POWER9 processor performance using SPEC Benchmarks
- Executed functional and performance tests in BE and LE systems

Nielsen Markham, ON
Application Developer, Nielsen Analytics May '16 - Aug '16

- Saved around **$700,000 annually** by designing and developing a data extraction application in **C# ASP.NET**, **Ext JS** and **SQL Server** to generate analytics reports
- Implemented various REST APIs in Ext JS to interact with SQL Server and Oracle SQL Developer
- Improved processing time from **2250+ hours** to **38 hours** by using an external cache to optimize Oracle and SQL queries and stored procedures

PROJECTS

LLVM Jan '20 - Present
https://reviews.llvm.org/p/anirudhp/

- Contributing and reviewing various patches in the LLVM community
- **IBM:** Adding HLASM support, Asm Lexer and Parser changes, SystemZ backend
- **Personal:** Experimenting with improvements to llvm-otool, LLDB, and the TableGen AsmWriter

Dyslexia Done Nov '19 – May '20
https://github.com/aniprasad/online-reading-tutor

- Worked with OnlineReadingTutor.com to come up with a new **Android** and **iOS** application to combat Dyslexia
- Re-designed the UI using **React Native** and improved lesson delivery by making it more interactive
- Implemented a "Reward" system in the app, giving virtual badges for achievements. Led to **70%** increase in daily logins and **50%** increase in lesson completions
- Conducted beta testing with students and parents and incorporated feedback into application

SoleSense May '18 – May '19

- Designed and developed a novel **smart shoe insole** that collects pressure sensor data to identify and diagnose gait abnormalities
- Worked with various stakeholders including podiatric physician and engineering adviser to craft iterative requirements and create product within given time and financial constraints
- Developed an accompanying **Android application** to interface with a **nRF52820 SoC** using Bluetooth
- Used signal processing, machine learning and **GAIT analysis** to efficiently process data to come up with healthy walking and running patterns
- Won **General Motors Best Complex Application and Design** award (out of 72 participating teams)