Jozef Lawrynowicz

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Skills

- C/C++, Bash, Python
- GCC/LLVM development, Computer Architecture, Compiler Design, Assembly, ELF, Linux, Git

Experience

Texas Instruments - Software Engineering Consultant   Nov 2017 – Dec 2020 (Remote)

MSP430-GCC - C/C++, Bash, Python, MSP430 Asm

- Led the development effort for the MSP430 GNU C/C++ toolchain, delivering new releases to Texas Instruments for distribution to thousands of software developers
- Optimized instruction selection in the MSP430 compiler backend, by analyzing generated code from benchmark applications, resulting in an average performance improvement of 10%
- Implemented a compiler cost model for describing the relative costs of operations for the MSP430 target, reducing code size by up to 12%
- Enhanced the MSP430-specific C runtime libraries, by increasing the utilization of hardware multiply capabilities, and optimizing the CRT startup procedure, resulting in an average code size reduction of 8%
- Designed and implemented the SHF_GNU_RETAIN ELF symbol flag, which was integrated into the upstream GNU and LLVM toolchains
- Collaborated with the upstream GNU toolchain community, contributing over 150 patches to the open source GCC, Binutils, GDB and Newlib projects, adding new features, improvements and bug fixes
- Created validation and benchmark reports for each release, assuring stakeholders of release quality with quantitative metrics
- Prepared design documents for stakeholders, describing how toolchain benchmark targets were going to be met, increasing confidence in the accuracy of time estimates for the associated tasks
- Collaborated with cross-discipline teams, to maintain ABI compatibility between toolchains, and ensure robust integration of MSP430-GCC into the Code Composer Studio IDE
- Implemented a cross-platform continuous integration system using Buildbot, targeting Linux, Windows and macOS platforms, significantly reducing time spent on manual testing, benchmarking, and packaging tasks
- Maintained user's guide documentation, and provided technical support directly to customers

Somnium Technologies - Software Engineer   Aug 2015 – Aug 2017 (Chepstow, UK)

Somnium DRT ARM Cortex-M Development Tools - C, Bash, Python, ARM Asm

- Implemented a function reordering linker optimization, delivering performance improvements of up to 15%
- Implemented an Eclipse IDE plugin to diagnose ARM CPU faults during debugging sessions, improving developer productivity
- Presented product capabilities at technology conferences (ARM TechCon, NXP FTF and Embedded World)

MSP430-GCC - C, Bash, Python, MSP430 Asm

- Managed requirements for new product releases, delegating tasks to colleagues according to their skill sets
- Implemented a GNU linker feature to optimize section placement between non-homogeneous memory regions, improving memory utilization for space-constrained devices

Projects

LLVM - C++   July 2021 – Sep 2021
- Planned improvements to MSP430 support, by analyzing the state of the MSP430 backend, using knowledge of the MSP430 ISA to prioritize tasks according to their expected impact on code generation
- Implemented initial MSP430X CPU support, adding new instructions to reduce code size and improve performance, for shift operations and function prologue/epilogue code

Education

University of Bristol   Sep 2012 – May 2015 (Bristol, UK)
- BSc (Hons) in Computer Science (1st Class)
- Final Year Project: Automated Guitar Solo Transcription (Awarded "Best Final Year Project")