Alexander J. Marshall

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Hard-working programming expert with experience developing for many diverse systems, including low-power devices such as proprietary games consoles and wearables. Very experienced with C, C++, assembler, and many other popular languages. Excels in a small team environment, and can work efficiently when independent. Fast learner of new languages, able to quickly adapt to new platforms, and can understand technical documentation with ease. Documents all tools, libraries, and other software during development.

Work Experience

Pebble Technology Corporation -- Firmware Engineer -- May 2015 to Present

- Designed and implemented a cron-style service to centralize handling accurate wall clock-based events while taking daylight savings time adjustments into account
- Worked in a team of 3 to bring up the next generation of product. Some specific roles were performance testing and optimization, and implementing cache maintenance routines and policies.
- Worked in a small team to back-port our 3.x operating system to our oldest line of products, which required large code-size reductions, optimization of images and fonts, and re-introducing monochrome support.

Battelle Memorial Institute -- Computer Scientist -- Jan 2013 to May 2014

- Reverse engineered and documented the proprietary ASICs used in Cisco Catalyst network switches
- Developed an emulator of Cisco Catalyst 3550 switches to verify and assist in reverse engineering efforts

Hex-Rays S.A. -- Software Developer -- Oct 2011 to Mar 2012

- Developed an Objective-C metadata interpreter to improve disassembler output quality
- Added support for various MIPS ASEs, including MIPS-3D, smartMIPS, MIPS-MT, and Toshiba's TX19a
- Added support for Paired Singles and VMX128 floating-point extensions to the PowerPC processor module, and improved performance
- Designed and developed a processor module for the SunPlus unSP embedded microcontroller architecture

Other Experience

- **Hien** -- Designed and developed a flexible and highly modular emulation application in C which constructs device emulations using a novel combination of compiled domain-specific languages and YAML
- **nmk004-trojan** -- Designed and developed a method of extracting the internal ROM from a protected MCU used on a number of arcade game boards. Utilized an FPGA development board to capture the data, and wrote a PC tool to reconstruct the original data from the capture

Skills

- **Operating Systems:** Mac OS X, Linux (Arch, Debian), Windows (10, 7, XP, 9x), various DOS
- **Programming Languages:** C, C++, Assembly (ARM, PPC, Z80, etc.), VHDL, Ruby, Python
- **Tools and Applications:** Git, Mercurial, Make, Newlib, Doxygen, IDA Pro
- **Processors:** ARM Cortex-M series, IBM PowerPC, Intel x86/64, Renesas SuperH, Zilog Z80

Accomplishments

- Developed Linux kernel modules for interfacing with hardware over PCIe
- Developed emulators for system research and documentation purposes
- Created tools and software development kits for under-documented proprietary systems
- Designed and implemented network servers to replace now-defunct servers used by legacy software