Dang Le

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Education

University of Waterloo – *BASc in Computer Engineering* Expected Apr 2027
Coursework**:** Digital Logic Design, Computer Organization, Real-Time Operating Systems, Reconfigurable Computing

Skills

Languages: C, C++, SystemVerilog, Verilog, VHDL, Python, x64/ARM Assembly, Tcl, Perl
Technologies: Git, SVN, Linux, Vivado, Quartus, Modelsim, Efinity
Protocols: UART, I2C, SPI, TCP/IP, UDP
Lab Equipment: Oscilloscope, Logic Analyzer, Function Generator, Soldering

Experience

Embedded and FPGA Developer Team Member, *UW Reality Labs - Waterloo, ON* Aug 2024 – Present
- Designed and validated image acquisition pipeline using custom RTL and Efinix vendor IPs to capture and process data from MIPI CSI-2 OV9281 camera with Raspberry Pi 4 for I2C-based control
- Wrote firmware in C on TI RM46 Cortex-R MCU to manage real-time hysteresis system, featuring I2C to communicate with digital sensors and FRAM storage for non-volatile data logging
- Performed board validation on custom PCBs using bare-metal test firmware for Trion T120 and T20 FPGAs and CH569 (RISC-V) MCU, verifying signal integrity with logic analyzer and multimeter
- Automated unit test and firmware cross-compilation for C, C++, and Assembly source code with CMake

Systems Software Engineer Intern, *BlackBerry QNX – Ottawa, ON* May 2024 – Aug 2024
- Integrated SHA-256 cryptographic hashing to message passing system calls in C, preventing Denial-of-Service attacks and data tampering in inter-process communication
- Led successful proof-of-concept implementation for porting QNX kernel to Cortex-R52 processor via QEMU virtual emulation, obtaining approval for physical bootloader development
- Added UNIX signal handling, error-checking and auto-documentation for QNX utilities with C and Bash, improving QoL

Software Engineer Intern, *University of Waterloo - Waterloo, ON* Aug 2023 – Dec 2023
- Designed e-commerce store UI features and web pages using LAMP stack to enhance customer shopping experience and enable operators to manage more than 100 print and scan requests daily
- Wrote Bash and Perl scripts to generate inventory reports and export data, reducing management workload for buyers

Software Engineer Intern, *University of Waterloo - Waterloo, ON* Jan 2023 – Apr 2023
- Developed back-end (PHP) functionality and performance fixes to business ERP application annual orders, providing an error-free fulfillment process for over 30,000 annual orders
- Configured Ubuntu print servers to protect deprecated legacy printing environment from eavesdropping and FTP attacks

Projects

x64 Native C++ Debugger – *C++, x64 Assembly, CTest* github.com/danglevm/sdb
- Engineered a native x64 debugger for ELF binaries in modern C++, leveraging Linux ptrace system call for low-level process control, memory manipulation, and register access
- Implemented comprehensive debug features including instruction patching (int3) for software breakpoints, hardware debug register (DR0-DR7) management for watchpoints, and custom DWARF parser for source line translation
- Authored 20+ functional test suites with CTest to validate breakpoint accuracy, symbol translation, and stack unwinding

AES-128 Accelerator – *SystemVerilog* github.com/danglevm/aes-accelerator
- Designed pipelined AES-128 encryption core in SystemVerilog, achieving correctness by verifying the design against the complete NIST FIPS 197 Known Answer Test (KAT) suite in ModelSim and running module on DE10 board

N x N Matrix-Vector Multiplicator - Written in SystemVerilog and operating at 150+ MHz on PYNQ-Z1 board
RTOS Kernel - C-based kernel running on baremetal Cortex-M4 MCU with pre-emptive scheduling and memory allocator