ANDY REN

Computer Engineering at University of Waterloo

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EXPERIENCE

Embedded Software Intern

Nuvation Energy

January 2021 – April 2021 | Waterloo, Canada

- Developed firmware in **C/C++** for the Nuvation **Battery Management System**
- Drafted and implemented a prototype software model for migrating flash memory data after a firmware upgrade
- Constructed system tests and test fixtures in **C++** and **Python** to verify firmware features in simulated and hardware environments
- Debugged and investigated numerous real-time bugs and test regressions using **gcc** and **Python**, improving firmware robustness

Software Developer

VirtaMove

September 2019 – December 2019 | Kanata, Canada

- Built a robust internal test framework for VirtaMove using **Python** and **Robot Framework**, which executed release-critical manual tests nightly, reducing software testing and verification time by up to **50%**
- Implemented features in **C/C++** which enabled V-Migrate host certificate regeneration, and resolved various runtime concurrency errors
- Configured the V-Migrate installer to automatically resolve TCP/IP port collisions, and perform closed network installation using **WiX Toolset**
- Redesigned migration agent key generation, enabling V-Maestro to communicate with previously linked agents after a system restart, improving product scalability
- Prototyped a new product activation graphical interface for migration licensing using **C#**, **.NET Core**, and **C++**

PROJECTS

ARM RTX Project

May-Aug 2021

- Constructed a real-time operating system kernel for an **ARM Cortex M3** microcontroller in **C** for a course lab component.

Systolic Array

May-Aug 2021

- Developed and deployed a matrix mulitplication systolic array bitstream using **Verilog** for a Xilinx Pynq FPGA board

home-monitor

github.com/ren-andy/home-monitor

- Built a multi-threaded home monitoring embedded system using a **Raspberry Pi 3B+** and **C++** capable of detecting nearby intruder movement, reading and displaying temperature and humidity, and playing music.

SUMMARY

- Professional experience in software/firmware development and testing with **ARM Cortex M** based embedded systems using **C**, **C++**, **Python**
- Practical experience with **Unix** programming, RTL programming in **Verilog**, and **RISC-V** assembly

SKILLS

Languages

C | C++ | Verilog | Python | JavaScript

Tools and Frameworks

Linux | gcc | git | STL | Docker | Vivado | Robot Framework | Cpputest

EXTRACURRICULARS

Engineering Student Councillor
Advocate for engineering student interests

Fitness Enthusiast
Avid weightlifter and distance runner

Lifelong Musician
Played **Piano**, and **Alto Saxophone** for over a decade

EDUCATION

BASc, Computer Engineering

University of Waterloo

September 2018- Present

- cGPA: 3.3/4.0
- Relevant Courses:
  - ECE 250 - Algorithms and Data Structures
  - ECE 224 - Embedded Microprocessor Systems
  - ECE 252 - Systems Programming and Concurrency
  - ECE 350 - Real-Time Operating Systems
  - ECE 327 - Digital Hardware Systems
  - ECE 320 - Computer Architecture