William Zhang

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Education

University of Waterloo **2023 - 2028**

Candidate for Bachelor of Computer Engineering *Waterloo, ON*

- Cumulative GPA: 91/100, Dean's Honours List in Terms 1A & 1B
- Relevant Courses: Algorithms & Data Structures, Electronic Circuits, Digital Computers, Discrete Math

Technical Skills

Programming Languages: Python, Java, C/C++, HTML, CSS, JavaScript, Bash, SQL, YAML, RISC-V Assembly

Software Knowledge: Linux, Debian, Eclipse, Jira, Git, MySQL, Jenkins, GoogleTest

Hardware Knowledge: Raspberry Pi, STM32 micro-controller, UART, I2C protocol, VHDL, LTSpice

Frameworks: Docker, Flask, TensorFlow, NumPy, Pandas, Matplotlib, scikit-learn, Protocol Buffers, MQTT, Wireshark

Network Protocols: Ethernet, IP, TCP, UDP

Experience

Embedded Software Developer Intern – ***Ford Motor Company*** **May - August 2024**

- Designed and integrated an out-of-coverage handler in **C++** for the **Telematics Control Unit** (TCU) **power manager** in **electric vehicles (EVs)**. It processes data from the **cellular control** subsystem, manages a timed shutdown sequence, and **minimizes power consumption** when searching for cellular coverage
- Implemented and executed **unit tests** for the TCU power manager using the **Google Test** framework, and achieved over **90 %** code coverage
- Developed over 15 **CLI commands** for the TCU power manager, in which Protobuf and the Linux C library are used

GeekWeek 8 Participant – ***Canadian Centre for Cyber Security*** **July 2023**

- Implemented a **YAML** configuration file to containerize a Flask web app frontend and a ZAP (Zed Attack Proxy) website vulnerability scanner backend in **Docker**. It launches the web app and scanner containers simultaneously with **Docker Compose** and links the containers' folders through Docker Volumes
- Implemented an **HTML** file to build the **Flask** web app with user input for the URL and dynamic content
- Developed a Python script to receive the URL and send it to the scanner's container by writing it in a shared **Docker Volume**. It also receives and renders the scanner's report in a separate app route

Projects

Temperature Aware Mug | *C, Embedded Systems, I2C Protocol, Circuits*

- Programmed an **STM32** micro-controller in **C** to control five **peripherals**: an infrared temperature sensor, an LCD display, a potentiometer, a buzzer, and a push-button.
- Successfully tracked and displayed the temperature of a hot mug and sounded the buzzer when the drink cooled to a user-preset temperature with **100%** accuracy

Flight Tracker | *Python, MySQL, Shell Scripting*

- Built a flight tracker on a **Raspberry Pi** with an RTL-SDR (RealTek Software-Defined Radio) flight antenna and a downloaded signal decoder
- Wrote shell scripts that collect data from the antenna and send it through a **TCP port** to a text file
- Developed a **Python** program to scan the text file, filter data, and push it to a **MySQL** database
- Implemented a flight data analyzer that reads from the database and outputs flight traffic statistics

AI/ML Projects | *Python, NumPy, Reinforcement Learning, TensorFlow*

- Trained an AI agent in **Python** using **reinforcement learning** to play the mathematical strategy game of Nim
- Built two **neural networks** to identify MNIST images of handwritten digits using **NumPy** and **TensorFlow**
- Trained a **Deep-Q Network (DQN)** to balance a cart pole in an **OpenAI gym** simulation

Hobbies

Classical music, Reading, Running, Tennis, Pickleball, Badminton