

# Raymond Chang

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## Skills

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- Proficient: Python, C++, C, Java, SQL. also experienced with: TypeScript
- Technologies: Git, SQLite, GNU Make, Spring, CMake, PostgreSQL

## Education

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**University of Waterloo** September 2022 - Present  
Masters of Mathematics in Computer Science (Thesis)

**University of Ottawa** September 2016 - April 2021  
Honours Bachelor of Science in Computer Science (CO-OP)  
Deans Honours List  
Honours project - Modelling and verifying distributed leader election algorithms with TLA+.

## Work Experience

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**Blackberry QNX** June 2020 - August 2020  
CoreOS Software Development Student

- Worked on a program to detect instructions that modify floating point registers
- Developed Unit tests for the QNX Neutrino RTOS and QNX Hypervisor

**Blackberry QNX** September 2019 - December 2019  
CoreOS Software Development Student

- Developed Unit tests for the QNX Neutrino RTOS and QNX Hypervisor
- Setup a QNX Hypervisor System with an Ubuntu guest on the R-CAR H3
- Worked on a Python script to test and track new commits to Review Board
- Increased knowledge of Assembly, C, GNU Make and Operating System design

**Ford Motor Company** January 2019 - April 2019  
Telematics Control Unit Software Developer

- Developed features and Unit tests for C and C++ multi-threaded Linux applications on the Telematics Control Unit
- Fixed bugs and multithreading related issues found by code analysis tools such as Thread Sanitizer and Clang Static Analyzer
- Wrote Python scripts using the Slash testing framework to test changes
- Increased knowledge of Bash scripting and GNU Make

**Canadian Border Services Agency**  
Junior Programmer

May 2018 - August 2018

- Worked in a team of three to create a web application for the management of software development using Java, JSP, Hibernate, jQuery and Spring MVC
- Developed functional UI Mock-ups for the web application using HTML, CSS and JavaScript
- Gathered the necessary requirements for the web application and participated in weekly progress meetings
- Increased knowledge of SQL by writing scripts for the initial creation of the database and testing
- Wrote JUnit Tests for a separate reporting application
- Acquired the Enhanced Reliability Status level of security clearance

## Projects

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### Juice - Java Compiler - Course project for CS644

January 2023 - April 2023

- Worked in a team of three to implement a x86 compiler for a large subset of the Java programming language
- Consisted of 28753 lines of TypeScript, 628 Jest unit tests ( 80% coverage) and passed the majority of course provided test cases
- Was the main author of the lexer, various compiler passes and the intermediate representation (IR) generator and canonicalizer
- Made major design decisions about the the IR and closely consulted with group members
- Ported and upgraded an existing IR interpreter from Java to TypeScript
- Wrote hundreds of Jest unit tests
- Source code available upon request

### Lettuce - New Programming Language and LLVM based compiler

July 2023 - August 2023

- Worked with a partner to create a new programming language and corresponding compiler using the LLVM compiler infrastructure
- Developed compiler in C++ and added an interpreter mode
- Created a new IR using MLIR
- Created the build system and dependency management using CMake and Bash scripts
- Source code: <https://github.com/rkchang/mlidk>

### DNS Server

December 2021 - Now

- Currently writing a DNS server in C++ using the ASIO library
- Used CMake and Bazel for the build system and dependency management
- Source code: <https://github.com/rkchang/rcdns>

### Document Search Engine - Course project for CSI4107

January 2020 - April 2020

- Worked with a partner to create a search engine for searching through a collection of course listings and news articles using Flask
- Source code: <https://github.com/rkchang/search-engine>, Final report available upon request