Nikola Zupancic

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EDUCATION

Queen's University

Kingston, ON, Canada

Bachelor of Applied Science; Computer Engineering

September 2021 - April 2025

- Relevant coursework: Computer Architecture, Data Structures, Algorithms, Object Oriented Programming, Microprocessors and Embedded Systems, Operating Systems, Computer Networks, Database Management Systems
- Awards: Dean's Honour List 2022-2023, Dean's Honour List 2023-2024

EXPERIENCE

Queen's Space Engineering Team Member

September 2023 - Current

- Working within the Onboard Computer (OBC) subteam on the **Queen's Space Engineering Team** to develop software for a **CubeSat**
- Participated in idea generation and the design process of the structure for the software that will run on the CubeSat
- Developed a driver for a Real Time Clock using the i2c protocol in C++ on linux

Queen's Cybersec and Cryptography Club (Q3C)

March 2024 - Current

- Co-founded the Queen's CTF team as a subgroup of Q3C
- Participated in CTFs with other students to represent Queen's University
- Created a discord bot to manage CTF related activites and data https://github.com/c-ola/q3ctf-bot

PROJECTS

GameBoy Emulator | https://github.com/c-ola/cassowary-gb

June 2023 – Present

- Developed a program in Rust that emulates the 8-bit Gameboy desktop platforms
- Interpreted the Gameboy's CISC instruction set on emulated registers, memory and i/o devices
- Emulated interrupts generated by input and output hardware, including display, timer, serial and joypad interrupts
- Emulated a pixel processing unit that decodes bytes in VRAM into pixels that are displayed using SDL2

Customizable Assembler | https://github.com/c-ola/minisrc-assembler

March 2024 - Present

- Wrote a Python program that assembles assembly into machine code given a description of an instruction set
- Used YAML and JSON to create a config format that allows for the description of RISC languages
- Developed support for tags, directives and comments, and windows and linux operating system executables

SBC Home Server July 2023 – Present

- Configured a rockpro64 to run docker on debian to host a NAS
- Used a VPN to allow for remote access from other networks

Patient Cancer Screening Service

November 2023

- Achieved 2nd place at the Queen's Engineering Competition for Programming
- Worked as a team of 4 to develop a service that determines if a patient should be screened for cancer
- Wrote a frontend using HTML, Tailwind CSS and React
- Wrote a backend in Python using Flask to process symptoms through a SVM to predict lung cancer

ACADEMIC PROJECTS

Duckietown Design Project

January 2024 - April 2024

- Used **computer vision** concepts to control and navigate a vehicle for MITs Duckietown Platform
- Placed top 10 across worldwide leaderboards in each completed exercise (including 1st and 2nd)
- Trained a Neural Network to identify obstacles along a road
- Used the braitenberg concept to steer around obstacles

TECHNICAL SKILLS

Languages: C/C++, Python, Rust, Java, Javascript, Verilog, Assembly, MATLAB, Bash, HTML, CSS, SQL

CTFs: QCTF - 4th, UMDCTF - 29/562 overall, 15/104 student, ringzer0ctf - top 9%

Libraries: SDL2, Raylib, React, Flask, OpenGL

DevOps: Git, Github/Gitlab, Docker **Tools**: Linux, Cloudflare, Android SDK

Hardware: Arduino, FPGAs, Single Board Computers