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
- Developped 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
- Developped 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