Nikola Zupancic

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Education

Queen's University Kingston, ON, Canada

Bachelor of Applied Science; Computer Engineering *September 2021 – December 2025*

- **Relevant coursework:** Computer Systems Architecture, Data Structures, Algorithms, Microprocessors and Embedded Systems, Operating Systems, Distributed Systems, Cryptography and Network Security Computer Networks, Object Oriented Programming, Database Management Systems, Computer Vision and Deep Learning
- **Awards:** Dean's Honour List 2022-2023, Dean's Honour List 2023-2024

Extra Curriculars

Queen's Cybersec and Cryptography Club (Q3C) March 2024 - Current

- Co-founded the Queen's CTF team as a subgroup of Q3C
- Participating in weekly CTFs with other students to represent Queen's University
- Represented Queen's at CyberSci Regionals 2024 in Ottawa, placing 3rd, 12th in Canada
- Lead team meetings, going over CTF challenges and cybersecurity concepts

Queen's Space Engineering Team (QSET) Member September 2023 - April 2024

- Working within the Onboard Computer (OBC) subteam on the **QSET** 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

Projects

IO Switcher (Software KVM Switch) | https://github.com/c-ola/ioswitch July 2024 – Present

- Wrote a **C** program that switches input devices between computers (software based KVM switch)
- Designed a **Client/Server Daemon** that sends/receives **Linux** input events across a network using **TCP**
- Implemented **Bash** scripts and a **Systemd** service to seemlessly incorporate it into my workflow

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 **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

Patient Cancer Screening Service November 2023

- Achieved **2nd** place in a team of 4 at the Queen's Engineering Competition for Programming
- Wrote a backend in **Python** using **Flask** to process symptoms through a **SVM** to predict lung cancer
- Wrote a frontend using **HTML, Tailwind CSS and React**

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, Verilog, Javascript, Assembly, MATLAB, Bash, HTML, CSS, SQL
Libraries: SDL2, Raylib, Pytorch, React, Flask, OpenGL
Tools: Linux, Git, Docker, Cloudflare, Android SDK
Hardware: Microcontrollers, FPGAs, Single Board Computers
CTFs and Reverse Engineering: Ghidra, Pwntools, GDB, x64dbg, Binutils