Fady Abousifein

647-787-0496 | fadyasifein@gmail.com | Ontario CA

Education

McMaster University Hamilton, ON

Mechatronics Engineering CO-OP

Skills: C, C++, Python, Java, Linux OS | EasyEDA, DraftSight, LTspice | Arduino, STM32 | CAN Communication, Simulink

Experience

Hardware Design and Simulation Engineering Intern May 2025 – Aug 2025

Skyjack *Guelph, ON*

- Designed a **collision detection system** for scissor lifts using **Arduino and ultrasonic sensing**, enabling real-time distance measurement and automated lift-response logic. Replicated a competitor's product in-house, securing a key customer and preventing over $100K in losses.
- Designed and built a custom **Arduino shield PCB** in **EasyEDA** to bridge the 24V scissor lift system with a 5V microcontroller. Implemented **transistor-based level shifting**, a **24V to 9V DC-DC buck converter** for inputs, and **transistor driver circuits** for outputs, enabling safe, reliable two-way communication between industrial hardware and embedded systems.
- Created detailed **schematics in DraftSight** and assembled a durable PCB through component soldering. Mounted the shield onto the Arduino and integrated the collision detection system, **ultrasonic sensor, embedded controller, and 24V lift** via **CAN communication**, delivering a fully functional prototype successfully demonstrated to a major customer in England.
- Utilized **Simulink** to model and validate collision detection control logic, simulating sensor–controller–machine interactions across diverse operating conditions. Reduced hardware debugging time by identifying and resolving integration issues in the virtual environment prior to deployment.

Combinatorial Algorithms Research Assistant Jun 2023 – Sept 2023

McMaster University *Hamilton, ON*

- Translated pseudocode from research papers into efficient **C++ and C** algorithms enabling testing and validation of combinatorial optimization techniques on real-world datasets.
- Optimized algorithms, reducing runtime complexity in targeted cases and accelerating computational experiments.

Productive Software Development Research Assistant Jun 2022 – Sept 2022

The University of Waterloo *Waterloo, ON*

- Contributed to **The Checker Framework**, a VSCode extension enhancing Java's type system and code safety.
- Migrated the project from **yarn** to **npm** to ensure compatibility with the evolving **VSCode extension API**, improving project stability and long-term maintainability.
- Authored and updated project documentation for clear onboarding and version consistency.

Projects

Sequential Digital Circuit Design Project Dec 2023

Analog and Digital Circuits Design Project *McMaster University, ON*

- Engineered a **sequential digital circuit** to drive a **seven-segment display** with a student ID, applying **finite state machines (FSMs)**, **counters**, and **binary-coded decimal (BCD) encoding** to achieve precise sequencing and robust handling of repeated digits.
- Designed the circuit using **6 JK flip-flops** (4 for digit storage, 2 for repetition counting) and optimized **Boolean logic** via **Karnaugh Map minimization** with **AND/OR gates**, reducing gate count and enhancing hardware efficiency.
- Verified the circuit in **Logisim** to identify and correct logic errors, then built and tested the final design on a **breadboard** to validate hardware performance and ensure reliable operation.

Embedded Stepper Motor Control System Apr 2024

Embedded Systems Design Project *McMaster University, ON*

- Engineered a real-time stepper motor control system on the **STM32F429ZI** using **mbed OS**, implementing precise, non-blocking angular motion control via **Ticker** and **Timeout** without halting program execution.
- Developed **interrupt-driven controls** for stepper motor direction, speed, and stepping mode, ensuring immediate responsiveness to user inputs through debounced hardware buttons.
- Designed and implemented a dynamic **LCD interface** to display student-specific information, motor speed, stepping mode, and direction, improving system usability and real-time feedback.