Amrit Virk

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Education

McMaster University — Hamilton, ON
Bachelor of Engineering & Co-Op, Electrical Engineering — *Sept. 2023 – Apr. 2027*

Relevant Courses: Circuit Analysis, Data Structures, Engineering Mathematics, Principles of Programming, Logic Design, Electromagnetics, Microprocessors

Experience

Stock Team Member — June 2024 – Sept. 2024
American Eagle Outfitters — *Vaughan, ON*

- Coordinated and streamlined the processing of 100+ incoming shipment boxes, ensuring accurate inventory tracking and efficient stockroom operations in a fast-paced retail environment.
- Delivered high-quality customer support by assisting with product selection and addressing client needs, directly contributing to the store achieving the top sales performance in Ontario.

STEM Instructor — Sept. 2022 – Aug. 2023
City of Brampton — *Brampton, ON*

- Led engaging STEM workshops for classes of 20+ students, delivering hands-on lessons in animation, coding, robotics, and video game design, fostering creativity and problem-solving.
- Developed and implemented adaptive lesson plans tailored to diverse learning styles and accessibility needs, incorporating real-world engineering principles (i.e., sensor integration, basic circuit logic, algorithmic thinking) into lesson content
- Trained new employees in developing lesson plans and teaching etiquette.
- Highest performance ratings in the center based on parent and student feedback.

Co-Captain & Mechanical Team Lead — May 2018 – May. 2020
KraftWerx Robotics — *Brampton, ON*

- Led the mechanical design team in the development and construction of a VEX Robotics competition robot, managing all phases from initial concept to final assembly.
- Engineered and troubleshooted a flywheel mechanism for the VEX Robotics seasons. Implemented a 15:1 gear ratio with an 11W high-speed motor, which led to power and stalling issues. Resolved this by increasing the ratio to 35:1 and adding a second motor.
- Designed and optimized an intake system for the 2019–2020 VEX Robotics season. Improved cube collection by reducing slippage and misalignment via adjustments to the attack angle, speed, and gripper positioning—raising success rate from 20% to 98%.
- Placed 5th in Division at VEX Worlds Competition.

Projects

Spatial Mapping System
Embedded C, I2C, UART, MSP432E401Y, VL53L1X, MATLAB, Assembly

- Engineered a 3D spatial mapping platform utilizing a VL53L1X time-of-flight sensor and stepper motor to execute full 360° scans along fixed x-axis intervals, achieving high-accuracy reconstruction of indoor environments.
- Developed embedded firmware on the MSP432E401Y microcontroller for controlling sensor acquisition, LED indicators, and system behavior through digital I/O and polling logic.
- Implemented I2C communication for distance data retrieval and UART protocols for serial transmission to a PC.
- Implemented controls via onboard pushbuttons for system start/stop, homing, and motor direction, with LED-based feedback to indicate operational states and scan progress.

Snake Game
C/C++, GitHub, VS Code, Object-Oriented Design, Dynamic Memory Allocation

- Developed a terminal-based Snake game in C++, applying object-oriented design (OOD) principles to ensure modular, reusable, and organized code architecture.
- Utilized dynamic memory allocation for heap-based object management, preventing memory leaks, improving runtime efficiency.
- Implemented gameplay mechanics such as collision detection, randomized item spawning, and score tracking.

The Safer Safe
Arduino, C++, ESP8266, Fingerprint Sensor

- Designed a secure safe with two-factor authentication by integrating fingerprint recognition and device-based unlocking.
- Developed a user interface using HTML & CSS and locking mechanism for seamless usability.

Technical Skills

- **Languages:** Python, C, C++, HTML, CSS, JavaScript, Java, Verilog, TypeScript, Assembly, MATLAB
- **Frameworks & Tools:** Git/GitHub, SQL, React, VS Code, Arduino IDE, Granta, Autodesk Inventor, MS/Google Suite