

UMAR JAVAID

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EDUCATION

McMaster University

Hamilton, ON

Bachelor of Computer Engineering (CO-OP)

Sep 2022 - Apr 2026

- Awards: Engineering Award of Excellence, Deans' Honour List [2023-2024].
- Relevant Courses: Digital Systems Design, Signals & Systems, Logic Design, Data Structures & Algorithms, Microprocessor Systems, Electronic Circuits & Devices, Circuits & Waves, Linear Algebra.

TECHNICAL SKILLS

Programming Languages: Java, C#, Python, C/C++, Verilog, SystemVerilog, VHDL, Assembly, MATLAB, Perl.

Libraries: Bootstrap, jQuery, Matplotlib, Numpy, ADCTouch, IRLibAll, OpenAI.

Tools: Arduino, Altium, Autodesk Inventor, CAD, Quartus, Git, LTSpice, Linux, Unix, Excel, Simulink, Operating systems.

Equipment: Multimeters, 3D Printers, Soldering, Oscilloscopes, Signal Generators.

EXPERIENCE

BMS Software Team Member

Sep 2024 - Present

Stellantis Battery Workforce Challenge [↗](#)

- Designed and simulated a Contactor **PID Control System** to ensure secure connections within a Battery Management System (BMS), optimizing system performance and safety standards.
- Configured a precharge system to control voltage buildup on the high-voltage bus, minimizing risks from uncontrolled surges and integrated thermal protection to ensure the safety and reliability of precharge circuitry.
- Created and tested **Simulink** models to simulate High Voltage Interlock Loop systems (HVIL), collaborating with cross-functional teams and industry experts to integrate safety systems into the **EV** architecture.

PROJECTS

FPGA Game Development [↗](#) | Verilog, Logic Design

Jul 2024 - Aug 2024

- Recreated Pong on the Nandland GoBoard using **Verilog**, achieving a fully functional hardware version of the classic game with a 60 Hz refresh rate.
- Employed debouncing techniques to ensure smooth button inputs, reducing input lag to under **10 milliseconds**, and used a 7-segment display to show the score of up to 9 points for each player.
- Integrated UART communication at 115200 baud rate and **VGA** output at 640x480 resolution, enabling efficient data transfer and clear visual display on a monitor.

Hack Computer [↗](#) | Assembly, C++

Nov 2023 - Jul 2024

- Engineered a **16-bit ALU** with signed number representation, capable of complex arithmetic and logical operations.
- Designed a memory architecture, using 32KB RAM and 8KB screen memory, and register files, optimizing data storage and retrieval.
- Constructed a **CPU** capable of executing custom machine instructions, seamlessly integrating control logic with the ALU and memory to achieve full computing functionality.
- Implemented an **assembler** for the Hack Computer using **C++**, translating assembly language into machine code with a two-pass architecture that optimized symbol management and error detection.

LiDAR Lite - 3D Spatial Mapping [↗](#) | Python, C++, Embedded Systems

Jan 2024 - Apr 2024

- Developed a LiDAR-based 3D scanning system with a range of up to 4 meters.
- Established **I2C** communication between the Time-of-Flight sensor and the microcontroller, and utilized **UART** protocols for data transfer between the microcontroller and a personal computer.
- Generated an accurate 3D Visual Representation of the surroundings in **Python** using the Open3D library, which provided a clear and interactive understanding of the spatial data.

ComfortClick [↗](#) | Arduino, C++

Feb 2023 - Apr 2023

- Created a touch-sensitive infrared remote for a client with Multiple Sclerosis.
- Programmed the touch interface in C++ on **Arduino**, using ADCTouch and CapacitiveSensor libraries for precise touch detection, optimizing button response time to under **12 milliseconds**.
- Achieved compatibility with major brands like Sony, Panasonic, and Samsung by utilizing the IRLib library to encode hexadecimal values into device manufacturers' IR protocols.