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: Logic Design, Data Structures & Algorithms, Microprocessor Systems, Electronic Circuits & Devices I, Circuits & Waves, Linear Algebra.

PROJECTS

LiDAR Lite - 3D Spatial Mapping | `C++, Python, Open3D, Embedded Systems`   *Jan 2024 - Apr 2024*
- Developed a LiDAR-based 3D scanning system using a VL53L1X Time-of-Flight sensor and ARM Cortex-M4F microcontroller, achieving a 360-degree view of indoor environments 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.

FPGA Game Development | `Verilog, VHDL`   *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 Arithmetic Logic Unit** (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.
- Built a C++ **assembler** that converts assembly language into machine code.

Snake Game | `C++, VS Code`   *Nov 2023 - Dec 2023*
- Developed a modular, console-based Snake game using C++ and Object-Oriented Programming techniques, delivering smooth, low-latency gameplay for up to 2 players.
- Significantly enhanced game performance by reducing runtime by **83.1%** using linked lists, stacks, and queues, improving memory efficiency and gameplay.

ComfortClick | `C++, Arduino, Autodesk Inventor, Ender Pro 3`   *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.
- Reduced overall production cost to CAD **$21.73** per unit, utilizing cost-effective materials and components, including an Arduino Nano, IR LEDs, and PLA+ filament, while maintaining performance.

TECHNICAL SKILLS

Programming Languages: Java, C#, Python, C/C++, Verilog, VHDL, CSS, HTML, JavaScript, Assembly, MATLAB.
Libraries: Bootstrap, jQuery, Matplotlib, Numpy, ADCTouch, IRLibAll, OpenAI.
Tools: Arduino, Altium, Autodesk Inventor, PrusaSlicer, Figma, Eclipse, iCEcube2, NetBeans, Intel Quartus, Git, LTSpice, Microsoft Office, VS Code.
Equipment: Multimeters, 3D Printers, Soldering, Oscilloscopes, Signal Generators.