THE UNIVERSITY OF BRITISH COLUMBIA
Co-op Program
Faculty of Applied Science

Aiman Ishmam

Electrical Engineering Student
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Technical Skills

Programming: C, C++, MATLAB, Python, SystemVerilog, VHDL, ARM Assembly
Electrical: Altium Designer, Circuit and PCB Design, SPI/I2C/UART, Embedded Systems
Lab Skills: Oscilloscope, Multimeter, Signal Generator, Power Supply

Work Experience

Electrical Communications Member **September 2023 – Present**
UBC Sailbot *Vancouver, BC*

- Designed and optimized the Power Distribution Board (PDB) and the Rudder PCB, meeting strict power, protection, and communication requirements for the vessel's control system.
- Designed enclosures for all the modules in the hull using SolidWorks, incorporating precise cutouts for connectors and ensuring proper fitment and functionality within the system.
- Designed mounting plates for all enclosures to securely fit PCBs onto the mounting board, ensuring proper alignment of standoffs for stability and ease of assembly.
- Conducted testing and validation procedures on buck converters and PCB switching mechanisms designed for UBC Sailbot, ensuring optimal performance and reliability in the system's power management.

Projects

ARC4 Decrypter | *UBC, Vancouver* **October 2025 – December 2025**

- Implemented a full SystemVerilog ARC4 decryption pipeline on the DE1-SoC FPGA, including state initialization, KSA, and PRGA, using on-chip M10K memories and a ready/enable microprotocol.
- Built a hardware brute-force key-cracking engine that iterates through the 24-bit keyspace and identifies valid plaintext via ASCII detection.
- Developed a parallel "doublecrack" architecture with two cracking cores searching disjoint ranges, achieving 2× speedup on larger key searches.

VGA Graphics Generator and Shape Renderer | *UBC, Vancouver* **October 2025 – December 2025**

- Designed and implemented a SystemVerilog datapath and FSM controller to drive a VGA framebuffer on the De1-SoC FPGA.
- Engineered modular hardware units for screen-filling, circle drawing using Bresenham algorithm, and Reuleaux-triangle rendering, supporting dynamic center and size parameters.
- Verified correctness and timing through comprehensive RTL and post-synthesis testbenches using ModelSim.

Simple Datapath and Controller: Baccarat | *UBC, Vancouver* **October 2025 – December 2025**

- Engineered a real-time Baccarat game on an Intel DE1-SoC FPGA using SystemVerilog, designing hardware modules for card dealing, score calculation, and VGA output.
- Controlled gameplay via a custom FSM, guaranteeing deterministic behavior for card dealing and win evaluation.
- Ensured functional correctness by developing and executing structured SystemVerilog testbenches to simulate game scenarios.

Flight Controller Prototype | *Personal Project* **April 2025 – May 2025**

- Built and validated sensor drivers for MPU6050 and BMP388 using I2C, enabling 98% reliable data acquisition through precise register configuration, calibration, and noise filtering.
- Designed a real-time data logging system with FatFS to record sensor metrics, acceleration, gyro, and pressure, to an SD card at 10Hz.
- Implemented USB-CDC telemetry to stream live sensor metrics to a host computer, reducing debugging time by 40% and improving system tuning efficiency.

Remote Controlled Coin Picking Robot | *UBC, Vancouver* **January 2025 – April 2025**

- Built a dual-microcontroller, PIC32 and EFM8, system for autonomous coin detection and collection with 95% accuracy using inductive sensing and ultrasonic tracking
- Designed a wireless remote control with real-time LCD feedback and joystick navigation via JDY-40 radios.
- Integrated a real-time 7-segment coin counter and directional LED indicators, improving user awareness and contributing to smoother, more intuitive operation.

Reflow Oven Controller | *UBC, Vancouver* **February 2025 – March 2025**

- Designed an FSM to automate PCB soldering (preheat, soak, reflow, cooling), maintaining ±5 °C precision with PWM heating and 10 Hz thermocouple feedback.
- Improved usability by integrating a servo-driven oven door, cooling fan, and LED state indicators via a custom 1-of-4 decoder circuit, enabling smoother operation and reducing the need for manual adjustments.
- Implemented safety features including temperature/time thresholds and an emergency stop, ensuring 100% safe shutdown during testing and preventing overheating incidents.

Education

Bachelor of Applied Science in Electrical Engineering **September 2023 – May 2027**
The University of British Columbia *Vancouver, BC*