Shiva Prakash

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Technical Skills

- **Hardware:** PCB Design, Circuit Debugging, Power Management, Sensors & Peripherals, Prototyping
- **Tools:** KiCad, Fusion360, 3D Printing, Git, Soldering, DMM,
- **Programming & Protocols:** C, C++, Python, I^2C, SPI, UART, USB HID

Education

University of Waterloo – BASc, Electrical and Computer Engineering — Sept. 2025 - April 2030

Technical Projects

Project Hermes - Raspberry Pi Game Streaming Handheld

- Designed complete handheld gaming system integrating Raspberry Pi 4, custom RP2040 controller PCB, and 7" LCD display to create portable PC game streaming device, under strict $200 CAD budget
- Engineered custom USB HID controller PCB using RP2040-Zero microcontroller and GP2040-CE firmware, eliminating need for custom drivers or setup
- Overcame handheld power constraints by implementing 5000mAh UPS system with USB-C passthrough, extending runtime to 3 hours under load
- Prevented thermal throttling in handheld form factor by integrating active cooling and 3D-printed housing, sustaining stable 720p60 streaming

HackCharm - Interactive OLED Keychain

- Developed miniaturized PCB system integrating ESP32-S3, 128×128 OLED, and ADXL362 accelerometer in keychain form factor at BOM cost of $49.66 CAD
- Extended device runtime to multiple days by designing 450mAh Li-Po power system with deep-sleep firmware for efficient low-power operation
- Implemented gesture-recognition firmware using accelerometer polling and processing to detect tap/shake patterns, triggering facial expressions on OLED with <100ms latency

NFC PCB Business Card

- Engineered a batteryless NFC circuit using passive smartphone power harvesting, integrating antenna design with LED indicator and data transmission capability
- Delivered hands-on electronics workshop teaching PCB design fundamentals to 100+ high school students aged 13-18, with each student receiving personalized functional PCB card

Duck Off Doomscrolling (D.O.D) - Computer Vision Water Turret

- Developed real-time computer vision tracking system in 4-day hackathon using OpenCV face detection, achieving sub-100ms servo positioning response for automated targeting application
- Designed closed-loop servo positioning with 2 MG996R motors, achieving precise targeting accuracy within 1m range
- Implemented reliable mechanical actuation system with commercial water gun with servo-actuated pump trigger

Leadership

President – MDHS Student Council — Sept. 2024 – May 2025

- Directed 21-member student council to deliver school-wide events impacting 1,400+ students, managing logistics, budgeting, and promotion.

President – MDHS STEM Club — Sept. 2024 – May 2025

- Grew membership from 15 to 190+ within one year through active outreach and teaching hands-on workshops on PCB design, CAD, and programming.

Portfolio

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Project Hermes - Raspberry Pi Game Streaming Handheld | Repo | Creation Journal

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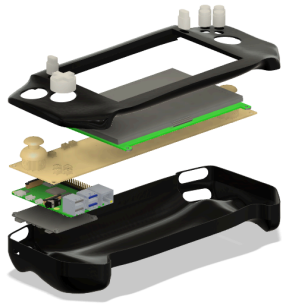
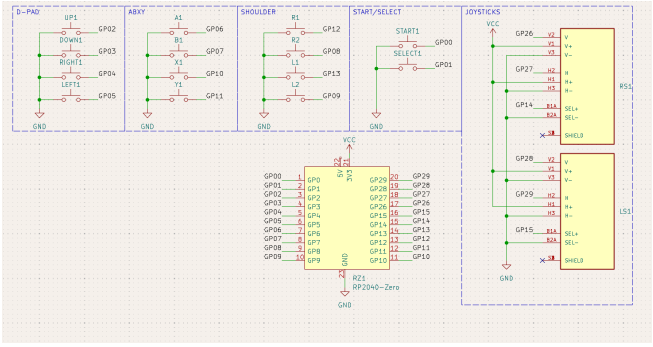
A portable console that streams PC games via SteamLink, letting players access their full library anywhere without rebuying games at a more affordable price than most consoles.

- Designed a full handheld gaming system under a strict $200 CAD budget, integrating Raspberry Pi 4, 7″ LCD, and custom controller PCB.
- Engineered a USB HID controller PCB using RP2040-Zero and GP2040-CE firmware, enabling plug-and-play compatibility with no custom drivers.
- Overcame handheld runtime constraints with a 5000 mAh UPS + USB-C charging system, achieving 2–3 hours of gameplay with passthrough charging.
- Designed and printed custom housing with passive cooling to prevent thermal throttling, sustaining stable 720p/60FPS streaming.
- Reflection: Taught me to balance thermal, electrical, and cost constraints in one integrated product.





HackCharm - Interactive OLED Keychain | Repo | Creation Journal

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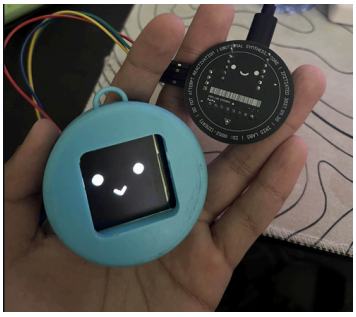
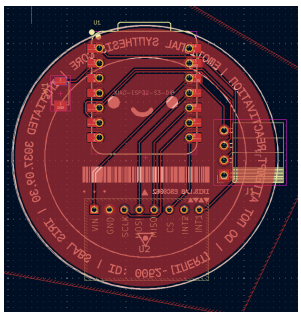
A keychain-sized Tamagotchi-like companion that reacts to taps and shakes with pixelated emotions on a tiny OLED display.

- Developed a miniaturized PCB system integrating ESP32-S3, 128×128 OLED, and ADXL362 accelerometer at $49.66 CAD BOM cost.
- Implemented deep-sleep firmware with a 450 mAh Li-Po to achieve multi-day battery life despite continuous interaction polling.
- Built gesture-recognition firmware to process tap/shake patterns in real time, triggering expressions with <100 ms latency.
- Reflection: First project where I combined **embedded firmware, circuit design, and enclosure design** into a polished product.





Portfolio

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NFC PCB Business Card | Repo | Workshop Video

A batteryless PCB card that lights an LED and transmits a link when tapped against a smartphone via NFC.

- Designed a passive NFC circuit with antenna, resistor, capacitor, and LED powered entirely by harvested smartphone RF energy.
- Taught to 100+ high school students through a workshop I led on PCB design fundamentals, making electronics approachable and hands-on.

Duck Off Doomscrolling (D.O.D) - Computer Vision Water Turret |Repo | Live Demo

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A hackathon project: a desk duck that tracks your face with OpenCV and squirts water at you if you open distracting apps.

- Built a real-time computer vision system with sub-100 ms servo response using OpenCV for face detection.
- Designed closed-loop servo positioning with 2 MG996R motors, achieving precise targeting accuracy within 1 m.
- Integrated a commercial water gun with servo-actuated pump trigger to create a reliable mechanical actuation system.