ANDREW MAO

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EDUCATION

Bachelor of Science, Computer Science — Expected Grad: May 2027
University of British Columbia, Vancouver, BC — (Current GPA: 4.33)

TECHNICAL PROJECTS

Flint - *TypeScript, Firebase*

- Developed Obsidian Notes plugin using Firebase API to provide self-hosted cloud backup and cross-platform notes access services.
- Leveraged HTTP protocols to design uploading/downloading processes that save local notes data in Firebase Storage buckets and copy remote data to local instances.
- Integrated personal UI, and hotkey support into Obsidian with Typescript APIs to streamline user experience.

Soccer Bots - *HTML, CSS, JavaScript, WebSockets, C++*

- Designed a full-stack web app for remote-controlled ESP32 microcontroller robots to joust and play soccer.
- Optimized preexisting latency issues of the standard Arduino IOT framework using WebSocket protocols for concurrent bidirectional communication resulting in improved robot dynamics.
- Claimed 2nd place in a course tournament and adopted by the department as a model for future coursework.

Collidy Road - *Unity Game Engine, C#*

- Launched a Crossy Road-themed beat 'em up for the 2023 Game Maker's Toolkit game development competition.
- Built core gameplay mechanics such as world controllers/physics, item interactions and enemy behaviours.
- Ranked top 30% amongst 23 000 participants in the largest game jam in Itch.io history (2023)

EXPERIENCE

Software Developer
UBC ThunderBots, Vancouver, BC — *Sept 2023 – Present*

- Collaborates in a multidisciplinary team to design autonomous soccer robots for worldwide RoboCup competitions (~3000 participants).
- Ranked 2nd in RoboCup 2024 SSL Division B as Grand Finalists.
- Developed network diagnostics tool for measuring round-trip time using C++ and Protocol Buffers to investigate high latency issues during gameplay resulting in the resolution of critical bugs in the codebase.
- Enforced systematic software design through PyTests and C++ tests to ensure deterministic and reliable code.
- Designed an overlay for the gameplay simulation engine using Python/PyQt to visualize previous robot positions and allow for detailed analysis/debugging of motion-based changes.
- Overhauled defensive gameplay and implemented Enemy Free Kick defensive response using state machines to allow for active ball acquisition tactics and significant reduction to acquired fouls during competition.

Engineering Club President
Hugh McRoberts Secondary, Richmond, BC — *Jun 2020 – Jun 2023*

- Directed club operations and leadership across three years resulting in club growth from 40 to 100 members.
- Manufactured custom PCB kits to teach high school students C++, robotics, and embedded systems.
- Co-founded a district-wide STEM initiative of over 120 members collaborating with the University of Victoria, Kwantlen Polytechnic University, and Simon Fraser University to promote education accessibility.

TECHNICAL SKILLS

- **Languages/Frameworks**: HTML, CSS, Python, C++, C#. JavaScript, Typescript, React, Java, Racket
- **Developer Tools**: Ubuntu, Platform.io, Bazel, Git, Unity, Firebase
- **Design Programs**: Inventor, Fusion 360, TinkerCAD, Ultimaker Cura, Fritzing