Avinav Bhandari

587-575-3424 | avinav.bhandari@mail.utoronto.ca | avinav.dev | LinkedIn | GitHub

Education

- **University of Toronto** — Toronto, Canada
  B.A.Sc Computer Engineering — *Graduating May 2027*
  - GPA: 3.7/4.0
  - Minor in Artificial Intelligence Engineering
  - Coursework: Computer Fundamentals (C), Programming Fundamentals (C++), Linear Algebra, Calculus, Engineering Strategies and Practices, Digital Systems (Verilog HDL), Computer Organization (Assembly), Computer Graphics (C/C++), Data Structures and Algorithms, Operating Systems, Probability

Experience

- **Draft Party [🌐]** — Remote
  Full Stack Software Development Intern — *May 2024 - Jun 2024*
  - Developed a daily game feature using Cloudflare Workers and Durable Objects, managing backend infrastructure for capable of scaling to 100s of players easily.
  - Created 20+ robust REST API endpoints with Typescript and Node.js, including thorough unit testing using Jest.
  - Designed and implemented a JWT authentication system and user statistics dashboard using VueJS/NuxtJS and TailwindCSS for use by over 800 players.
  - Utilized version control (Git/Github) and project management tools (Jira) to ensure efficient development and collaboration.

  Jr. Part-time Frontend Software Developer — *Jan 2024 - May 2024*
  - Developed interactive webpages for a draft-based team-building trivia game.
  - Implemented a website redesign from scratch, efficiently translating mock-up designs into functional frontend code using Vue/Nuxt, Typescript/JavaScript, HTML, and CSS.
  - Created adaptive and responsive web layouts that render effectively across various devices and screens, reaching over 800 players.
  - Implemented a brand new leaderboard page which brought new corporate customers immediately after releasing.

- **University of Toronto Aerospace Team - Rocketry Division [🌐]** — Toronto, Canada
  Avionics/Software Developer — *Sept 2022 - May 2024*
  - Communicated with a team of approximately 20 people to develop avionics/software solutions to aid the successful launch of an experimental hybrid-fuelled rocket.
  - Developed a headless C/C++ Linux application that is responsible for driving signals to GPIO pins in order to actuate and read from different sensors in the fuelling system.
  - Led the development of a C++ backend application and networking solution that successfully parses thermocouple data and enables seamless data transfer over a small network.
  - Developed Python scripts to implement GPS data parsing and storage functionality, enhancing the efficiency and accuracy of data handling processes.
  - Successfully placed 3rd and 2nd at Launch Canada 2023 and 2024 competitions of over 30 university teams.

Projects

- **Complete Breadboard CPU and Custom Instruction Set** — *May 2024 - Present*
  Skills: Breadboarding, Digital Circuit Design
  - Designed a simple 8-bit CPU from scratch using only basic electronics (logic gates in ICs), showing a deep understanding of computer architecture.
  - Designed an ALU that includes an adder, subtractor, shifters, and simple logic operations, mirroring core functions of modern computers.

- Implemented a memory system, register file, and program counter, allowing the computer to store and execute multi-step programs, just like commercial computers.
- Wired ICs and other components on a breadboard to create a working CPU and variable-speed clock.
- Created a custom instruction set to be able to load and run programs on the CPU.

- **Krumbz Recipe App: Recipe Searcher** *May 2024 - Present*

Skills: Golang, PostgreSQL, Typescript, React, React Native

- Created a recipe app where users can select ingredients they have and see recipes from a database of over 1000 that they can cook.
- Used React Native to implement an iOS and Android app.
- Used PostgreSQL to create and maintain a database containing data for more than 1000 recipes and capable of processing over 100 users.
- Used Golang to create a REST API backend, maintaining 25+ endpoints, integrating with a PostgreSQL database, and implementing JWT authentication.
- Containerized backend using Docker Containers, and hosted on Google Cloud Run.

- **Rocket Projectile Simulator** *Jan 2024 - May 2024*

Skills: C/C++, Firmware/Embedded Systems Programming

- Created a physics projectile simulator in the style of a rocket simulator directly on a soft processor using C/C++.
- Wrote custom drivers to interface the processor and program with a 60Hz VGA screen including double-buffering.
- Wrote custom drivers to interface with a keyboard using the PS/2 protocol.

- **FPGA Human Benchmark Games Project** *Sep 2023 - Dec 2023*

Skills: Verilog HDL, SystemVerilog, FPGA Programming

- Designed an interactive game inspired by Human Benchmark games, focusing on reaction speed and a chimpanzee memory test, entirely in Verilog/System Verilog on the De1-SoC.
- Implemented double buffering and interfaced game data from the FPGA with a VGA display while integrating PS2 mouse input with the VGA display using Verilog.
- Enabled cursor functionality and improved user interaction by facilitating the visual experience.

SKILLS

- **Programming Languages:** C/C++, Javascript/Typescript, Go/Golang, C#/.NET, Python, Verilog, SystemVerilog
- **Web Technologies:** Vue/Nuxtjs, React/Nextjs, React Native, CSS/TailwindCSS
- **Database Systems:** SQL, PostgreSQL
- **Cloud Technologies:** Cloudflare Workers, Cloudflare Durable Objects, Google Cloud Run
- **DevOps & Version Control:** Git, Github, Docker