

# Abdalla Eldoumani

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## Education

### University of Calgary

B.Sc. Computer Science, Minor in Philosophy

GPA: 3.6/4.0 | Dean's List (2023–2024, 2024–2025)

Sep 2022 – Jun 2027

Calgary, Alberta

### Relevant Coursework:

- Computing Machinery I & II (C, ARMv8 Assembly, Computer Architecture, Embedded Systems), Principles of Operating Systems, Design & Analysis of Algorithms, Data Structures & Algorithms, Computer Networks, Database Management Systems, Artificial Intelligence, Computer Security, Network Systems Security, Software Engineering, Reverse Engineering

## Work Experience

### Teaching Assistant

University of Calgary

- Serve as Head TA for CPSC 355; coordinate TAs, configure Gradescope auto-graders, and automate grade splitting.

Sep 2025 – Present

Calgary, Alberta

- Teach labs on computer architecture, C, and ARMv8 assembly covering memory management, register allocation, and ISA.
- Lead CPSC 413 tutorials on algorithm design: greedy, divide-and-conquer, dynamic programming, and NP-completeness.
- Debug low-level code and evaluate student assembly programs and C implementations for correctness and efficiency.

### AI Training Specialist

Outlier

- Evaluated AI-generated Python code across 500+ dual-response scenarios, analyzing algorithm efficiency and optimization.
- Tested AI solutions for functional correctness and performance, documenting comparative analysis with technical feedback.
- Identified bugs and optimization opportunities in diverse programming tasks including data structures and algorithms.

Oct 2024 – Sep 2025

Remote, Canada

### Software Engineering Fellow

Headstarter AI

- Built and deployed 5 AI-powered applications using Python and Docker, completing intensive hackathons with teams.
- Developed a capstone project serving 1,000+ users using React.js, TypeScript, and modern web frameworks.

Jul 2024 – Sep 2024

Remote, Canada

### Python Mentor

Al Oruba International School

- Led programming workshops for 30+ high school students, teaching Python fundamentals and algorithm implementation.
- Designed hands-on coding exercises and project-based assignments improving student programming confidence.

Jul 2021 – Jul 2022

Riyadh, Saudi Arabia

## Projects

### Rust HTTP Server

Rust, Axum, SQLite, WebSocket | Solo Developer

Jul 2025 – Present

- Architected production-grade server handling 10,000+ concurrent connections with sub-10ms latency and JWT auth.
- Integrated full-text search with fuzzy matching, intelligent caching reducing DB load by 60%, and rate limiting.

### AEOS — Educational OS

C/C++, ARMv8 Assembly, QEMU | Solo Developer

2025 – Present

- Built a monolithic kernel from scratch on the QEMU virt board (ARM64) with bootloading and interrupt handling.
- Engineered memory management subsystem and process scheduler, exploring core OS primitives at hardware level.

### FastMathExt

C++, Python, AVX2 SIMD, OpenMP | Solo Developer

Jan 2025 – Present

- Optimized matrix multiplication achieving 25–41% gains over NumPy through cache blocking and SIMD vectorization.
- Implemented Strassen's algorithm with task-based concurrency, reducing complexity from  $O(n^3)$  to  $O(n^{2.807})$ .

### DUST

Next.js, TypeScript, Convex, Clerk | Calgary Hacks 2026

Jan 2026

- Built a real-time multiplayer web game where players explore a decaying internet as digital archaeologists via Convex.
- Implemented competitive and cooperative modes with secure Clerk authentication and immersive discovery mechanics.

### AI-Platform

Next.js, TypeScript, OpenAI API, Prisma, MySQL | Solo Developer

2024

- Developed multi-tool AI platform with conversation, image/video generation, music composition, and code generation.
- Integrated Stripe subscription management, API rate monitoring, and secure auth with a centralized dashboard.

### Budget Buddy

Next.js, TypeScript, PostgreSQL, Clerk, Vercel | Team Lead

Feb 2024

- Built full-stack financial platform with real-time stock data integration and secure authentication for 100+ users.
- Implemented budget tracking, investment projections, and financial analytics dashboard deployed on Vercel.

### Interactive Cybersecurity Site

HTML, CSS, JavaScript | Team Lead

Sep 2023 – Dec 2023

- Developed educational platform with interactive quizzes on cryptography, hashing, malware, and digital privacy.
- Authored content on encryption methods and security principles with a hands-on, interactive learning approach.

### Self-Checkout Station Simulation

Java, JUnit, Git | Team Member

Sep 2023 – Dec 2023

- Collaborated in a 20-member team to build a self-checkout simulation with responsive GUI using Java and OOP.
- Conducted comprehensive testing with JUnit and improved productivity by 30% through effective Git workflows.

## Technical Skills

Languages: C, C++, Python, Java, JavaScript/TypeScript, Rust, SQL, ARMv8 Assembly

Tools & Frameworks: Git, Linux, Docker, React.js, Node.js, Next.js, Flask, Django, FastAPI, Spring Boot

Technologies: AWS, Azure, Google Cloud, PostgreSQL, MongoDB, MySQL, REST APIs, WebSocket, CI/CD, Kubernetes