Abdalla Eldoumani

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EDUCATION

University Of Calgary — **Calgary, Alberta**
B.Sc. Computer Science (Minor in Philosophy) — 2022 – 2027

WORK EXPERIENCE

Headstarter AI — **Calgary, Alberta**
Software Engineering Fellow — July 2024 – September 2024

- Led development and deployment of 5 AI projects using Python and Docker, revamping machine learning proficiency and honing operational deployment capabilities.
- Delivered innovative solutions during multiple hackathons, addressing real-world challenges through effective teamwork and agile problem-solving across 5 intensive weekends.
- Completed a high-impact final project reaching over 1,000 users by utilizing React.js, Angular, HTML, CSS, and TypeScript, ensuring a robust and scalable platform.

Al Oruba International School — **Riyadh, Saudi Arabia**
Python Mentor — July 2021 – July 2022

- Led a peer mentoring program, guiding high school colleagues in mastering Python programming.
- Devised and conducted weekly workshops, covering Python fundamentals, data structures, and basic algorithms, resulting in overhauled programming proficiency among participants.
- Facilitated hands-on coding sessions, enabling peers to apply theoretical concepts to practical problems.
- Mentored peers on project-based learning, assisting in developing Python projects, boosting confidence and coding skills.
- Encouraged collaboration and peer learning, fostering an environment where students supported each other in overcoming coding challenges.

PROJECTS

Rust HTTP Server | Rust, Axum, SQLite, WebSocket | *Solo Developer* July 2025 - Present

- Architected production-ready HTTP server handling 10,000+ concurrent requests with <10ms response time using Rust, Axum framework, and SQLite integration, featuring comprehensive JWT authentication with role-based access control across multiple API versions.
- Built advanced search engine with full-text indexing and fuzzy matching delivering sub-100ms query responses, plus asynchronous background job processing system with retry mechanisms and WebSocket notifications for bulk operations.
- Integrated intelligent caching layer achieving 60% reduction in database queries and implemented comprehensive security features including rate limiting (1000+ req/min), CORS protection, input validation, and SQL injection prevention.
- Designed modular architecture with 15+ middleware components, automated database migrations, real-time monitoring dashboards, and file management system supporting concurrent uploads and performance analytics.

FastMathExt | C++, Python | *Solo Developer* January 2025 - Present

- Optimized matrix multiplication algorithms achieving 25-41% performance gains over NumPy through multi-level cache blocking, AVX2 SIMD instructions, and OpenMP parallelization
- Engineered comprehensive benchmarking framework with statistical analysis and automated testing across 10,000+ iterations, ensuring robust performance validation
- Developed memory-efficient algorithms with predictable performance characteristics suitable for frame-rate critical applications and resource-constrained environments
- Implemented Strassen's algorithm with task-based concurrency reducing computational complexity from $O(n^3)$ to O(n^2.807) for large-scale mathematical operations

Interactive Cybersecurity Site | HTML, CSS, JavaScript | *Team Member/Lead* September 2023 – December 2023

- Contributed to developing an educational platform, broadening cybersecurity knowledge through theoretical lectures and interactive quizzes.
- Formulated quizzes covering cryptography, hashing, malware, and privacy, deepening users' understanding of critical cybersecurity principles.
- Authored educational content on encryption methods, malware, and digital privacy, offering a comprehensive learning experience.
- Established a user-friendly interface with HTML, CSS, and JavaScript, ensuring platform remains responsive and engaging.
- Created complex cybersecurity topics accessible through a hands-on, interactive approach, reinforcing theoretical knowledge with practical applications.

Self-Checkout Station Software Simulation | Java, JUnit, Git Calgary, Alberta | *Team Member* September 2023 – December 2023

- Cooperated within a 20-member team to execute a software simulation for a self-checkout station using Java.
- Employed object-oriented programming and Java's GUI libraries to develop a responsive touchscreen interface.
- Amplified development productivity by 30% through maximized version control and collaboration strategies using Git.
- Conducted comprehensive testing with JUnit, ensuring flawless operation and achieving 100% usability.

SKILLS

- Technical: Java, JavaScript/TypeScript, Python, C/C++, Assembly, Rust, C#, SQL, NoSQL, HTML/CSS, React.js, Node.js, MySQL, PostgreSQL, MongoDB, AWS, Azure, Google Cloud, Git, Linux, Docker, Kubernetes, REST API, Spring Boot, Django, Flask, FastAPI, CI/CD, Jenkins, Kafka, TensorFlow, PyTorch, Data Structures, Algorithms, Microservices, API Development, Database Design, Cloud Computing, Containerization, Network Security
- Interpersonal: Leadership, Critical Thinking, Problem-Solving, Team Collaboration, Adaptability, Communication, Detail-Oriented, Self-Motivated, Decision-Making Under Pressure