

# JUAN DIEGO SERRATO

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## PROFESSIONAL SUMMARY

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**Computer Science graduate (B.Sc.) and Diploma in Mechanical Engineering Technology.** Specialized in high-performance systems, distributed architecture, and AI-driven optimization. Proven ability to engineer low-level hardware drivers in C and scalable distributed applications in Java. Adept at bridging the gap between physical engineering precision and robust, full-stack software solutions.

## EDUCATION

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**Mount Royal University** | B.Sc. in Computer Science | Minor in Business | **Graduated: Jan 2026 | GPA: 3.48**

- **Awards: Dean's Honour Roll** (Winter 2022, Winter 2024, Fall 2024) – Recognized for GPA > 3.5 while carrying full course load.

**Southern Alberta Institute of Technology** | Mechanical Engineering Technology Diploma | **2019**

## TECHNICAL SKILLS

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- **Languages:** Java, C, C++, Python, SQL, TypeScript
- **Frameworks/Tools:** Git/GitHub, Vercel, [Next.js](#), React, [Node.js](#), Tailwind CSS, Docker
- **Systems:** Linux/Unix, Distributed Systems, Object-Oriented Programming (OOP)

## PROJECTS

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### Engineering Portfolio | Next.js, TypeScript, Tailwind CSS, Vercel

- **Type-Safe Architecture:** Engineered a high-perfo web application using **TypeScript** and **Next.js** to showcase multi-disciplinary engineering projects.
- **Logic-Driven UI:** Implemented a custom CSS grid system and adaptive project-filtering logic, optimizing visual delivery for various media types.
- **Automated CI/CD:** Integrated a professional deployment pipeline via **Vercel** and **GitHub**, ensuring instant, version-controlled production updates.

### Distributed Systems & Game Architecture | Java

- **Consensus Logic:** Implemented FIFO-Total Order Broadcast using Lamport Logical Clocks to maintain absolute state consistency across distributed peers.
- **Reliability:** Engineered a Failure Detector with heartbeat monitoring to manage client states (Alive, Suspected, Failed) and released resources for disconnected nodes.
- **Microservices:** Decoupled game logic from storage via a standalone Word Repository service communicating over UDP.

### Custom Linux Shell | C

- **Kernel Interfacing:** Developed a functional CLI from scratch using Linux system calls for process management (forking), I/O redirection, and piping.
- **Resource Management:** Optimized memory safety and process lifecycle control without the use of high-level C standard library functions.

## Atari 2D Game Engine | Low-Level C, Motorola 68000

- **Hardware Drivers:** Wrote custom drivers for the YM2149 sound chip and raster graphics library, bypassing OS dependencies to interface directly with the MMU.
- **Performance Optimization:** Achieved flicker-free 70fps by synchronizing double-buffering logic with the hardware's 70Hz vertical blank (VSYNC).

## AI-Driven Financial Optimization Model | Python

- **Supervised Learning:** Built classifier to optimize risk and profit for a simulated \$100M insurance fund
- **Constraint Logic:** Engineered algorithmic decision logic to solve multi-dimensional constraint problems (risk vs. utility).

## AI-Driven Research Simulation | Python

- **Custom Function Approximation:** Built a supervised learning model from scratch to facilitate autonomous agent navigation in dynamic environments.
- **Genetic Optimization:** Implemented selection, crossover, and mutation operators in a custom genetic algorithm to optimize agent neural weights.

## PROFESSIONAL EXPERIENCE

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### Cashier and Merchandiser | Shoppers Drug Mart | 2015 - 2020

- **Data Integrity & Inventory:** Managed shelf-stocking and inventory audits, ensuring digital stock records matched physical hardware counts with high precision.

### Solar Technician | Determination Drilling | 2020

- **Quality Assurance:** Conducted QA onsite to ensure the installation of the piles that support the panels were within the engineers specified tolerance.
- **Technical Systems Installation:** Executed the physical setup of renewable energy systems, ensuring peak mechanical performance.

### Surveyor | Construction Surveying Canada| 2021

- **Precision Engineering:** Conducted high-accuracy spatial measurements and data analysis for large-scale infrastructure projects.
- **Stakeholder Coordination:** Collaborated with site engineers and project managers to ensure data integrity across the construction lifecycle.

### Guest Services | Cineplex | 2024

- **Transaction Management:** Processed hundreds of daily financial transactions with high accuracy in a fast-paced environment.
- **Conflict Resolution:** Navigated fast-paced service environments to resolve guest technical issues and scheduling conflicts, ensuring a seamless user experience.
- **Operational Coordination:** Collaborated with a large floor team to manage theater logistics and safety protocols during peak operational hours.

### Background Extra | ACTRA (Canada) | 2021 - Present

- **Professional Adaptability:** Successfully navigated high-pressure professional environments on major film and television sets.
- **Communication:** Demonstrated strong interpersonal skills and the ability to follow complex, real-time technical instructions within a large team.