

Massimo Caruso

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Miriam Diallo
CAE Inc.
8585 De la Côte-de-Liesse Rd, Saint-Laurent, Quebec H4T 1G5

January 24, 2025

Dear Miriam Diallo,

I am thrilled to apply for the Software Engineering Intern role at CAE Inc. As a Software Engineering student at Concordia University, I bring a robust foundation in software development, coupled with hands-on experience from academic and professional projects.

Throughout my position as a CTF Challenge Designer at AtHackCTF, I developed RFID-based Capture the Flag challenges to simulate real-world security scenarios. This experience enhanced my technical skills in system analysis, hardware/software integration, and designing interactive problem-solving environments—skills that directly align with the requirements of the Software Engineering Intern role.

In addition, my academic projects, such as creating an online Food Database System and a Teacher-Student Feedback Web Application, allowed me to refine my expertise in Python, JavaScript, and SQL while working with APIs and relational databases. These projects taught me to manage end-to-end software development, optimize system performance, and focus on user-centered design.

What excites me most about CAE Inc. is its leadership in designing and deploying advanced defense and security systems that protect lives and ensure mission success. I am particularly drawn to the opportunity to contribute to developing innovative simulation technologies and scalable solutions for defense applications, which aligns with my career goals of advancing security and technology in high-stakes environments.

I am confident that my technical skills, academic achievements, and passion for software engineering make me a strong candidate for the Software Engineering Intern role. I would welcome the opportunity to discuss how my experiences align with the needs of your team. Please feel free to reach out to me at (514) 944-5977 or massimo02caruso@gmail.com.

Thank you for considering my application. I look forward to the possibility of contributing to CAE Inc.'s success.

Sincerely,
Massimo Caruso

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Education

Montreal, Canada

Concordia University

Jan 2023 – Present

- **Major:** Software Engineering, BEng

Experience

CTF Challenge Designer,

AtHackCTF

Nov 2024 – Present

Hackathon (www.athackctf.com): Capture the flag based hackathon.

- Designed and implemented RFID-based Capture the Flag (CTF) challenges that simulate real-world security scenarios, providing participants with engaging and educational problem-solving experiences.
- Created challenges involving RFID technologies, leveraging knowledge of protocols, hardware (e.g., RFID readers and tags), and software tools to develop realistic attack and defense simulations.
- Focused on balancing difficulty and educational value, ensuring participants gain practical skills in RFID security, including vulnerability identification and exploitation.

Projects

Food Database System

- Developed an online nutritional database integrating structured data from two APIs (FatSecret and TheMealDB) to provide detailed nutritional information, recipes, and dietary metadata.
- Scraped, cleaned, and validated JSON data from APIs using Python scripts, addressing null and duplicate values. Data was stored in relational (PostgreSQL) and non-relational (MongoDB) databases to leverage hybrid data management.
- Designed an ER model with 15 interconnected tables for PostgreSQL and collections for MongoDB ("recipes," "directions," and "foods"). Optimized queries for both SQL and NoSQL, including indexing and aggregate operations to enhance performance.
- Automated migration of structured data from PostgreSQL to MongoDB using Python scripts, ensuring seamless linkage of primary and foreign keys during the process.
- Resolved inefficiencies in FatSecret API data retrieval by implementing a random recipe name generator to bypass large ID gaps, significantly improving data extraction speed and accuracy.

Teacher-Student Feedback Web Application

- Designed and implemented responsive frontend components, including an interactive sidebar, header, and landing page, ensuring smooth navigation and adaptability across devices.
- Developed and connected the frontend for the feedback and contact pages to backend APIs, allowing users to view feedback and submit messages with real-time confirmations.
- Designed and hosted relational databases on Microsoft Azure, optimizing SQL queries for efficient data retrieval and manipulation.
- Conducted acceptance tests, resolved bugs, and ensured feature functionality for a seamless user experience across various devices.
- Managed the repository with version control, reviewed pull requests, implemented coding standards, and documented processes to ensure project quality and organization.

Linear Regression Model

- Developed a multiple linear regression model to analyze factors influencing life expectancy using WHO data from 193 countries (2000–2015).
- Cleaned and preprocessed data by managing missing values, removing outliers, and converting categorical variables into quantitative data using Python.
- Applied backward elimination to reduce predictors from 20 to 6, addressing multicollinearity and improving model accuracy (adjusted $R^2 = 0.771$).
- Used Python (Pandas, NumPy, Scikit-learn) for analysis, hypothesis testing, and modeling; visualized correlations using heatmaps and scatter plots.
- Predicted 2013 Canada life expectancy within 0.5 years of WHO's reported value, demonstrating model reliability and efficiency.

Skills

Languages: (Proficient): Java, HTML/CSS, Javascript, Python, SQL; (Familiar): C, C++, Clojure, Erlang

Frameworks: React, Node.js, Flask, Express.js

Libraries: Pandas, NumPy, Matplotlib, Scikit-learn

Developer Tools: Git, Docker, MongoDB, PostgreSQL, Neo4j, VS Code, Eclipse, Jupyter Notebook

Relevant Courses: Data Structures and Algorithms, Operating Systems, System Hardware, OOP, Databases