Massimo Caruso

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Hiring manager
COMPANY
STREETNUMBER STREETNAME, CITY, PROVINCE POSTALCODE

September 30, 2025

Dear Hiring manager,

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

As a challenge designer with the Hexploit Alliance at AtHackCTF, I designed a security challenge simulating an access control system using MIFARE Classic cards, focusing on vulnerabilities like weak key management and privilege escalation. Participants reverse-engineered RFID memory sectors and forged admin access, gaining hands-on experience with embedded systems security.

In the AtHackCTF 2025 organizing team, I prepared over 600 MIFARE Classic cards, handling custom data writing and proper labeling. I also managed the distribution of RFID card readers and facilitated a lockpicking activity during the event.

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 COMPANY is COMPANYDETAILS. I am particularly drawn to the opportunity to POSITIONDETAILS.

I am confident that my technical skills, academic achievements, and passion for software engineering make me a strong candidate for the POSITION 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 COMPANY's success.

Sincerely,
Massimo Caruso

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Education

Montreal, Canada **Concordia University** **Jan 2023 – Present**

- **Major:** Software Engineering, BEng
- **Relevant Courses:** Data Structures and Algorithms, Operating Systems, Databases, Embedded Systems, Machine Learning, and Deep Learning

Experience

PayFacto - Payment Technology Solutions **May 2025 – August 2025**
Software Project Manager, Intern

- Spearheaded data acquisition, cleaning, and preprocessing of raw merchant data sets for the deployment of MEVWeb, a province-wide cloud-based SaaS platform mandated by Revenu Québec.
- Participated in end-to-end deployment of MEVWeb software both remotely and on-site, including planning, testing, and installation across restaurant partners.
- Led and supported physical hardware transitions by uninstalling legacy MEV devices and installing MEVWeb-compatible components such as printers and routers.
- Collaborated with project delivery, field services, and sales teams to ensure seamless coordination of deployments and merchant onboarding.
- Tested MEVWeb software builds and deployment packages, reporting bugs and verifying stability before production rollout.

AtHackCTF **Nov 2024 – March 2025**
Challenge Designer and Developer, Permanent Part-time

- Designed a complex RFID-based Capture the Flag (CTF) challenge using a real ATM machine and MIFARE Classic cards, which communicated with the machine's reader to simulate a security environment.
- Developed three flags requiring participants to:
  - Extract the card's PIN from memory by reverse-engineering the RFID data.
  - Manipulate the card's balance data, allowing the participant to alter the funds stored on the card.
  - Modify the card's UID to impersonate an admin and escalate privileges within the system.
- Implemented an interactive ATM interface, including buttons for navigation and a printer to issue flags upon successful completion of challenges.
- Facilitated the learning of hardware security, from memory manipulation to privilege escalation, within a real-world context.
- Prepared over 600 MIFARE Classic cards by writing custom data to each card and ensuring proper labeling and formatting for participant use.

Projects

Food Database System
- Developed an online nutritional database integrating APIs (FatSecret, TheMealDB) to provide detailed nutritional data, recipes, and dietary metadata.
- Cleaned and validated JSON data, storing in hybrid databases (PostgreSQL + MongoDB) with optimized queries, indexing, and aggregates.
- Automated data migration between SQL and NoSQL using Python, improving retrieval efficiency with custom recipe-name generator for FatSecret API.

Teacher-Student Feedback Web Application
- Designed responsive frontend components (sidebar, header, landing page) with smooth navigation across devices.
- Connected frontend forms to backend APIs for feedback submission and confirmation; optimized Azure-hosted SQL database queries.
- Performed acceptance testing, bug resolution, and version control (Git), maintaining coding standards and repository organization.

Linear Regression Model
- Built a multiple regression model to analyze life expectancy factors (WHO dataset, 193 countries, 2000–2015).
- Applied backward elimination to reduce predictors from 20 to 6, achieving adjusted $R^2 = 0.77$ and predicting Canada's 2013 life expectancy within 0.5 years of reported value.
- Used Python (Pandas, NumPy, Scikit-learn) for preprocessing, modeling, and visualization.

GetNextLine Implementation (C)
- Implemented a custom function to read lines from standard input using low-level system calls ('read') and manual memory management.
- Designed buffer-zeroing and dynamic allocation strategies to handle varying input sizes safely while preventing overflow.
- Handled edge cases (EOF, null bytes, `\n`/`\r` line breaks, empty input) with correct memory cleanup using `malloc`/`free`.

Limited `printf` Implementation (C)
- Built a custom 'printf' supporting %s, %c, and %d format specifiers without the C standard library.
- Used only system calls (`read`, `write`) and implemented supporting functions (`my_strlen`, `my_puts`, `my_itoa`) for string handling and integer conversion.
- Managed variadic arguments via stack frame manipulation (`x86args.h`), demonstrating low-level assembly interface and systems programming.

Skills

Languages: (Proficient): C, Java, LaTeX, HTML/CSS, Javascript, Python, SQL; (Familiar): C++, Clojure, Erlang
Frameworks: React, Node.js, Express.js, Flask
Libraries: Pandas, NumPy, Matplotlib, Scikit-learn, PyTorch
Developer Tools: Git, Docker, Makefile, MongoDB, PostgreSQL, Neo4j, VS Code, Eclipse, Jupyter Notebook
Methodologies: Agile development, Scrum, Waterfall