# Jacob McGreen

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## Education

**University of Rochester** Rochester, NY
B.S. in Computer Science (GPA: 3.62, Dean's List) Class of 2026
Coursework: Data Structures & Algorithms, Design & Analysis of Algorithms, Parallel & Distributed Systems, Database Systems, Artificial Intelligence, Programming Language Design, Computer Organization, Machine Learning

## Experience

**Principal Financial Group** Des Moines, IA
*Software Engineering Intern* May 2025 – August 2025

- Reduced annual licensing costs by $519K by developing a production internal AI service using **Python**, **AWS**, and **ServiceNow** to replace a third-party vendor tool.
- Engineered **Java** and **Spring** microservices in a customer investment platform to support account and transaction functionality.
- Implemented 75+ unit tests in **JUnit** increasing code coverage above 95% in SonarQube across 3 microservices.

**The Mutual Group** Des Moines, IA / Remote
*Applications Development Intern* June 2024 – February 2025

- Improved front-end accessibility and database connectivity in a **TypeScript** and **Angular** application supporting internal business operations.
- Implemented internal RESTful endpoints, handling HTTP request lifecycles to improve search functionality for **100,000+** insurance claims.
- Rewrote a legacy application using **React**, **Java**, and **SQL**, modernized the user interface and updated backend functionality.

**RocLab** Rochester, NY
Back End Engineer February 2024 – February 2025

- Developed backend features in **TypeScript** for *Unicycle*, a live student marketplace serving 500+ users, supporting listing management, file uploads, and search/filter functionality.
- Deployed and maintained backend services on **AWS**, led a migration of the platform's hosting infrastructure that reduced hosting costs and improved deployment workflows.
- Supported secure authentication workflows and maintained platform stability in a production environment.

## Projects

**Monte Carlo Options Pricer**

- Built a full-stack Monte Carlo pricing system using **Python/Numpy** with optional **Numba** JIT acceleration and a **FastAPI** backend integrated with a **Next.js** frontend.
- Implemented European, Asian (arithmetic), and up-and-out barrier option pricing with configurable simulation controls (paths, steps, antithetic variates, seed).
- Designed scalable pricing endpoints supporting configurable financial inputs ($S_0$, $K$, $\sigma$, $T$, $r$, $q$) and reproducible Monte Carlo simulations.

**Connect 4 AI**

- Built an adversarial game AI using **Minimax** with **Alpha-Beta pruning** for efficient game-tree search.
- Implemented heuristic board evaluation and configurable search depth to balance strategy quality and runtime performance.
- Developed a playable interface supporting human vs AI gameplay.

## Skills

**Languages:** Python, Java, C++, C, TypeScript, JavaScript, SQL, React
**Frameworks/Tools:** Spring, FastAPI, React, Next.js, Angular, AWS, MongoDB
**Concepts:** REST APIs, Microservices, Distributed Systems, Unit Testing