

# Nicholas Maggio

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## Education

**University of Colorado Boulder** – Bachelor of Science in Computer Science

August 2024 – May 2028 (Expected)

## Experience

**Software Development Engineer Intern**, Amazon Web Services – Denver, CO

Aug 2026 – Present

- Engineered TypeScript and React interfaces in a Linux-based development environment to address UX failures in AWS data-center control systems, cutting data-center technician support tickets by 32% (measured by weekly ticket volume).
- Migrated the data-center inventory generator to upload data-center components to an asynchronous RESTful API backed by DynamoDB and Lambda, reducing failed uploads by 21%.
- Designed DynamoDB stores to track the current and past states of inventory generator uploads, providing data-center technicians with an audit log to diagnose the current construction-phase of a data-center.

**Software Engineering Research Intern**, Virsolve – Boulder, CO

Jan 2026 – Present

- Authored "Engineering Optimal Open Addressing for High-Load Hash Tables" and submitted it for peer review at the CSIT journal. (Accepted pending minor revisions)
- Conducted the first comprehensive engineering study of Funnel Hashing, benchmarking cache-conscious C++ (SIMD) implementations against 11 leading hash tables on Apple M4 and x86-64.
- Outperformed IcebergHT with 1.7× faster fills and 11% lower memory use, and cut insert p99.9 latency 5× against double hashing at load 0.999.

## Projects

**C++ Compiler**

[github.com/nick-maggio/cpp-compiler](https://github.com/nick-maggio/cpp-compiler)

- Built a C++ compiler supporting lexing, parsing, semantic analysis, template instantiation, and x86 code generation
- Generated native Linux, macOS, and Windows executables through NASM-backed assembly output
- Validated correctness with 700+ GTest unit tests against g++ and Clang behavior across supported language features

**Neural Snake w/ Custom Graphics**

[github.com/nick-maggio/neural-snake](https://github.com/nick-maggio/neural-snake)

- Built a custom DirectX 11 renderer in C++ to visualize neural-network gameplay without a game engine
- Implemented a feedforward neural network and genetic algorithm in C++ to train Snake agents over 200 generations of 150 agents
- Parallelized agent evaluation across CPU cores, reducing average training time by 74% from 9.3s to 2.4s

**Selenium + Pytest Cross-Browser Test Suite**

[github.com/nick-maggio/-saucedemo-test-suite](https://github.com/nick-maggio/-saucedemo-test-suite)

- Developed an automated UI test suite of 40+ test cases using Selenium and Pytest to validate login, cart, and checkout workflows on a demo website
- Implemented cross-browser testing across 4 browsers (Chrome, Firefox, Edge, Safari) using a Page Object Model structure and Pytest fixtures
- Tested positive and negative user flows through both automated and manual testing to ensure site reliability and completeness

## Skills

**Languages:** TypeScript, C++, Python, JavaScript, SQL, x86 Assembly (NASM), Bash

**Frameworks and Libraries:** React, Selenium, Pytest, GTest, DirectX 11

**Cloud & Dev Tools:** AWS (Lambda, DynamoDB, S3, API Gateway, EC2), REST APIs, Git, Linux