

# Allen Cao

🌐 <https://allencaoo.github.io>

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## EDUCATION

### University of California, Berkeley

Berkeley, CA

B.A. Computer Science, GPA: 3.86/4.0

August 2020 - May 2024

- **Coursework:** Data Structures, Efficient Algorithms, Computer Architecture, Database Systems, Operating Systems, Artificial Intelligence, Compilers, Principles of Data Science, Computer Security, DeFi, Circuits, Linear Algebra, Discrete Mathematics, Probability
- **Course Staff:** CS188 (Intro to AI), CS61B (Data Structures)

## SKILLS

**Programming Languages:** Python, Java, C/C++, C#, TypeScript/JavaScript, HTML/CSS, Rust, SQL, Scala, Bash, Go

**Frameworks:** Node.js, Express, React, Django, Flask, Spring, Ruby on Rails, GraphQL, Apache Spark, MySQL, PostgreSQL, .NET, OpenCV

**Tools:** AWS (Lambda, CloudFormation, DynamoDB, Athena/Glue, S3, API Gateway, Redis, RDS), Git, MongoDB, Unity, Docker, Kubernetes

## WORK EXPERIENCE

### UC Berkeley EECS, Barsky Lab

Berkeley, CA

Computer Vision Researcher

August 2022 - Present

- Created Unity plugins to compile and integrate vision filtering algorithms into dynamic link libraries for Android and IOS app development.
- Developed a network-based research workflow to enable cross-language, cross-platform communication for C/C++ algorithm experimentation in .NET/C# apps.
- Building a live computer vision application for elderly assistance with PyTorch deep learning and OpenCV.

### UC Berkeley EECS: CS188, CS61B

Berkeley, CA

Reader/Tutor

January 2023 - Present

- Holding weekly office hours to respond to student homework, lab, project, and exam inquiries.
- Leading weekly small group discussion sections to go through worksheets on course topics and support students in their challenges.

### Amazon Fashion

Seattle, WA

Software Development Engineer Intern

May 2023 - August 2023

- Reduced week-long data management tasks to mere seconds by building a highly efficient content database administrator tool to enable seamless data search, modification, and migration.
- Achieved a 97% decrease in data retrieval latency by designing and implementing a downstream database partitioning scheme with Apache Spark, resulting in predictable latencies for 100k daily API requests.
- Developed a scalable REST API using API Gateway, integrated with a React frontend and Lambda, Athena/Glue backend to serve thousands of Amazon Fashion content managers and data engineers daily.
- Constructed deployable cloud infrastructure using AWS CloudFormation/CDK and integrated across 3 development stages.

### Baxter International

Deerfield, IL

Software Development Engineer Intern

June 2022 - August 2022

- Fully obtained FDA compliance by incorporating an interrupt service routine into medical device systems to monitor device damage, collect data, and generate logs to an end-user database.
- Upgraded internal API by developing a logging queue and integrating throughout codebase to resolve thread-safety concerns and optimize multi-threading.
- Constructed a streamlined Python machine learning workflow that includes an ETL pipeline feeding into a damage detection classifier, resulting in a model with 99% accuracy on test data.
- Automated internal GUI quality control by building an OpenCV application to identify missing design requirements from GUI images.

## PROJECTS

### Pathfind Visualizer

React

<https://allencaoo.github.io/Pathfind-Visualizer>

- Built an interactive visualization tool for pathfind and maze generation algorithms on a 2D grid.
- As course staff, released the project to over 50 students in UC Berkeley's data structures (CS61BL) course section as a visual learning tool.
- Algorithms include BFS, DFS, Dijkstra's, A\*, Greedy Best First Search, Randomized Prim's, and Inverted Randomized Prim's.

### tAI

MongoDB, Node, Express, React, Redux

- Built an AI-powered educational tool delivering personalized assistance to all educational levels and subjects.
- Features include feedback-based quizzes, conversational office hours, and grading interface.
- Utilized MongoDB to manage content and student feedback, Express.js and AI text generation APIs for backend, and React for UIs.

### Pintos OS

C, x86 Assembly

- Programmed a uniprocessor operating system to handle and manage interrupts, system calls, memory allocation, thread scheduling, extensible file system (Berkeley FFS), caching, and virtual memory.
- Implemented comprehensive thread and process synchronization using locks, semaphores, and monitors.

### Gitlet

Java

- Designed and implemented a version control system for local and remote repositories.
- Built an organized hash-based storage system for commits, branches, and remote repositories.
- Supports init, add, commit, rm, log, global-log, status, checkout, branch, rm-branch, reset, merge, add-remote, rm-remote, fetch, push, pull.