Marshall G. Moats

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Education

Iowa State University | Ames, IA **Aug 2022 – May 2025**
BS Computer Science, BS Mathematics GPA: 3.9
Involvement: Honors Program, Undergraduate Research, Hixson Scholar, Computer Science Club, Game Dev Club

Experience

Software Engineering Intern **May 2024 – Aug 2024**
Workiva Ames, IA
- Led initial development of a new feature that would allow users to make styling edits much more quickly.
- Built new frontend features in the spreadsheets application using React and Dart.
- Contributed to backend handling of user spreadsheet edits.
- Created several support tools to gather and display aggregate data on spreadsheets in order to diagnose issues.

Software Engineering Intern **Nov 2023 – May 2024**
John Deere Ames, IA
- Wrote C code and unit tests for microcontrollers running a real-time operating system.
- Utilized Matlab and Simulink models to conduct in-depth analysis of sprayer performance.
- Built rigorous mathematical models for control of sprayer nozzle flow and pressure.
- Knowledge of and experience with Agile methodology.

Mathematics Research Assistant **Jan 2024 – May 2024**
Iowa State University Ames, IA
- Implemented a machine learning algorithm to compute eigenstates of quantum mechanical systems.
- Used Python and machine learning libraries such as PyTorch and JAX to create the model.

Computer Science Research Assistant **May – Aug 2023**
Iowa State University Ames, IA
- Studied chemical reaction networks and they are affected by random perturbations to reaction rates.
- Built a high-performance Rust library that can simulate stochastic and deterministic CRNs. Includes a GUI for visualizing the results.

Mathematics Research Assistant **Jan – May 2023**
Iowa State University Ames, IA
- Investigated properties of integer sequences known as parking functions. Used Python with SageMath to collect data.
- We discovered formulas describing the number of parking functions satisfying various color patterns.

Technical Skills

Languages: C, C++, Python, JavaScript, Java, Go, Rust, Matlab, SQL, Dart
Software & Tools: Git, AWS (EC2), Linux, Docker, Visual Studio, Android Studio, CMake

Projects

AI Recipe Generation App | *Java, SQL* **Jan – May 2023**
- Generates recipes that use the ingredients in your fridge. Utilizes OpenAI's DaVinci model.
- Set up testing and continuous development/continuous integration with GitHub Actions.

Chemical Reaction Network Simulator | *Rust* | GitHub **May – Aug 2023**
- Built a GUI for simulating and parsing chemical reaction networks, using my own built-from-scratch Rust library.
- Final product is able to simulate 1 million trials in 5 seconds on a moderately powerful laptop.

AI Discord Bot | *Rust* **Aug – Sep 2023**
- Uses a Markov chain for text generation. Generating messages of <500 tokens is effectively instant.
- Trains on your Discord server's messages by default, but isn't restricted to this—feed it Shakespeare and it will generate some random Middle English!

Farmers' Market Web App | *Python* **Oct 2023**
- Built a REST API with Flask for a web app as part of an ag-themed hackathon. Frontend written in React.
- Backend handles user creation/deletion requests, finds nearby farmers' markets and shows users what's for sale!

Competitions

ISU CSE Club: 1st Place, Advanced Division (Fall 2023, Spring 2024)
Putnam Score: 25 (Dec 2023)
ICPC NCNA 2022: 13th out of 116 teams