Alexander Paolini

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EDUCATION

University of Central Florida, Burnett Honors College Aug. 2025 — May 2028
Bachelor of Science in Computer Science *Orlando, FL*

- Associations: Knight Hacks, Honors Congress, KnightRiders
- Relevant Coursework: Data Structures and Algorithms, Discrete Structures, Programming with C, Programming with Java

EXPERIENCE

Software Development Intern May 2024 — Aug. 2024
Better World Analytics *Melbourne, FL*

- Developed **data processing scripts** using **Python** and **pandas** to analyze call detail records and timing advance tables.
- Utilized **Kepler.gl** to analyze and visualize potential criminal paths, providing insights that could aid defense lawyers in preventing wrongful convictions.
- Collaborated with a team through weekly standup meetings, maintaining effective communication via email with coworkers and supervisors.

Math Instructor Dec. 2022 — Aug. 2024
Mathnasium *Boca Raton, FL*

- Guided 1-4 students at a time, primarily in Algebra II and Calculus, using the Socratic method to enhance critical thinking and problem-solving skills.
- Developed individualized learning strategies that significantly improved students' understanding of complex mathematical concepts.

Volunteer Developer 2021 — 2023
JPBBots *Remote*

- Developed many different Discord bot applications including **Censor Bot**, a bot that would automatically delete inappropriate or disallowed words/phrases.
- Led the development of Censor Bot's filter, ensuring comprehensive coverage against inappropriate language, including handling lookalike characters and diacritics.
- Gained experience in proper development workflows using Git and Docker with TypeScript, contributing to a project utilized by over **100,000 communities** and **millions of users**.

PROJECTS

m | Java, Recursive Descent Parsing, Abstract Syntax Tree, Interpreter

- Developed a math-oriented interpreted programming language in **Java** — most notably supporting arbitrary precision numbers, functions, and lists.
- Developed a recursive descent parser to generate an **Abstract Syntax Tree (AST)** for efficient expression parsing, easily supporting operator precedence.
- Implemented a **Tree Walk Interpreter** to execute parsed statements dynamically.

ibssbi | C, Binary, Bitwise Operations, Register-Based VM

- Designed and implemented a custom **register-based bytecode interpreter** in **C** as a foundation for a future compiler.
- Supports execution of **37 OpCodes**, including arithmetic operations, control flow, stack management, and system calls, with room for **64 total instructions**.
- Implements a **64-register** architecture with a dedicated stack and jump/call instructions for execution flow, using a compact 32-bit instruction format.
- Developed optimized bit manipulation **macros** for efficient instruction decoding.

ShareX Server | JavaScript, redis, MongoDB, git, Mongoose

- Developed a **webserver** that allowed users to upload screenshots automatically through ShareX or equivalent software.
- Built a frontend using **Express.js** and **ejs** to allow users to view and manage their uploaded files.
- Implemented a time-based cache on files using **redis** to temporarily save images on the host server, reducing overall requests to custom built file storage nodes.

HONORS AND AWARDS

- UCF President's List | Fall 2024, Spring 2025
- 12th place at the 38th Annual UCF High School Programming Tournament
- UCF Provost Scholarship

SKILLS

- **Programming Languages**: Python, C++, C, Java, JavaScript, TypeScript
- **Libraries/Frameworks**: numpy, pandas, Express.js, Next.JS, React