

# Malcolm Kaplan

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## EDUCATION

### University of Illinois at Urbana-Champaign

Champaign, IL

*Bachelor of Science in Computer Science and Anthropology – 3.98 GPA*

*August 2021 – Present*

- Honors: Phi Beta Kappa; James Scholar; Dean's List; Phi Eta Sigma National Honor Society, Alpha Chapter

## EXPERIENCE

### Computer Architecture Course Assistant

January – May 2024

*University of Illinois at Urbana-Champaign*

*Champaign, IL*

- Held office hours to guide students through the creation and debugging of lab assignments focused on CPU design and optimization in Verilog, MIPS Assembly Language, C, and C++
- Taught students topics in computer optimization, including pipelining, caching, parallelism, and virtual memory

### Software Engineering Intern

June – August 2022, May – August 2023

*AvTech Corp.*

*Des Plaines, IL*

- Created an app using Python, MicroPython, Java, and JavaScript to efficiently and securely communicate with proximity beacons via LoRaWAN technology, allowing for remote access and modification of transmitted data
- Created a VBA (Excel) program to algorithmically assign van drivers to service flights given a set of constraints, including shift times and weight capacities, saving hours of manual work for airport staff each day
- Manually parsed through huge codebases to implement new features and find bugs
- Thoroughly tested new features on existing applications prior to public releases
- Actively communicated with clients to ensure that the company's programs met their exact criteria
- Wrote detailed project reports to submit to clients, guiding users through the setup and running of the programs

### Discrete Structures Course Assistant

January – May 2023

*University of Illinois at Urbana-Champaign*

*Champaign, IL*

- Held office hours, attended discussion sections, and answered student questions on course forums to help teach students fundamental computer science topics including algorithm analysis, boolean algebra, recursion, and graphs

## PROJECTS

### Linux-Like Kernel | C, x86 Assembly, GDB, GitLab

March – April 2024

- Led 4 engineers to develop a Linux-like monolithic operating system, consisting of over 13,000 lines of code
- Engineered infrastructure for running and switching between multiple processes seamlessly, including scheduling, system calls, and interrupt handling
- Implemented features to ensure security and speed, including virtualized memory and file system abstractions
- Developed comprehensive device drivers for keyboard, terminal, real-time clock, and timer

### Elden Ring Speedrun Optimizer | C++, Python, Matplotlib, Make, GitHub, Docker

May 2023

- Created a program to read in locations from the Elden Ring video game and calculate an optimal speedrun route
- Developed modifications of Dijkstra's algorithm and the Floyd-Warshall algorithm to find shortest paths while simultaneously accounting for the intricacies of the game and enforcing a strict ordering of certain pathways
- Achieved calculated route times within 5% of actual speedrun world records, indicating high accuracy
- Visualized results by drawing a path on an image of the Elden Ring map using Python and Matplotlib

### Machine Learning Model for Estimating CPU Performance | Python, Pandas, Scikit-Learn

November 2023

- Created a machine learning model that estimates the performance of a CPU given statistics such as the size of the cache and the number of memory channels

### Personal Website | React, JavaScript, CSS, HTML, GitHub

November 2022

- Developed an interactive personal website to house resume and various other important things

## SKILLS

**Programming Languages:** C, C++, Python, Java, Go, x86, MIPS, VBA, C#, Verilog, JavaScript, CSS, HTML, SQL

**Tools, Frameworks, and Libraries:** Git, GitHub, GitLab, GDB, Bash, PowerShell/Command Prompt, Docker,

NumPy, SciPy, Pandas, scikit-learn, React, Node.js, Flask, Make, XML

**Multimedia Software:** Photoshop and Sony Vegas, creating projects amassing over 1,000,000 total views on YouTube

## ACTIVITIES

### Association for Computing Machinery (ACM)

January 2022 – Present

- Active member of special interests groups relating to computer architecture ("SIGARCH"), human-computer interaction ("SIGCHI"), and video game development ("Game Builders")

### Illini Classics Club, Treasurer

October 2021 – Present

- Handle membership dues and University-related monetary transactions and maintain accurate financial records