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 – May 2025*

- **Honors:** Phi Beta Kappa; James Scholar; Dean's List; Phi Eta Sigma National Honor Society, Alpha Chapter
- **Relevant coursework:** Data Structures, Algorithms, Machine Learning, Operating Systems, Distributed Systems, Database Systems, Networks, Computer Architecture, Data Science, Statistics and Probability, Linear Algebra
- **Activities:** Association of Computing Machinery (ACM), Treasurer of Illini Classics Club

Experience

Software Engineering Intern June – August 2022, May – August 2023, 2024

AvTech Corp. *Des Plaines, IL*

- Developed novel full-stack solutions across the aviation industry, including the following:
  - An interactive map web console in Typescript to display real-time locations of buses as well as a backend service in C# to parse location information from a database and calculate estimated arrival times
  - An app in 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
  - A VBA 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
  - A server in Python for parsing and storing ADS-B data containing the locations of nearby planes obtained from a Raspberry Pi, as well as a Javascript web application to display the planes on a map in real-time
  - An Android user-interface for bus drivers to efficiently scan passengers and keep track of upcoming services
- 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

Computer Architecture Course Assistant January – May 2024

University of Illinois at Urbana-Champaign *Champaign, IL*

- Held office hours to guide students through CPU design and optimization projects in Verilog, MIPS, C, and C++
- Taught students topics in computer optimization, including pipelining, caching, parallelism, and virtual memory

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

Distributed Stream Processing Framework | *Golang, Bash, GitLab* August – December 2024

- Developed a fault-tolerant, parallel stream processing framework from scratch, consisting of over 4,600 lines of code
- Engineered a fault-tolerant distributed file system for safely and efficiently storing input and output data
- Included support for arbitrary and customizable operations on the input data
- Implemented the SWIM protocol for efficient and complete failure detection among nodes in the cluster

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

Skills

Languages: C, C++, Python, Java, Go, JavaScript, Typescript, CSS, HTML, SQL, x86, MIPS, VBA, C#, Verilog, Haskell
Tools, Frameworks, and Libraries: Git, GitHub, GitLab, Azure DevOps, GDB, Bash, PowerShell/Command Prompt, Docker, NumPy, SciPy, Pandas, scikit-learn, React, jQuery, Node.js, Make, XML, SQlite, Entity Framework
Multimedia Software: Photoshop and Sony Vegas, creating projects amassing over 1,000,000 total views on YouTube