Malcolm Kaplan

mkaplan6@illinois.edu | linkedin.com/in/malcolm-kaplan/ | github.com/mkaplan6 | mkaplan6.github.io

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

Software Engineering Intern   June – August 2022, May – August 2023, 2024
AvTech Corp.   *Des Plaines, IL*
- Developed novel full-stack solutions for various problems 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

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

SKILLS

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

ACTIVITIES

Association for Computing Machinery (ACM)   January 2022 – Present
- Active member of groups for computer architecture, human-computer interaction, and video game development

Illini Classics Club, Treasurer   October 2021 – Present
- Handle membership dues and University-related monetary transactions and maintain accurate financial records