Brook Mao

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# Skills

## Technical

* Proficient in Python, JavaScript/TypeScript, Java, C/C++, and PHP, developing apps such as \_\_\_\_\_\_\_\_\_\_.
* Skilled at using PowerShell and Git Bash for various tasks across 10+ personal and school projects.
* Experienced with SQL databases and data modelling, building a full stack profile collection app leveraging MySQL.
* Familiar with NoSQL databases like MongoDB and Firebase Realtime DB, building apps such as \_\_\_\_\_\_\_\_\_\_.
* Familiar with basic system design from engineering a multiplayer chess clock app with a 3-tier architecture.
* Clear documentation skills demonstrated through open-source contributions to the VSCode user documentation.
* Skilled at writing clean, object-oriented, and easily understandable code (by peers and TAs), as well as improving code through refactoring by applying modern design patterns, from U of T's software design course.
* Detailed in quality assurance, writing unit tests for personal projects and school assignments using frameworks such as doctest, unittest, Jest, and JUnit.
* Seasoned in cloud technologies, having deployed 3 apps via Amazon Web Services, Azure, and Google Cloud.
* Familiar with DevOps, using Docker and GitHub Actions to set up CI/CD pipelines in projects such as \_\_\_\_\_\_\_\_\_\_.
* Strong analytical skills, mining and visualizing raw CSV data using Python libraries including Pandas and Matplotlib to reveal insights and produce clear reports, through freeCodeCamp's data analysis certificate.
* Familiar using TensorFlow to build machine learning models, including a malaria cell classification neural network.
* Skilled at implementing polished user interfaces using HTML, CSS, and front-end libraries like React, jQuery, Bootstrap, and Tailwind, as exemplified in the UI and UX design for ThreatTrace AI.
* Experienced in web development and building REST APIs using frameworks like Express and Flask.
* Familiar with client-side and server-side rendering, applying both techniques across 3 different web apps.
* Experienced in using the Git version control system with GitHub to collaborate across 4 different group projects.
* Familiar with static code analysis tools like Cppcheck to identify and resolve issues, enhancing code quality.
* Experienced in using Google Suite (Sheets, Docs, Slides) and Microsoft Suite (Excel, Word, PowerPoint) through tracking membership information for the Agincourt Chess Club and expenses for an eCommerce store.
* Familiar with A/B testing through running ads for an eCommerce store, tracking results with Google Analytics.

## Interpersonal

* Experienced working in Agile and Scrum teams, leading a group of 6 as Scrum Master using Jira to build an artifact database Android app catering to client requirements for a final course project.
* Open communicator, facilitating standup meetings both in software teams and with colleagues as a camp counselor.
* Collaborates effectively and quickly learns new skills to fulfill roles in hackathon projects and meet tight deadlines.
* Skilled at presenting complex ideas in a simple manner, through experience as a chess instructor.

# Education

## University of Toronto, Honors Bachelor of Science in Computer Science (Co-op) Expected 2027

Software Engineering Stream | Relevant Courses: Software Design, Computer Organization

## Additional Certifications

* JavaScript Algorithms and Data Structures, freeCodeCamp.org
* Data Analysis with Python, freeCodeCamp.org
* Web Applications for Everybody Specialization, University of Michigan (Coursera)

# Experience

## [Artifact Database Android App](https://github.com/BrookMaoDev/SoftwareDesignFinalProject) | *Android Studio, Java, Firebase, Jira, Agile and Scrum* July 2024 - August 2024

* Leveraged Firebase and Java to develop a mobile app that efficiently manages and organizes museum artifacts.
* Led a team of 6 as Scrum Master, facilitating standups and sprint planning, communicating tasks and deadlines, and enabling smooth collaboration on GitHub by resolving merge conflicts, earning a peer evaluation score of 5/5.
* Troubleshooted and resolved bugs for 3 team members, ensuring the artifact display page and report generation feature met requirements and kept the project on schedule.
* Implemented a vibrant, interactive UI by extending standard AndroidX fragments to create custom UI elements.
* Wrote maintainable and testable code by utilizing the Model-View-Presenter (similar to MVVM) architecture, and applying object-oriented design patterns including Singleton, Adapter, and Strategy.

## [3D Rendering Engine](https://github.com/BrookMaoDev/3DRenderingEngine) | *C++, Cppcheck, Make* March 2024 - August 2024

* Built an object-oriented computer graphics program in C++ to render 3D shapes, including cubes and tetrahedrons.
* Applied software design principles to ensure flexibility for future enhancements, such as addition of new shapes.
* Implemented rotation, zooming, and panning functionalities using linear algebra and other mathematical techniques.
* Ran static code analysis with Cppcheck to identify and correct style issues, adhering to proper coding standards.

## [Portfoliify](https://portfoliify.brookmaodev.me/) - Profile Management App | *PHP, MySQL, Apache, JavaScript, Azure* December 2023 - July 2024

* Implemented a full stack application for managing online profiles using PHP, MySQL, and JavaScript, featuring login, sign-up, easy profile creation, and profile editing.
* Used knowledge in relational databases to design a data model with 5 SQL tables, efficiently storing users, profiles, educations, experiences, and institutions, while mapping their one-to-many and many-to-many relationships.
* Leveraged GitHub Actions to set up a CI/CD pipeline, automating Docker image builds on repository updates, making for faster deployments (≈ 30 seconds) to Azure Container Apps.

## [ThreatTrace AI](https://threattrace.brookmaodev.me/) - Malaria Detection CNN | *Python, TensorFlow, Flask, JavaScript, GCP* October 2023 - July 2024

* Collaborated in a team of 4 at Hack the Valley to develop a convolutional neural network that classifies cell images as healthy or malaria-parasitized with 95.45% accuracy, winning the Pulsar ML Challenge.
* Delegated tasks and ensured teammates were clear on their roles to deliver a prototype within a 36-hour deadline.
* Built the TensorFlow model with steps documented in a Jupyter notebook, training it on a dataset of 27,000+ images.
* Preprocessed dataset and user-uploaded images, ensuring consistent image sizes compatible with the model.
* Served the model using a Flask REST API, with Bootstrap and JavaScript on the client side, allowing users to try the model by uploading their own images through a web app with a sleek, interactive user interface.
* Leveraged GitHub Actions to set up a CI/CD pipeline, automating Docker image builds on repository updates, making for faster deployments (≈ 2 minutes) to Google Cloud Run.

## [Python Data Analysis Certification](https://www.freecodecamp.org/certification/BrookMaoDev/data-analysis-with-python-v7) | *Python, Pandas, NumPy, Matplotlib, Seaborn, SciPy, Unittest* June 2024

* Analyzed vast datasets with up to 70,000 data points using Pandas and visualized the data with Matplotlib and Seaborn to uncover traffic metrics and other insights about the freeCodeCamp website.
* Normalized and cleaned 2 datasets by removing outliers, improving the accuracy of results.
* Predicted future sea levels by conducting statistical analysis on historical data using SciPy.
* Produced clear, concise reports with visualizations for all 5 certification projects.
* Verified the accuracy of the results by passing 100% of freeCodeCamp's unit tests.

## [MultiClock](https://github.com/BrookMaoDev/MultiClock) - Multiplayer Chess Clock | *MERN, Tailwind, NGINX, Docker, Linux, AWS, GitHub CI/CD* May 2024

* Developed a full stack web app using React for the frontend, Node and Express for the backend, and MongoDB for the database, resulting in an easy-to-use tool that serves as a timer for multiplayer board games.
* Enabled use of the app on both desktop and mobile by implementing a responsive web design.
* Containerized each layer of the application with Docker, allowing for individual scaling of each component.
* Deployed the application on AWS using a Linux VM and configured NGINX as a reverse proxy, achieving HTTPS encryption, and ensuring secure, reliable access for users.
* Leveraged GitHub Actions to set up a CI/CD pipeline, automating Docker image builds on repository updates, making for faster deployments (≈ 2 minutes) to Amazon Web Services.

## The Wacky Store - University Assignment | *C* February 2024 - April 2024

* Implemented data structures such as linked lists, trees, and graphs from scratch, applying relevant algorithms to simulate a store with a social network and product recommendation system.
* Wrote comprehensive tests ensuring robustness and memory safety, earning 100% grades across all 3 tasks.

## [Matrix Multiplication Calculator](https://github.com/BrookMaoDev/MatrixMultiplicationCalculator) | *C, Cppcheck* March 2024

* Implemented a matrix multiplication algorithm as a console application to efficiently perform computations.
* Conducted static code analysis with Cppcheck to identify and address potential buffer overflow issues.

## [VSCode](https://github.com/microsoft/vscode) - Open-Source Contributor | *TypeScript, PowerShell, GitHub CI/CD* March 2024

* Improved the user experience by clarifying user documentation and identifying the code segment to update.
* Shared ideas on GitHub Discussions and used code review feedback from Microsoft engineers to successfully merge a pull request and resolve a backlog issue.
* Successfully built the application from the source code on a local Windows machine using the terminal.

## Ontario Bridges Data Analysis - University Assignment | *Python, Doctest* November 2023

* Analyzed a Government of Ontario bridge dataset containing 2,000+ bridges, focusing on metrics like Bridge Condition Index and last inspection date to assess bridge health.
* Developed an algorithm to automatically assign bridge inspectors to the nearest and highest-risk bridges.
* Thoroughly tested each function using Doctest, catching and resolving bugs to achieve 100% program functionality.

## [The Wildfire Network](https://github.com/BrookMaoDev/TheWildfireNetwork) - Wildfire News & Predictions Website | *Python, Django, Feedparser* August 2023

* Collaborated remotely on GitHub in a team of 3 to develop a site featuring the latest wildfire news, hotspots, and a basic prediction algorithm within 36 hours at Ignition Hacks.
* Learnt the Python Feedparser library on the fly to successfully collect and extract news data from CBC RSS feeds, making it possible to display real-time wildfire news articles on our homepage.

## [Java Brokers](https://github.com/BrookMaoDev/JavaBrokersMobile) - Stock Trading Simulator | *Java, UML, Yahoo Finance API* December 2022 - January 2023

* Collaborated in a team of 3 to develop a desktop stock trading simulator app, featuring user authentication, stock search, buy/sell functionality, portfolio management, and more.
* Leveraged the Yahoo Finance API (a third-party API) to integrate real-time data for the top 50 NASDAQ stocks.
* Designed the software using UML diagrams, promoting maintainable code, and simplifying task delegation.