

# OWEN MOOGK

Mechatronics Engineering Student  
at the University of Waterloo

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## SKILLS

- Software Development:** Python, TypeScript, JavaScript/jQuery, C++, C#, Java, R, SQL (Postgres / MS SQL Server).
- Frameworks / Tools:** React, Docker, Next.js, Django, FastAPI, WSL, Ubuntu, Linux, MVC/ASP.NET, TanStack, Visual Studio, VS Code.
- Software Experience:** Website development, OOP, data structures and algorithms, scripting, data analysis, testing and debugging.
- Other:** Experience working closely with a team and using agile development techniques, including version control with Git and TFS.

## EXPERIENCE

<b>Operational Software Developer (Co-op) – Rocket Factory Augsburg</b>	September 2024 – December 2024
<ul style="list-style-type: none"><li>Developed operational tools for a 300-person team building advanced rocket technology, using React and FastAPI.</li><li>Implemented web application features for a manufacturing execution system, directly improving production workflow.</li><li>Designed and built a time tracking application used company-wide, reducing administrative overhead by an estimated 60-70%.</li><li>Improved advanced database ORM architectures for scalability and speed in PostgreSQL, reducing complexity immensely.</li><li>Optimized codebase structure, refactoring and enhancing existing code to enhance performance, reusability, and scalability.</li><li>Utilized Git pipelines to improve testing and deployment of applications, ensuring quality and usability of tools.</li><li>Implemented CRUD features in a modular manner, allowing for optimal code reuse and development ease.</li><li>Utilized planning, project management, and communication skills to ensure adoption and integration of tools (studying workflows and designing with the user in mind).</li></ul>	
<b>Lead Software Developer – QAMP Outdoors</b>	September 2023 – November 2024
<ul style="list-style-type: none"><li>Developed a full-stack mapping application for camping/backpacking trip planning and routing.</li><li>Implemented UI designs (Figma) and effective data transfer and manipulation on the frontend, using Next.js / React.</li><li>Built database scripting tools, for mass transfer and processing of complex spatial relational data and information.</li><li>Designed and created HTTP endpoints using Django and RESTful APIs, retrieving and serving data to frontend displays.</li></ul>	
<b>Software Developer (Co-op) – BusPlanner Inc.</b>	May 2023 – September 2023
<ul style="list-style-type: none"><li>Developed and maintained web applications using the MVC ASP.NET framework, ensuring robust solutions for clients.</li><li>Implemented and improved many web application features, directly affecting hundreds of clients across North America.</li><li>Resolved issues on both the frontend and backend, employing debugging skills to identify and fix bugs, optimize performance, and enhance application usability with tools including C#, JavaScript/jQuery, and Bootstrap.</li><li>Designed SQL database solutions and advanced SQL queries for efficient data retrieval and manipulation.</li><li>Improved codebase structure, refactoring and optimizing existing code to enhance performance, reusability, and scalability.</li><li>Utilized Azure DevOps and TFS version control to manage source code and participate in code reviews among team members.</li><li>Conducted thorough testing of web applications to identify issues, ensuring optimal functionality and user experiences.</li></ul>	
<b>R&amp;D Development Engineering (Co-op) – Hub for Neuroengineering Solutions</b>	January 2024 – April 2024
<ul style="list-style-type: none"><li>Developed engineering solutions to create innovative neuroscience research devices at the University of Lethbridge.</li><li>Built full-stack websites for serving collected data, using Django (Python), React (JavaScript), and SQL databases.</li><li>Programmed Raspberry Pi microprocessors using Python, to process, interface, and relay recorded information to a user.</li><li>Developed embedded systems code in Python for Linux based operating machines, optimizing speed and performance.</li><li>Optimized hardware development workflow through an improved file storage and communication procedure.</li></ul>	

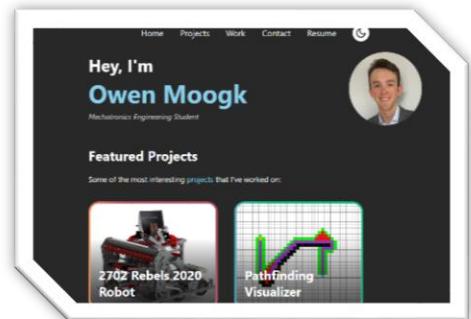
## EDUCATION

<b>Mechatronics Engineering – University of Waterloo</b>	2022 – 2027
<ul style="list-style-type: none"><li>Candidate for Bachelor of Applied Science studying Mechatronics Engineering, with a grade average of 95% / 4.0 GPA.</li><li>Presidents Scholarship of Distinction, Douglas Wright Award, International Experience Award, Dean's Honors.</li><li>Relevant courses: Digital Logic, Data structures and Algorithms, Calculus / Differential Equations, Linear Algebra.</li></ul>	

# PROJECTS

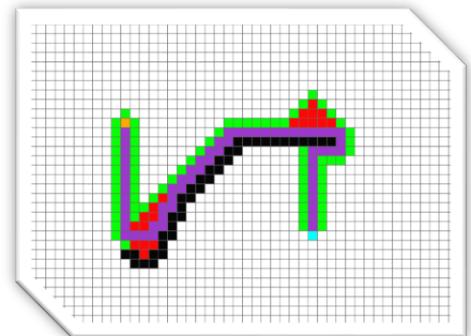
## Personal Website

- Designed and built a personal website using **React**, to showcase personal projects.
- Iterated over many versions, optimizing code structure and design.
- Created and handled **API requests** for data storage and page functionality.
- Project URL: <https://owenmoogk.github.io>



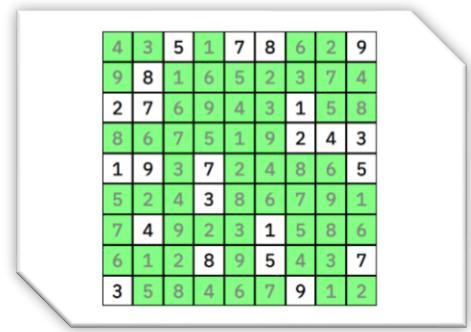
## Pathfinding/Sorting Algorithm Visualization

- Designed and programmed a variety of pathfinding and sorting algorithms in **Python** and **JavaScript**.
- Built websites using **React** to showcase a visualization of these algorithms.
- Implemented **pathfinding algorithms** including as A\*, Greedy Best First Search, Dijkstra's Algorithm, BFS, and DFS.
- Implemented **sorting algorithms** including Merge Sort, Heap Sort, and Hoare and Lomuto Quick Sort.
- Built tools that allowed users to experiment with algorithm performance in different situations.
- Pathfinding Visualizer: <https://owenmoogk.github.io/pathfinding-visualizer/>
- Sorting Visualizer: <https://owenmoogk.github.io/sorting-visualizer/>



## Sudoku Wave Function Collapse (algorithm)

- Designed and programmed an algorithm to solve a sudoku in **JavaScript**, modelling the problem as a modern **Wave Function**.
- Improved upon the common backtracking algorithm, with constraint propagation to vastly improve runtime.
- Built a website using **React** to visualize algorithm implementation.
- Project Website: <https://owenmoogk.github.io/wave-function-collapse/>



## Custom Mail Merge Application

- Designed a **full-stack** mail merge application using **Django** and **React**.
- Allowed users to customize templates and variables, with different contact fields.
- Implemented **Gmail API authentication**, allowing connection of external accounts.
- Stored user data in an **SQL Database**, serving API requests with **Python** and a **REST API**.
- Project Repository: <https://github.com/owenmoogk/email-bot>

## SimpleLib – Data Structures and Algorithms Library

- Designed, and programmed a **Data Structures and Algorithms** library in **Python**.
- Implemented data structures including Linked Lists, Binary Search Trees, Hashmaps, and Graphs.
- Implemented algorithms including tree traversal and inversion, graph pathfinding, and binary tree sorting.
- Allowed for user customization of algorithm implementation, including hashing function ranges and porting from other forms data storage.
- Implemented simple algorithms and functionality (such as hexadecimal conversion, data analysis tools, and much more)
- Project Details: <https://owenmoogk.github.io/simplelib>

These are some of my favourite and most applicable projects.

For a complete list of projects and some details please visit my website's project page, located at:  
<https://owenmoogk.github.io/projects>