OWEN MOOGK

Mechatronics Engineering Student
at the University of Waterloo

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SKILLS

Software Development: Python (6 years), JavaScript/jQuery (5 years), C++ (2 years), C# (1 year), Java (1 year), and SQL (1 year).

Frameworks / Tools: React (4 years), MVC/ASP.NET (1 year), Django (1 year), FastAPI (1 year), 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 / TFS.

EXPERIENCE

Operational Software Developer (Co-op) – Rocket Factory Augsburg
September 2024 – December 2024

- Developed operational tools for a 300-person team building advanced rocket technology, using React and FastAPI.
- Implemented web application features for a manufacturing execution system, directly improving production workflow.
- Designed and built a time tracking application used company-wide, reducing administrative overhead by an estimated 60-70%.
- Improved advanced database ORM architectures for scalability and speed in PostgreSQL, reducing complexity immensely.
- Optimized codebase structure, refactoring and enhancing existing code to enhance performance, reusability, and scalability.
- Utilized Git pipelines to improve testing and deployment of applications, ensuring quality and usability of tools.
- Implemented CRUD features in a modular manner, allowing for optimal code reuse and development ease.
- Utilized planning, project management, and communication skills to ensure adoption and integration of tools (studying workflows and designing with the user in mind).

Lead Software Developer – QAMP Outdoors
September 2023 – November 2024

- Developed a full-stack mapping application for camping/backpacking trip planning and routing.
- Implemented UI designs (Figma) and effective data transfer and manipulation on the frontend, using Next.js / React.
- Built database scripting tools, for mass transfer and processing of complex spatial relational data and information.
- Designed and created HTTP endpoints using Django and RESTful APIs, retrieving and serving data to frontend displays.

Software Developer (Co-op) – BusPlanner Inc.
May 2023 – September 2023

- Developed and maintained web applications using the MVC ASP.NET framework, ensuring robust solutions for clients.
- Implemented and improved many web application features, directly affecting hundreds of clients across North America.
- 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.
- Designed SQL database solutions and advanced SQL queries for efficient data retrieval and manipulation.
- Improved codebase structure, refactoring and optimizing existing code to enhance performance, reusability, and scalability.
- Utilized Azure DevOps and TFS version control to manage source code and participate in code reviews among team members.
- Conducted thorough testing of web applications to identify issues, ensuring optimal functionality and user experiences.

R&D Development Engineering (Co-op) – Hub for Neuroengineering Solutions
January 2024 – April 2024

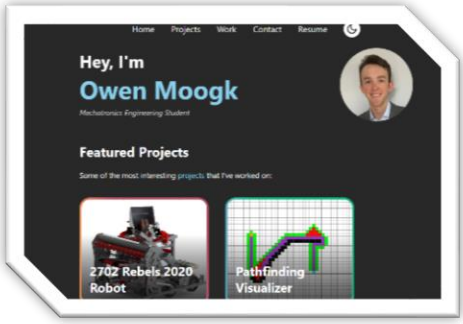
- Developed engineering solutions to create innovative neuroscience research devices at the University of Lethbridge.
- Built full-stack websites for serving collected data, using Django (Python), React (JavaScript), and SQL databases.
- Programmed Raspberry Pi microprocessors using Python, to process, interface, and relay recorded information to a user.
- Developed embedded systems code in Python for Linux based operating machines, optimizing speed and performance.
- Optimized hardware development workflow through an improved file storage and communication procedure.

EDUCATION

Mechatronics Engineering – University of Waterloo
2022 – 2027

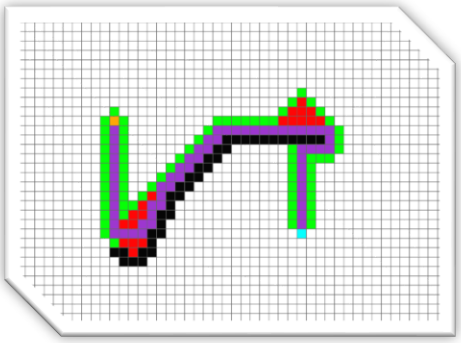
- Candidate for Bachelor of Applied Science studying Mechatronics Engineering, with a grade average of 95% / 4.0 GPA.
- Presidents Scholarship of Distinction, Douglas Wright Award, International Experience Award, Dean's Honors.
- Relevant courses: Digital Logic, Data structures and Algorithms, Calculus / Differential Equations, Linear Algebra.

PROJECTS



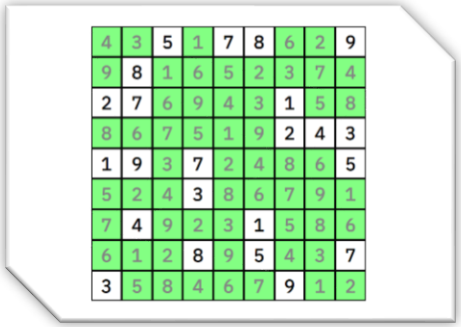
Personal Website

- 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/



4	3	5	1	7	8	6	2	9
9	8	1	6	5	2	3	7	4
2	7	6	9	4	3	1	5	8
8	6	7	5	1	9	2	4	3
1	9	3	7	2	4	8	6	5
5	2	4	3	8	6	7	9	1
7	4	9	2	3	1	5	8	6
6	1	2	8	9	5	4	3	7
3	5	8	4	6	7	9	1	2

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.

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-fullstack

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-documentation

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