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

## 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.

# Graphical user interface Description automatically generatedPROJECTS

## 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

* Chart

  Description automatically generatedDesigned 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/>

A picture containing electronics, keyboard

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## 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>

## 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>