OWEN MOOGK

Mechatronics Engineering Student

at the University of Waterloo

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# SKILLS

**Software Development:** Python (4 years), JavaScript/jQuery (4 years), C++ (2 years), C# (1 year), Java (1 year), and SQL (1 year).

**Frameworks / Tools:** MVC/ASP.NET (1 year), ReactJS (3 years), HTML/CSS/Bootstrap (5 years), Django (1 year), Visual Studio.

**Software Experience:** OOP, advanced data structures and algorithms, JSON/XML scripting, data analysis in R, testing and debugging.

**Other:** Experience working closely with a team, using agile development techniques, including version control with Git / TFS.

# EXPERIENCE

## 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.

## Subteam Lead – FIRST Robotics Team August 2018 – September 2022

* Led a subteam of students using project management and teamwork skills to design and build a robotic subsystem.
* Designed flexible assemblies and robotic systems in SolidWorks for manufactured and 3D printed fabrication.
* Fabricated complex parts and assembled robotic systems, troubleshooting and optimizing mechanical systems.
* Led the team’s sponsorship program, using networking and interpersonal skills to attract and retain sponsorship for the team.

## Drivetrain Lead – Electric Racecar Team September 2021 – June 2022

* Designed and manufactured a fully electric racecar in under a year, optimizing drivetrain systems to increase efficiency.
* Developed offboard battery management system in Python, tailoring power use and energy deployment in competition.
* Designed a 3D printed emergency stopping system in OnShape, ensuring safety and ease of use in emergencies.

## Personal Projects

* Developed complex full-stack webpages using HTML, CSS, JavaScript, ReactJS and Django (Python).
* Implemented advanced algorithms and data structures to solve a variety of computing problems.
* Built a responsive personal portfolio web app, showcasing many personal projects and endeavours (linked above).

# ACHIEVEMENTS

**SHAD Canada:** Engineered an award-winning solution interfacing Canadians with their water consumption habits.

**JamHacksV Hackathon Winner:** Won first place, where I designed and built a complete 3D-printed cat feeding robot in 48 hours.

**AP Scholars Award:** Awarded for exceptional performance on the Chemistry, Physics, and Economics advanced placement exams.

**Duke of Edinburgh’s Award:** Awarded the prestigious Bronze and Silver Duke of Edinburgh awards for exceptional community service and personal growth.

# 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.
* Working with likeminded students building collaboration, time management, and technical skills.
* Relevant courses: Circuits, Digital Logic, Data Structures and Algorithms, Statics / Dynamics, Linear Algebra, Materials.

# Graphical user interface Description automatically generatedPROJECTS

## Personal Website

* Designed and built a personal website using **ReactJS**, 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 **ReactJS** 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 **ReactJS** to visualize algorithm implementation.

## Custom Mail Merge Application

* Designed a **full-stack** mail merge application using **Django** and **ReactJS**.
* 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>