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, in depth 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.

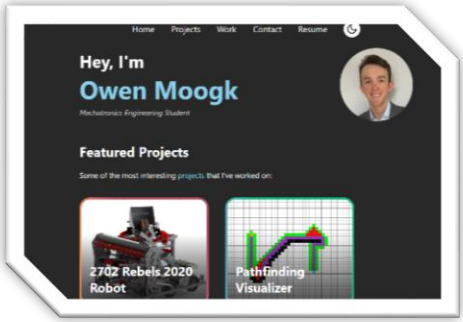
Duke of Edinburgh's Award: Awarded the prestigious Bronze and Silver Duke of Edinburgh awards for exceptional community service and personal growth.

EDUCATION

Mechatronics Engineering – University of Waterloo — 2022 – 2027

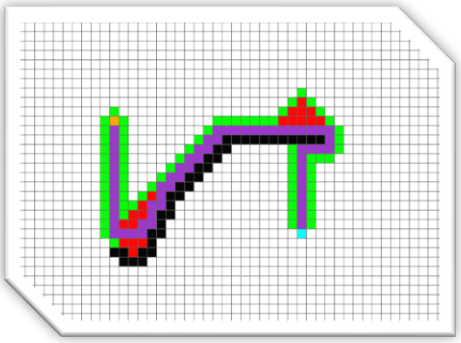
- Candidate for Bachelor of Applied Science studying Mechatronics Engineering, with a grade average of 95% / 4.0 GPA.
- Working with likeminded students building collaboration, time management, and technical skills.
- Relevant courses: Circuits, Digital Logic, Data Structures and Algorithms, Statics / Dynamics, Linear Algebra, Materials.

PROJECTS



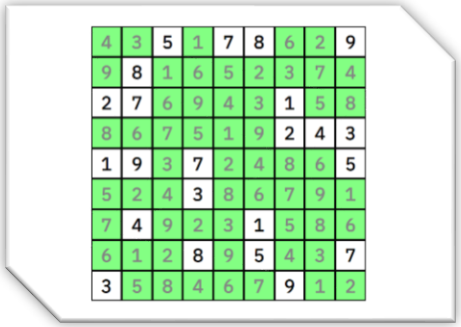
Personal Website

- 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

- Designed 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/



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 **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