OWEN MOOGK

Mechatronics Engineering Student
at the University of Waterloo

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EXPERIENCE

Personal Projects — 2019 – Present

- Developed complex webpages using HTML, CSS, JavaScript, and ReactJS.
- Implemented advanced algorithms and data structures to solve problems.
- Designed and built full stack applications with ReactJS and Django (Python).
- Built a responsive personal portfolio website with ReactJS, showcasing many personal projects and endeavours (linked above).

Formula SAE Team – Powertrain Member — September 2022 – Present

- Working to design and build a powertrain system for a Formula racecar.
- Designing assembly and manufacturing aids in SolidWorks.
- Fabricating parts using 3-axis milling machine and lathe.

FIRST Robotics – Subteam Lead — 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 functioning systems in SolidWorks for manufactured and 3D printed fabrication.
- Fabricated complex parts and assembled robotic systems.
- Sponsorship program lead, using networking and interpersonal skills to attract and retain sponsorship for the team.

Electric Car Team – Senior Student — September 2021 – June 2022

- Designed and manufactured a fully electric racecar in under a year.
- Designed a 3D printed emergency stopping system in OnShape.
- Optimized drivetrain systems to increase efficiency.

Merry Hill Golf Club – Clubhouse Employee — May 2020– September 2022

- Demonstrated excellent customer service by implementing communication, responsibility, and cooperation skills.
- Navigated difficult situations through accountability and professionalism.

Choose to Lead – Student — September 2018 – June 2022

- Developed teamwork, cooperation, management, and leadership skills in a variety of community activities and volunteering efforts.
- Developed public speaking skills, hosting the Waterloo Regional Mayors forum.

SHAD Canada – UPEI Fellow — July 2021

- Engineered an award-winning solution interfacing Canadians with their water consumption habits, including custom 3D printed pipe mounting.
- Networked and learned from global leaders regarding environmental sustainability and business practices.

EDUCATION

Mechatronics Engineering – University of Waterloo — Present

Candidate for Bachelor of Applied Science, studying Mechatronics Engineering. Working with likeminded students building collaboration, time management, and technical skills. Maintaining a grade average above 95%, with a 4.0 GPA.

SKILLS

Software

Proficient in many languages, including Python (4 years), JavaScript/jQuery (4 years), C++ (2 years), Java (1 year). Experienced in object-oriented programming.

Experience implementing and utilizing advanced data structures and algorithms.

Experience with XML and JSON scripting.

Experience in software documentation and testing/debugging.

Frameworks / Tools

Proficient in website and full-stack development with HTML (5 years), CSS/LESS (5 years), ReactJS (3 years), Django (2 years), Git/GitHub (4 years), Visual Studio Code (5 years).

Proficient in creating and utilizing REST API solutions and user authentication systems (JWT), with Django and SQL databases.

Other

Experience in customer service and leadership roles, demonstrating teamwork and cooperation. Eager to learn new skills on the job.

ACHIEVEMENTS

JamHacksV Winner

Won first place in the JamHacksV hackathon, where I designed and built an AI-powered cat feeding robot in 48 hours.

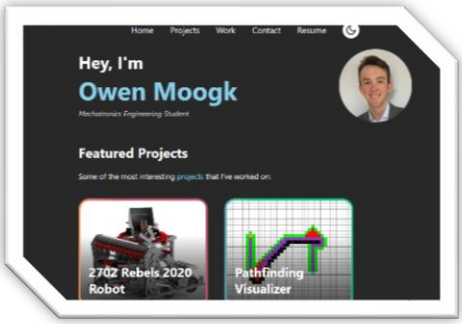
Harvard CS50

Completed the Harvard CS50 computer science course, in which I learned software design principles, C++ and Python, and built a full stack application.

AP Scholars Award

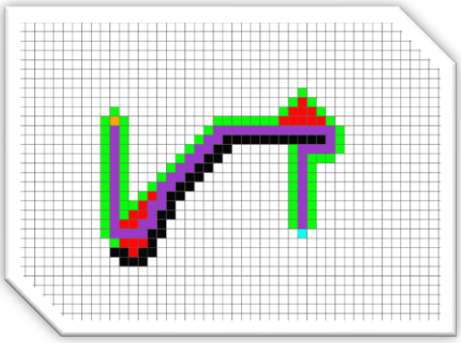
Awarded the AP scholars Award for exceptional performance on Chemistry, Physics, and Economics advanced placement exams, all of which I achieved a qualifying score.

PROJECTS



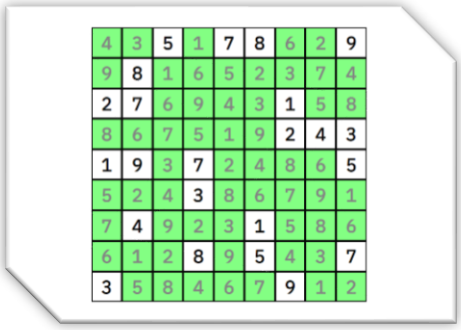
Personal Website

- 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: https://owenmoogk.github.io



Pathfinding/Sorting Algorithm Visualization

- Designed and built 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.

Email Bot (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 **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 Algorithm** 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