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.

# 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>