Harvey Donnelly

Computer Science Student

@HarveyDonlio

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Personal Website: **www.donl.io**

Personal Profile

Conscientious and industrious student aspiring to become a leading software engineer.

Developed an excellent vocational skillset through extracurricular work, inclusive of exceptional programming expertise and experience with most contemporary languages and technologies. Received numerous prestigious awards for advanced scientific research projects.

High academic achiever; predicted A* grades in all GCSE subjects and AS-Level Computer Science (to be completed a year earlier than typical). Profoundly passionate about computer science, physics and mathematics. An ardent problem solver, endeavouring to pursue new and innovative solutions to the major issues facing our global society.

Education and Qualifications

Wellington College — **October 2014 - Present**
18 Carolan Road, Belfast — **Year 12 Student**

GCSE Mathematics (CCEA) A* [Full Marks]

Awarded August 2018

Predicted A* Grades in all ongoing GCSE Qualifications (CCEA/OCR)

Further Mathematics, Computer Science, Physics, Chemistry, Biology, Business Studies, English Language and English Literature.

To be Awarded August 2019

Predicted A* Grade in AS-Level Computer Science (OCR)

My passion and aptitude for computer science has enabled me to complete the AS-Level course a year earlier than typical. As I aspire to pursue a career in computer science, my endeavour to achieve an A* grade at A-Level remains unwavering.

To be Awarded August 2019

Projects and Experience

Selective source code and documentation can be found on GitHub and my personal website.

Modelling Electrochemical Cell Reactions

In late 2017 I began developing software which generated comprehensive mathematical models of the chemical reactions and processes which take place in electrochemical cells (i.e. battery cells). Through my research, I highlighted and documented an array of new cell technologies which demonstrated potential to be cost-effective alternatives to existing battery types. Throughout the development of this project, I worked with a variety of software languages and technologies including ***Python*** (together with many advanced libraries), ***MySQL***, ***XML***, ***C#*** (using ***.NET framework***), ***LaTeX***, ***MATLAB*** and ***Applied Neural Networks/Machine Learning***. I truly believe that my software has made a meaningful contribution to the field of electrochemistry, enabling future researchers to cite and apply my mathematical models to further their altruistic efforts.

Awards and Recognition:

- ***Northern Ireland Young Scientist Overall Winner Award*** at Regional Big Bang Competition 2018
- ***First Place in Chemical, Physical and Mathematical Category*** at BT Young Scientist 2018
- ***First Place Northern Irish Project*** at BT Young Scientist 2018
- ***Queen's University Belfast Award for Mathematics*** at Regional Big Bang Competition 2018
- ***Royal Society of Chemistry Award*** at Regional Big Bang Competition 2018
- ***National Finalist Category Runner up*** for the UK Big Bang Competition 2018

Cloud Thinker – Community Archiving Software

Beginning in 2016, I designed a complex web application for archiving categorical data through community contributions. The software provided a centralised graphical framework for users to create and contribute to bespoke public archives regarding a multitude of datasets, from pasta recipes to organic molecules. While developing this software, I gained experience using a variety of purposive software technologies and programming languages, including ***PHP***, essential ***Frontend Web Design tools*** (i.e. ***CSS***, ***Adobe Illustrator*** etc.), ***JavaScript*** (along with associated libraries/tools such as ***jQuery*** and ***AJAX***), ***MySQL***, ***basic Unix shell*** skills (including ***LAMP server configuration***), ***Mobile Java Development*** (using the ***Android API***) and ***Google Firebase/Analytics*** libraries. Ultimately, the challenges that I faced through this project lead me to become a more proficient, full-stack software engineer, expediting my passion for computer science.

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Optimisation of a Quantum ALU through Intelligent Data Modelling and Machine Learning

Still in the early stages of development, this ongoing project entails building a comprehensive mathematical model of a Quantum Arithmetic Logic Unit and a binary equivalent using ***Java*** alongside the ***Swing Framework***. The generated datasets will then be integrated with a bespoke machine learning program using ***Python*** with the ***Keras/TensorFlow*** libraries. From this, I aim to derive an optimised ALU schematic which will potentially prove to be far more efficient than both the binary system and the standard quantum design. This research endeavours to expedite the necessary evolution of Quantum Computing technology, which may lead to meaningful solutions to issues of climate change and global sustainability.

Additional Projects and Awards

- ***Northern Ireland Young Software Engineer Award*** by Allstate 2016
- ***First Place Game Development Award*** at Beltech 2016
- ***National Finalist*** at BP Ultimate STEM Challenge at the London Science Museum 2017
- ***Second Place Finalist*** for Ecolibrium Coin (an energy-efficient/sustainable cryptocurrency) at Digital DNA Digital Futures Competition 2018
- ***National Finalist*** at UK National Science and Engineering Competition 2016

Technical Skills

Python ♦♦♦♦♦

Advanced expertise and experience with cutting-edge libraries and frameworks such as ***Keras***, ***TensorFlow***, ***Threading*** etc. Background in developing complex backend software, particularly with respect to mathematical modelling and machine learning.

Java ♦♦♦♦♢

Proficient in mobile development, using the ***Android API/SDK*** and desktop application development using the ***Swing Framework***.

Unix Shell ♦♦♦♢♢

Experience working with a variety of Unix-based systems, configuring and maintaining ***LAMP*** and ***Node.js*** servers. Ability to navigate and carry out basic bash commands.

PHP ♦♦♦♦♦

Comprehensive knowledge of advanced PHP programming, particularly with respect to backend web development.

Node.js ♦♦♦♦♦

Extensive experience developing backend console programs and advanced web applications using the ***MEAN Stack*** (***MongoDB***, ***Express.js***, ***Angular.js*** and ***Node.js***) as well as the ***React.js*** library.

Client-side JavaScript ♦♦♦♦♦

Confident knowledge and expertise using client-side JavaScript to construct dynamic graphical web interfaces and applications. Capable of using a variety of libraries such as ***jQuery***, ***Ajax***, ***Bootstrap*** and ***Google Firebase/Analytics***.

C# ♦♦♦♢♢

Adept skillset with the ***.NET framework***, developing frontend and backend Windows applications.

MATLAB ♦♦♦♦♦

Aptitude for developing MATLAB scripts to analyse and graphically represent complex datasets.

SQL ♦♦♦♦♢

Proficient with a variety of industry-standard SQL technologies, inclusive of ***MySQL***, ***NoSQL***, ***Oracle DB*** and ***Mongo DB***. Adept at setting up, configuring and maintaining SQL servers; able to integrate their functionality with a variety of software stacks.

C++ ♦♦♦♢♢

Experience developing advanced C++ programs using the ***Arduino Framework*** to interface with various hardware devices. For example, engineering ***RFID read/write*** systems, ***Scientific Data-logging*** devices etc.

Frontend Web Design ♦♦♦♦♢

Confident using ***CSS*** to produce visually-stunning graphical user interfaces. Also skilled at using ***Adobe Illustrator*** with respect to graphic design, constructing logos and icons for a variety of software projects

References

Gary O'Hara

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David Cardwell

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