Ryan Allcock

C++ Programmer

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An analytical programmer of algorithms and implementations in C++, keen to become a Software Engineer through discipline and efficient, hard work. Capable of working independently and cooperatively on problem-solving, software design and software development tasks.

Languages	**Frameworks**	**Methodologies**	**Teamwork**
C++ (STL)	Win32, SDL2, GLFW	Design Patterns	Readable Code
C	OpenGL (2.1 & 3.3)	Manual Testing	Documentation
		Debugging	Version Control

Academic Experience

My degrees involved building a foundational knowledge and practical application of programming competence, data structures and algorithms. I learned from a wide range of programming environments like Visual Studio, Matlab and Excel, within Windows and Linux, while using numerous languages. All work involved clear documentation, while collaborative projects required me to present work and be proactive, helpful and available for my team.

SPH Crowds 2022 July - 2023 Sept
Academic publication of MSc project which was presented at Social Simulation Conference SSC2023. Custom-built simulator repository, featuring crowds in various states of panic, for measuring safety in dense crowd scenarios. Used to parameterise forms of crowd healthiness with inputs and outputs. Original dissertation in MS Word, then converted to LateX for publication.

Optimisation and Reasoning Solvers 2021
Extensively utilised MS Excel and LP Solve to create solutions for optimisation problems using LP, IP, BIP, MIP and MOO. Used Z3, Python CSP and OrTools to tackle reasoning problems in a multitude of approaches.

Compilers 2021
Implemented a Triangle compiler to type-check and convert Triangle code into TAM code using Haskell, then implemented a Triangle Abstract Machine interpreter to execute the resulting program.

Malware Analysis 2021
In-depth static and dynamic analysis of malicious programs. Investigated Windows library and x86 exploitations and obfuscations, safely using Azure Virtual Desktop, and decompilers including Ghidra and IDA.

Network Sockets 2017
Quote-printing server for requesting responses using a client. Made to demonstrate client-server architectures using TCP over a local network, built using WinSock2.

Personal Experience

Between academic studies I have stayed active by building my own projects, using learned research methods. To maintain and grow my skills, I've set up some open-ended GitHub repositories, to clearly demonstrate techniques and algorithms.

Polyhedron Generator 2024
A geometric implementation of Conway's polyhedron notation, used to mutate a simple seeded shape into a convex polyhedron through discrete steps. A relaxation algorithm is added to convert the shape into canonical form, for improved visual consistency. Built using SDL2, GLM, and OpenGL 3.3, throughout various decoupled libraries useful for 3D graphics, models, and scene navigation.

3D Surface Construction 2023
Generates meshes from uniform scalar fields using Marching Cubes. Explores different versions which attempt to limit surface inconsistencies. Features Perlin Noise to produce layered coherent nD noise, to produce realistic 3D terrain. Built and maintained independently to high code standards using SDL2, GLM and OpenGL 3.3, enabling frictionless extension and adaptability.

Wavefront File Reader 2023
Built to extract data from the Wavefront family of geometric model file formats. Designed with extension in mind for more formats and types of data, to be used in a rendering engine.

Design Patterns 2023 throughout
Comprehensive list of GoF pattern implementations from a practical yet tangible perspective. Built in object-oriented C++, to produce simple, intuitive, demonstrative code that's useful as a educational resource.

MSc Computer Science University of Nottingham, 2021 Sept - 2022 Oct

BSc Computer Science University of Nottingham, 2017 Sept - 2021 July