

# Mackenzie Blackaby

Macclesfield, UK | [www.blackaby.uk](http://www.blackaby.uk) | 07552 665855 | [mackenzieblackaby@outlook.com](mailto:mackenzieblackaby@outlook.com) |  
<https://www.linkedin.com/in/mackenzie-blackaby-884b16217/> | <https://github.com/ToxikDnb>

## PROFILE

I am a British Lancaster University first class Computer Science graduate. With exemplary ability in low-level and front-end development, I am adept in creating SDKs in C/C++ for microcontrollers and their peripherals. My front-end experience spans eight years of C# and three in Java, including personal Unity-based games and collaborative Java applications. Currently, I am developing a Nintendo Gameboy emulator in Java as my final-year project, which combines my low-level, high-level, and front-end research skills and expertise as I delve into the Sharp SM83 processor.

My recent studies in AI and machine learning in MATLAB include designing genetic pathfinding algorithms, image classification, decision trees and KNN. I would love the opportunity to explore this innovative field further, combining it with my low-level skills and attention to detail. I'm now seeking graduate work opportunities with forward-thinking companies, where I can contribute to impactful, design-led technology projects while continuing to grow as a developer and problem-solver.

## EDUCATION & QUALIFICATIONS

**Lancaster University: BSc in Computer Science:** 1<sup>st</sup> (Hons) 2025

**King's School Macclesfield** – A Level 2022

Maths: A\*

Chemistry: A

Computer Science: A

## RESEARCH & TEAM PROJECTS

### Final University Project: Gameboy Emulator | Java | Lancaster University

Researched and developed a multi-platform emulator for the Nintendo Gameboy's Sharp SM83 processor, peripherals, and architecture with focus on hardware accuracy, performance, and user experience.

- Conducted research and analysis of the Sharp SM83 Processor, the Gameboy's peripherals, and IO systems.
- Currently developing an optimised and extensible emulator for accurate performance on modern platforms.
- This project highlights the need for digital cultural preservation and Java-based emulation strategies for the platform, of which there are few. Code will be released for this project upon my graduation

### Second Year Project: Less Powerful Point | Java | Lancaster University

Led a team-based research project focused on collaboration in software development, delivery methods and user-centred evaluation, with the aim to create a replica of Microsoft's PowerPoint.

- Managed a team of eight using the AGILE framework, allowing iterative consumer-focused development.
- Researched common UI design patterns and to optimise user interaction and workflow.
- Delivered a final product that demonstrated the power of collaborative software development and scalable architecture.

### Steganosaurus | Java | Personal

Currently developing a piece of Steganography software called Steganosaurus, which allows for the obfuscation of data and files inside images.

- Implemented a full UI using Java's AWT and Swing toolkits, creating an effective and efficient workflow
- Designed a custom encryption system, which stores both a header or metadata and file data into the last bits of each pixel's RGBA values
- This project emphasises cryptography and my ability to manipulate data, demonstrating the power of creative encryption and cyber security.

## PROGRAMMING EXPERIENCE

### MicroBit Low-Level Programming | C++ | Lancaster University

Conducted extensive research and development on the nRF52833 processor to explore the capabilities of embedded systems.

- Developed APIs for interfacing with low-level hardware, including multiplexed and OLED I2C displays, touch sensors, RGB LEDs, timers, accelerometers, serial communications, and speakers.
- Engineered a software digital voltage sampler and PWM output, allowing for conversions between analogue and digital data.
- Programmed, using these APIs, a graphing software that displays accelerometer and jerk data in real-time on an OLED display.

### Machine learning pathfinding | MATLAB | Lancaster University

Explored the application of genetic algorithms for optimising robot pathfinding in static environments.

- Developed and optimised a genetic algorithm from first principles for navigation across procedurally generated city maps.
- Researched and implemented various selection, crossover, and mutation techniques to allow the user to optimise efficiency and obstacle avoidance.
- Demonstrated the use of genetic algorithms in robotics and vehicle navigation systems.

### Distributed System Development | Java | Lancaster University

Researched and developed a reliable and secure distributed system architecture for sensitive data transactions.

- Designed and implemented a reliable auction system using passive replication to handle system faults.
- Developed a robust asymmetric encryption system to ensure secure communication.
- Demonstrated the ability to construct a secure and reliable communication system and the knowledge of reliability engineering principles.

## ADDITIONAL INFORMATION

My website [www.blackaby.uk](http://www.blackaby.uk) is designed to be an interactive CV, highlighting my front-end programming and website development skills. I also completed Udemy course on 2D & 3D game development in Unity [2024] and attended a 10-day InvestIN internship with UCL university about advanced technology like AI, collaborating with companies such as Tesla [2021]. I also have three years of experience working as a children's sports coach, where I developed leadership skills by organizing, supervising, and creating engaging activities for children.

Languages – English (Native); German (Working Standard); Arabic (Elementary)