



Wednesday 31 Jan 2024
West Kirby Grammar School

Programme of Activities

10.00 – 10.15	Arrival in our Lab & Welcome (including security induction & account registration)
10.15 – 11.00	Workshop 1: Wavefunction collapse (Ben C-W)
11.00 – 11.30	Giant Sorting Network (outdoor activity)
11.30 – 12.00	Lunch Break
12.00 – 12.45	Workshop 2: Code breaking (Navi)
12.45 – 13.45	Hands-on Workshop: Lego EV3 drives the warehouse
13.45 – 14.00	Closing Talk

All workshops take place in Lab 3 of the George Holt building.

Information about the Activities

Wavefunction collapse algorithm

Wavefunction collapse is an algorithm based on concepts from quantum computing. Using just one input image, it outputs an image of selected size without aid of machine learning techniques. The goal of this lesson is to teach the students of both the algorithm's existence and Shannon entropy, the metric the algorithm uses to pick which pixel to 'collapse' next. This will occur intuitively via a board game and a connecting slideshow.

Code breaking

Cryptography is the practice of encoding information in order to secure it and prevent it being read by unauthorised parties. In history, secret messages were communicated using ciphers to minimise the risk of them being intercepted by the enemy. Today, encryption is a crucial part of online security, especially since most communication happens on the internet. In this engaging and hands-on lesson, students will be introduced to two basic ciphers and create their own cipher wheel. They will have the opportunity to use this tool to encrypt and decrypt secret messages, enhancing their problem-solving skills and allowing them to experience the thrill of code breaking.

Giant Sorting Network

In this outdoor lesson, pupils will play the role of the "compute nodes" in a parallel sorting algorithm. They will experience first-hand how parallelism speeds up computation, but also makes it more challenging to reason about programs.

Lego EV3 Drives the Warehouse

Robots managing large warehouses are one of the many examples where automation helps humans to solve a task faster and cheaper. For this to be effective, robots need to be at least partially autonomous, i.e., able to sense and react to the physical world without (constant) human intervention. In this hands-on lesson, pupils program Lego EV3 robots to follow a line, avoid obstacles, and ultimately navigate a warehouse safely and autonomously.