



*The Academy of St Francis of Assisi*  
Wednesday 08 March 2023

## Programme of Activities

<b>10.00 – 10.15</b>	Arrival in our Lab & Welcome (including security induction & account registration)
10.15 – 11.00	<b>Workshop 1: Intro to AI and Data Science</b>
11.00 – 11.30	<b>Giant Sorting Network</b> (outdoor activity)
11.30 – 12.00	Lunch Break
12.00 – 12.45	<b>Workshop 2: Boolean Logic - Unplugged</b>
12.45 – 13.45	<b>Hands-on Workshop: EV3 Drives the Warehouse</b>
13.45 – <b>14.00</b>	Closing Talk

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

## Information about the Activities

### An Introduction to Cyber Security

As reliance on technology is growing, so are risks and dangers of being online. Threats range from individuals or institutions being hacked, to sophisticated malware being installed on devices. We are thus increasingly dependent on the cyber security industry for our defense. This lesson exposes students to puzzles as they arise in the cyber security industry and introduces them to the skills and opportunities of this field.

### Lego algorithms

Can you escape the bricks in this unplugged computer science activity? The lesson conveys fundamentals of algorithms by traversing through a Lego maze and teaches the difference between a list of instructions and a general algorithm.

### Data to Delivery: Technologies of E-Commerce

Ever wondered what happens behind the colorful buttons of a webshop? In this lesson, students will build a simple, fully functional, and publicly accessible E-commerce site using industry standard services. In passing, they will learn about databases and their importance for E-Commerce applications.

### Intro to Artificial Intelligence and Data Science

The lesson gives some concrete examples of how artificial intelligence can look like and its diverse applications in the world.

### Boolean Logic - Unplugged

In this unplugged computer science activity, we get the students up on their feet, moving around the classroom holding Jumbo Playing Cards to organise themselves, conforming with Boolean logic statements. Boolean logic is a form of algebra which simply decides if something is True or False. It's a core concept that is used in most programs and information databases. These values of "true" and "false" are used to test the conditions that selection and iteration are based around, and which form the basis of all Boolean circuits from which processors are built.

## Social Engineering – The oldest trick in the book

Social engineering is a vital part of hacking that is often overlooked although being one of the most important factors of cyber security. We can have the strongest security on the software end, but that will all break down if someone writes down their password or clicks on a malicious link. In this lesson pupils will look at different ways social engineering attacks can be performed and step into the shoes of the attacker.

## Phishing in Cybersecurity

Pupils will learn about phishing through a role-play activity in which they are put into the shoes of a Social Engineer themselves. The philosophy behind this approach is derived from the Art of War by Sun Tzu, where he says “If you know the enemy and you know yourself, you need not fear the result of a hundred battles.” By thinking of what needs to go into malicious emails from the perspective of the fraudster, pupils will learn what to look out for in their own emails. A key part of this section will be to study some real-world examples and break down what makes them suspicious.

## How Computers Work

The lesson introduces the structure of Von Neumann processor architecture with the aim to introduce students to how computers are structured and how they work at a fundamental level. To aid in that, the main activity of the lesson will be puzzles designed to be solved using a *Little Man Computer* online simulator.

## Python Snake

In this lesson, students generate their own self-contained, playable “Retro Snake” game in Python. No prior programming knowledge required!

## Weigh your choices!

In this unplugged lesson, pupils will explore algorithms for sorting and searching using sets of weights and a weighing scale. It teaches both algorithm complexity and the comparison model of computation.

## Code-a-meme with Vidcode and Javascript

JavaScript is *the* language of the web: it runs on all interactive websites, webapps, and increasingly also on backends. We all rely on it unknowingly in our daily digital life. In this

lesson, students seamlessly learn some basic JavaScript programming using *Vidcode* to program their own interactive meme.

## 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 example 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.