



*The Mosslands School*  
Wednesday 16 March 2022

## Programme of Activities

<b>09.40</b> – 10.00	Arrival in our Lab & Welcome (including security induction & account registration)
<b>10.00</b> – 10.55	<b>Workshop 1: Cryptography: From Caesar to AES</b>
10.55 – 11.00	Break
<b>11.00</b> – 11.55	<b>Workshop 2: Sorting – Compared to What?</b>
11.55 – 12.30	Lunch Break
<b>12.30</b> – 13.25	<b>Workshop 3: APIs or How to program a drone in 20min</b>
13.25 – 13.30	Break
<b>13.30</b> – 14.35	<b>Workshop 4: Lego EV3 Drives the Warehouse</b>
14.35 – <b>14.45</b>	Closing Talk

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

## Information about the Activities

### Cryptography: From Caesar to AES

How to securely encrypt messages so that the intended addressee (and only her!) can decipher them again has been a sought-after technology throughout human history. Computers have profoundly transformed cryptography by making both attackers as well as users of encryption schemes much more powerful. In this lesson, a series of unplugged puzzles will guide pupils from Caesar's cipher to modern cryptography.

### Sorting – Compared to What?

When a computer scientist has several algorithms for the same task at her disposal, how shall she decide which one to use? In this activity, pupils will explore by role play how the resource usage of various sorting algorithms differs, how one can get mathematically proven impossibility results about algorithms, and how analysis of algorithms helps computer scientists make informed decisions about what algorithms to choose.

### APIs or How to program a drone in 20min

Application Programming Interfaces (APIs) are a hugely successful way of managing complexity. Pupils will experience this first hand by programming real flying drone after a few minutes of introduction to the corresponding drone control API.

### 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.