

Programming and Instructions

- Computers can be programmed to do what we tell them by following a set of instructions.
- The instructions have to be written in a special **programming language** that the computer can understand.
- All computers understand **binary** where everything is written just as 1 or 0.
- For example if you want to tell a computer to add two numbers the code in binary could be:

0011 0001

0101 0010

0110 0011

- Hmm, it doesn't look very easy to know what the computer is doing here. That's why we use something called **assembly language** to understand these basic commands. In assembly, we have words that represent binary instructions so we as humans can understand what's going on.
- Try looking at the binary code again with this assembly translations:

LOAD = 0011 Position 1 = 0001

ADD = 0101 Position 2 = 0010

SAVE = 0110 Position 3 = 0011

- Both of these are examples of **low level languages** because we have to know where the numbers are stored in the computer's memory. (i.e Load our first number from position 1)
- Nowadays, programmers use **high level languages** that do a lot of the finer details without us having to tell the computer exactly what to do. In a language called Python, we can add two numbers and store the result with:

$A = 1 + 2$

Computers are stupid

- Even using high level languages like Python, we still have to tell the computer **EXACTLY** what to do. The computer will always do exactly what you tell it, which can lead to some difficult problems when we assume the computer knows more than it does.
- For example, **‘to make a Jam sandwich by spreading butter and jam on two pieces of bread’** could be a simple instruction to a human, but to a computer, it won’t know to spread the butter with a **knife** because we didn’t tell it that. We didn’t say which sides of the bread to butter, where to get the bread or anything!
- Have a go at the ‘Saturn Striker’ and ‘Twin Rocket’ exercises, which only give half of the needed instructions to complete the challenge - and write what problems you found in the box below.

Saturn Striker

Twin Rocket

"Saturn Striker"

DESCRIPTIONS ONLY

- Fold paper in half along the longest length and then unfold.
- Fold top corners into the centre line.
- Fold in both sides along the centre line.
- Turn paper over.
- Fold in half.
- Fold down both wings.
- Fold up flaps on both wings.

"Twin Rocket"

IMAGES ONLY

