

# Year 9 Data Representation – Part 1 Knowledge Organiser

## Binary (Base 2)

The only thing that computers understand is Binary.

8	4	2	1		
0	1	0	1	1	= ON
				0	= OFF

0101 = 5

128	64	32	16	8	4	2	1
0	1	0	1	1	1	1	1

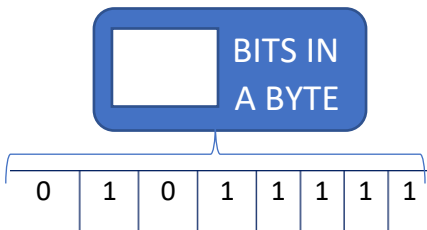
Convert these binary numbers into denary:

1) 1010		6) 1011	
2) 1010		7) 0001	
3) 0110		8) 1011	
4) 0111		9) 1001	
5) 0100		10) 0011	

Convert these denary numbers into binary (4 bits):

11) 14		16) 6	
12) 2		17) 11	
13) 10		18) 15	
14) 4		19) 2	
15) 3		20) 12	

The ones and zeros in Binary represent 'bits'. Each '1' or '0' is one 'bit'.



## COMPUTATIONAL THINKING

**DECOMPOSITION** → BREAK DOWN DATA AND PROBLEMS INTO SMALLER PARTS

**PATTERN RECOGNITION** → OBSERVE PATTERNS AND TRENDS IN DATA

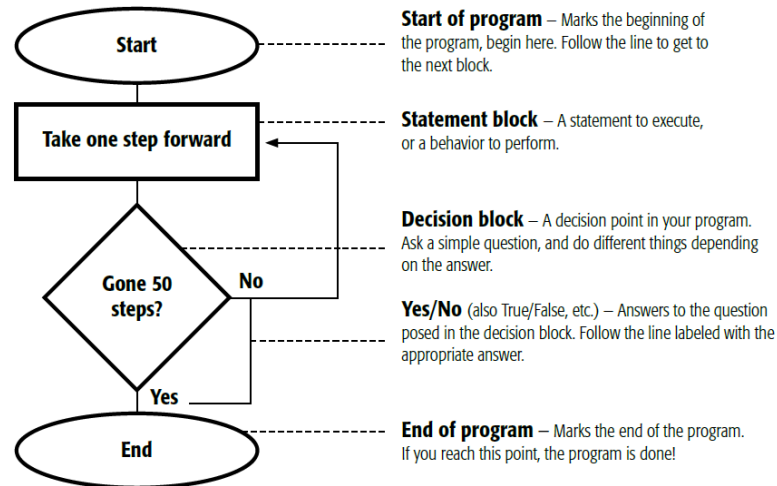
**ALGORITHMS** → DETERMINE WHAT STEPS ARE NEEDED TO SOLVE A PROBLEM

**ABSTRACTION** → REMOVE DETAILS AND EXTRACT RELEVANT INFORMATION

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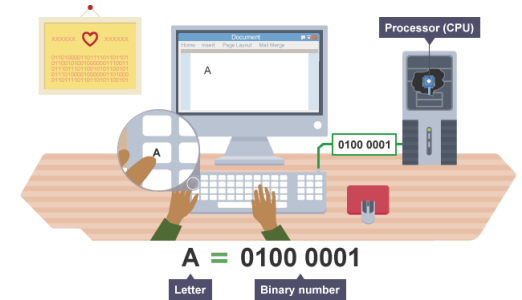
## Flowcharts

We use flowcharts to help us put instructions in order.



## Representing Text

When any key on a keyboard is pressed, it needs to be converted into a binary number so that it can be processed by the computer and the typed character can appear on the screen.

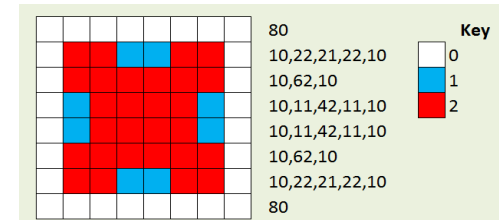


## Representing Images

**Bitmaps** are the name given to one way of storing graphics on a computer system.

A **bitmap** is laid out in a grid format with each box on the grid containing one "Picture element" which is better known as a "Pixel".

The picture below shows us how a picture can be represented by numbers.



Can you remember how the numbers on the left represent the 'pixels' on the right?