

Samples

NAME \_\_\_\_\_

CLASS \_\_\_\_\_



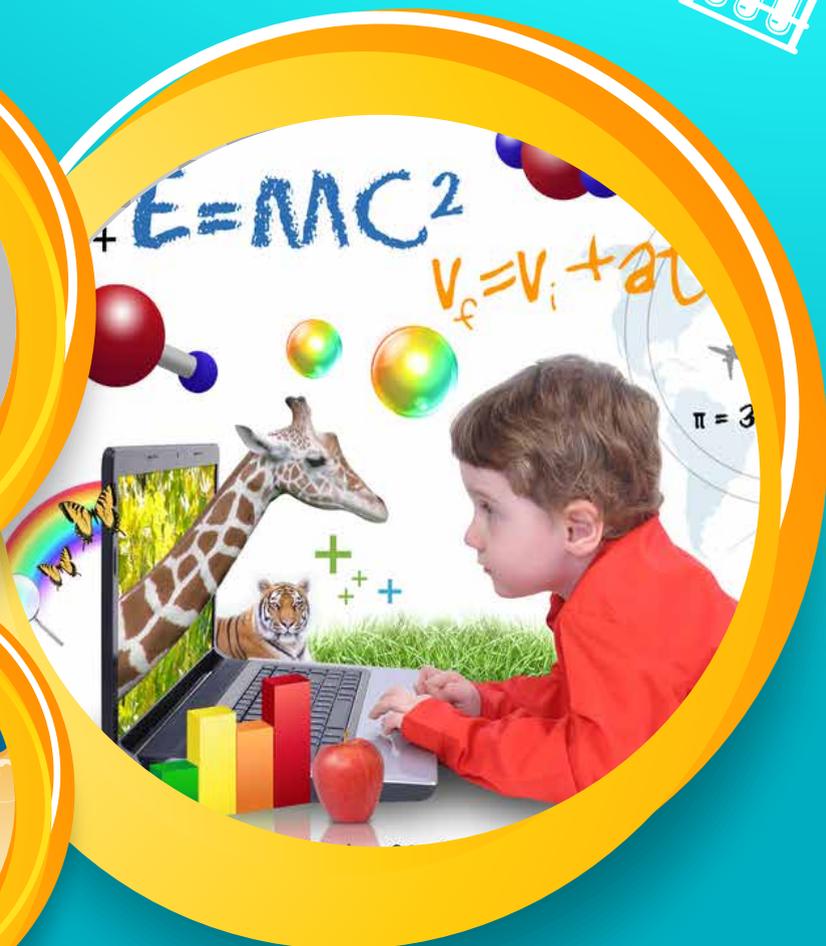
# Computational Thinking



# WORK BOOK



Puzzles for  
pupils aged  
7-11





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# Computational Thinking



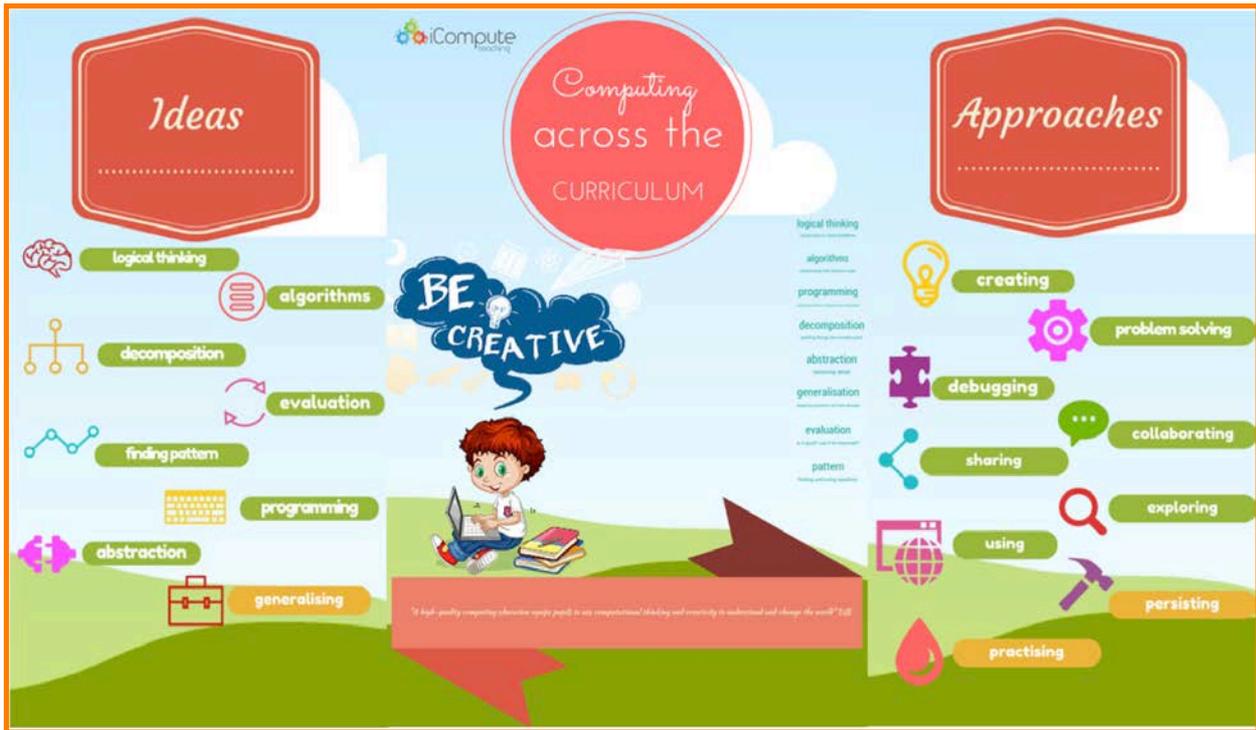
WORKBOOK

By  
Liane O'Kane



# Samples

# Computational Thinking



Computational Thinking is learning how people solve problems; changing what looks like a difficult task into a simple one that you know how to deal with. Skills needed to solve maths problems, plan a project or develop a piece of writing share similarities and all involve using problem solving skills.

This booklet contains a sample of the puzzles contained within the full series of workbooks – one puzzle from each book. The full practice books contain a variety of puzzles that help develop pupil's computational thinking skills in a really fun way. Some are about creating algorithms that solve problems and some involve thinking logically, but all of them involve spotting patterns and finding or making rules. These are important skills that will help children, not only with their computing work, but also throughout their lives.

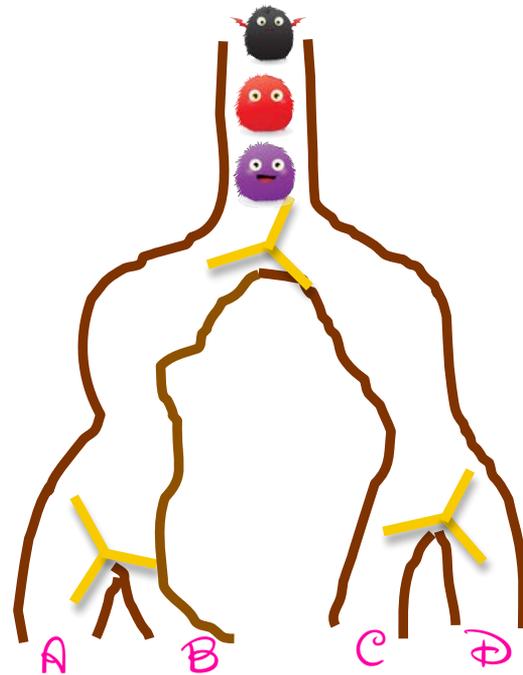
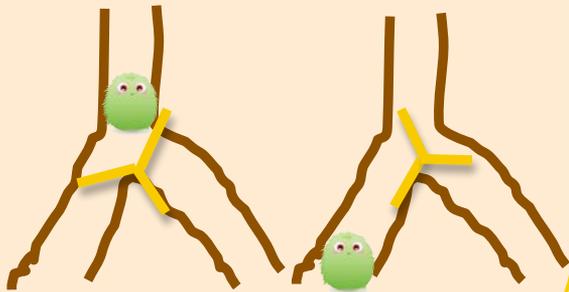
# Puzzle 11



## Flip Flop Circuits

Some furbles have a tunnel built like the one in the picture on the right hand side. Which tunnel will the **black** furble drop out of?

When they jump into the tunnel they go right or left depending on where the flip flop is. While dropping, it pushes the flip flop so that the next furble drops in the opposite direction



### COMPUTATIONAL THINKING FACT:

Computers contain circuits that use Boolean logic **gates** to work. Some logic gates work like the Flip Flop. If you arrange the gates correctly, they will remember what you started with (the input). This simple idea is the basis of a computer's **memory**.

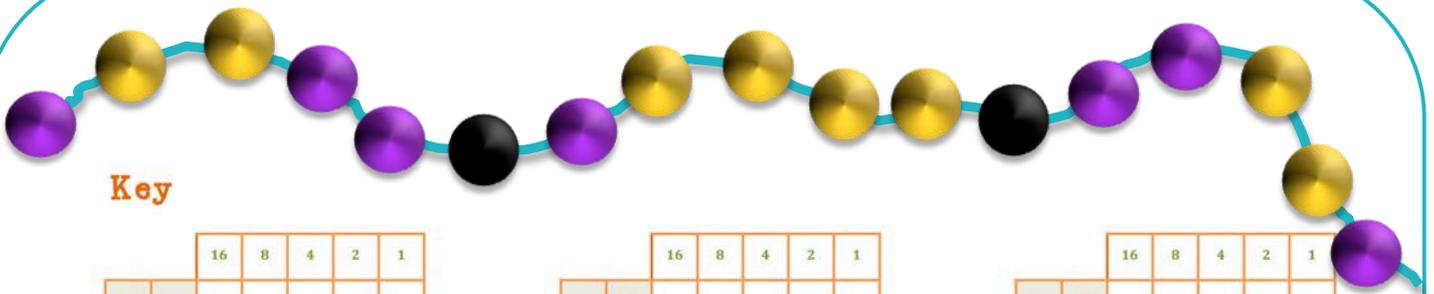
# Puzzle 2



## Binary Beads

In the binary number system, any number can be represented by 0's and 1's. We have given letters of the alphabet a number and that number has been encoded into binary.

A purple bead stands for 1, a gold bead for 0 and a black bead is a space. What does this string of beads spell?



### Key

		16	8	4	2	1
1	A	0	0	0	0	1
2	B	0	0	0	1	0
3	C	0	0	0	1	1
4	D	0	0	1	0	0
5	E	0	0	1	0	1

		16	8	4	2	1
11	K	0	1	0	1	1
12	L	0	1	1	0	0
13	M	0	1	1	0	1
14	N	0	1	1	1	0
15	O	0	1	1	1	1

		16	8	4	2	1
21	U	1	0	1	0	1
22	V	1	0	1	1	0
23	W	1	0	1	1	1
24	X	1	1	0	0	0
25	Y	1	1	0	0	1
26	Z	1	1	0	1	0

		16	8	4	2	1
6	F	0	0	1	1	0
7	G	0	0	1	1	1
8	H	0	1	0	0	0
9	I	0	1	0	0	1
10	J	0	1	0	1	0

		16	8	4	2	1
16	P	1	0	0	0	0
17	Q	1	0	0	0	1
18	R	1	0	0	1	0
19	S	1	0	0	1	1
20	T	1	0	1	0	0

### COMPUTATIONAL THINKING TIP:

Look at each "bit" (group of 5 zeros and ones), write down the binary number (eg. 00001) then look it up using the key to find its corresponding letter

# Puzzle 7



## Battling Birdies

Fox Furble has six different birds. Sadly, not all of them get along. He needs to put some of the birds in separate cages but he doesn't have a lot of money. How can Fox Furble organise the cages so that only birds that get along share a cage? What is the smallest number of cages he needs to buy?



- \* The yellow bird will peck the purple bird
- \* The pink bird fights with the blue and red bird
- \* The blue bird cannot share with the purple or yellow bird
- \* The green bird does not eat if she's with the pink or red bird

### COMPUTATIONAL THINKING TIP:

Try and use a systematic approach to solving this problem. Look for what you have the most information about. Then try out your idea against each of the rules. Working systematically really helps solve problems and with debugging.

# Puzzle 3



## Cryptography

Cryptography is the art of creating and reading coded messages. A substitution code has been used here where the letters of the alphabet have been substituted with Emojis. Use the key to decipher this coded message...

A	B	C	D	E	F	G	H	I	J	K	L	M
N	O	P	Q	R	S	T	U	V	W	X	Y	Z

Teacher:

Pupil: ? ?

### COMPUTATIONAL THINKING FACT:

Writing in code has been used throughout history. We still code messages today, mainly for security when transferring data over the Internet. Everything you send using the Internet is encoded so that your data stays private.



# Answers

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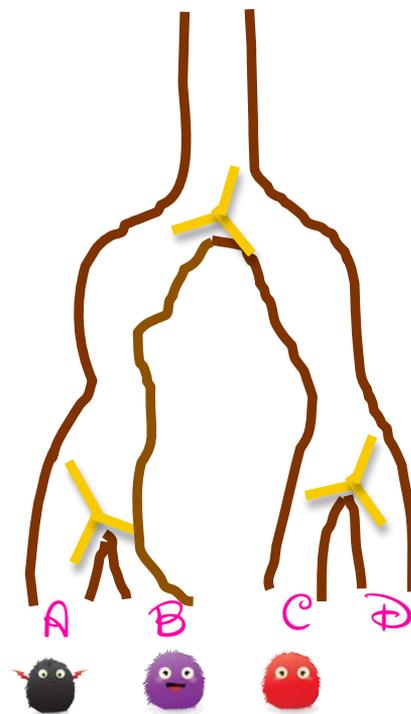
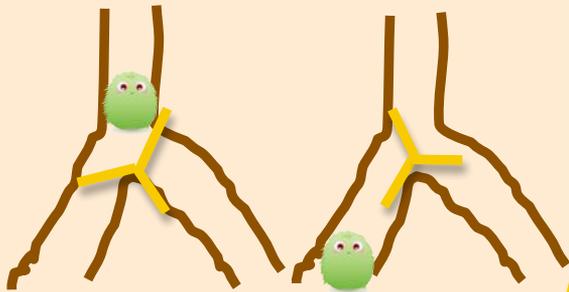
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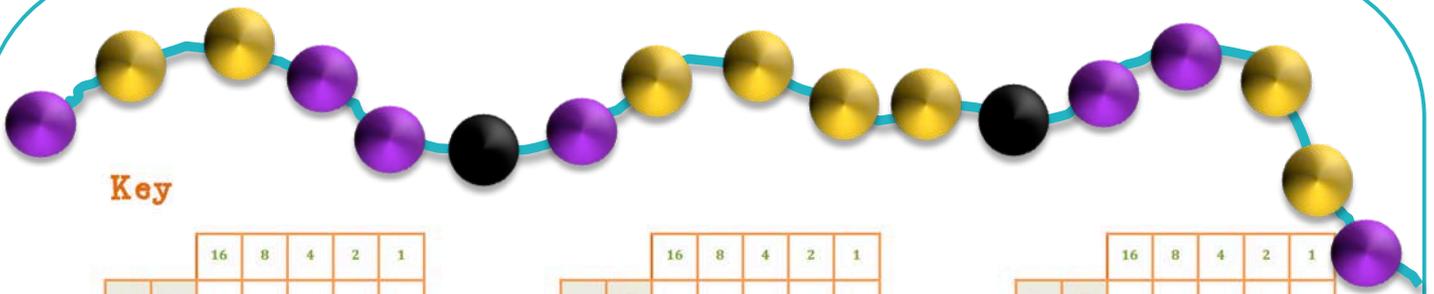
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19	S	1	0	0	1	1
20	T	1	0	1	0	0

spy

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# Puzzle 7

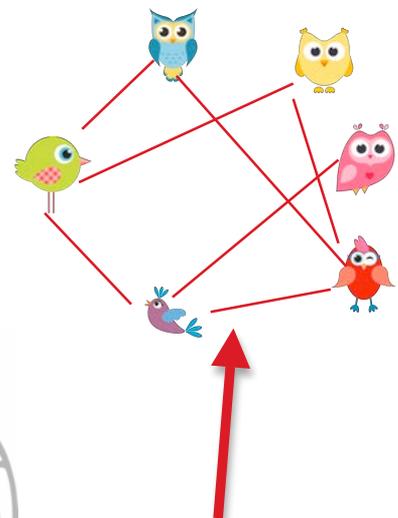


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You need three cages.

Here is one possible solution



Birds that  
can be put  
together

### COMPUTATIONAL THINKING TIP:

Try and use a systematic approach to solving this problem. Look for what you have the most information about. Then try out your idea against each of the rules. Working systematically really helps solve problems and debugging.

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N	O	P	Q	R	S	T	U	V	W	X	Y	Z

Teacher: **Name two pronouns**

Pupil: **Who? Me?**

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# iCompute for Primary Schools

