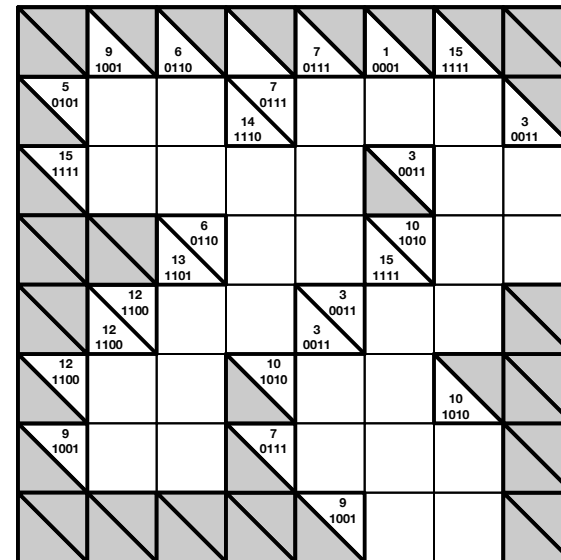


# Bakuro: Binary Logical Thinking Puzzles

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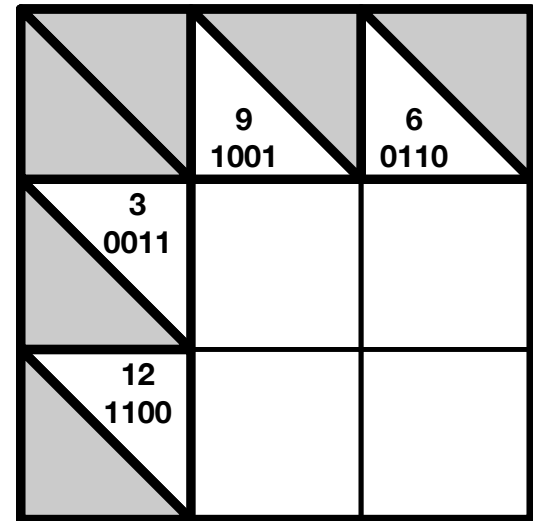
With support from Google,

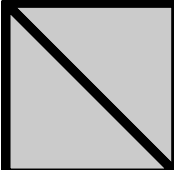
DfE, the Mayor of London, CHI+MED



# A simple example puzzle

- Fill the grid using only powers of 2 (1,2,4,8)
- Horizontal (vertical) blocks must add to the number on the left (above)
- Fill in the binary of the answers too



	9 1001	6 0110
3 0011		
12 1100		

# A simple example puzzle

- Each number has a unique sum
- Work values out from the intersection of sums
- $3 = 1 + 2$
- $9 = 1 + 8$

/	9 1001	6 0110
3 0011	<b>1</b> <b>0001</b>	
12 1100		

# A simple example puzzle

- $3 = 2 + 1$
- $6 = 2 + 4$

The binary tells you the numbers!

$$0011 = 0010 + 0001$$

$$3 = 2 + 1$$

	9 1001	6 0110
3 0011	<b>1</b> 0001	<b>2</b> 0010
12 1100		

# A simple example puzzle

- $12 = 8 + 4$
- $6 = 2 + 4$
- $9 = 8 + 1$

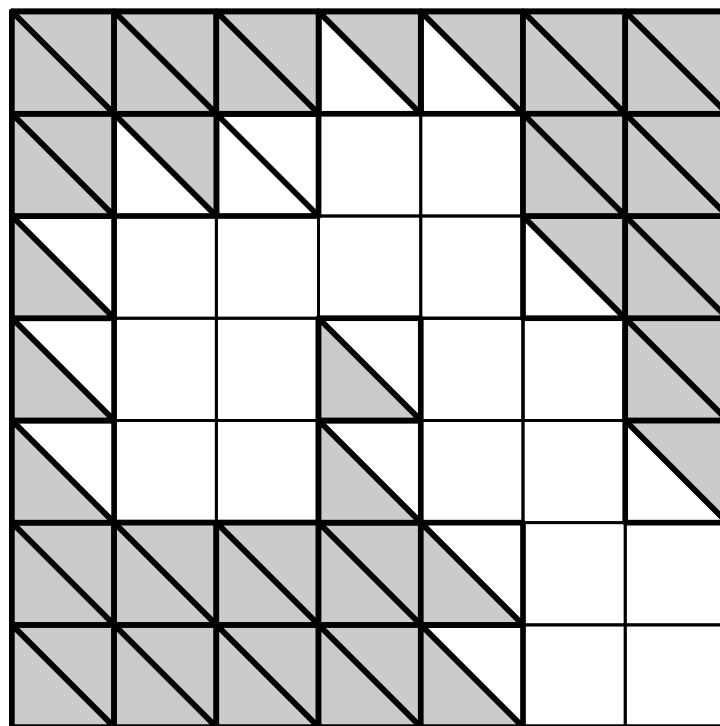
Now you have the basics, do a harder version

	9 1001	6 0110
3 0011	1 0001	2 0010
12 1100	8 1000	4 0100

	9 1001	6 0110		7 0111	1 0001	15 1111	
5 0101			7 0111 14 1110				3 0011
15 1111					3 0011		
		6 0110 13 1101			10 1010 15 1111		
	12 1100 12 1100			3 0011 3 0011			
12 1100			10 1010			10 1010	
9 1001			7 0111				
				9 1001			

# Extension Activity

- Get the students to invent their own based on blank grids
- They must check it is solvable!
- Then create ones from a blank sheet of squared paper



# Summary

- Learn fundamentals of binary and logical thinking
- Lots of practice at binary
  - more fun than lists of binary-decimal conversions to do
  - also focusses on underlying construction
- Puzzles are a good way to explore and learn many computing and computational thinking ideas



# More support

On our website contains:

- Activity sheets
- Booklets
- Slides
- Lots more stories

**For teachers:** [www.teachinglondoncomputing.org](http://www.teachinglondoncomputing.org)

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