

COMPUTING · GRADES 4–5

# Binary Numbers

How computers count

## What is binary?

Computers can only really tell two states: ON or OFF. So they count using just two digits: 0 (off) and 1 (on). Each position in a binary number represents a power of 2 — starting from the right: 1, 2, 4, 8, 16, 32, 64, 128. To find the decimal value, add up the values of every position that has a 1.

## Place values in 8-bit binary

Position	7	6	5	4	3	2	1
8							
128	64	32	16	8	4	2	1

## Binary → Decimal

1. 0001 = \_\_\_ (just 1)
2. 0010 = \_\_\_ (just 2)
3. 0101 = \_\_\_ (4 + 1)
4. 1010 = \_\_\_ (8 + 2)
5. 1100 = \_\_\_
6. 1111 = \_\_\_ (the highest 4-bit number)
7. 00010001 = \_\_\_
8. 10101010 = \_\_\_



**Decimal → Binary (use 8 bits)**

1.  $5 = \underline{\quad}$

2.  $10 = \underline{\quad}$

3.  $16 = \underline{\quad}$

4.  $31 = \underline{\quad}$

5.  $64 = \underline{\quad}$

6.  $100 = \underline{\quad}$

7.  $255 = \underline{\quad}$  (the highest 8-bit number)

