From a Picture to 0s and 1s

A computer has no eyes. It cuts a picture into tiny squares called pixels and keeps one number for each square. Fewer squares = fewer numbers, but the picture gets blurrier.

1. The real picture

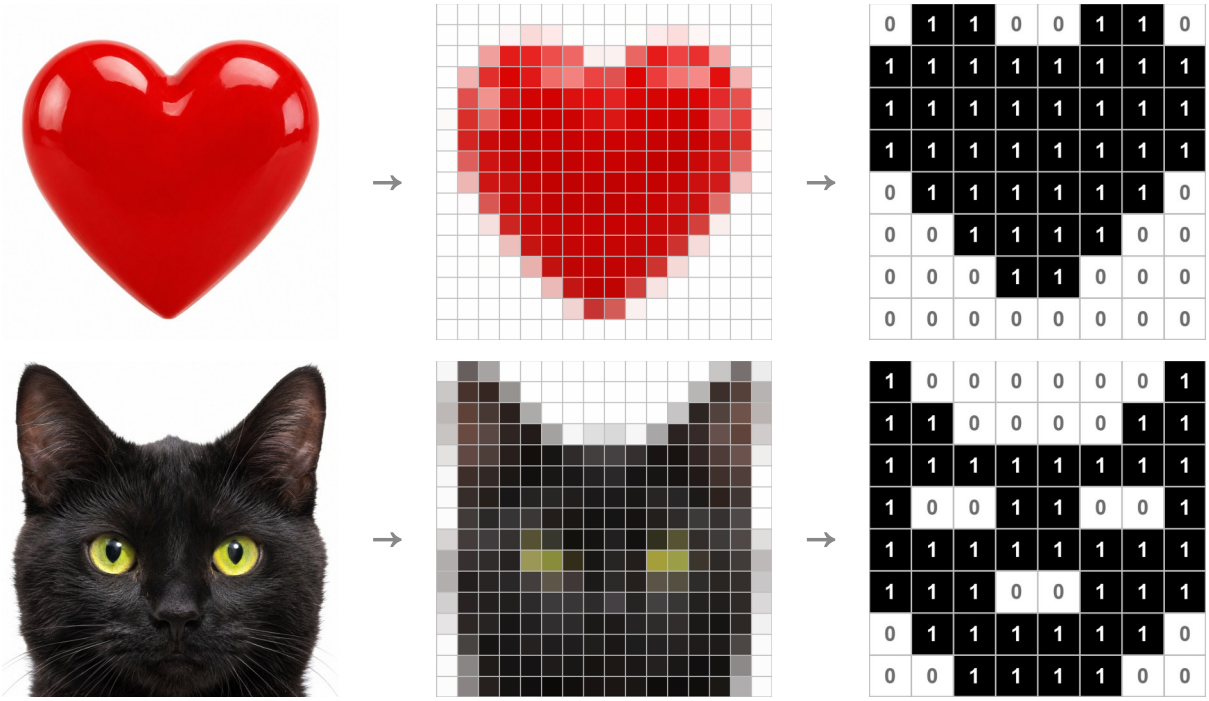
A photo has millions of pixels.

2. Mosaic: 16 × 16

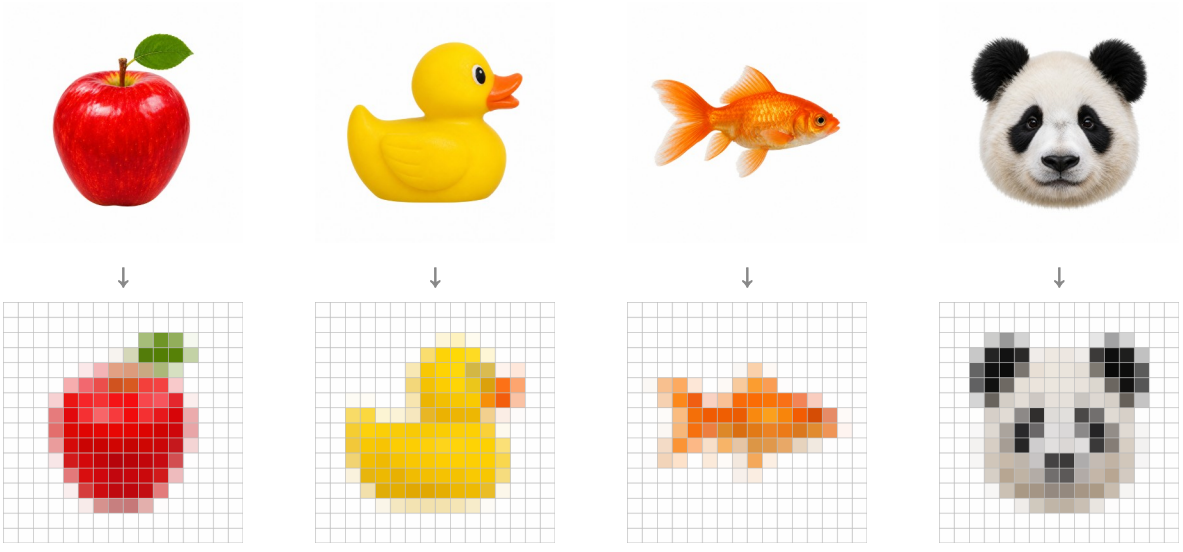
256 squares, each one color.

3. Black and white: 8 × 8

64 squares, each 0 or 1.



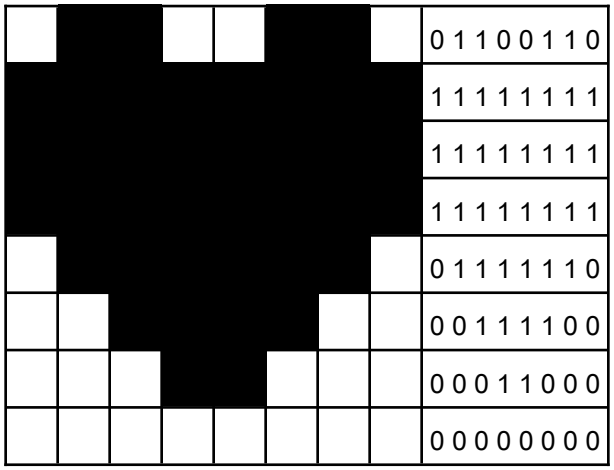
More mosaics. Each photo is cut into 16 × 16 squares. Can you still tell what it is?



Worksheet: How Does a Computer See?

A computer keeps a picture as tiny squares called **pixels**. Each pixel is a number: **1 = black**, **0 = white**.

A. Look first. This picture is already filled in: every 1 is black, every 0 is white. What is it?



	0 1 1 0 0 1 1 0
	1 1 1 1 1 1 1 1
	1 1 1 1 1 1 1 1
	1 1 1 1 1 1 1 1
	0 1 1 1 1 1 1 0
	0 0 1 1 1 1 0 0
	0 0 0 1 1 0 0 0
	0 0 0 0 0 0 0 0

It is a: _____

B. Paint by numbers. Fill in every square that is 1. What picture do you get?

	1 0 0 0 0 0 0 1
	1 1 0 0 0 0 1 1
	1 1 1 1 1 1 1 1
	1 0 0 1 1 0 0 1
	1 1 1 1 1 1 1 1
	1 1 1 0 0 1 1 1
	0 1 1 1 1 1 1 0
	0 0 1 1 1 1 0 0

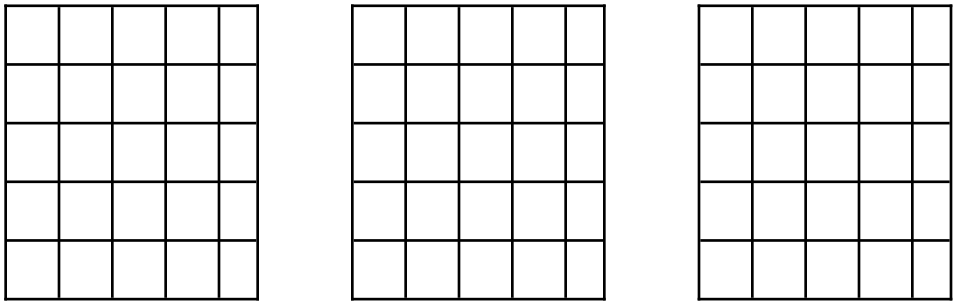
My picture is a: _____

C. Make your own secret picture (in class). Fill in squares, then write each row as 0s and 1s. Don't show anyone: a parent will guess it at home!

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	_ _ _ _ _ _ _ _
	_ _ _ _ _ _ _ _
	_ _ _ _ _ _ _ _

Back: Many 7s, and a Picture to Send Home

D. Many different 7s. Fill in squares to make the number 7 in three different ways.



E. Send your secret picture home. In class: copy the 0s and 1s of your picture C next to this grid. At home: read them to a parent, one row at a time, but don't say what it is! The parent fills in the grid and guesses.

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At home (with a parent)

Parent's guess: It is a _____ Right? Yes / No

Turn the page over. Same picture? Yes / Almost / No Parent's initials: _____