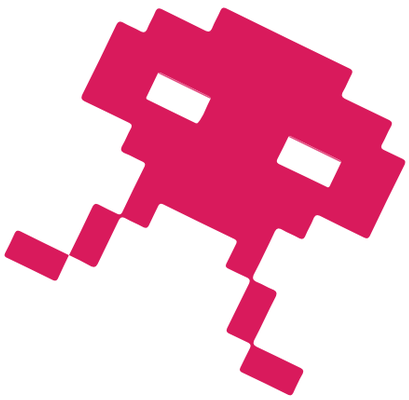
code club

Unplugged



Pixel art

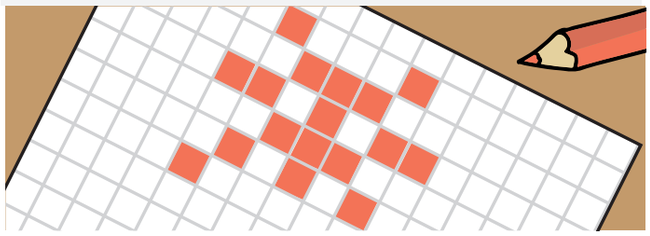
Download this worksheet at:

rpf.io/cc-unplugged-pixelart

1

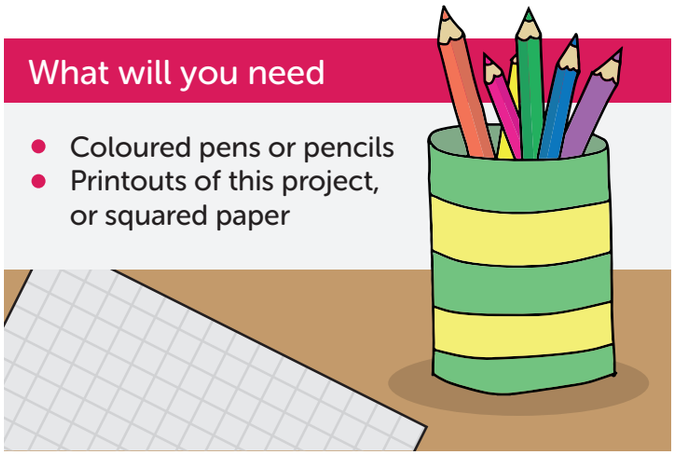
Introduction

You will be working in pairs or threes and making your own pixel art pictures.



What will you need

- Coloured pens or pencils
- Printouts of this project, or squared paper



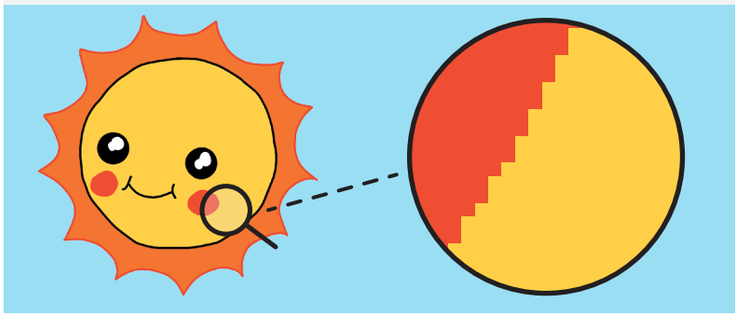
What you will learn

- How computers create and store images
- How to use (x, y) coordinates

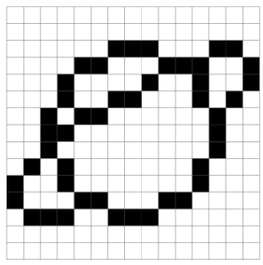
2

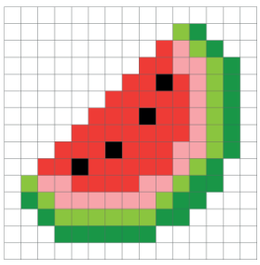
Pixels

Computer screens, and the pictures they show, are divided up into grids of very small dots called pixels (picture elements). When you zoom in on a picture, you can see its pixels.



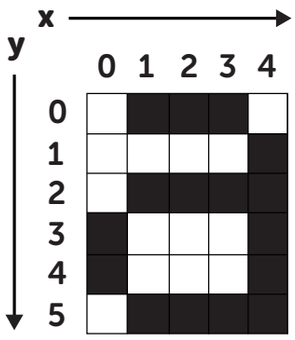
These images show how you can use pixels to make art.





Computers represent everything, even pictures, with numbers. This means that when you design a picture for a computer, you need to turn the picture's pixels into numbers.

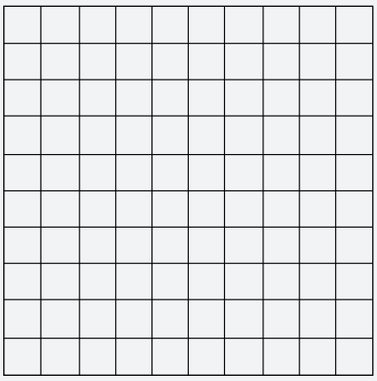
The grid numbering starts at (0, 0) in the top left-hand corner of the grid. This is because computers use the same (x, y) coordinates as old-fashioned televisions, which display images in horizontal lines from left to right, starting at the top and moving downwards.



(1,0) (2,0) (3,0)
(4,1)
(1,2) (2,2) (3,2) (4,2)
(0,3) (4,3)
(0,4) (4,4)
(1,5) (2,5) (3,5) (4,5)

Task:

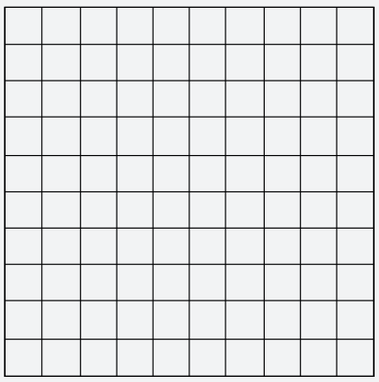
Decode this image by colouring in the right coordinates. You can use whichever colour you like. What does the image show?



(1,1) (2,1) (6,1) (7,1)
(0,2) (3,2) (5,2) (8,2)
(0,3) (4,3) (8,3)
(0,4) (8,4)
(1,5) (7,5)
(2,6) (6,6)
(3,7) (5,7)
(4,8)

3 Challenge: decode a bigger picture

Can you decode this image?



(3,0) (6,0)
(0,1) (4,1) (5,1) (9,1)
(0,2) (1,2) (2,2) (3,2) (6,2) (7,2) (8,2) (9,2)
(2,3) (7,3)
(0,4) (2,4) (7,4) (9,4)
(0,5) (1,5) (2,5) (7,5) (8,5) (9,5)
(2,6) (7,6)
(0,7) (1,7) (2,7) (2,7) (7,7) (8,7) (9,7)
(0,8) (3,8) (6,8) (9,8)
(4,9) (5,9)

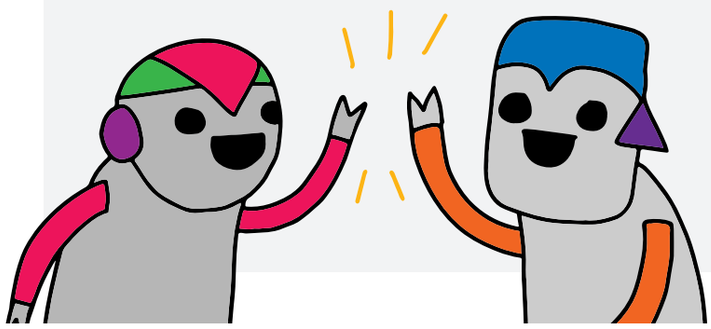
What do you see in the image?

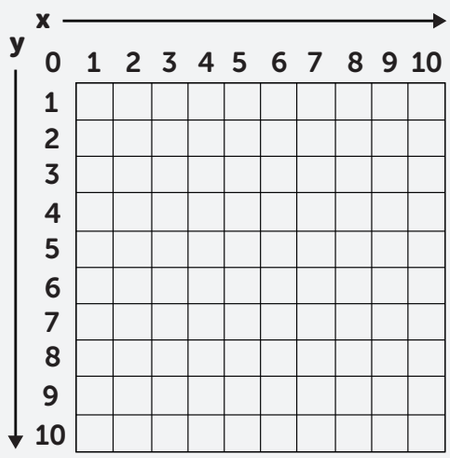
Hint: it is really important you keep them out of your code!

4 Task: create your own pixel art

Create your own pixel art image in the grid below by colouring in pixels.

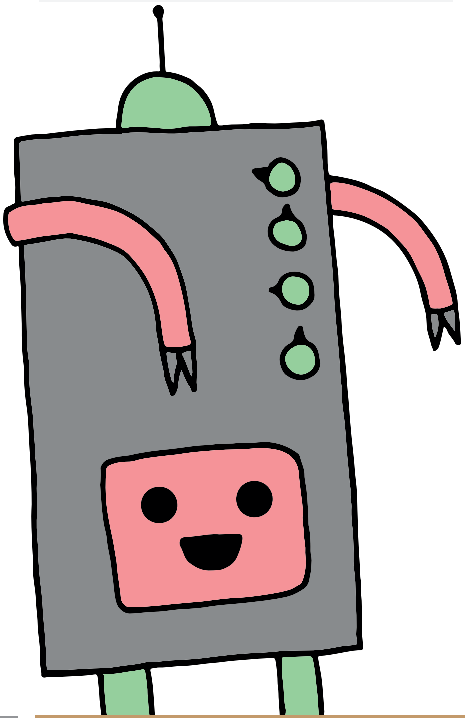
The image can show anything you want.





5 Encode your picture

Now it's time to turn your pixel art into numbers a computer (or a friend) can understand and try to decode!



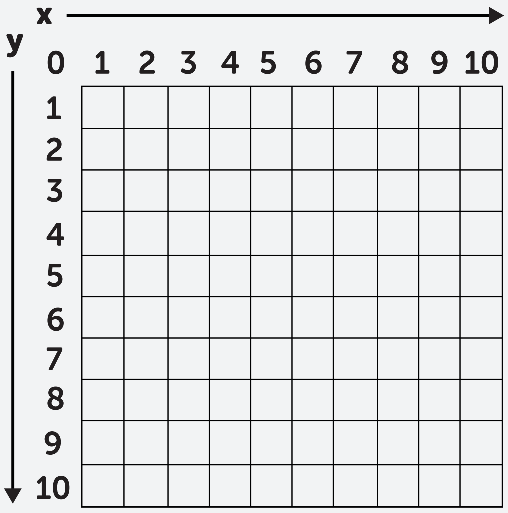
Task:

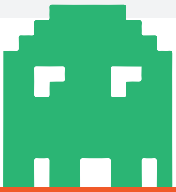
Write down the (x, y) coordinates of the pixels which you coloured in.

X	Y

Task:

Swap your coordinates with a friend so they can try to decode your image and you can decode theirs.

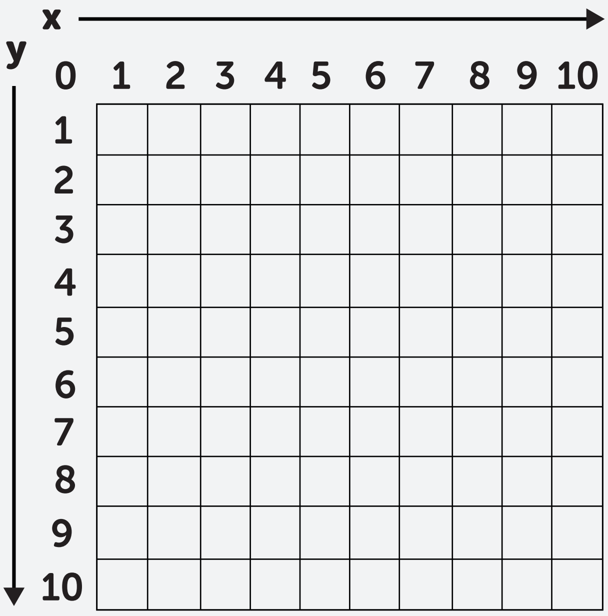




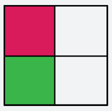
6 Challenge: create a multicolour picture

At the moment ,your pixel art pictures are monochrome, meaning they only use one colour.

Can you create and then encode a pixel art image which has more than one colour?



Hint: To encode a monochrome image, you only need two columns (for x and y).



(0,0, red)
(0,1, green)

For multicolour pictures, you need at least one more column to store the colour.

Task:

Write down the (x, y) coordinates and colour of the pixels in your picture.

X	Y			

What next?

Create your own pixel art editor in HTML/CSS code, with the help of this online project:
rpf.io/pixel-art