

# Digital pictures

Computers have to use numbers for everything they do. In order to store and transmit pictures, computers use numbers to code the pictures. Digital cameras, smart phones, and other electronic gadgets do it, too.

Computer screens are divided into a grid of small dots called **pixels**. "Pixel" comes from *picture* *elements*. To keep things simple, we'll look at a black and white picture, where each pixel is either black or white.

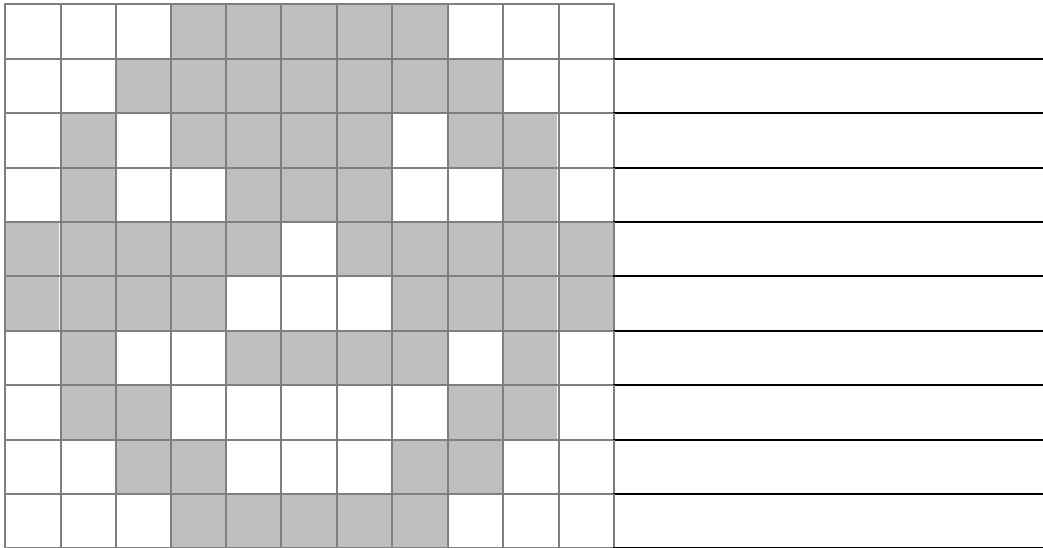
## Example:

Note that the first number always is about white pixels, so **if the first pixel is black, we need to start with 0!**

|  |  |  |  |  |            |
|--|--|--|--|--|------------|
|  |  |  |  |  | 1, 3, 1    |
|  |  |  |  |  | 0, 1, 3, 1 |
|  |  |  |  |  | 0, 1, 3, 1 |
|  |  |  |  |  | 1, 4       |
|  |  |  |  |  | 3, 1, 1    |
|  |  |  |  |  | 2, 1, 2    |
|  |  |  |  |  | 1, 1, 3    |

[In colour? A separate number is used to store that information.]

How would a computer code this?



Now try to de-code this picture.

|  |  |  |  |  |  |  |  |  |  |                  |
|--|--|--|--|--|--|--|--|--|--|------------------|
|  |  |  |  |  |  |  |  |  |  | 3, 1, 8          |
|  |  |  |  |  |  |  |  |  |  | 2, 1, 9          |
|  |  |  |  |  |  |  |  |  |  | 1, 3, 6, 1, 1    |
|  |  |  |  |  |  |  |  |  |  | 0, 2, 1, 1, 7, 1 |
|  |  |  |  |  |  |  |  |  |  | 0, 4, 7, 1       |
|  |  |  |  |  |  |  |  |  |  | 2, 9, 1          |
|  |  |  |  |  |  |  |  |  |  | 2, 8, 2          |
|  |  |  |  |  |  |  |  |  |  | 2, 8, 2          |
|  |  |  |  |  |  |  |  |  |  | 2, 1, 6, 1, 2    |
|  |  |  |  |  |  |  |  |  |  | 1, 2, 5, 2, 2    |