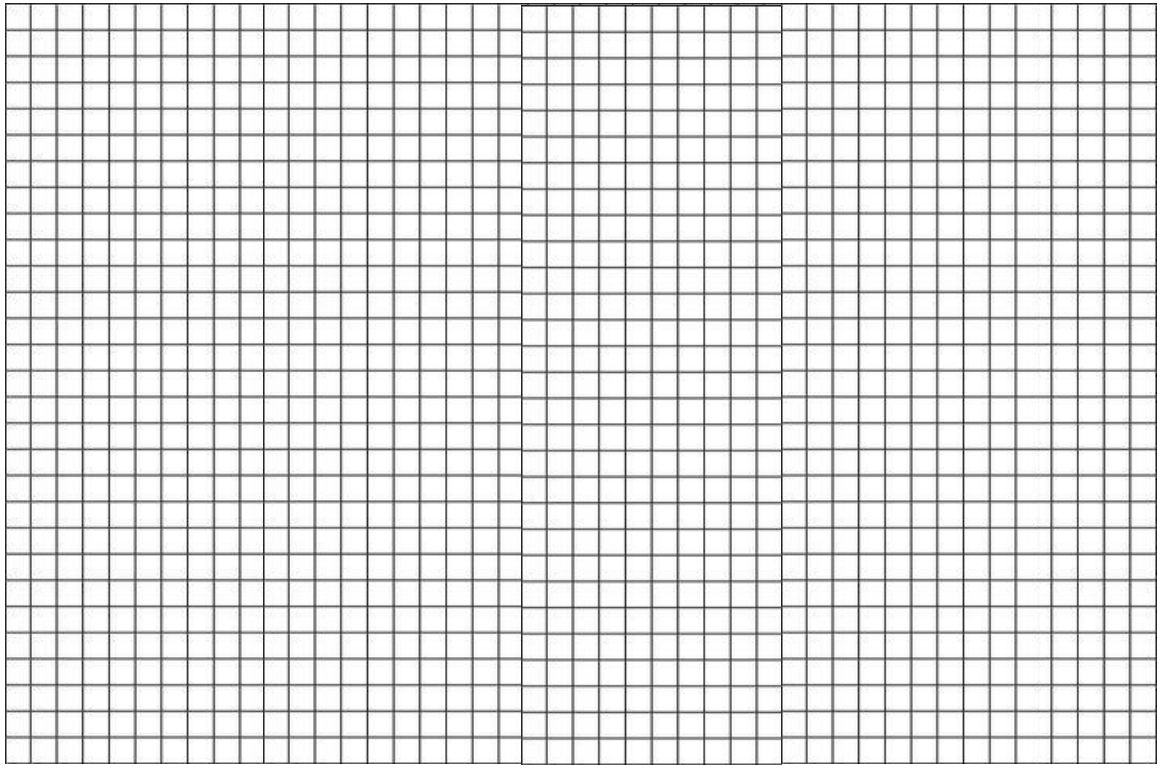
pixel

what is pixel ?

- Every image consists of a set of **pixels.** Pixels are the raw building blocks of an image. There is no finer granularity than the pixel.
- Normally, we think of a pixel as the “color” or the “intensity” of light that appears in each place in our image.
- If we think of an image as a grid, each square in the grid ccontains a single pixel.



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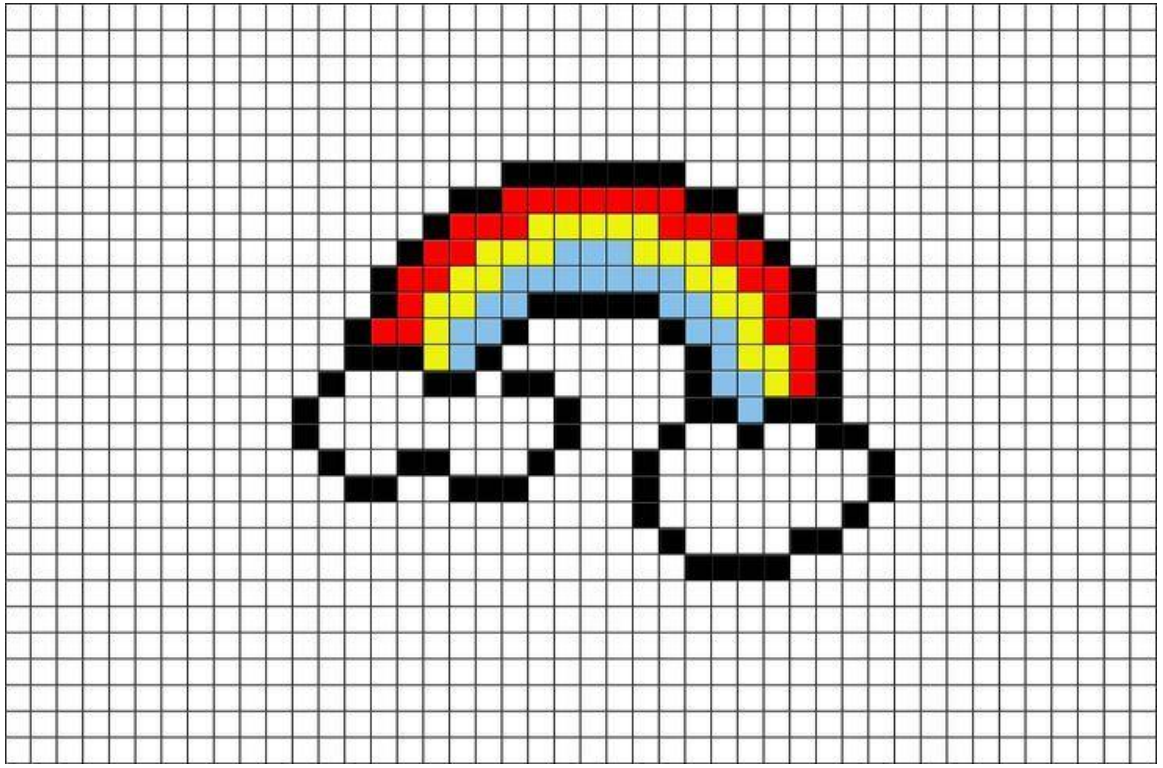


activity

- For example:

let's assume we have an image with a resolution of **500 x 300**. This means that our image is represented as a grid of pixels, with 500 rows and 300 columns.

- How many pixels are there in an image ?

500 x 300 = **150, 000** pixels in our image.

range of pixel

- The range of pixels for an n-bit image is.

$$0 \ -(2^n \ -1)$$

- The range of pixels for an 8-bit image is.

$$0 \ -255$$

color and grayscale

grayscale

In a grayscale image, each pixel has a value between 0 and 255, where,

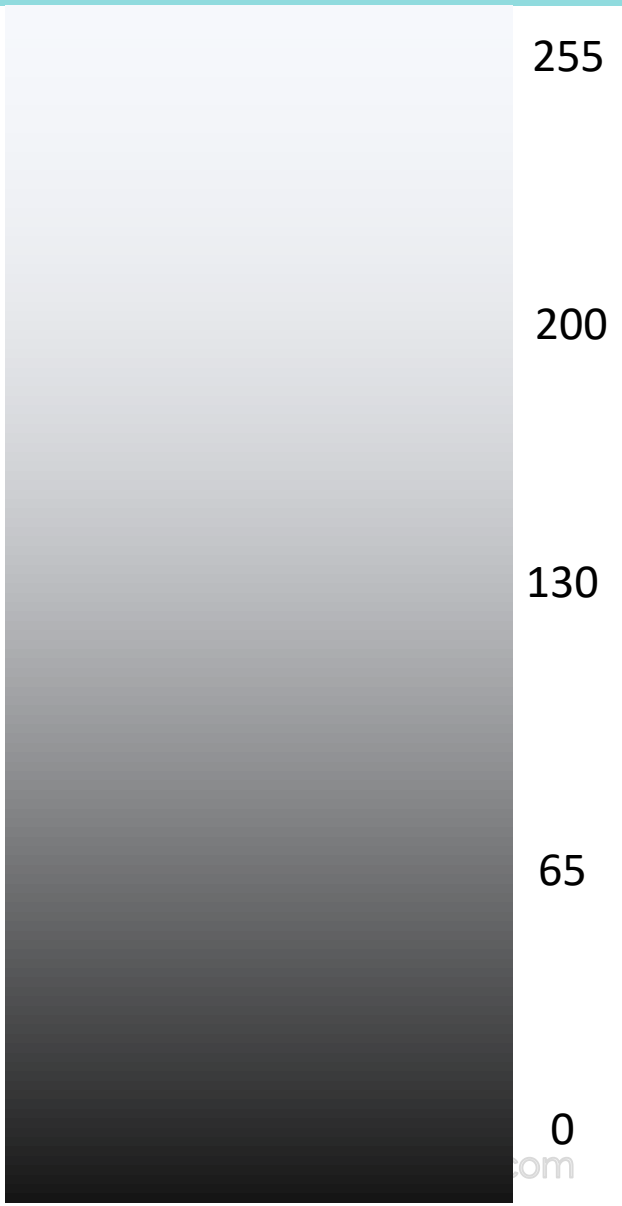
zero corresponds to "black"

255 corresponds to "white".

The values in between 0 and 255 are varying shades of gray.

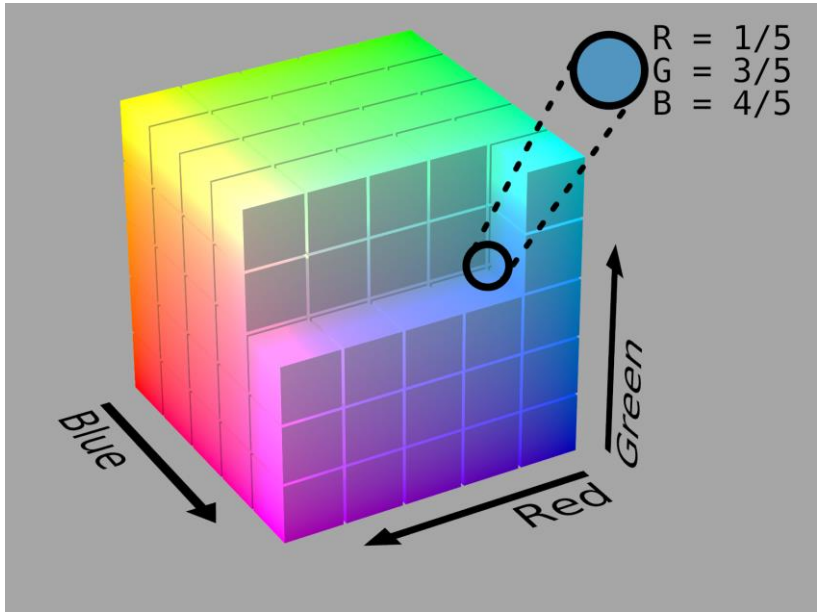
where values closer to 0 are darker

and values closer to 255 are lighter



color

- **Color** pixels are normally represented in the RGB color space
  - one value for the Red component,
  - one for Green,
  - and one for Blue.
- Other color spaces exist, but let's start with the basics and move our way up from there.

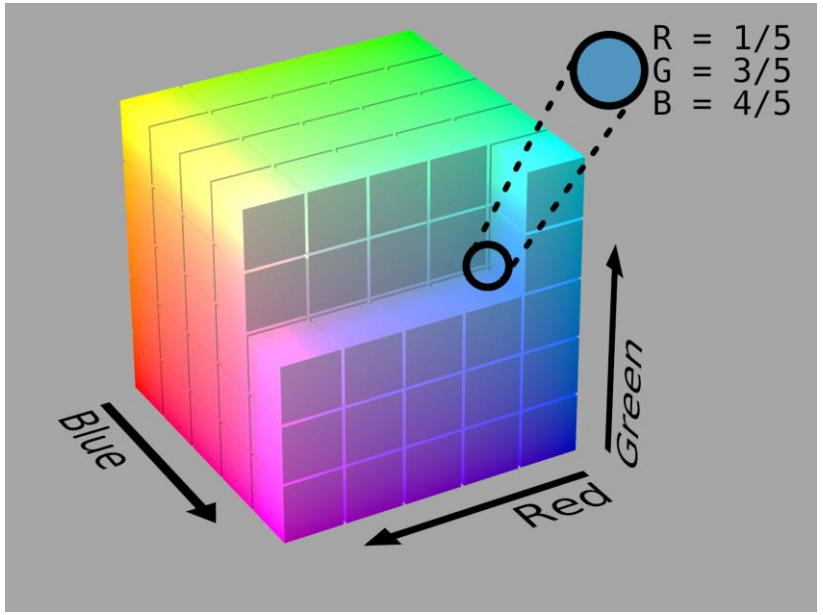


Each of the three colors is represented by an integer in the range 0 to 255, which indicates how "much" of the color there is. Given that the pixel value only needs to be in the range [0, 255], we normally use an 8-bit unsigned integer to represent each colour intensity.

We then combine these values into an RGB tuple in the form (red, green, blue). This tuple represents our color.

color

- To construct a white color, we would fill up each of the red, green, and blue buckets completely, like this: (255, 255,255).



For your reference, here are some common colors represented as RGB tuples:

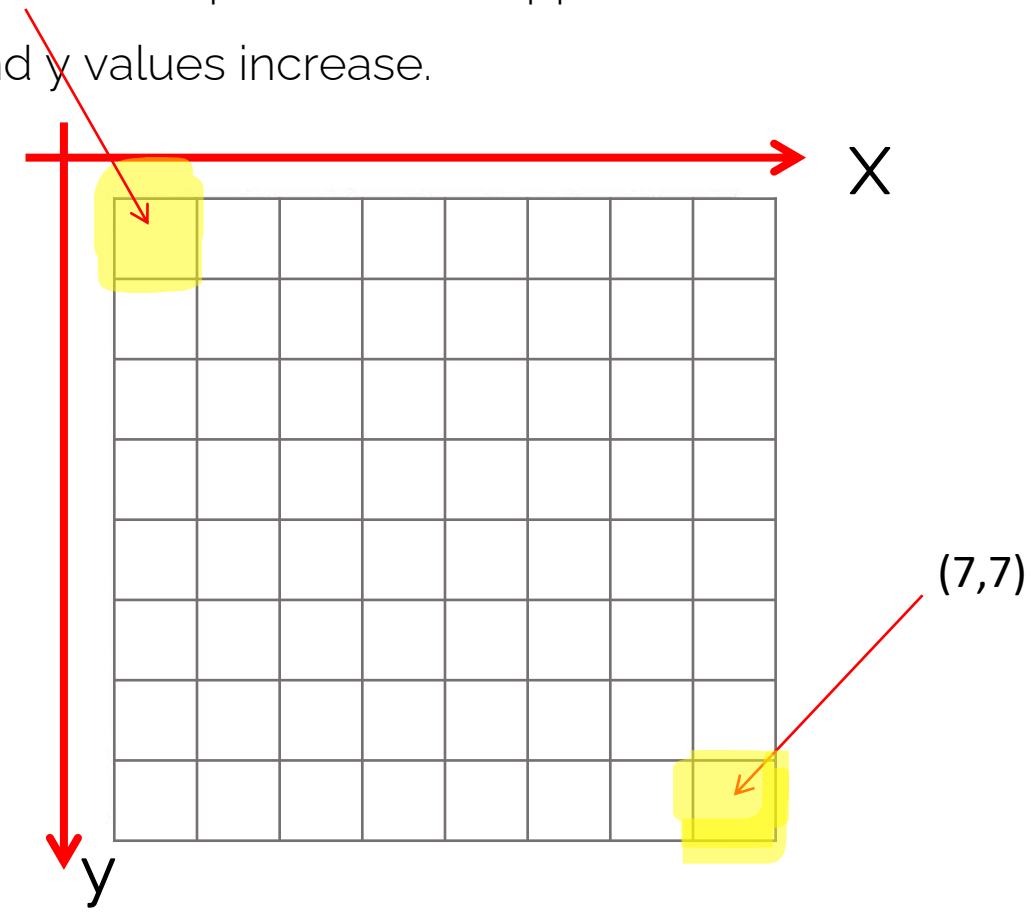
Black: (0,0,0)
White: (255,255,255)
Red: (255,0,0)
Green: (0,255,0)
Blue: (0,0,255)
Aqua: (0,255,255)
Fuchsia: (255,0,255)
Maroon: (128,0,0)
Navy: (0,0,128)
Olive: (128,128,0)
Purple: (128,0,128)
Teal: (0,128,128)
Yellow: (255,255,0)

coordinate system of an image

Coordinate System

- As I mentioned above, an image is represented as a grid of pixels. Imagine our grid as a piece of graph paper.

Using this graph paper, the point (0, 0) corresponds to the upper left corner of the image. As we move down and to the right, both the x and y values increase.



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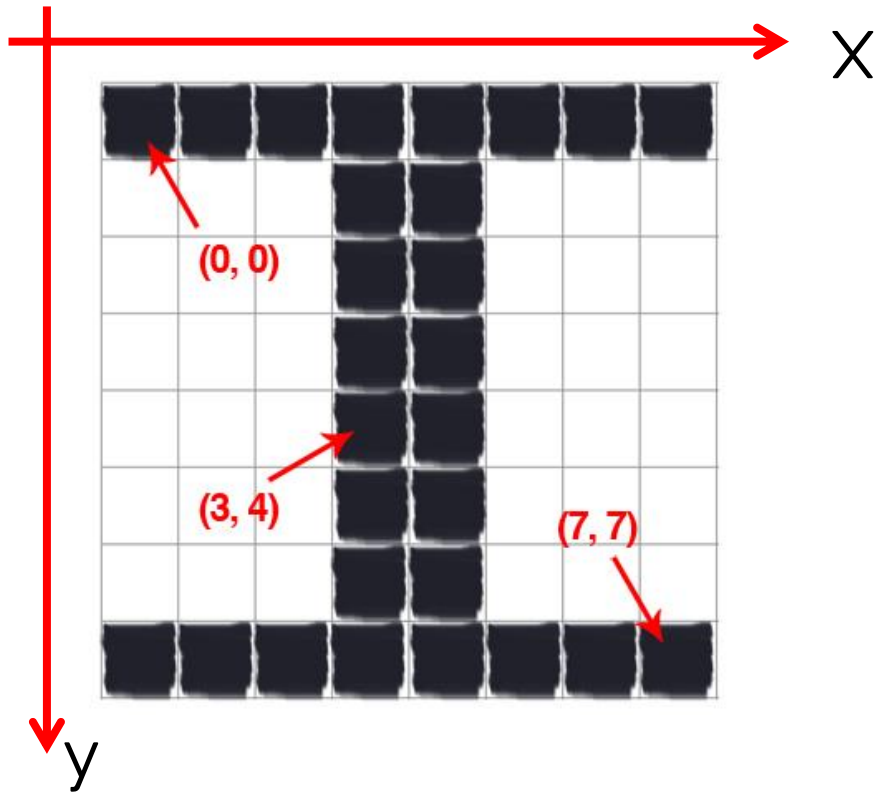

next

convert color in **o**pen**cv** python