Intro to CV

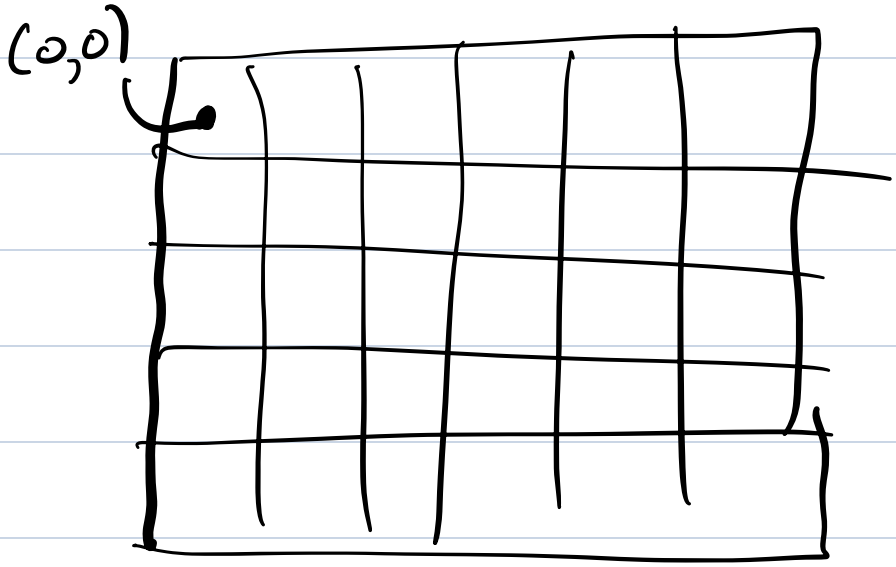
chapter 3 in the first book

Image Processing

- **Digital image** - is composed of pixels each with finite, discrete numeric representation of its intensity.

  0-255 - black white
  color - r, g, b
  c, m, y, k

digital Image - is a two-dimensional function that take in pixels values in spatial coordinates (x, y) (i, j)



Colors = [r, g, b]

open cv = [b, g, r]

- Binary Image / 1-Bit - is an image that consists of pixels that have exactly two colors.
  - stored as 0 or 1

- Gray Scale - is an image where each pixel is a single sample representing light / intensity information.

[0 - 255] - 256 - 8-bits

- 0 → black
- 255 → white

- each pixel has 1 value.

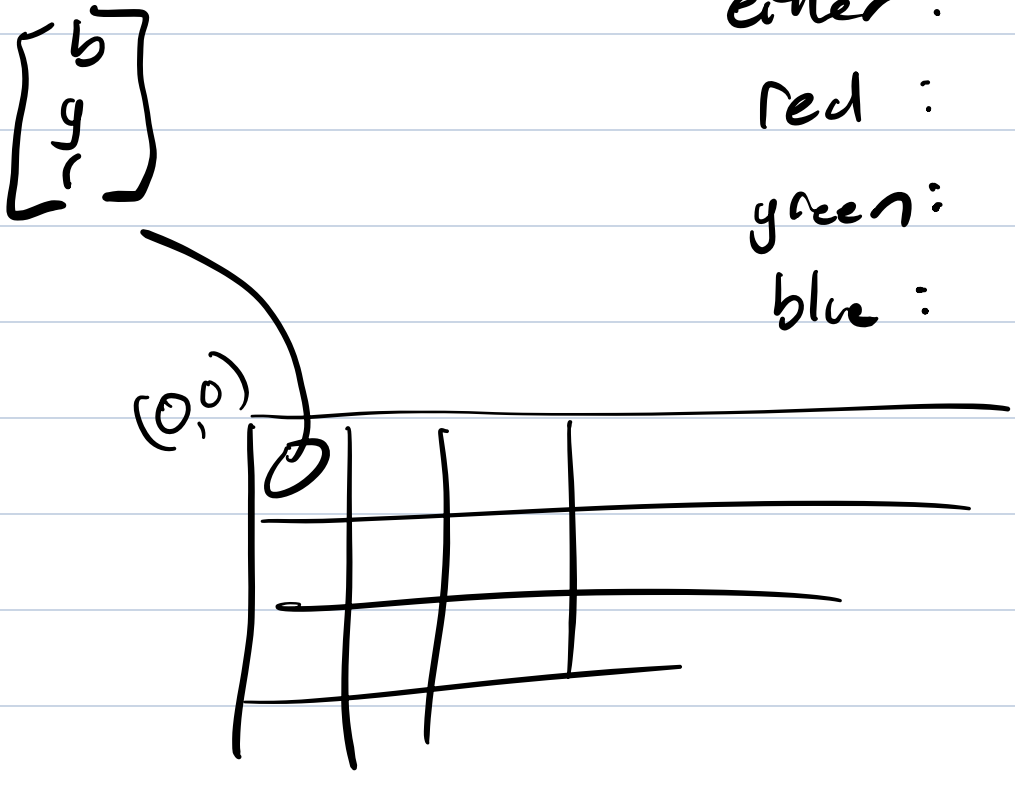
- Color image - represents multispectral data acquired through the visible domain.

  - Each pixel is composed three numbers
    - each one representing either:

      red : 0-255

      green: 0-255

      blue : 0-255

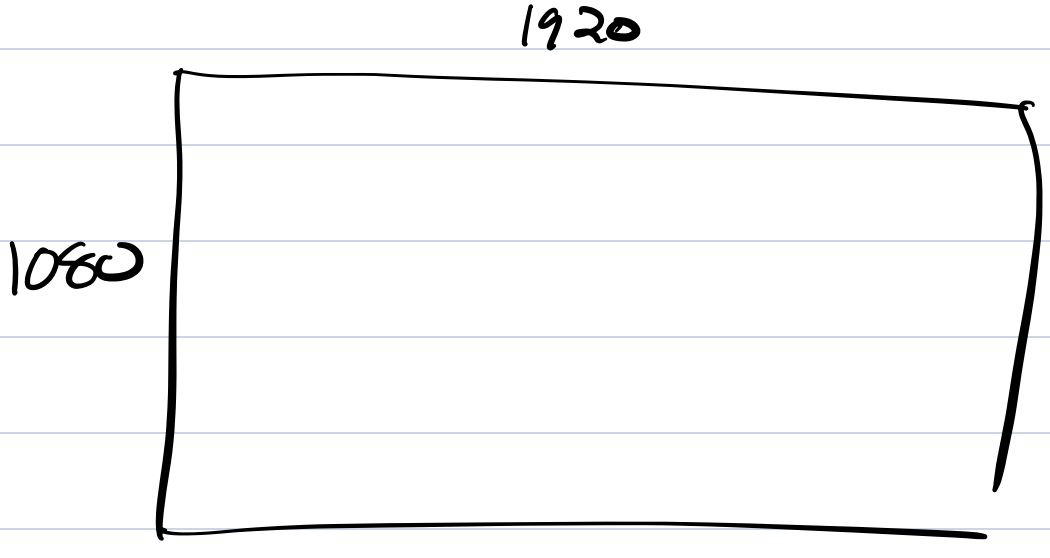


$$\begin{matrix} 0 \\ 1 \\ 2 \end{matrix}\begin{bmatrix} 255 \\ 0 \\ 0 \end{bmatrix} \rightarrow \text{blue}$$

$$\begin{bmatrix} 255 \\ 0 \\ 255 \end{bmatrix} \rightarrow \text{purple}$$

- **Image resolution** – is the count of pixels displayed horizontally and vertically

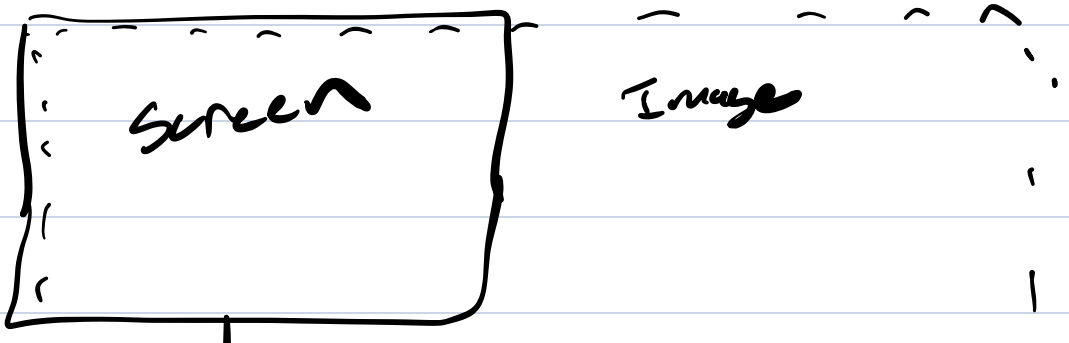
(1920 × 1080)



HD

Screen size 1920 × 1080

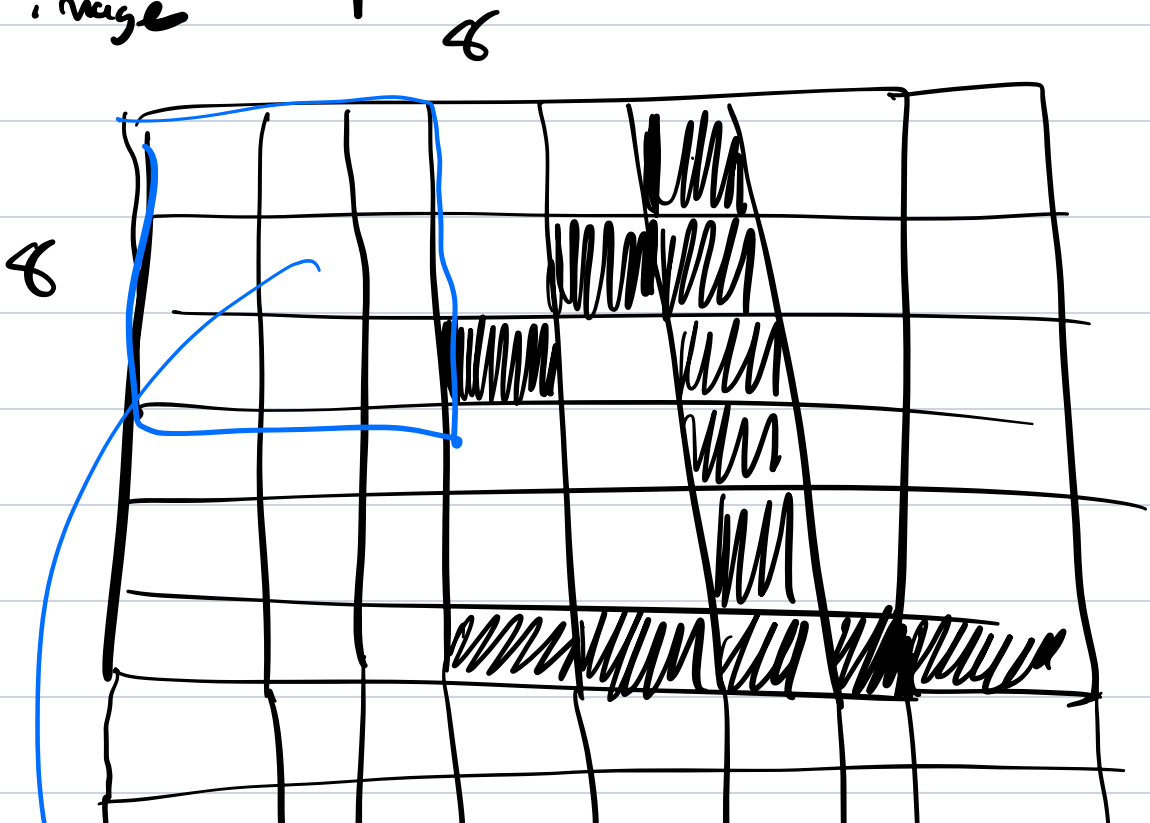
image size 3840 × 2160 – 4K

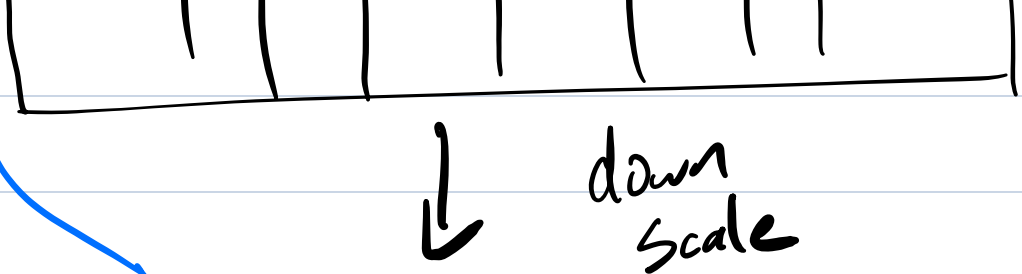


- aspect ration - describes the proportional relationship between n x w

1920 : 1080 → 16 : 9
640 : 480 → 4 : 3
800 : 600 → 4 : 3

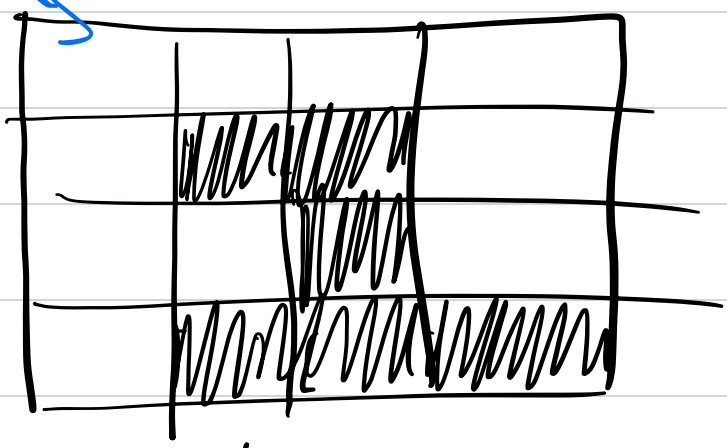
binary image 0/1





down scale

4x4



up scale

8x8