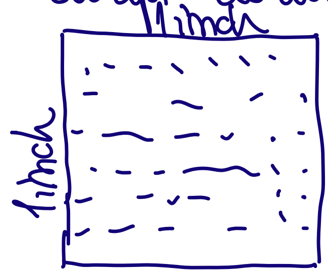
dpi dot per inch → 300 dpi 300 dot/puncte per inch

2.54 cm
=25.4mm

300x300 dpi



$x\,mm = \frac{x}{25.4}$ inch   Print 300dpi

210mm = 8.26 inch · 300 = 2480 pixeli } A4
297mm = 11.69 = 3508 pixeli

8,5000 x 11 US letter

imagine x pixeli lățime
y pixeli înălțime
byte grayscale
3 bytes ~~grayscale~~ RGB < 1B R, 1B G, 1B B

8064 pixeli lățime
6048 → înălțime

8064 · 6048 = 48 771.072 pixeli
1000x :1024 kilo grayscale pix=byte
1000x :1024 Mega
48 M pixeli ⇒ 48MByte = 48MB grayscale

640x480 = 307 200 → 8 inch x 6 inch recomanded canvas size
~~300 dpi~~ 60dpi

4K Digi: 4MP.
3.8 2400x1600

∈[0,255]

Matlab: im1+im2 → suma

100   200

100 + 200 = ~~300~~ 255

im1 = (0:255)' * ones(1, 256)

0:255 → (0 1 2 .... 255.)' vector linie^T

$$\begin{pmatrix} 0 \\ 1 \\ \vdots \\ 255 \end{pmatrix} \begin{pmatrix} 1 & 1 & \dots & 1 \end{pmatrix} = \begin{pmatrix} 0 & 0 & 0 & \dots & 0 \\ 1 & 1 & 1 & \dots & 1 \\ 255 & 255 & \dots & & 255 \end{pmatrix}$$

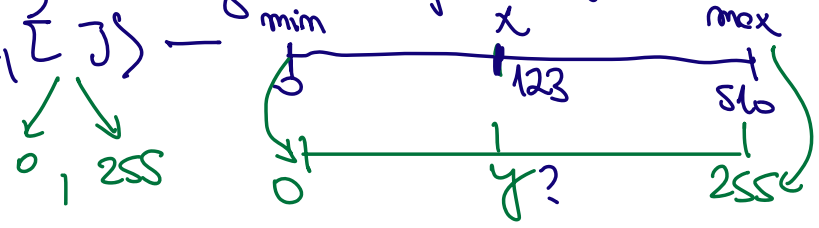
$$\begin{pmatrix} & \end{pmatrix} + \begin{pmatrix} 0 & 255 \\ 0 & \vdots \\ \vdots & \vdots \\ 0 & 255 \end{pmatrix} = \begin{pmatrix} 0 & & \\ & & \\ & & \end{pmatrix}$$

510 → overflow

suma ∈ [0, 510]

imshow(suma) → imagine albă pentru ~~1~~

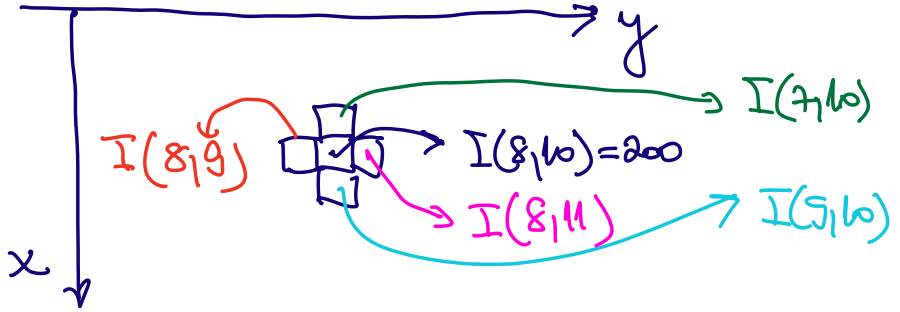
imshow(suma, [ ]) —

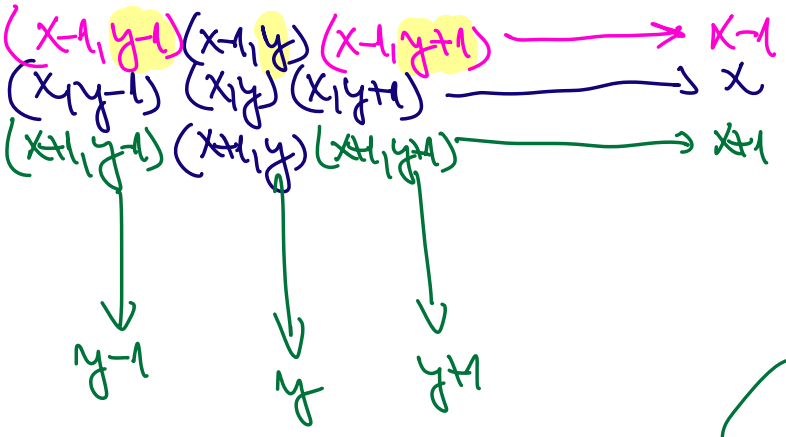


f(x) = y = ax + b ec. dreptei

$$\begin{cases} f(0) = 0. \\ f(510) = 255. \\ f(x) = y. \end{cases} \quad a, b. \begin{cases} a \cdot 0 + b = 0. \\ a \cdot 510 + b = 255. \end{cases}$$

sumauint = uint8(suma) > 255 → limitează 255.

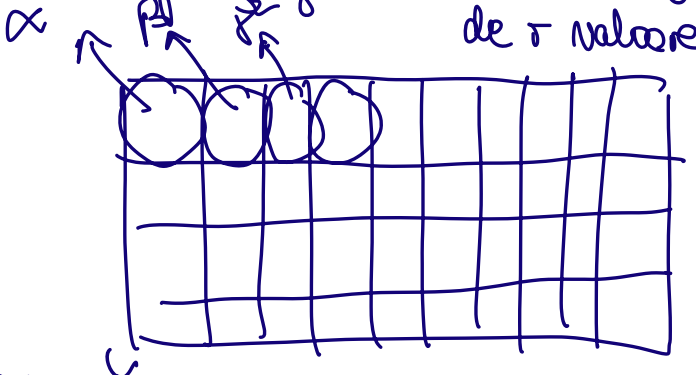




3 categorii: operații punctuale $I(x,y) = \alpha \rightarrow I(x,y) = \beta$ (α: 100, β: 200)

operații locale: feature-uri / pot fi caracterizate cu o valoare

operații globale: toată imaginea este caracterizată de o valoare

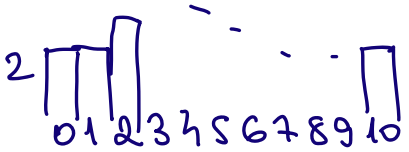


Histograma:

frecvența de valori:

[0 2 9 2 5 8 7 3 1 9 4 3 5 8 10 0 1 2 9 5 10];

0 → 2-ori
1 → 2-ori
2 → 2-ori
...
10 → 2-ori
...
255



0 1 2 3 4 5 6 7 8 9 10

[2]

[2+2][ ][ ][ ]

9 < val ≤ 10

Threshold pragmire: grayscale → alb negru

$AN = (I > 100)$ 1, pb. val pix > 100

0, pb. pix <= 100

$INV = 255 - AN$

Contrast stretching: MIN: 30, MAX: 200 → transformare liniara

$[MIN, MAX] \rightarrow [0, 255]$

[100, 180] imadjust

$$f(x,y) = \frac{255-0}{max_{img} - min_{img}} (I(x,y) - min_{img})$$

30 → 0

200 → 255

40 → 42

$$f(x,y) = \frac{255-0}{200-30}(30-30) = 0.$$

$$f(x,y) = \frac{255-0}{200-30}(200-30) = 255.$$

$$f(x,y) = \frac{255-0}{200-30}(40-30) = \frac{255}{170} \cdot 10 = 15.$$