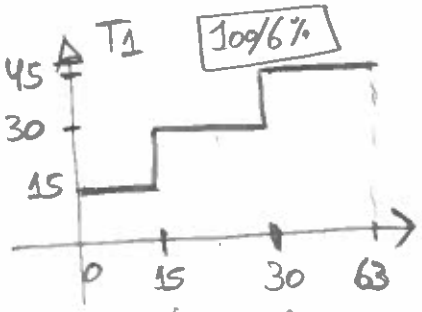
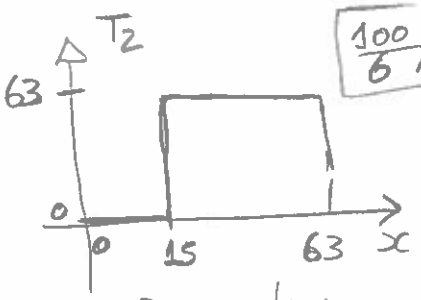
③ a)



100/6 %

- Reduction of 64 levels to 3 levels

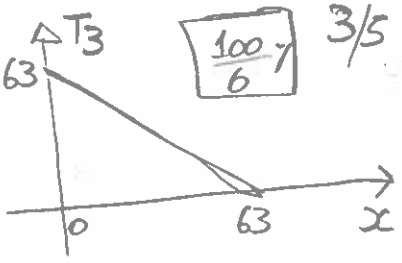
100/6 %



100/6 %

- Binarization with Th = 15

100/6 %



100/6 %

- Negative Version

100/6 %

b) $I_A = T_1[I_1] = \begin{bmatrix} 15 & 15 & 15 \\ 15 & 30 & 30 \\ 30 & 45 & 45 \end{bmatrix}$

100/3 %

$I_B = T_2[I_1] = \begin{bmatrix} 0 & 0 & 0 \\ 0 & 63 & 63 \\ 63 & 63 & 63 \end{bmatrix}$

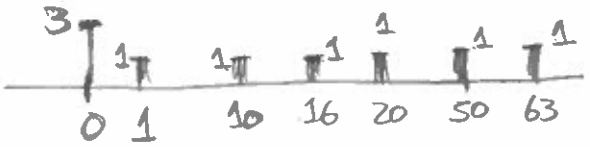
100/3 %

$I_C = T_3[I_1] = \begin{bmatrix} 63 & 63 & 63 \\ 53 & 42 & 43 \\ 43 & 21 & 23 \end{bmatrix}$

100/3 %

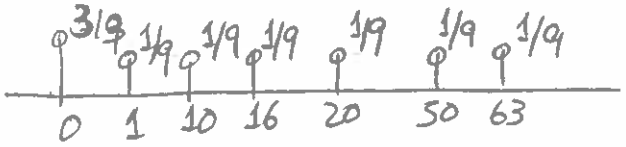
c) I_2, histogram

25% →

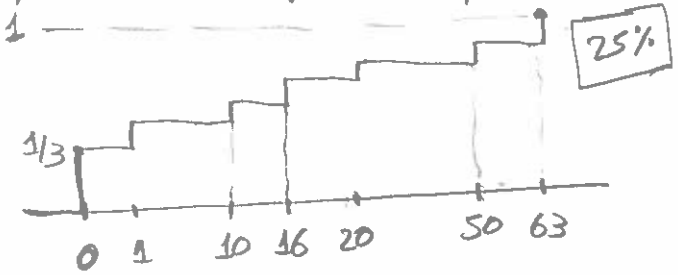


I_2, probability mass function

25%

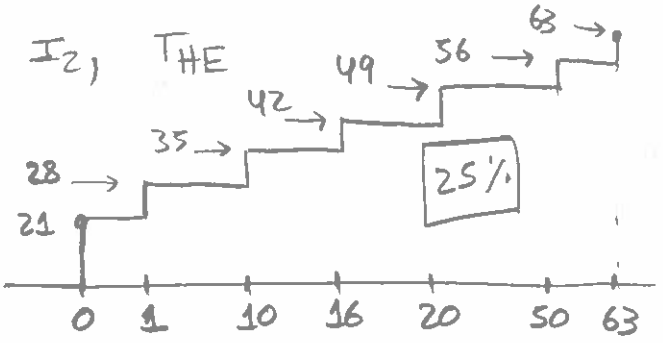


I_2 cumulative probability



25%

I_2, THE



25%

x	0	1 to 9	10 to 15	16 to 19	20 to 49	50 to 62	63
THE	$\text{int}\left(\frac{3}{9} \times 63\right)$	$\text{int}\left(\frac{4}{9} \times 63\right)$	$\text{int}\left(\frac{5}{9} \times 63\right)$	$\text{int}\left(\frac{6}{9} \times 63\right)$	$\text{int}\left(\frac{7}{9} \times 63\right)$	$\text{int}\left(\frac{8}{9} \times 63\right)$	63
	= 21	= 28	= 35	= 42	= 49	= 56	