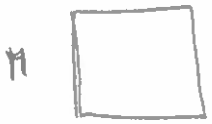
(4) a) Histogram of A

$300 + 300 + 300 + \underbrace{\approx 124}_{\text{aprox}} = 1024$



Square image

$\rightarrow n \times n = 1024$

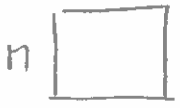
$(=) n^2 = 1024 = 2^{10}$

$(=) n = 2^5 = 32$

32×32 20%

Histogram of B

$100 + 100 + \underbrace{\approx 26 + 30}_{\text{approx}} = 256$



Square image

$\rightarrow n \times n = 256$

$(=) n^2 = 256 = 2^8$

$(=) n = 2^4 = 16$

16×16 20%

$I_A \Rightarrow \quad m_{I_A} = \frac{1}{32 \times 32} \times (200 \times 300 + 220 \times 300 + 230 \times 300 + 250 \times 124)$

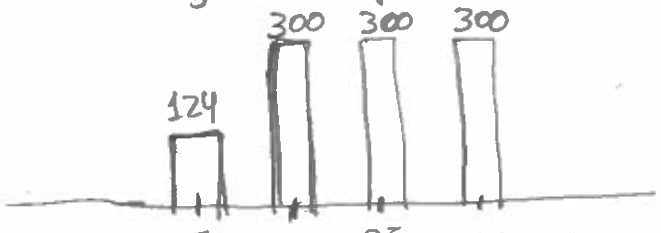
$= 220{,}7$ 20%

$H(I_A) = -3 \times \frac{300}{1024} \times \log_2\left(\frac{300}{1024}\right) - \frac{124}{1024} \times \log_2\left(\frac{124}{1024}\right)$

$= 1{,}925$ 20%

I_A has high brigthness, since the pixel values are 200, 220, 230, and 250 on a 0...255 scale. and average intensity of 220,7 (nigth-hawk-side histogram) 20%

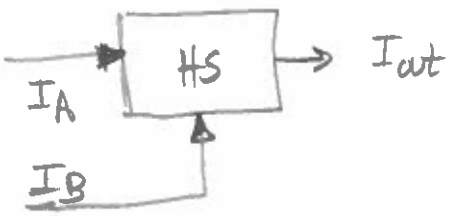
b) Histogram of $I_c = \text{NOT}[I_A]$ with $I_c = 255 - I_A$



50%

The entropy of I_A and I_c is the same, since they have the same histogram counts. 50%

c) Yes, it is possible to use HS over I_A with I_B as reference because they have the same depth resolution ($n = 8$ bit/pixel) 50%



The expected result is that I_{out} has the same content as I_A, but with a lower brigthness, because I_B has low brigthness. 50%