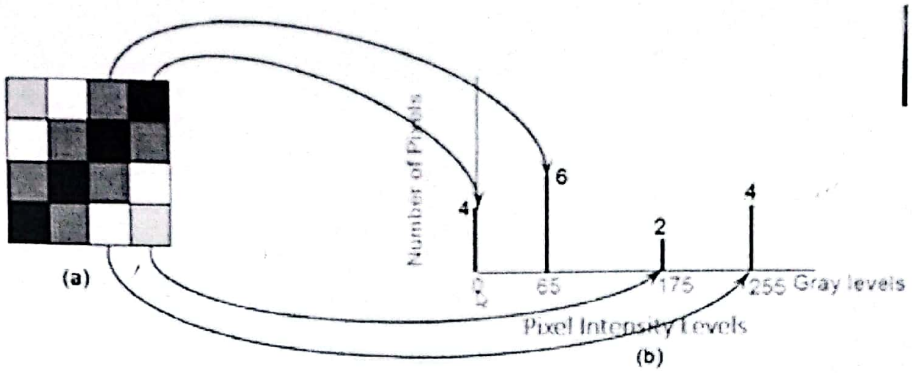
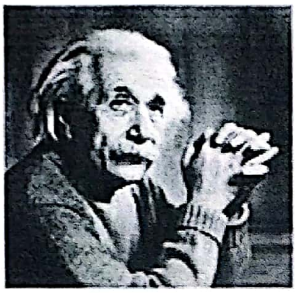


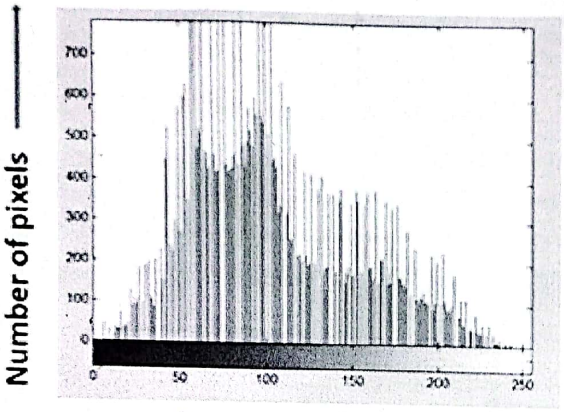


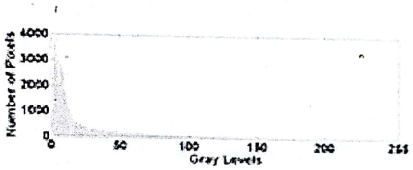
Grey Image

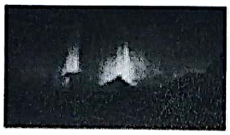
Number of pixel intensities = 256

0 → **Black**

255 → **White**

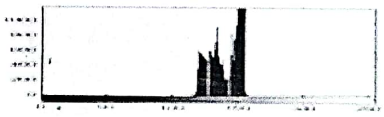


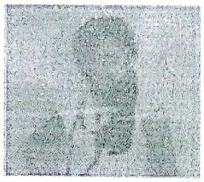




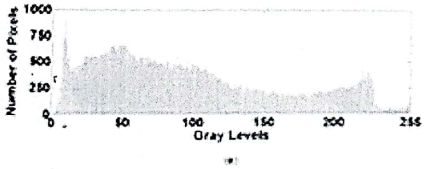
More Black Pixels

More White Pixels



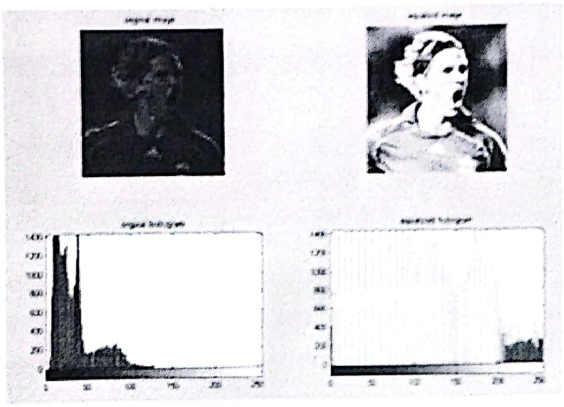


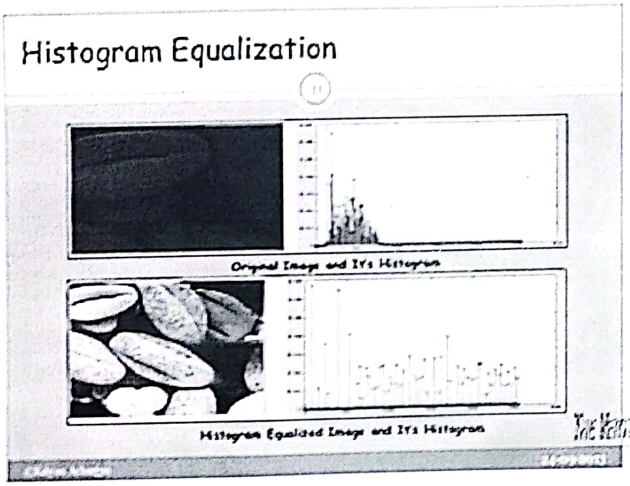
Dull Image



Pixels of all intensity levels

Histogram Applications



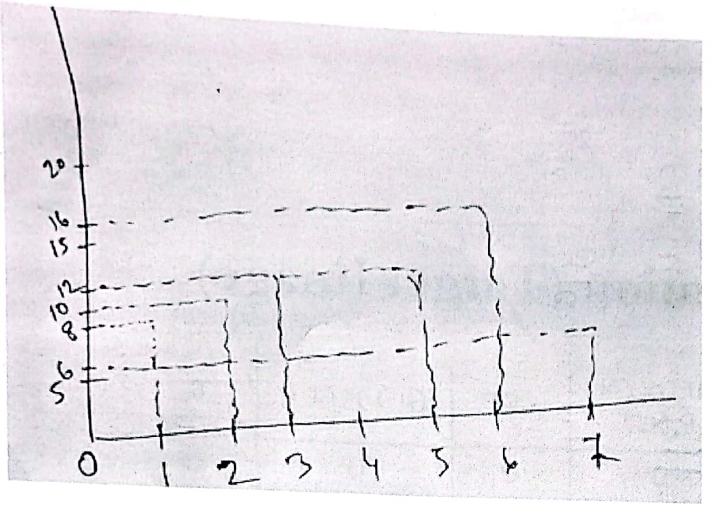


Histogram Equalization

Q1 Perform histogram equilization on the following 8×8 image. The gray level distribution of the image is given below:

gray level (r_k)	0	1	2	3	4	5	6	7
No. of pixel (n_k)	8	10	10	2	12	16	4	2

r_k	n_k	$P_r(r_k) = n_k/MN$	Cm	L = 7 × Cm	R.O.V.	No. of pixel
0	8	8/64 = 0.125	0.125	0.875	1	8
1	10	10/64 = 0.15625	0.28125	1.96875	2	10
2	10	0.15625	0.4375	3.0625	3	12
3	2	0.03125	0.46875	3.28125	3	
4	12	0.1875	0.65625	4.59375	5	12
5	16	0.25	0.90625	6.34375	6	16
6	4	0.0625	0.96875	6.78125	7	6
7	2	0.03125	1	7	7	



Perform the Histogram Specification

Original Image

Gray level	0	1	2	3	4	5	6	7
No. of Pixels	8	10	10	2	12	16	4	2

Desired Image

Gray level	0	1	2	3	4	5	6	7
No. of Pixels	0	0	0	0	20	20	16	8

Histogram Equalization (Input Image)

Gray level(r_k)	No. of Pixels(n_k)	PDF(n_k/N) $P_r(r_k)$	CDF	(L-1)*CDF	H_k
0	8	0.13	0.13	0.91	1
1	10	0.16	0.29	2.03	2
2	10	0.16	0.45	3.15	3
3	2	0.03	0.48	3.36	3
4	12	0.18	0.66	4.62	5
5	16	0.25	0.91	6.37	6
6	4	0.06	0.97	6.79	7
7	2	0.03	1.0	7	7
	64	1			

Histogram Equalization (Target Image)

Gray level(r_k)	No. of Pixels(n_k)	PDF(n_k/N) $P_r(r_k)$	CDF	(L-1)*CDF	S_k
0	0	0	0	0	0
1	0	0	0	0	0
2	0	0	0	0	0
3	0	0	0	0	0
4	20	0.31	0.31	2.17	2
5	20	0.31	0.62	4.34	4
6	16	0.25	0.87	6.09	6
7	8	0.13	1.0	7	7
	64	1			

Mapping

Gray Scale	H	S	Map
0	1	0	4
1	2	0	4
2	3	0	5
3	3	0	5
4	5	2	6
5	6	4	6
6	7	6	7
7	7	7	7

Modified Image

Gray level	0	1	2	3	4	5	6	7
No. of Pixels	0	0	0	0	18	12	28	6