

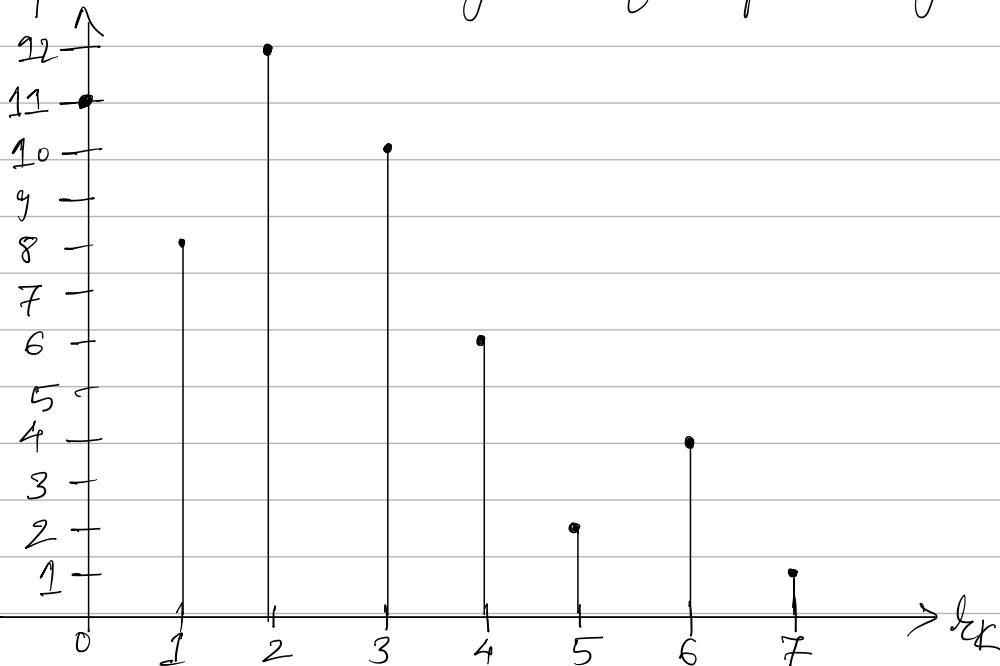
Histogram Equalization Numericals

Exercise -01: Perform the histogram equalization in given image.

Gray levels	0	1	2	3	4	5	6	7
No of Pixels	1	8	12	10	6	2	4	1

Solution:

Step 1: Plot the histogram of input image:



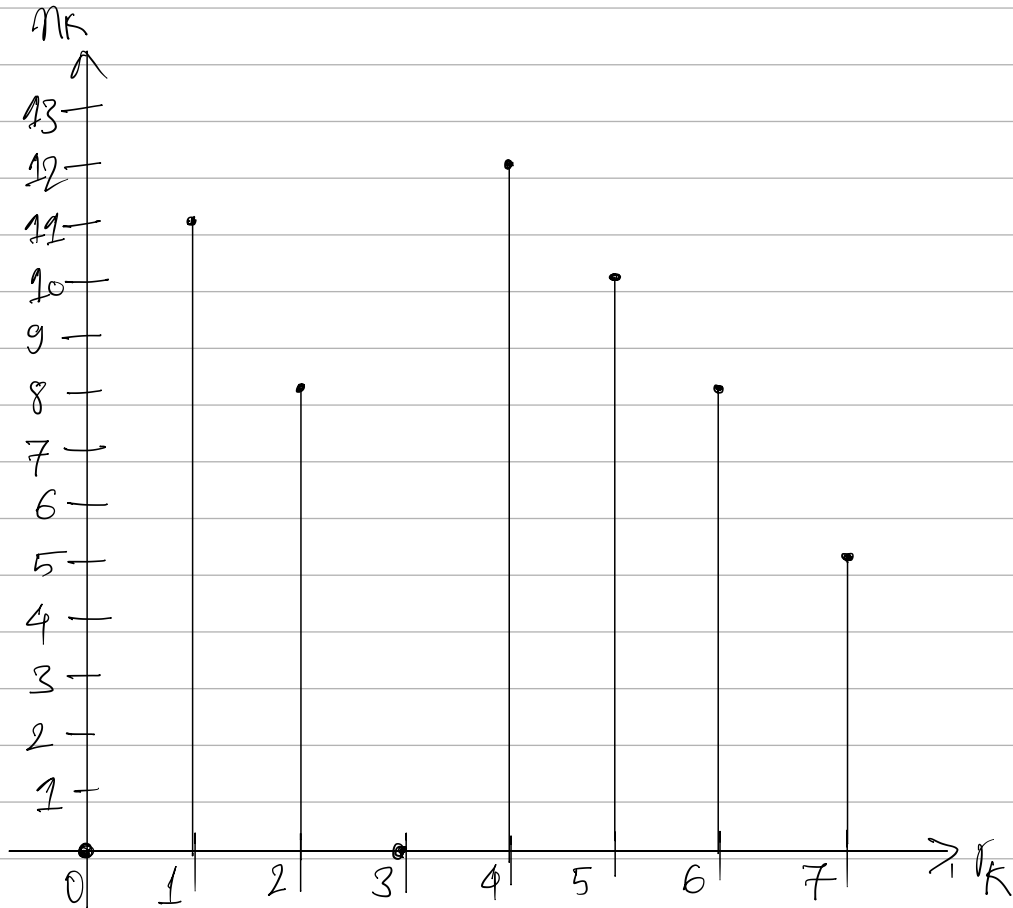
Step 2: Calculate the histogram equalization values,

Gray levels(x_k)	No of Pixels(n_k)	$P(x_k) = n_k/n$ PDF	S_k CDF	$S_k \times 7$	Histogram Equalization
0	1	0.203	0.203	1.421	1
1	8	0.148	0.351	2.457	2
2	12	0.222	0.573	4.011	4
3	10	0.185	0.758	5.306	5
4	6	0.111	0.869	6.083	6
5	2	0.037	0.906	6.342	6
6	4	0.074	0.98	6.86	7
7	1	0.018	0.998	6.986	7

$$n = 54$$

Step 3 - Plot the equalized histogram

Gray levels	1	2	4	5	6	7
No of Pixels	11	8	12	10	8	5



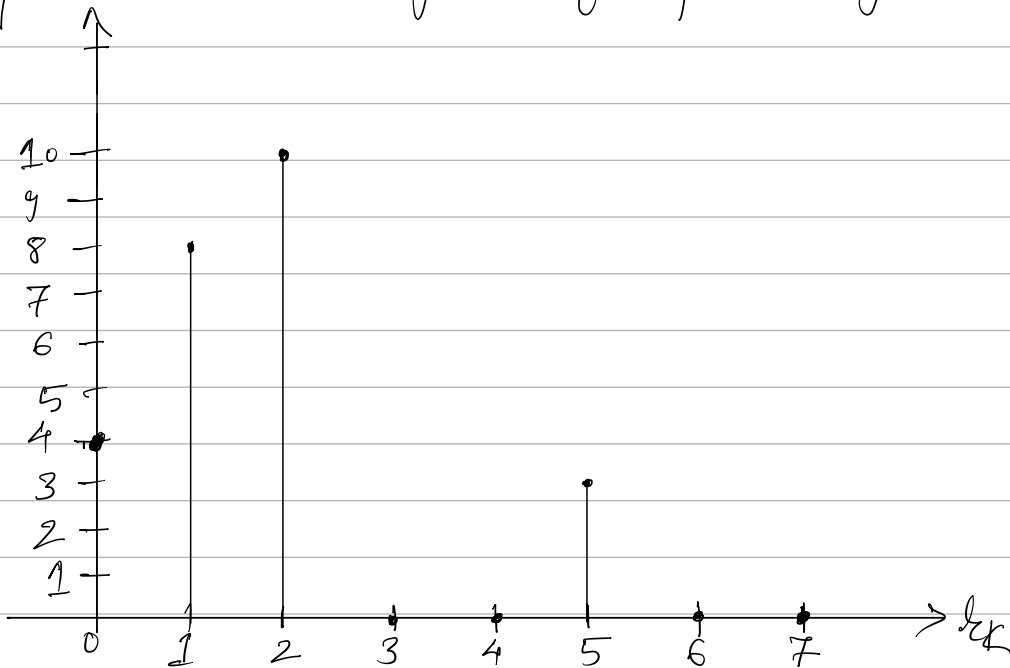
Exercise-02 : Perform histogram equalization in given image.

2	1	1	2	2
2	5	0	0	0
2	2	1	1	0
1	2	1	2	2
5	5	2	1	1

Solution :

Gray levels	0	1	2	3	4	5	6	7
No of Pixels	4	8	10	0	0	3	0	0

Step 1: Plot the histogram of input image



Step 2: Calculate Histogram equalization values

Gray levels(l_k)	No of Pixels(n_k)	$P(r_k) = n_k/n$ PDF	S_k CDF	$S_k * 7$	Histogram Equalization
0	4	0.16	0.16	1.12	1
1	8	0.32	0.48	3.36	4
2	10	0.4	0.88	6.16	6
3	0	0	0.88	6.16	6
4	0	0	0.88	6.16	6
5	3	0.12	1	7	7
6	0	0	1	7	7
7	0	0	1	7	7

$$n = 25$$

Step 3 - The calculated equalized histogram values are

Gray levels	0	1	2	3	4	5	6	7
No of Pixels	0	4	0	0	8	0	10	3

From calculated value the enhanced image after histogram equalization can be represented as:

6	4	4	6	6
6	7	1	1	1
6	6	4	4	1
4	6	4	6	6
7	7	6	4	4