HISTOGRAM EQUALIZATION

EXAMPLE :- Perform histogram equalization of the image.

$f(x,y) =$
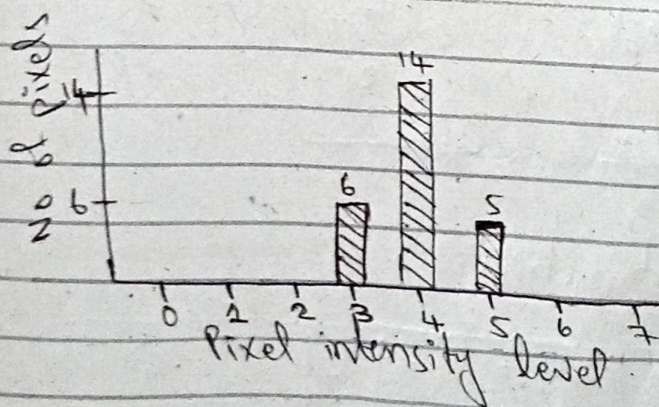
4	4	4	4	4
3	4	5	4	3
3	5	5	5	3
3	4	5	4	3
4	4	4	4	4

Maximum gray value = 5

No of bits required to represent

each intensity = 3 bits

No of possible gray levels = 8 that varies from 0 to 7.

Gray level	0	1	2	3	4	5	6	7
No. of pixels	0	0	0	6	14	5	0	0

Gray Level	No of Pixel = n_k	PDF = n_k/N	(Running sum) CDF S_k	Running sum × max gray level $S_k \times 7$	Cround of Histogram equalized level
0	0	0/25 = 0 → 0	0	0×7 = 0	0
1	0	0/25 = 0 → 0	0	0×7 = 0	0
2	0	0/25 = 0 → 0	0	0×7 = 0	0
3	6	6/25 = 0.24 → 0.24	0.24	0.24×7 = 1.68	2
4	14	14/25 = 0.56 → 0.8	0.8	0.8×7 = 5.6	6
5	5	5/25 = 0.2 → 1	1	1×7 = 7	7
6	0	0/25 = 0 → 1	1	1×7 = 7	7
7	0	0/25 = 0 → 1	1	1×7 = 7	7
	N = 25				

Input Image

Input Image / orginal Image

4	4	4	4	4
3	4	5	4	3
3	5	5	5	3
3	4	5	4	3
4	4	4	4	4

After equalization →

Output Image

6	6	6	6	6
2	6	7	6	2
2	7	7	7	2
2	6	7	6	2
6	6	6	6	6

Histrogram equalization of the image

After equalization

Gray level	0	1	2	3	4	5	6	7
No of pixels	0	0	6	0	0	0	14	5

Num of pixels

6

14

5

0 1 2 3 4 5 6 7
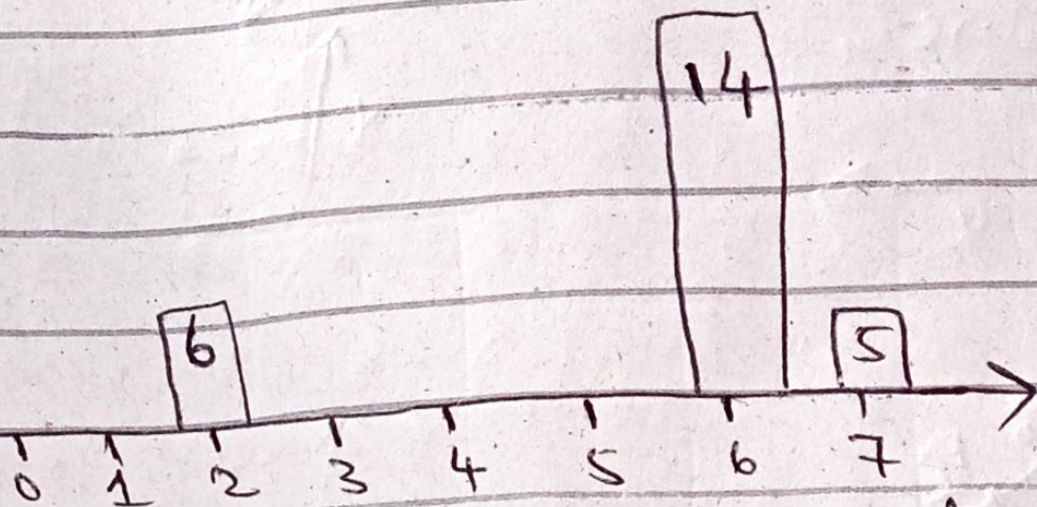
Pixels intensity level

— X —— X —