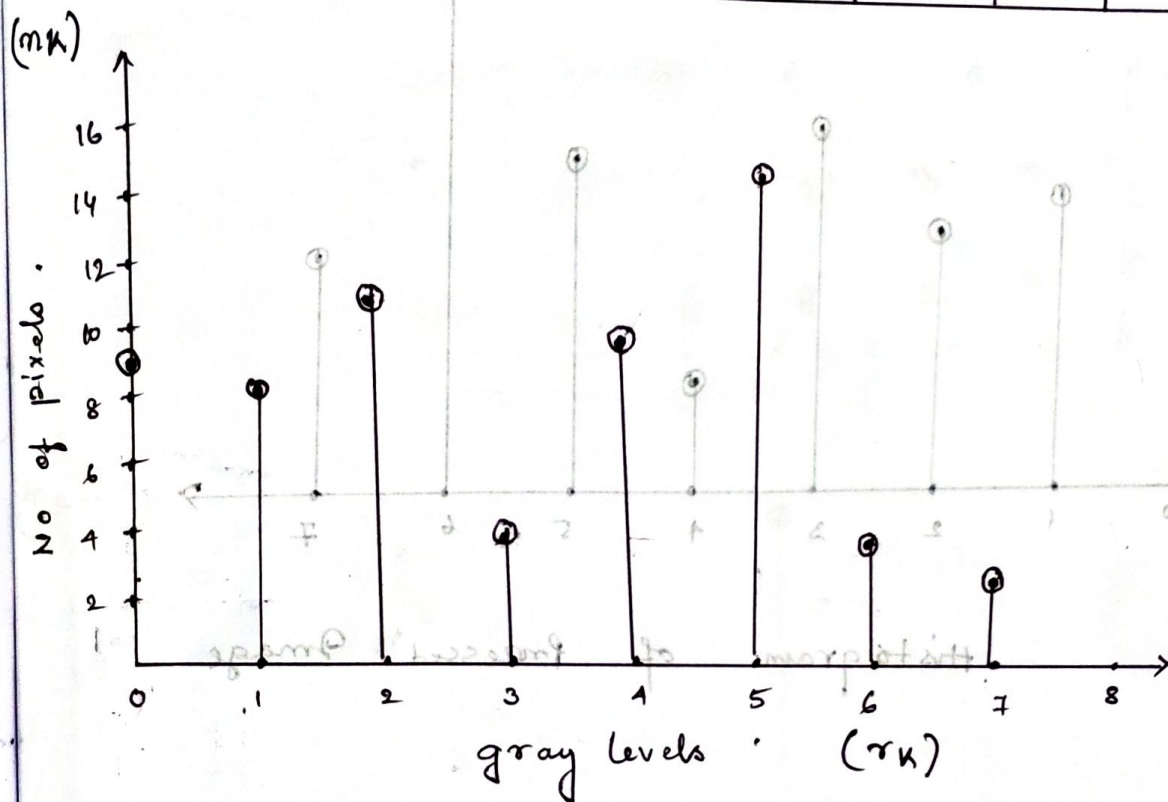


# ① Histogram Equalization

Perform histogram equalization for an 8x8 image shown below.

Gray levels	0	1	2	3	4	5	6	7
No of Pixels	9	8	11	4	10	15	4	3

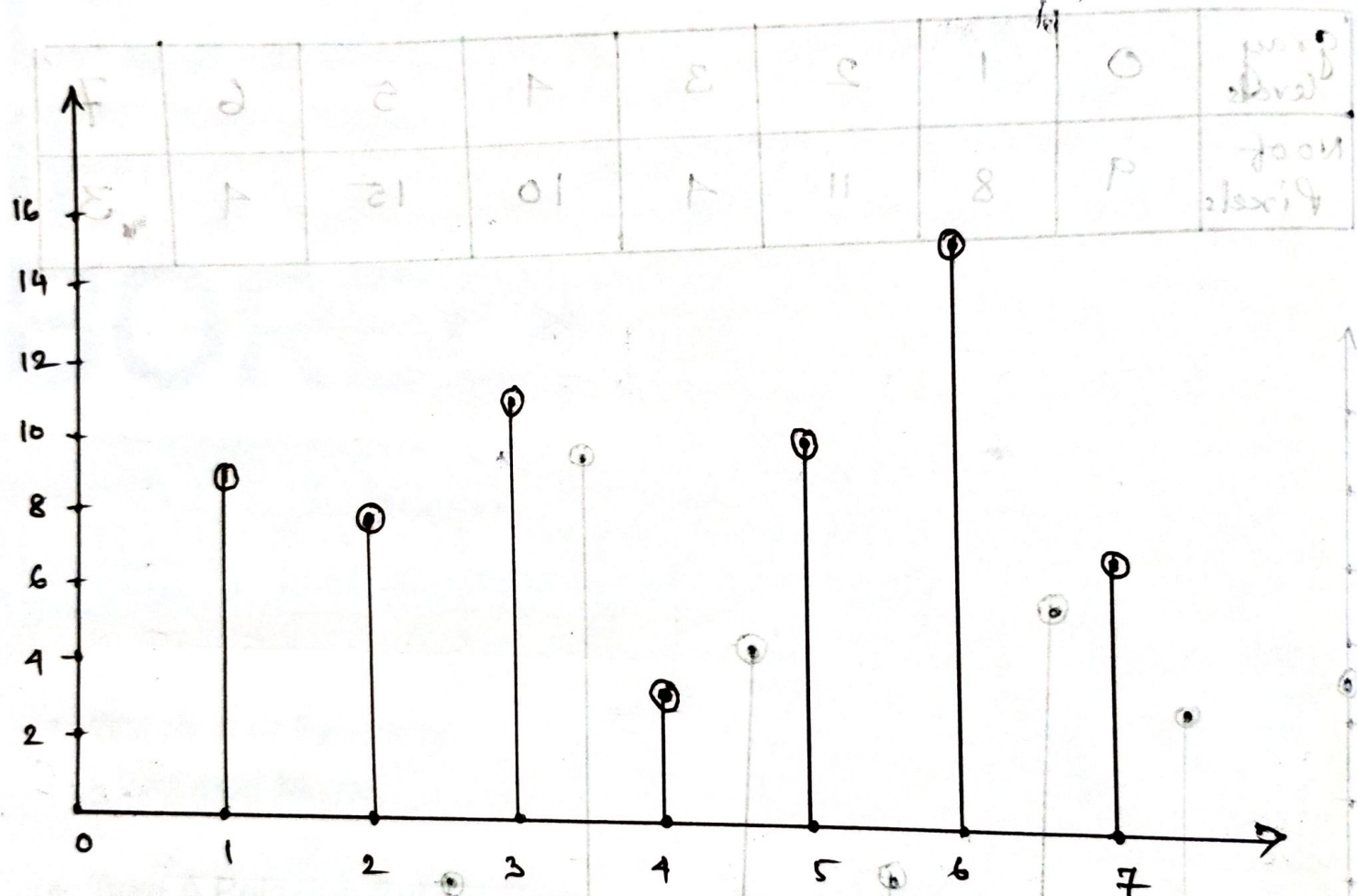


Histogram of Input Image.

Gray levels $r_k$	No of Pixels $n_k$	$P(r_k) = n_k/n$ (PDF)	$S_k$ CDF	$S_k \times 7$	histogram equalized level
0	9	0.141	0.141	0.987	1
1	8	0.125	0.266	1.862	2
2	11	0.172	0.438	3.066	3
3	4	0.0625	0.5005	3.5035	4
4	10	0.156	0.6565	4.5955	5
5	15	0.234	0.8905	6.2335	6
6	4	0.0625	0.953	6.671	7
7	3	0.047	1	1	7
$n = 64$					

# Histogram Equalization

Gray levels	1	2	3	4	5	6	7
No of pixels	9	8	11	4	16	15	7



Histogram of processed image

Histogram of input image

Gray level	No of pixels	$P(r) = \frac{n_r}{N}$	$CDF$	$2 \times CDF$
1	9	0.141	0.141	0.282
2	8	0.125	0.266	0.532



② Perform Histogram equalization for the following image.

$f(x,y)$

1	2	1	1	1
2	5	3	5	2
2	5	5	5	2
2	5	3	5	2
1	1	1	2	1

Max value = 5

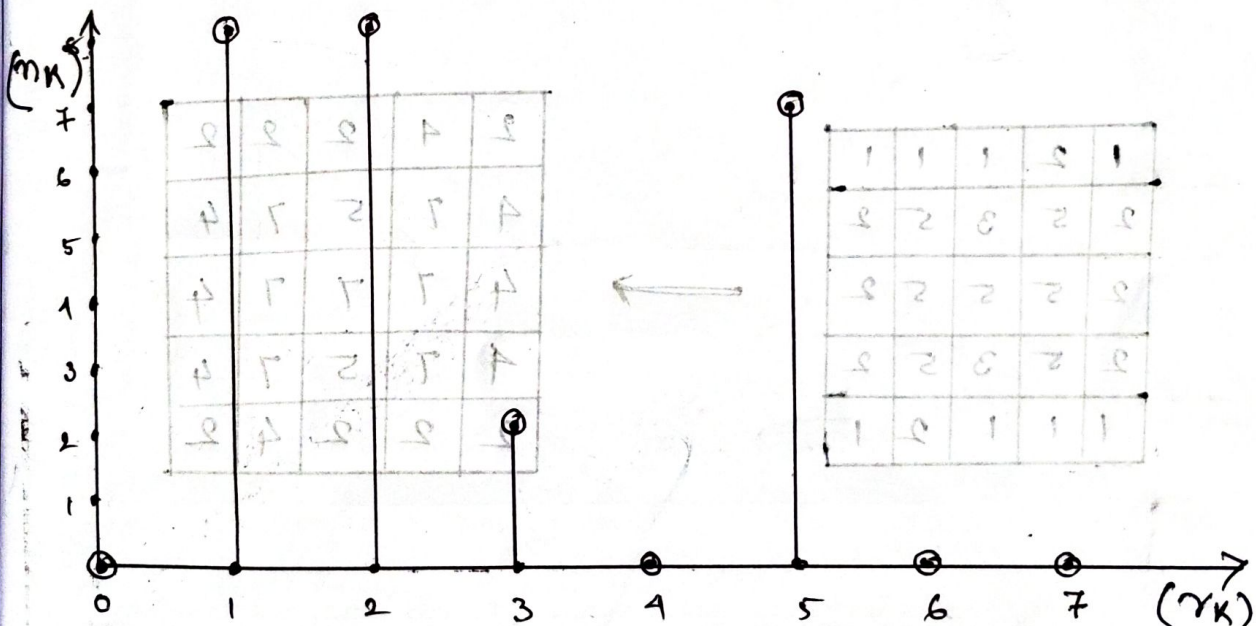
5 is of 3 bit

$$\therefore 2^3 = 8$$

$$L = 8 \quad L-1 = 7$$

Input Image

gray levels ( $r_k$ )	0	1	2	3	4	5	6	7
No of pixels ( $n_k$ )	0	8	8	2	0	7	0	0

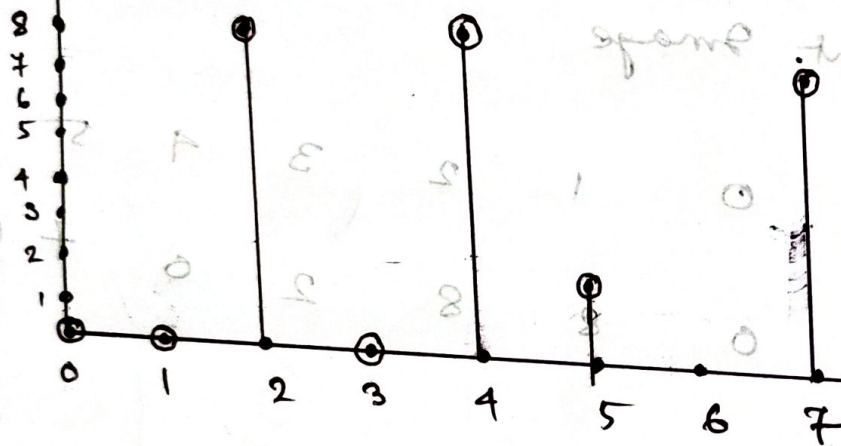


gray levels $r_k$	No of pixels ( $n_k$ )	$P_k = n_k/n$ (PDF)	SK CDF	SK $\times T$	Histogram Equalized Level
0	0	0	0	0	0
1	8	0.32	0.32	2.24	2
2	8	0.32	0.64	4.48	4
3	2	0.08	0.72	5.04	5
4	0	0	0.72	5.04	5
5	7	0.28	1	7	7
6	0	0	1	7	7
7	0	0	1	7	7

$n=25$

gray levels	0	2	4	5	7				
No of pixels	0	1	1	8	1	8	1	2	7

0	1	1	8	1
1	2	2	2	2
2	2	2	2	2
2	2	8	2	2
1	1	1	1	1



1	2	1	1	1
2	5	3	5	2
2	5	5	5	2
2	5	3	5	2
1	1	1	2	1



2	4	2	2	2
4	7	5	7	4
4	7	7	7	4
4	7	5	7	4
2	2	2	4	2

	5x5	2x2	5x5	4x4	4x4
0	0	0	0	0	0
1	10.0	10.0	10.0	10.0	10.0
2	10.0	10.0	10.0	10.0	10.0
3	10.0	10.0	10.0	10.0	10.0
4	10.0	10.0	10.0	10.0	10.0
5	10.0	10.0	10.0	10.0	10.0
6	10.0	10.0	10.0	10.0	10.0
7	10.0	10.0	10.0	10.0	10.0
8	10.0	10.0	10.0	10.0	10.0