

0	1	2	0
3	4	7	2
2	5	6	3
0	3	4	0

Consider the above 3-bit input image of size 4 x 4. The histogram equalized image is computed as follows.

r_k (gray levels)	n_k (histogram)	$p_r(r_k) = n_k/MN$ (normalized histogram)	$\sum_{j=0}^k p_r(r_j)$ (cumulative normalized histogram)	$s_k = (L-1) \sum_{j=0}^k p_r(r_j)$ (transformed gray levels rounded to nearest integer)
0	4	0.25	0.25	1.75 -> 2
1	1	0.0625	0.3125	2.1875 -> 2
2	3	0.1875	0.50	4
3	3	0.1875	0.6875	5
4	2	0.125	0.8125	6
5	1	0.0625	0.875	6
6	1	0.0625	0.9375	7
7	1	0.0625	1	7

Here, $L-1 = 7$

Discrete values:

$$s_k = T(r_k) = (L-1) \sum_{j=0}^k p_r(r_j)$$

Now replacing the r_k values in the input image above by the corresponding s_k values, we get the histogram equalized image as follows.

2	2	4	2
5	6	7	4
4	6	7	5
2	5	6	2