

(2.)

⇒ soln: Histogram Equalization:

|   |   |   |   |
|---|---|---|---|
| 3 | 2 | 4 | 5 |
| 1 | * | 1 | 2 |
| 7 | 3 | 1 | 2 |
| 7 | 6 | 4 | * |

\* = last ~~to~~ two digits of my  
roll number (171347)

\* = 47 i.e. 4 & 7

|   |   |   |   |
|---|---|---|---|
| 3 | 2 | 4 | 5 |
| 1 | 4 | 1 | 2 |
| 7 | 3 | 1 | 2 |
| 7 | 6 | 4 | 7 |

Now,

|                         |   |   |   |   |   |   |   |   |
|-------------------------|---|---|---|---|---|---|---|---|
| Gray level ( $r_k$ )    | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| No. of pixels ( $n_k$ ) | 0 | 3 | 3 | 2 | 3 | 1 | 1 | 3 |

Then,

| $x_k$ | $n_k$ | Pdf    | Cdf    | $S_k = (L-1) \text{Cdf}$<br>$= 7 \times \text{Cdf}$ | New<br>$n_k$ |
|-------|-------|--------|--------|---|--------------|
| 0     | 0     | 0      | 0      | 0   | 0            |
| 1     | 3     | 0.1875 | 0.1875 | $1.3125 \sim 1$                                     | 3            |
| 2     | 3     | 0.1875 | 0.375  | $2.625 \sim 3$                                      | 3            |
| 3     | 2     | 0.125  | 0.5    | $3.5 \sim 4$  | 2            |
| 4     | 3     | 0.1875 | 0.6875 | $4.8 \sim 5$  | 4            |
| 5     | 1     | 0.0625 | 0.75   | $5.25 \sim 5$                                       |              |
| 6     | 1     | 0.0625 | 0.8125 | $5.69 \sim 6$                                       | 1            |
| 7     | 3     | 0.1875 | 1      | 7   | 3            |

$$(\sum n_k = 16)$$

Finally, After Histogram Equalization, we get .

|   |   |   |   |      |   |   |   |   |
|---|---|---|---|------|---|---|---|---|
| 3 | 2 | 4 | 5 | H.E. | 3 | 2 | 5 | 5 |
| 1 | 4 | 1 | 2 |      | 1 | 5 | 1 | 2 |
| 7 | 3 | 1 | 2 |      | 7 | 3 | 1 | 2 |
| 7 | 6 | 4 | 7 |      | 7 | 6 | 5 | 7 |

And the new equalized Histogram is

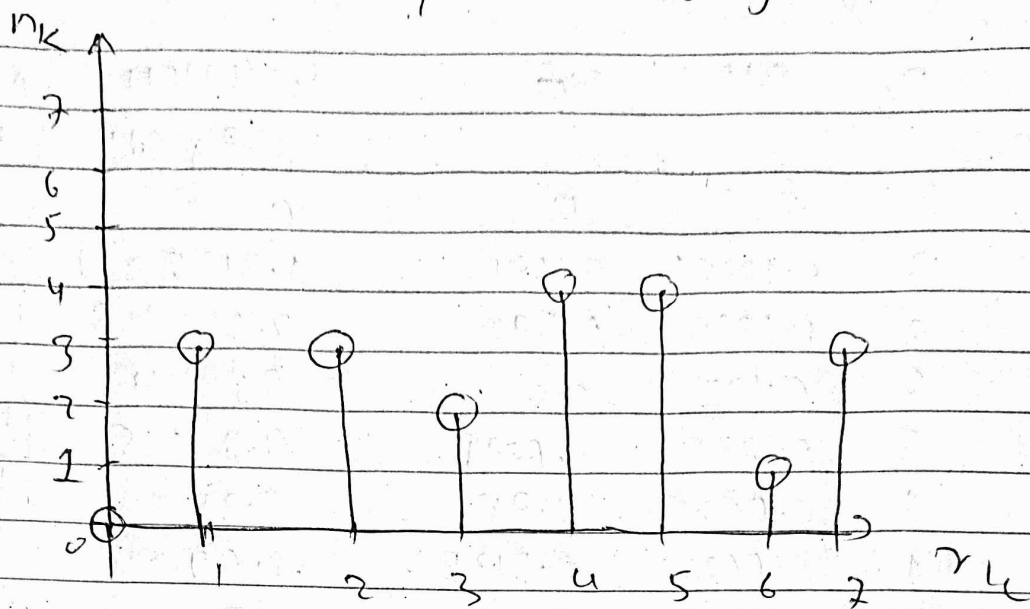


fig: Equalized Histogram