```
clc;
clear;
close all;

% ------------------ Input Image (8x8 Matrix) ------------------
I = [52 55 61 59 79 61 76 61;
     62 59 55 104 94 85 59 71;
     63 65 66 113 144 104 63 72;
     64 70 70 126 154 109 71 69;
     67 73 68 106 122 88 68 68;
     68 79 60 70 77 66 58 75;
     69 85 64 58 55 61 65 83;
     70 87 69 68 65 73 78 90];

I = uint8(I);   % Convert to uint8

% ------------------ Step 1: Histogram Calculation ------------------
[counts, grayLevels] = imhist(I);

% ------------------ Step 2: PDF Calculation ------------------
numPixels = numel(I);
pdf = counts / numPixels;

% ------------------ Step 3: CDF Calculation ------------------
cdf = cumsum(pdf);

% ------------------ Step 4: Normalize CDF ------------------
L = 256;  % Number of gray levels
cdf_norm = round((L - 1) * cdf);

% ------------------ Step 5: Intensity Mapping ------------------
I_eq = zeros(size(I), 'uint8');

for i = 1:numel(I)
    I_eq(i) = cdf_norm(I(i) + 1);
end

% ------------------ Step 6: Display Results ------------------
figure('Name','Histogram Equalization Without histeq');

subplot(2,2,1);
imshow(I);
title('Original Image');

subplot(2,2,2);
imhist(I);
title('Original Histogram');

subplot(2,2,3);
imshow(I_eq);
title('Equalized Image');
```

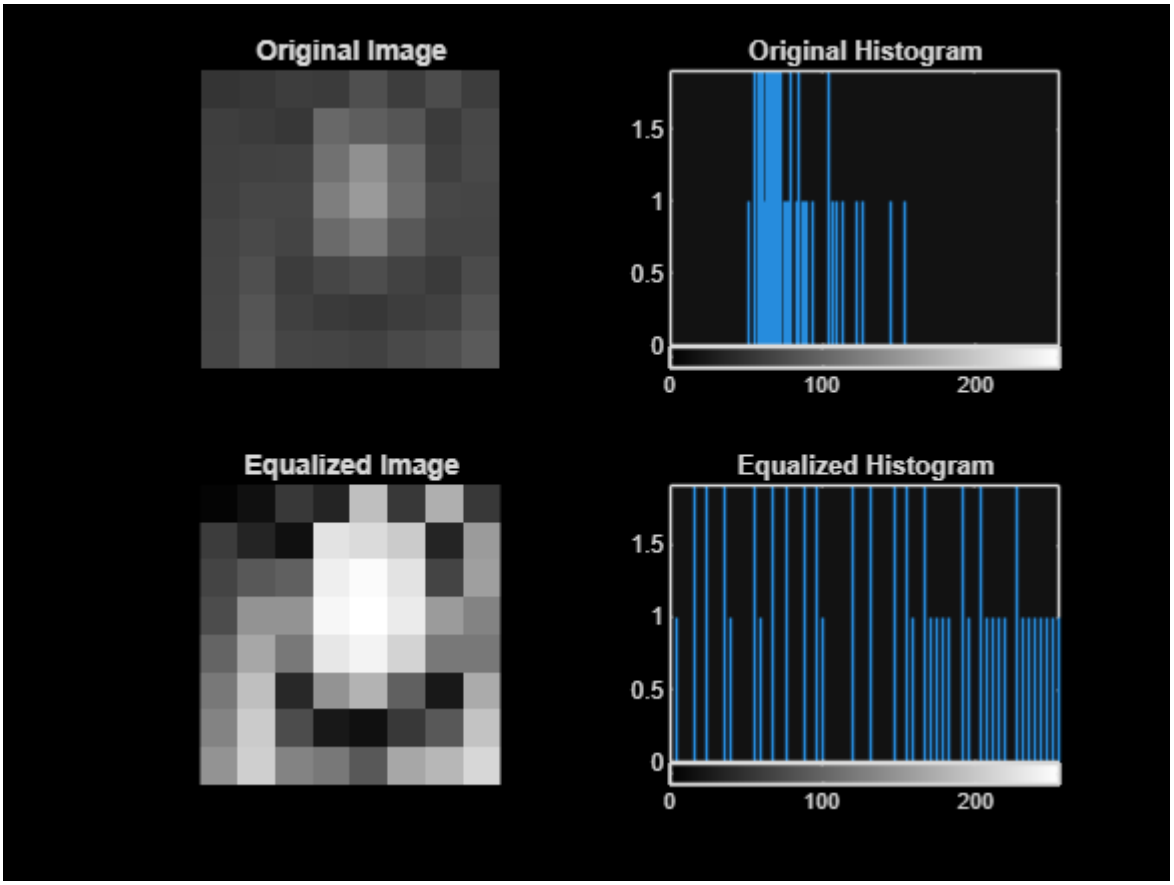
```
subplot(2,2,4);
imhist(I_eq);
title('Equalized Histogram');

% ------------------ Display Output Matrix ------------------
disp('Original Matrix:');
disp(I);

disp('Histogram Equalized Matrix:');
disp(I_eq);
```

```
Original Matrix:
    52    55    61    59    79    61    76    61
    62    59    55   104    94    85    59    71
    63    65    66   113   144   104    63    72
    64    70    70   126   154   109    71    69
    67    73    68   106   122    88    68    68
    68    79    60    70    77    66    58    75
    69    85    64    58    55    61    65    83
    70    87    69    68    65    73    78    90

Histogram Equalized Matrix:
     4    16    56    36   191    56   175    56
    60    36    16   227   219   203    36   155
    68    88    96   239   251   227    68   159
    76   147   147   247   255   235   155   131
   100   167   120   231   243   211   120   120
   120   191    40   147   179    96    24   171
   131   203    76    24    16    56    88   195
   147   207   131   120    88   167   183   215
```



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