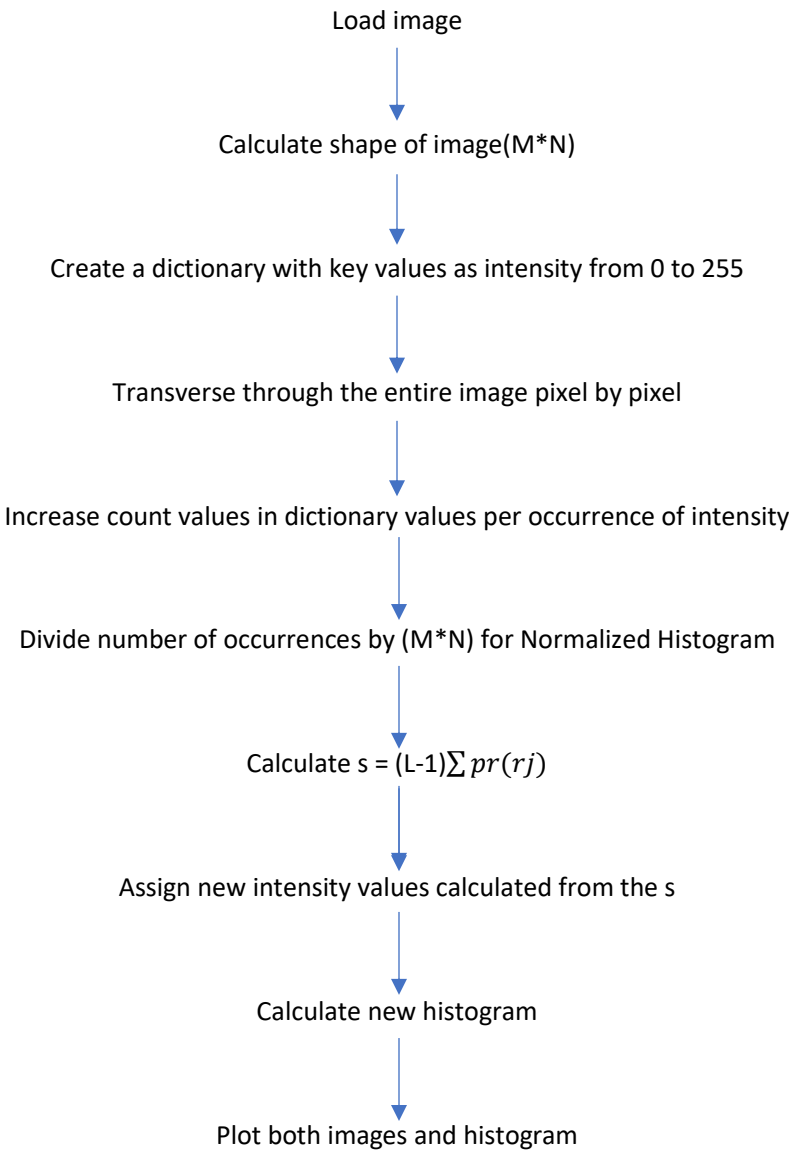
Assignment 1

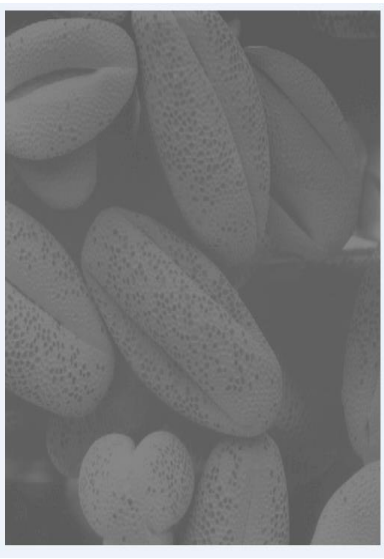
Q1. Histogram equalization

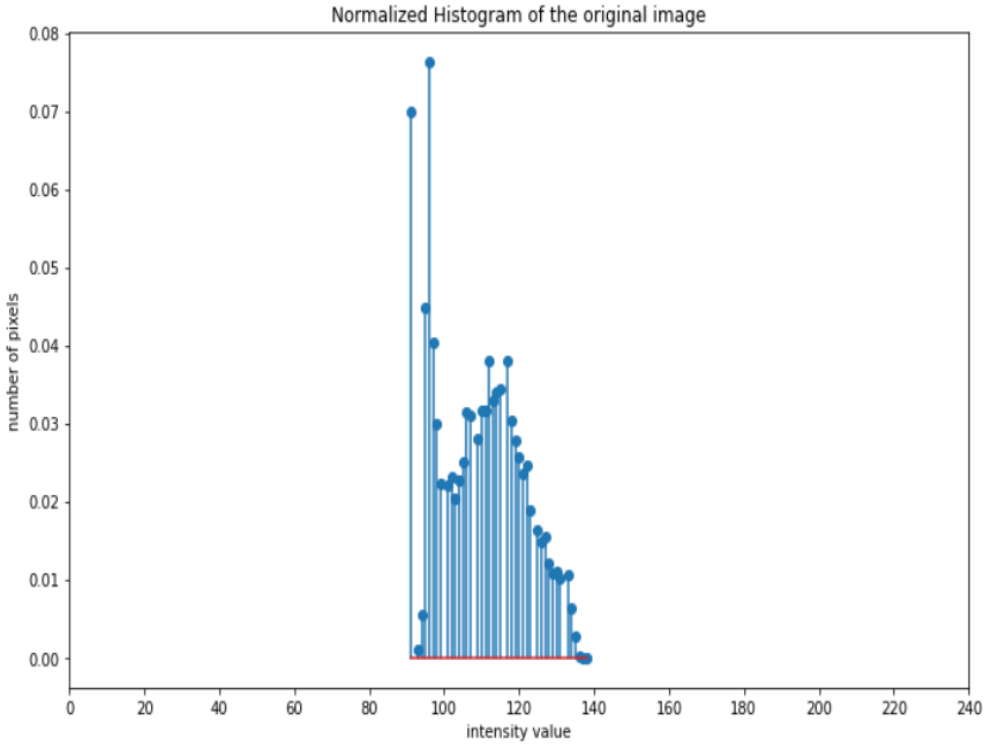
Ans: Algorithm:



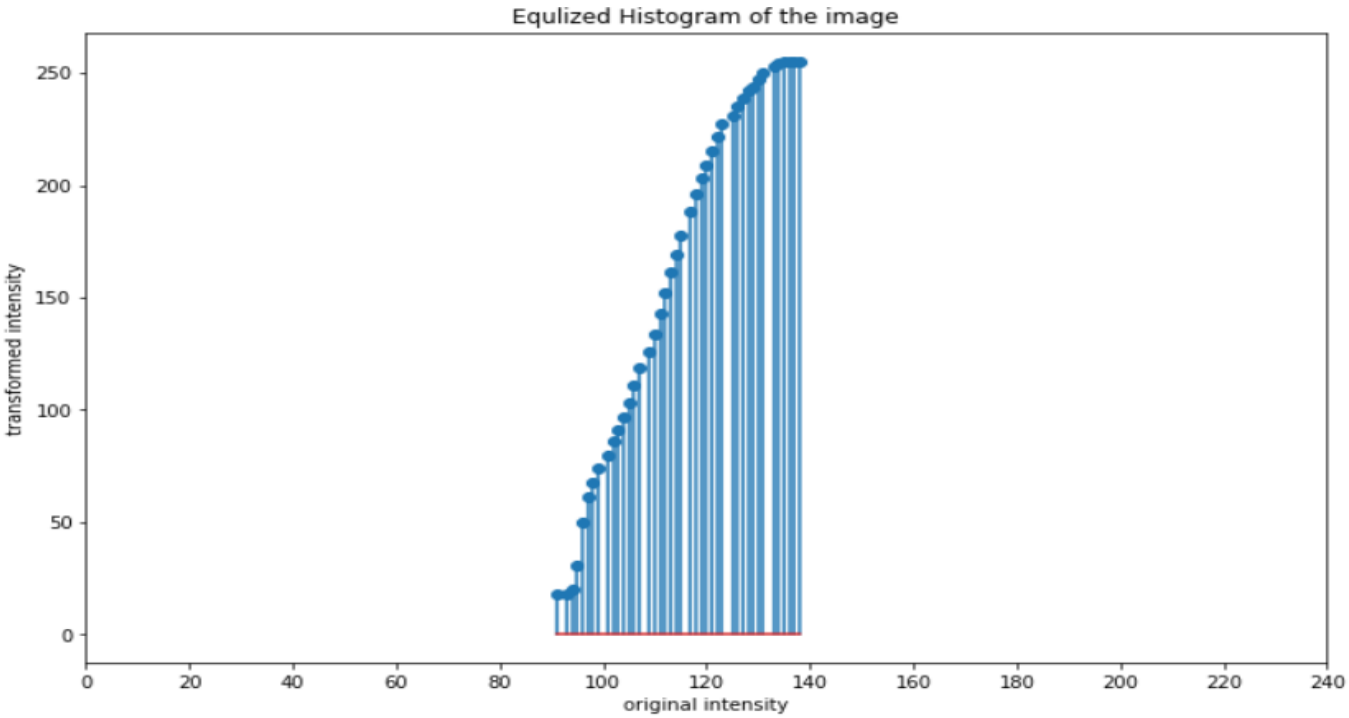
Output:

a) The original image is low contrast and so the original histogram is located at middle of intensity spectrum.

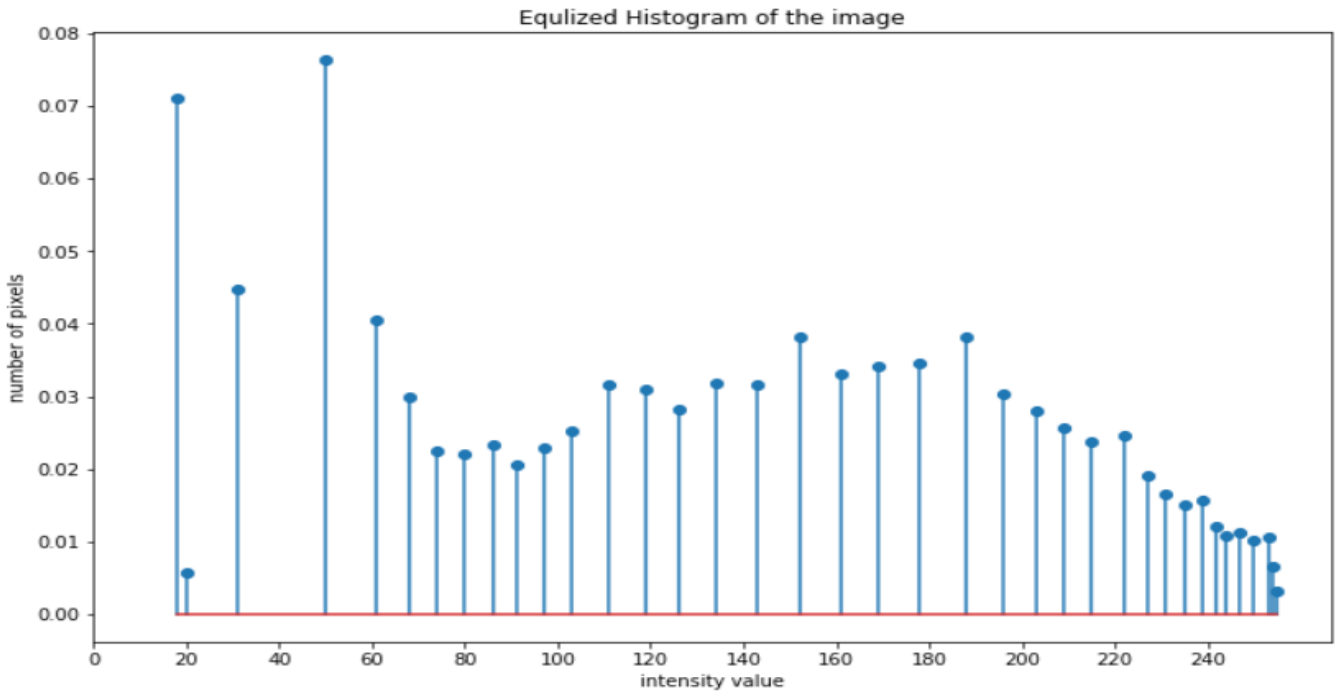




The histogram transformation function is a monotonic increasing function.

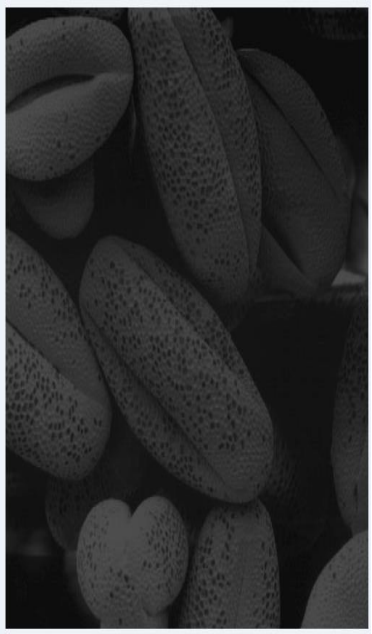


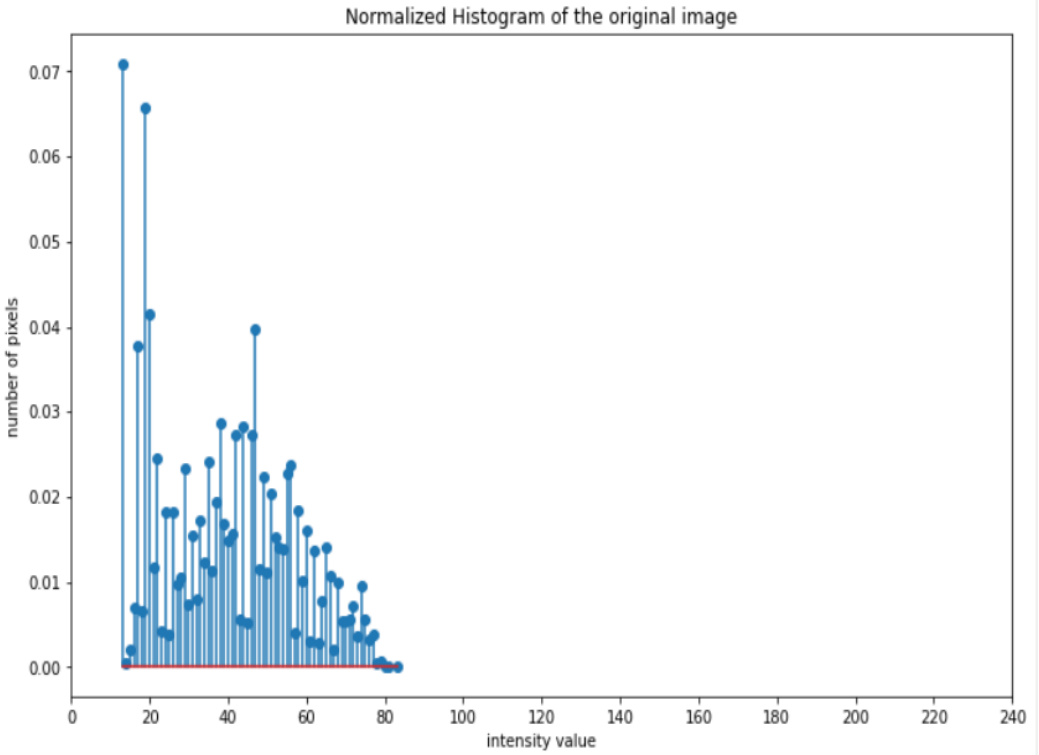
So, the original histogram is now transformed with above function resulting in more uniform histogram leading to better contrast and grey tones.



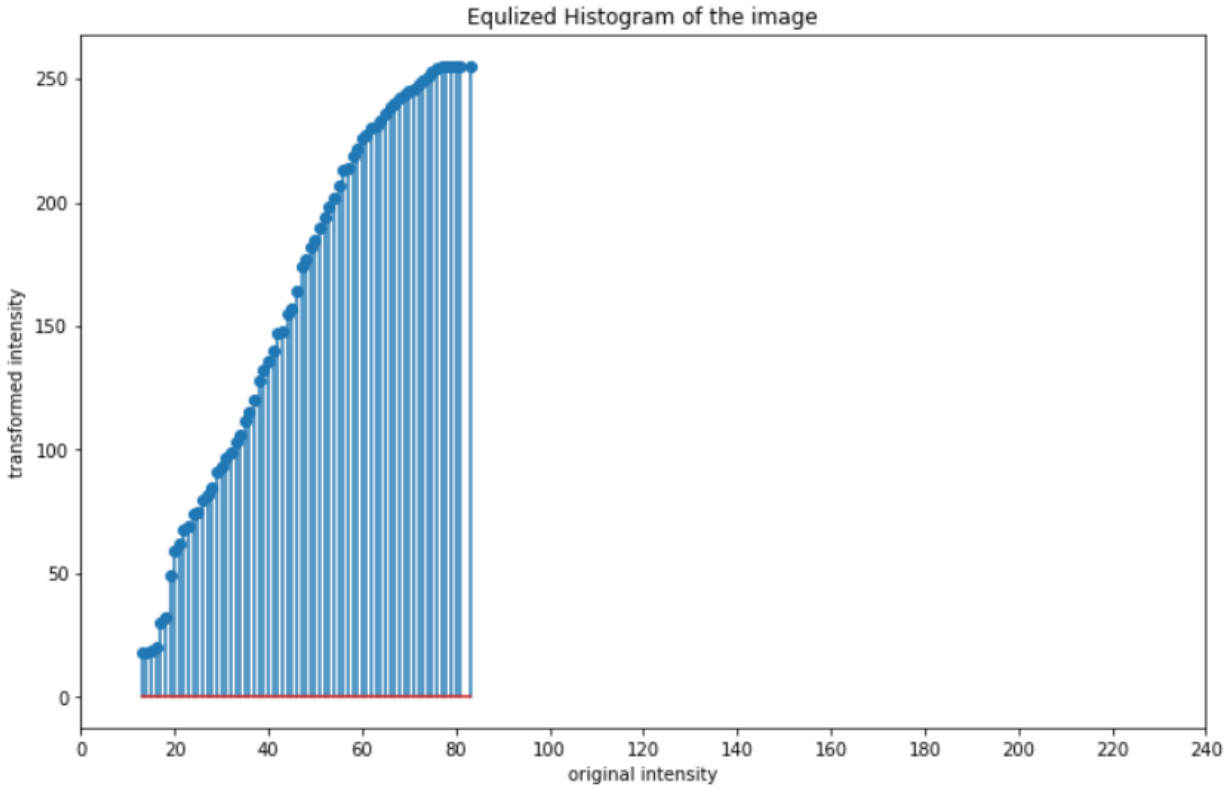
Final image:

b) The original image is dark and so the original histogram is located at end of intensity spectrum.

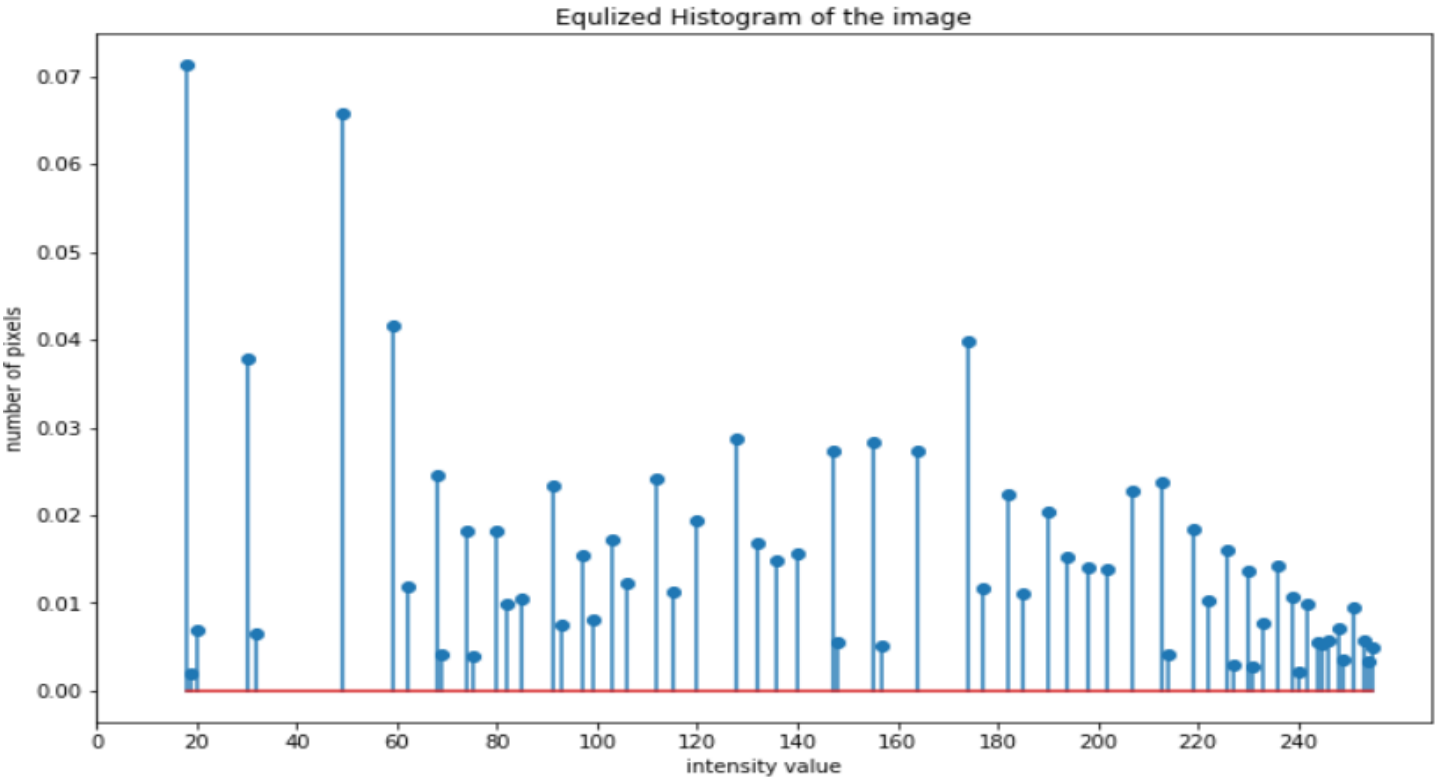




The histogram transformation function is a monotonic increasing function.

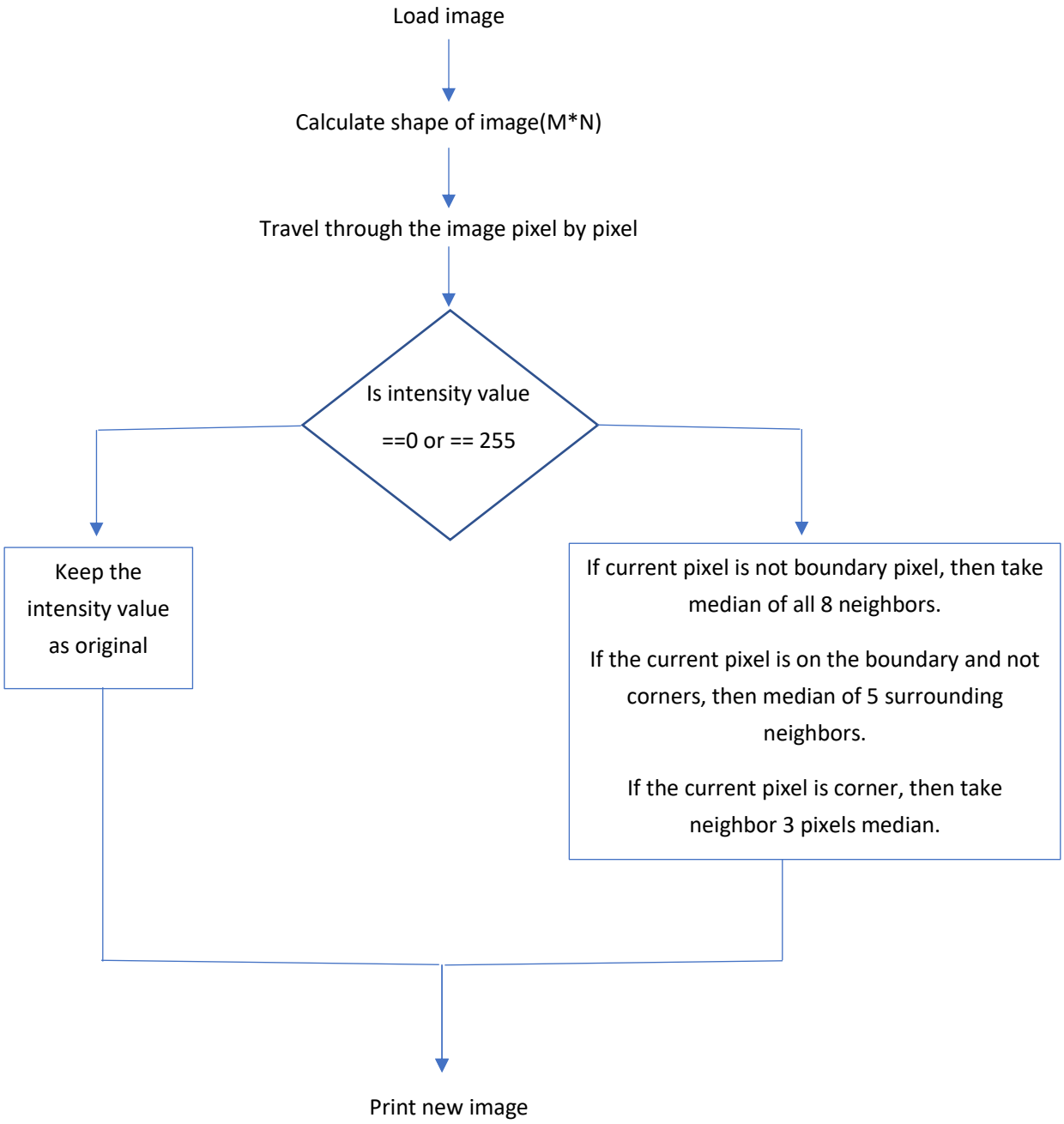


Output histogram is transformed and results into uniform spectrum intensity thus with good brightness and contrast.



Final Image:

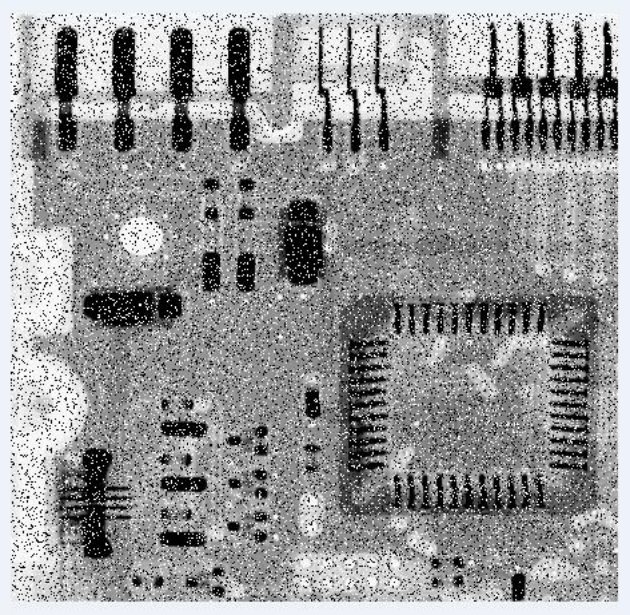
Q2. Write a program to reduce the salt-and-pepper noise in the image below (sp.tif)



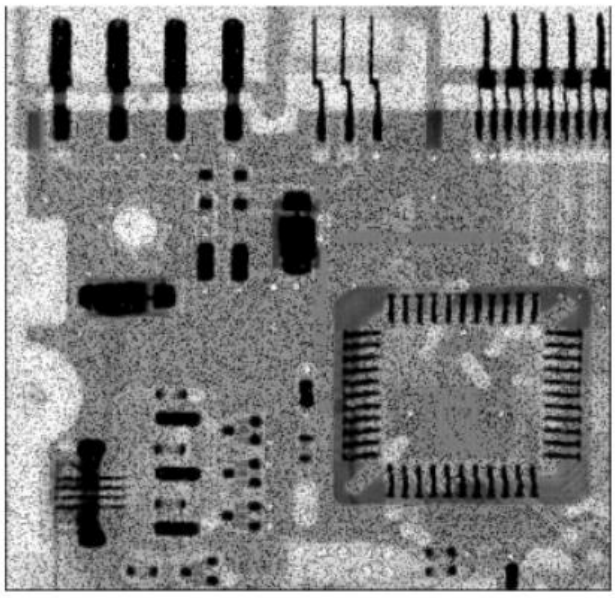
Out of curiosity I created mean and mode filters as well. Mode filer did not perform well as in many cases all the values of neighbors were same. For mean filter the result image had improvements compared to original but median filter performed the best.

Output:

Original Image: Salt and Pepper error is the black and white spots on the image which can be reduced by filter which replaces these pixels with median value from neighbors.



Output Image: Median Filter gives a smoother image.



Output image: Mean filter