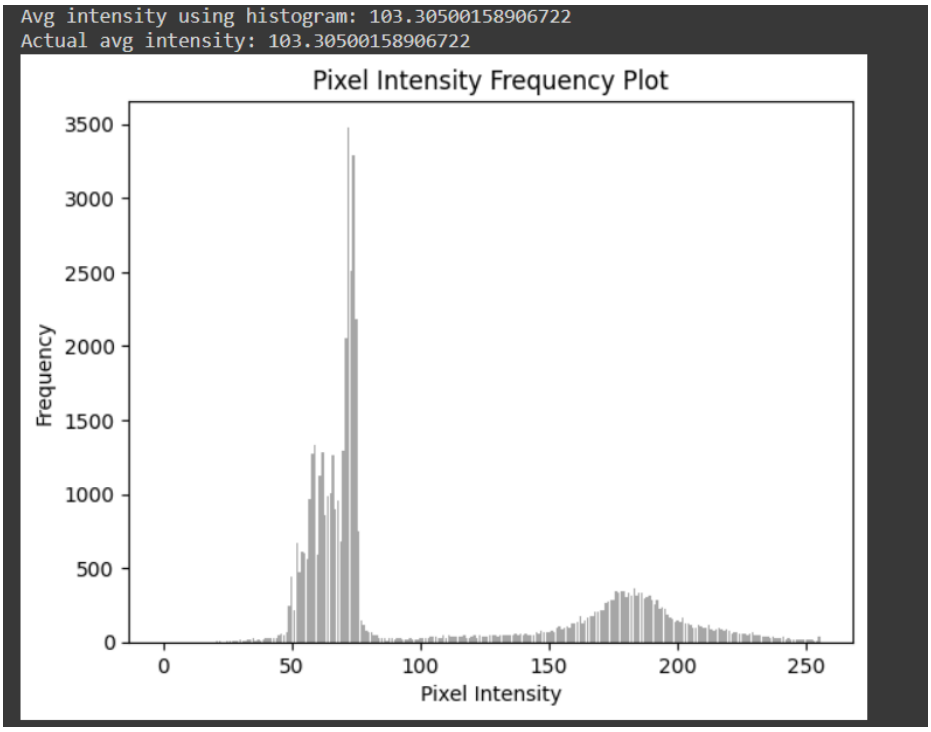
ASSIGNMENT-1

Bhikshapathi

06-18-01-10-51-24-1-24489

PROBLEM-1

OUTPUT RESULT:



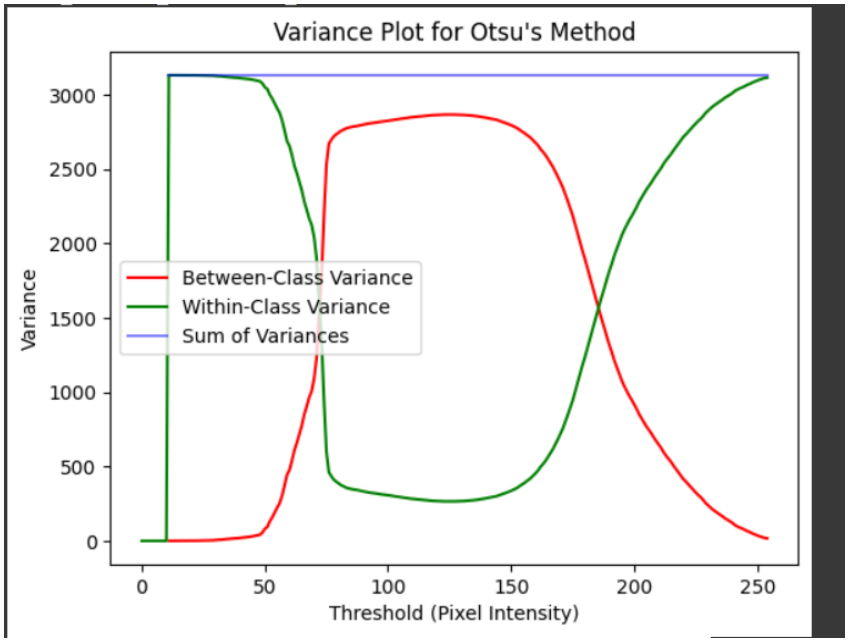
- Most pixel intensities are concentrated in the lower range with a sharp peak around intensity values of 30 to 50, which says the image might be darker in that intensity.
- We see second class of intensities in range 150 –200, which might produce bright image
- The computed average pixel intensity using the histogram, and the actual average intensity are both approximately **103.31.**

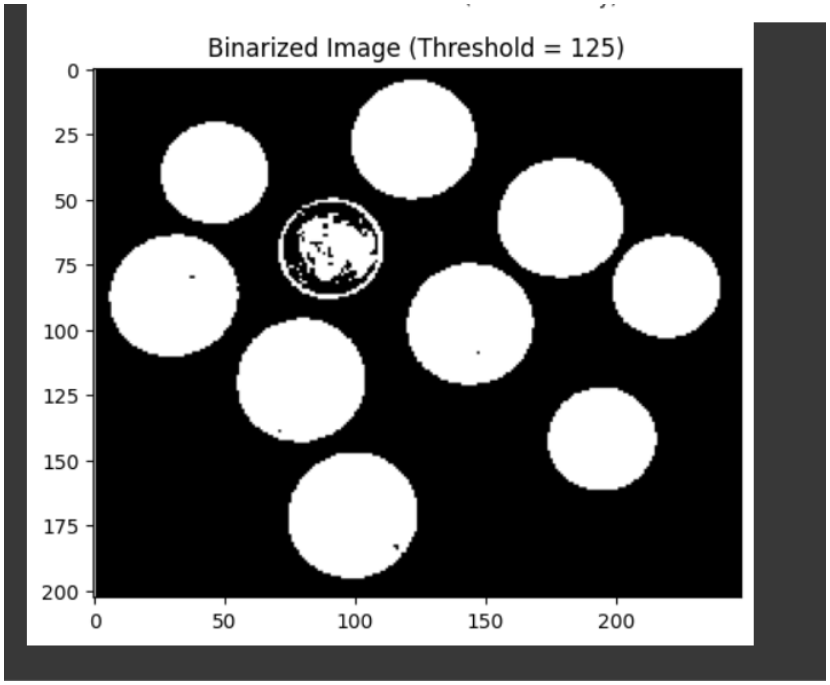
PROBLEM-2

- The code implements Otsu's thresholding method, which determines the optimal threshold for binarizing an image by minimizing the within-class variance (green line) and maximizing the between-class variance (red line).
- This method will find the threshold intensity that could divide the intensities into two classes, one with bright (255) and dark (0) intensity.
- The **between-class variance** (red curve) increases sharply and reaches a peak around optimal threshold and then decreases.

- The **within-class variance** (green curve) decreases smoothly and reaches threshold and then increases.
- Total variances remain constant (sum of both with-in and between-class)
- We see that the threshold intensity binarizes the image into two perfectly divided classes.

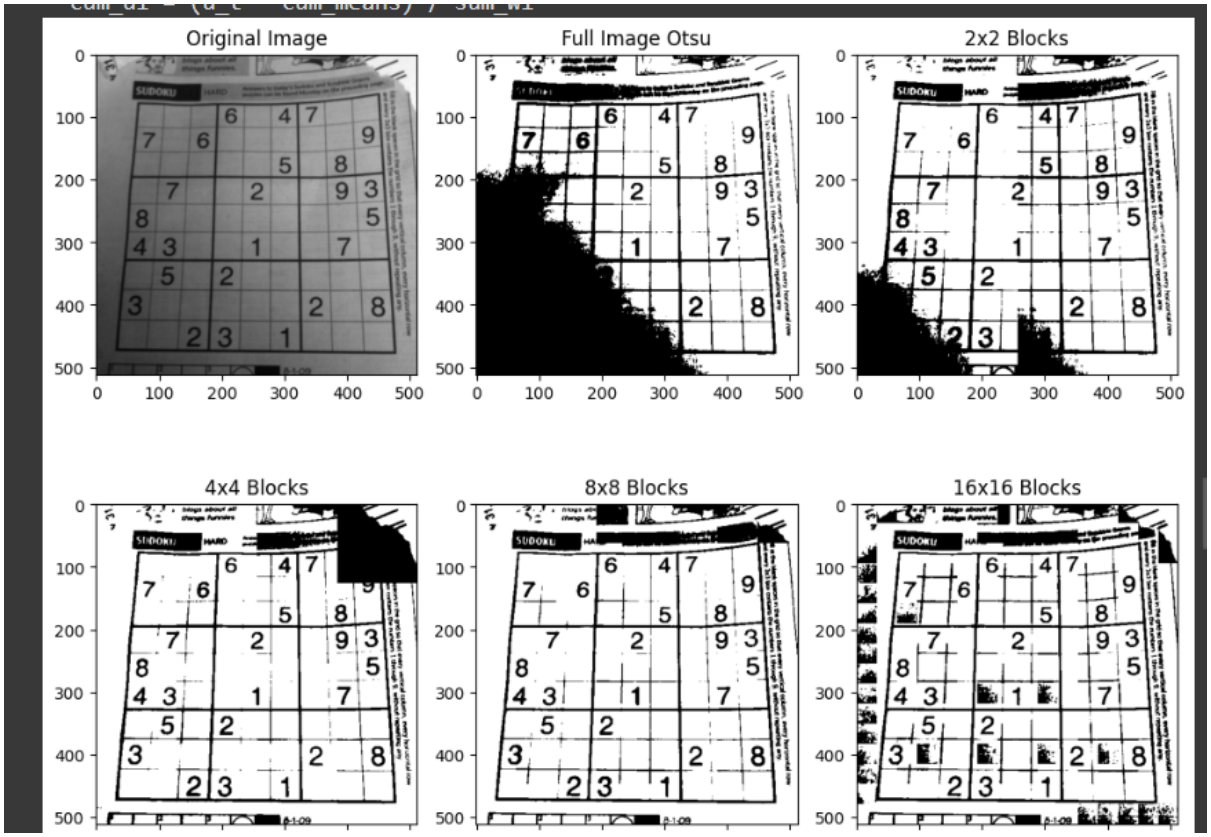
OUTPUT RESULT:





QUESTION-3

OUTPUT RESULT:



- FULL IMAGE Otsu: We can see uncleared binarized image due large shadows that makes algorithm to biased towards dark intensity.
- As we increase the number of blocks as 2 *2 or 4*4 we can see a better version of the image, which reduces the shadows and some biases.
- In 8*8 blocks we see a perfectly binarized image as it clearly binarizes every block by reducing noise and shadows.
- In 16*16 blocks binarize adds some noise due to overfitting of the algorithm
- In conclusion we can say we get a better version of the binarized image, if we do block by block binarization. And as blocks increase, we get a better version of the image, and the image quality drops after reaching a certain limit of number of blocks.

QUESTION-4

- We see that the algorithm will find 68 unique characters, but after excluding outlier (punctuation parks and background) we get 64 unique characters
- We use simple 8-neighbour connectivity algorithms

OUTPUT RESULTS: