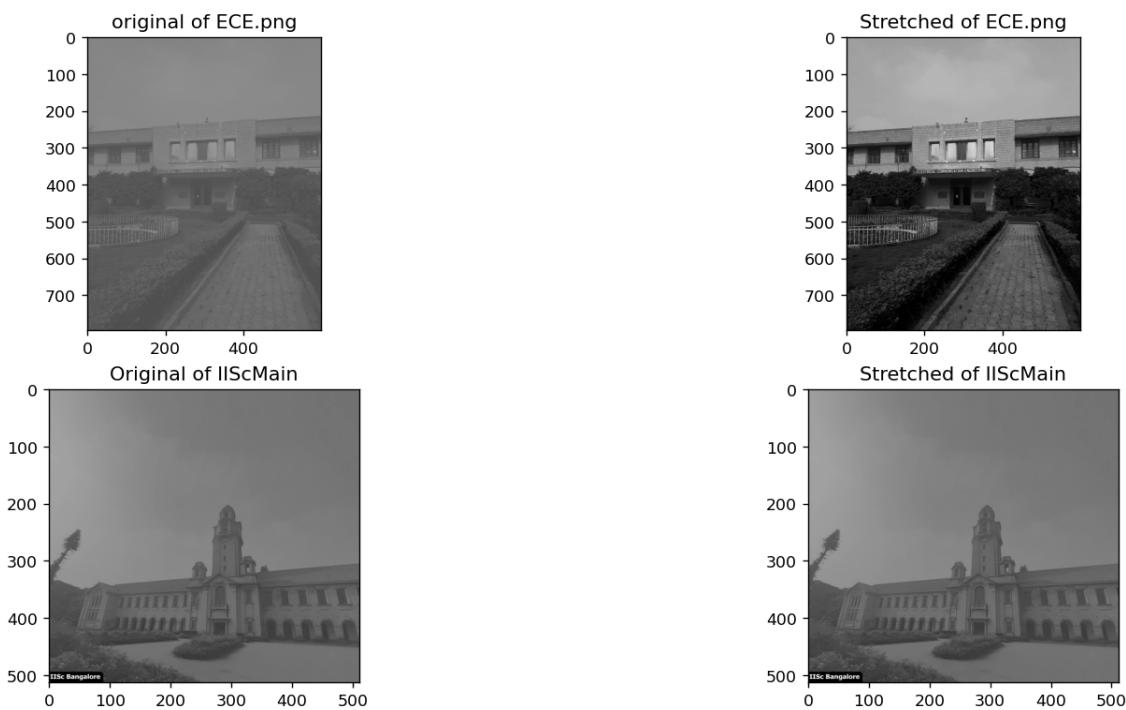
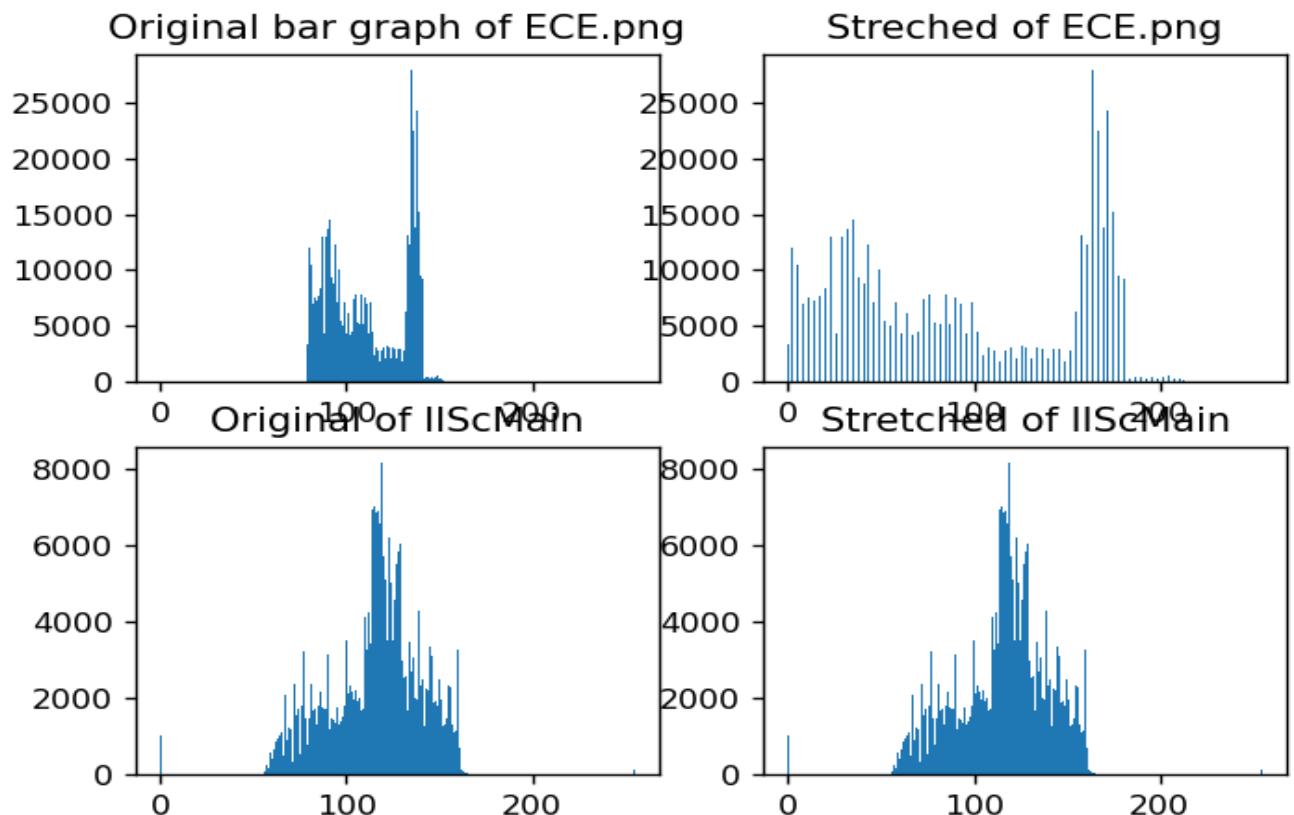


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Assignment - 2

Note :

1. To run the code first extract the zip file and then open wrapper.py. After running wrapper.py it will ask you for a one-digit input from 1- 3
2. To run the first program enter 1 and for the second program enter 2 and so on.
3. I have used Visual studio code to write code, and the codes are working properly on VS code and may cause some errors on different IDEs having different versions of prerequisites.
4. Codes contain explicit for loop( We are not allowed to use always inbuilt function), so it may take some time to reflect output. Waiting time will reflect after running each program. Please wait till the reflected time on the screen to see the output.

Q.1 (a). Full-scale contrast stretching works on the ECE.png but does not work on IIScMain.png. If we see the histogram of ECE.png then the maximum pixel value is not 255 and we can stretch it. After stretching the quality of the image increased. But in the case of IIScMain.png, its maximum pixel value is around 255 and the lowest value is around 0. Hence it is already stretched to the maximum value. So contrast enhancement will not work on this. All though the count of these types of pixels having values near 255 and 0 is less they do exist. And contrast stretching only spread the pixels between 0-255, but in the case of IIScMain.png, it is already spread.

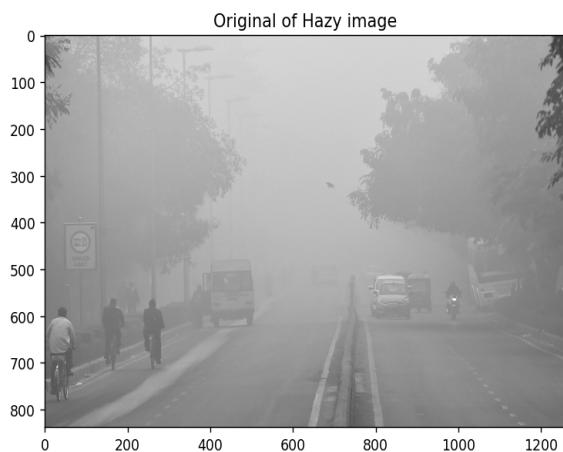
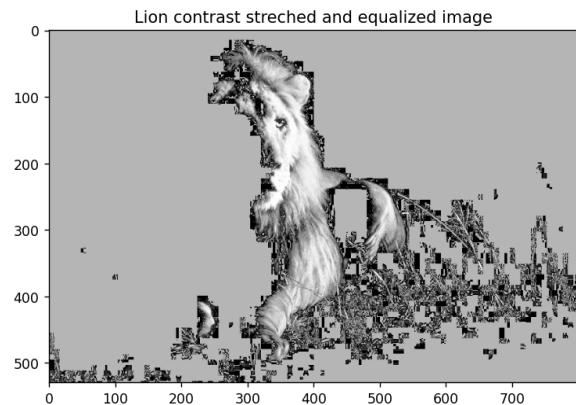
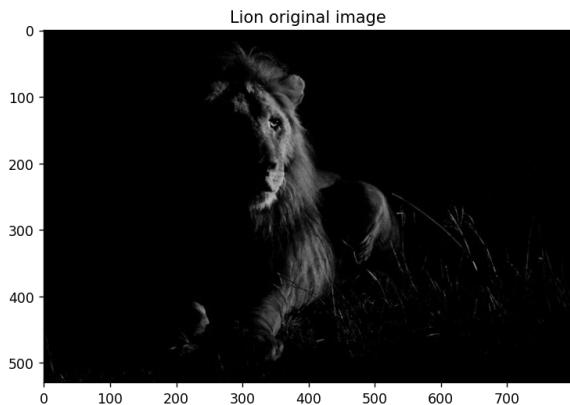


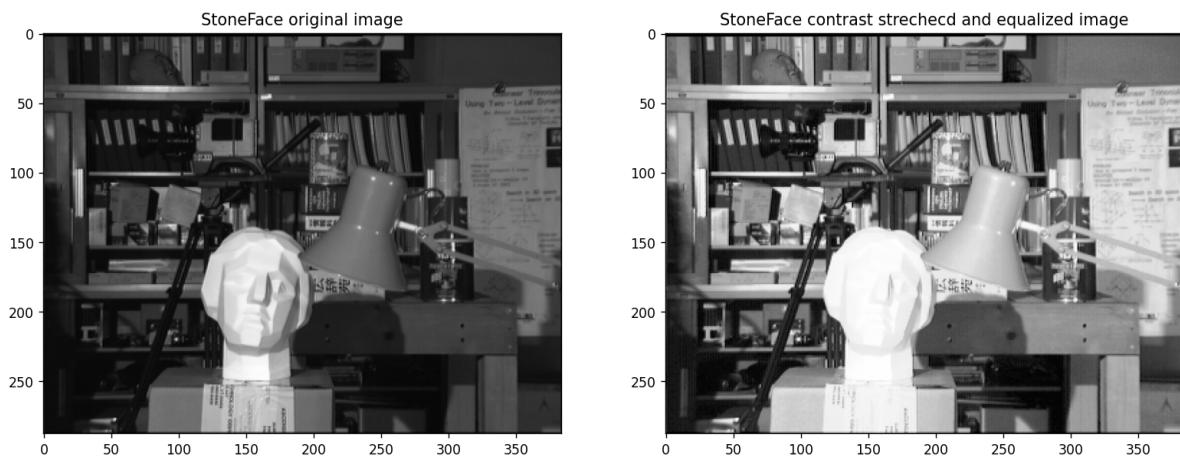
Q. 1 (b) Histogram Equalization: First I have done contrast stretching and the equalization to get better output( As told by Sir in class).

(i) The major portion of the lion.png image is dark and the minor portion is light. Through histogram equalization, boundary pixels get affected by bright pixels and it is showing some weird shape.

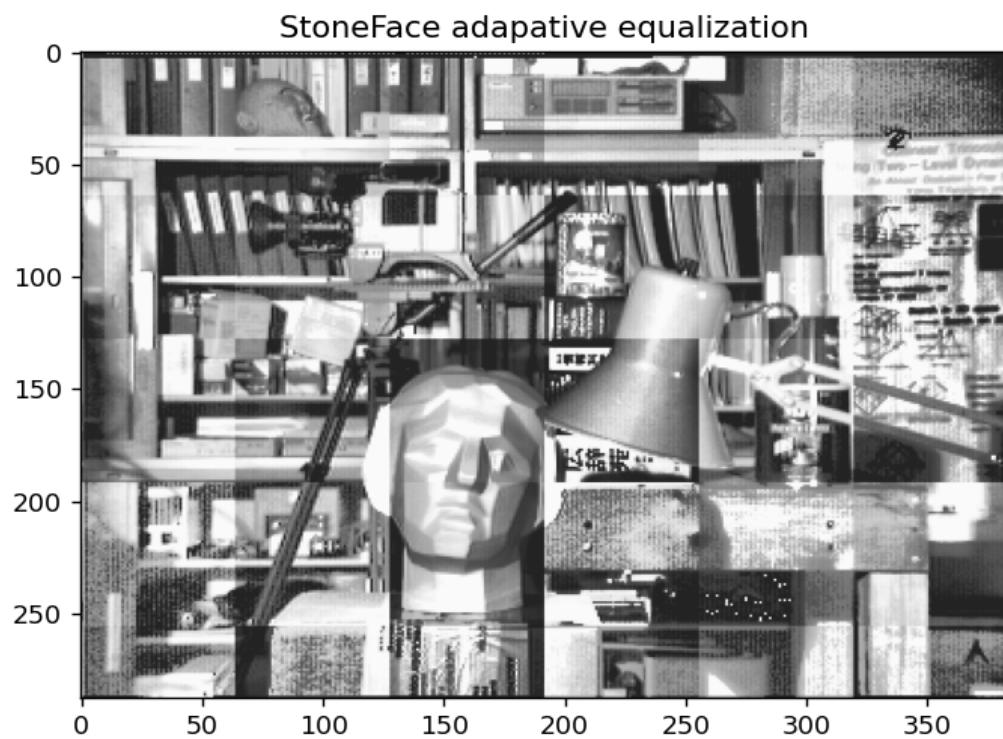
(ii) Hazy.png contains noise in enough amount and direct equalization will not work in this picture. By the observation you can see the pixels have the almost same level of intensity throughout the image, hence first do stretching and then equalization.

(iii) Stretching and equalization both are working well in the case of StoneFace.png.

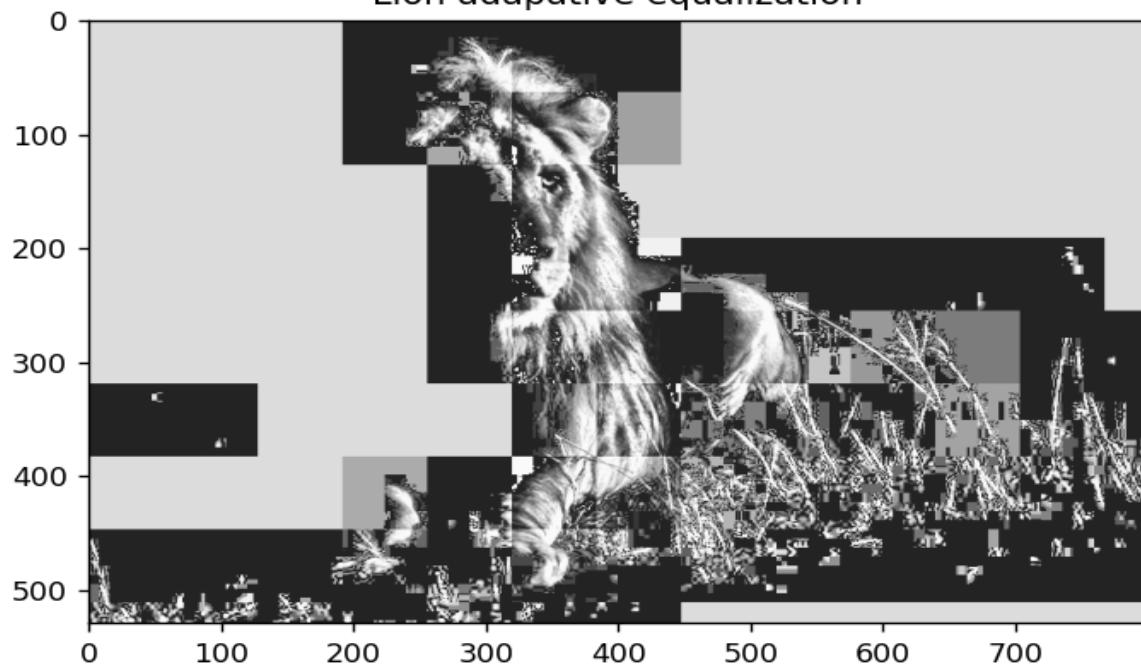




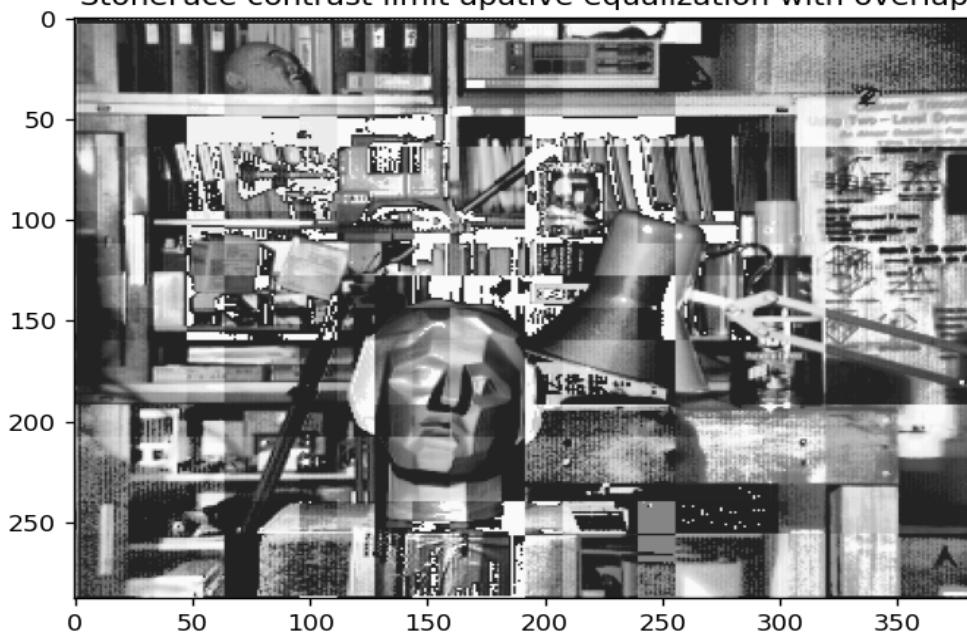
Q. 1(c)

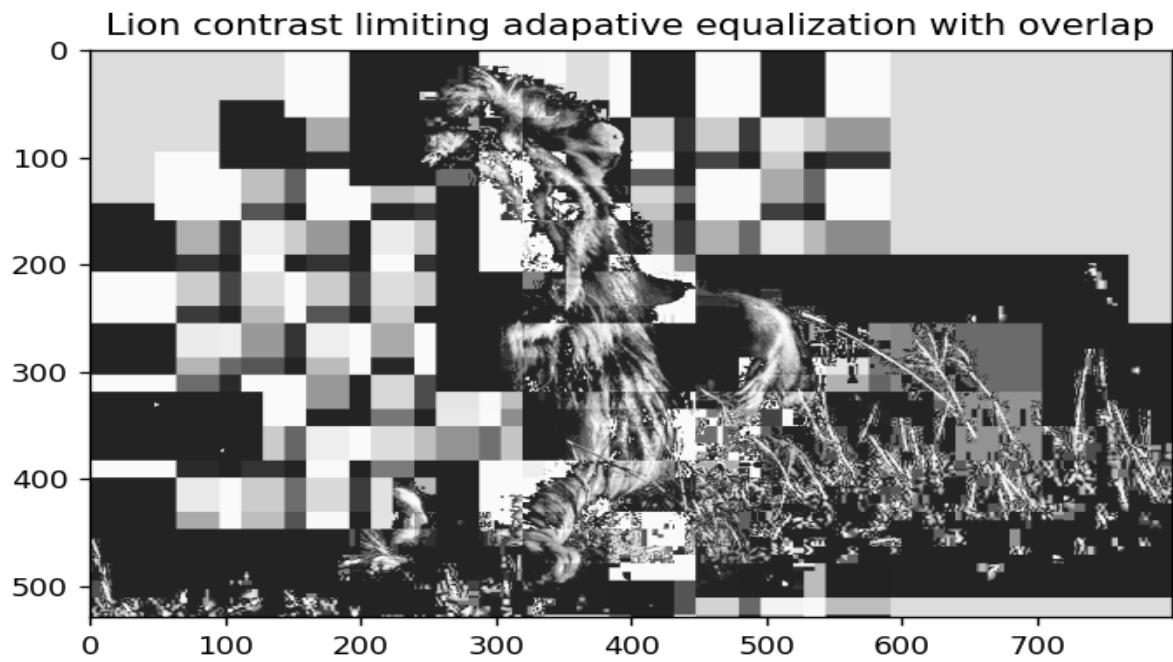


Lion adaptative equalization

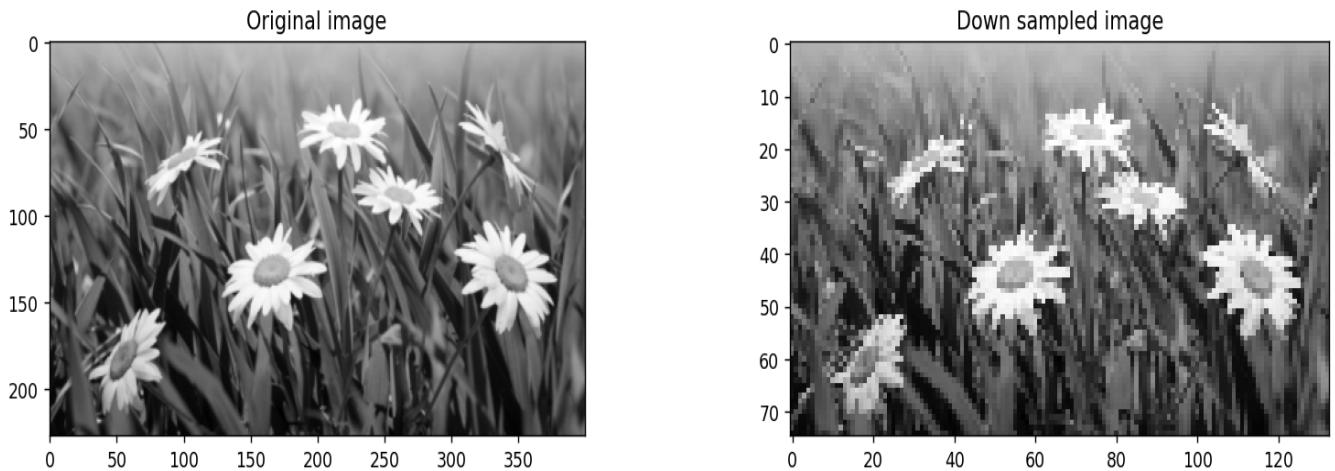


StoneFace contrast limit adaptive equalization with overlap

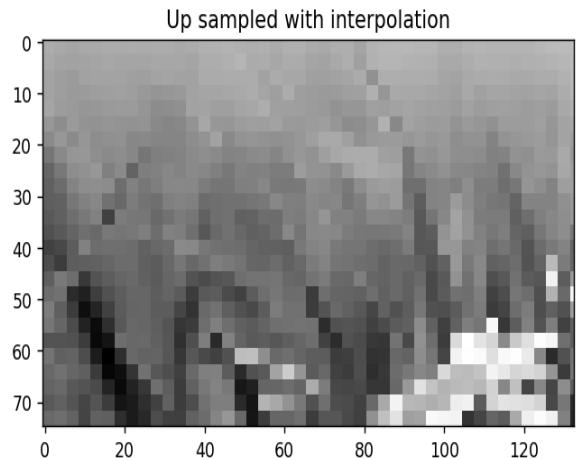
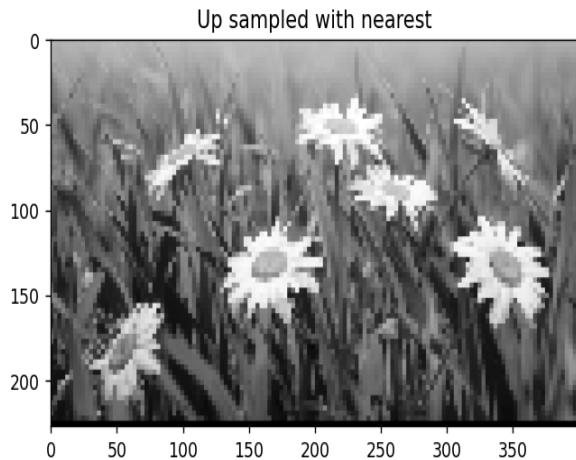




Q. 2 Downsampling of Flower.png

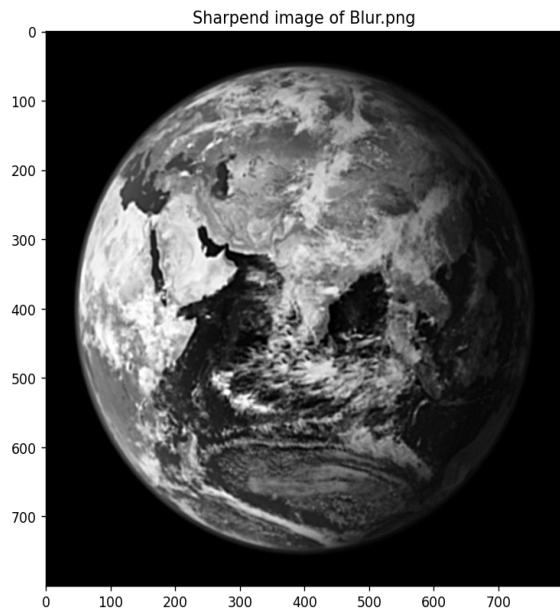
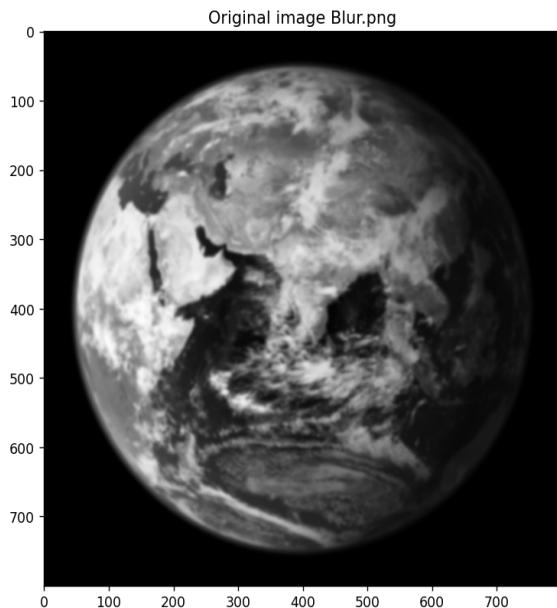


Upsampling of Down sampled image Flower.png by the nearest neighbor and with interpolation



A

Q. 3(a) Laplacian filter is used to sharpen the image and the scaling constant is 4.5.



Q. 3(b)

Now in the case of Noisy.png, It contains high-frequency noise(spikes) which we can get easily through a sharpening filter. Now when we add this high-frequency noise containing a sharp image with the original image we get a more noisy image.

