COMPUTER VISION PROJECT-1
REPORT

Part 1

I observed some changes in color in the following images:

a. **Command:** python xyz_classhisteq.py 0.3 0.3 0.7 0.7 test3.jpg out2.png

   **Input Image:** test3.jpg   **Output Image:** out2.png

Observation: The green tree in the input image changed to reddish brown in the output image. The bluish sky in the input image is green in the output image.

b. **Command:** python xyz_histeq.py 0.3 0.3 0.7 0.7 test4.jpg out3.png

        Input Image: test4.jpg   **Output Image:** out3.png

Observation: The white building in the reflection in the input image has turned pink in the output image and the blue sky in the input image has acquired a pink tinge in the output image.

c. **Command:** python xyz_histeq.py 0.3 0.3 0.7 0.7 test6.jpg out4.png

   Input Image: test6.jpg   **Output Image:** out4.png
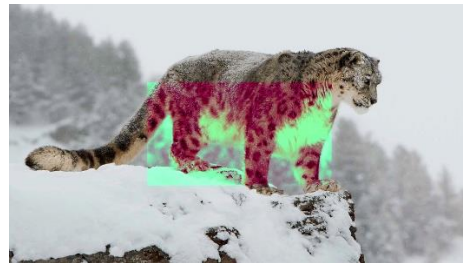
Observation: The grey fur in the input image is reddish in the output image and the white snow and the white fur in the input image is green in the output image.

Part 2

I think Lab linear scaling is the best and XYZ linear scaling is the worst.The common command used to run all of the following programs is   python <linear scaling program> 0.3 0.3 0.7 0.7 test5.jpg <output file>.The following images support my answer:-

a. **Original Image:** test5.jpg

b. **Luv Linear Scaling:** scale1.png

c. **Lab Linear Scaling:** scale2.png

d. **XYZ Linear Scaling:** scale3.png

Note: All linear scaling images have been cropped to the window selected for the purpose of comparing these images. The complete image can be obtained by running the respective commands. The original image is attached along with report for your perusal.

Explanation: The XYZ linear scaling completely changes the colors in the image and hence it is the worst. There is a very subtle difference between Luv linear scaling and Lab Linear scaling. The difference can be seen at the right top corner in the window. In Luv linear scaling, at this position, the color is distorted while in the Lab linear scaling the image is clear and does not appear to be distorted at any position. Thus, Lab linear scaling appears to be the best linear scaling method among all the proposed methods.

Part 3

I think Lab Histogram Equalization (OpenCV) is the best and the XYZ Class Histogram Equalization is the worst. The common command used to run all of the following programs is   python <histogram equalization program> 0.3 0.3 0.7 0.7 check56.jpg <output file>.The following images support my answer :-

a. **Original Image:** check56.jpg

b. **Luv Histogram Equalization (OpenCV):** hist1.png

c. **Lab Histogram Equalization (OpenCV):** hist2.png

d. **XYZ Histogram Equalization (OpenCV):** hist3.png

e. **Luv Class Histogram Equalization:** hist4.png

f. **Lab Class Histogram Equalization:** hist5.png

g. **XYZ Class Histogram Equalization:** hist6.png

Note: All histogram equalization images have been cropped to the window selected for the purpose of comparing these images. The complete images can be obtained by running the respective commands. The original image is attached along with report for your perusal.

Explanation: It can be clearly observed from the images that XYZ class histogram equalization and the XYZ histogram equalization (OpenCV) distort the colors in the window giving it a greenish tinge. However, the XYZ class histogram equalization appears to distort the image more and hence, it is the worst histogram equalization method. The Lab class histogram equalization and the Luv class histogram equalization appear slightly better than their XYZ histogram equalization counterparts, but the colors are clearly distorted especially near the edges of the sun's reflection in the water body. The Lab histogram equalization and the Luv histogram equalization are clearly better among the rest. However, upon closer observation it can be clearly seen that the Lab histogram equalization image's colors seem to be closer to the original image when compared to the Luv histogram equalization image's colors especially near the reflection and above the sun. Thus, the Lab histogram equalization method is clearly the best among all the proposed methods.