**CS 6384.001 Computer Vision**

**Instructor: Prof. Haim Schweitzer**

**Programming Assignment 1**

Submitted By:

**Shyam Patharla (sxp178231)**

**Question 1**

Window: h1=0.3, w1=0.3, w2=0.7, h2=0.7

1. The image is given in the sRGB domain
2. We convert the image from sRGB -> Non-linear RGB -> linear RGB -> XYZ -> Luv
3. We scale the L values to the range (0,100)
4. We replace the L values with the scaled values
5. We convert the image back from Luv -> XYZ -> linear RGB -> non-linear RGB -> sRGB

**Question 2**

Window: h1=0.3, w1=0.3, w2=0.7, h2=0.7

1. The image is given in the sRGB domain
2. We convert the image from sRGB -> Non-linear RGB -> linear RGB -> XYZ -> Luv
3. We perform histogram equalisation on the L values to the range (0,100)
4. We replace the L values with the new values
5. We convert the image back from Luv -> XYZ -> linear RGB -> non-linear RGB -> sRGB

**Question 3**

Window: h1=0.3, w1=0.3, w2=0.7, h2=0.7

1. The image is given in the sRGB domain
2. We convert the image from sRGB -> Non-linear RGB -> linear RGB -> XYZ -> xyY
3. We scale the Y values to the range (0,100)
4. We replace the Y values with the scaled values
5. We convert the image back from xyY -> XYZ -> linear RGB -> non-linear RGB -> sRGB

Given below are the steps for running the code for all the questions.

**Project Decisions**

1. We have a function **limit** linear and non linear RGB values to (0,1) range
2. We have a function **limitRGB** to limit sRGB values to (0,255) range
3. We have functions to convert between from sRGB -> nonlinearRGB -> linear RGB -> XYZ -> Luv and back
4. We have functions to convert between from sRGB -> nonlinear RGB -> linear RGB -> XYZ -> xyY and back
5. Division by zero cases have benn handled specifically

**Running the Code**

1. Open teminal
2. Go to the directory containing the python files
3. Run the following commands:

> python3 part1.py 0.3 0.3 0.7 0.7 test.bmp out1.png

> python3 part2.py 0.3 0.3 0.7 0.7 test.bmp out3.png

> python3 part3.py 0.3 0.3 0.7 0.7 test.bmp out3.png