

# Project 1 Report

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## Description of Files:

1. proj1-a.py is First Program which displays continuous changes in color for Luv representation.
2. proj1-b.py is Second program which performs linear scaling in the Luv domain.
3. proj1-c.py is Third program which performs histogram equalization in the Luv domain.
4. proj1-d.py is Fourth program which is the same as the third program, except openCV functions for color conversion and histogram equalization.

## Inputs to run programs:

For proj1-a.py: `python proj1-a.py number_of_columns number_of_rows`

For proj1-b.py, proj1-c.py, proj1-d.py: `proj1-n.py w1 h1 w2 h2 input_image name_of_output_image`

Where n is b, c, d

## Explanation of any decision that you have made.

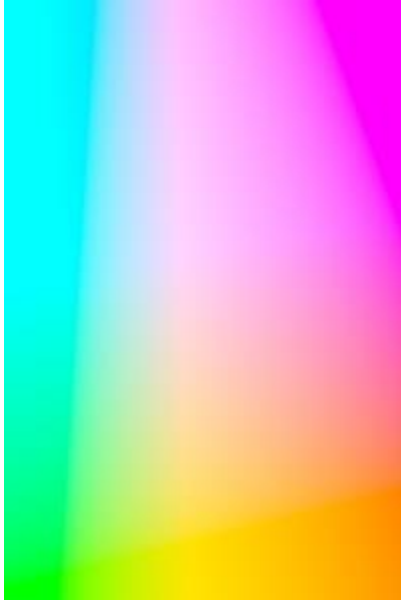
I have implemented color conversions, linear scaling and histogram equalization in such a way that division by zero is avoided. Also, I round out of range values to the closest value in the range.

I decided to do all image color conversions in one for loop so that I have fewer for loops and a lower runtime. Example BGR -> XYZ -> LUV in one loop which converts each pixel individually.

## Describe the results that you obtain in applying your program. Can you find situations in which your program makes a picture look “bad”? Give an example of a such a picture.

The first program just outputs the LUV color pixels into RGB color pixels.

Output for proj1-a.py



The second program performs linear scaling on a specified part of image in the LUV domain.

Output for proje1-b.py



Third program which performs histogram equalization in the Luv domain on a specified region.

Output for proj1-c.py



The Fourth program which is the same as the third program, except openCV functions for color conversion and histogram equalization.



Linear scaling and histogram equalization generally made darker pictures brighter and brighter images darker.

The histogram equalization program makes bright images darker, which makes them lose detail.

Example: The image below has lost detail and become blurry after histogram equalization.



Original below



Linear scaling also does not work well with very bright images.

Example: The image below looks bad after linear scaling.



Original image below.

