

# Assignment-2

## 1. HDR imaging (60 points)

### 1.1 Develop RAW images (5 points)

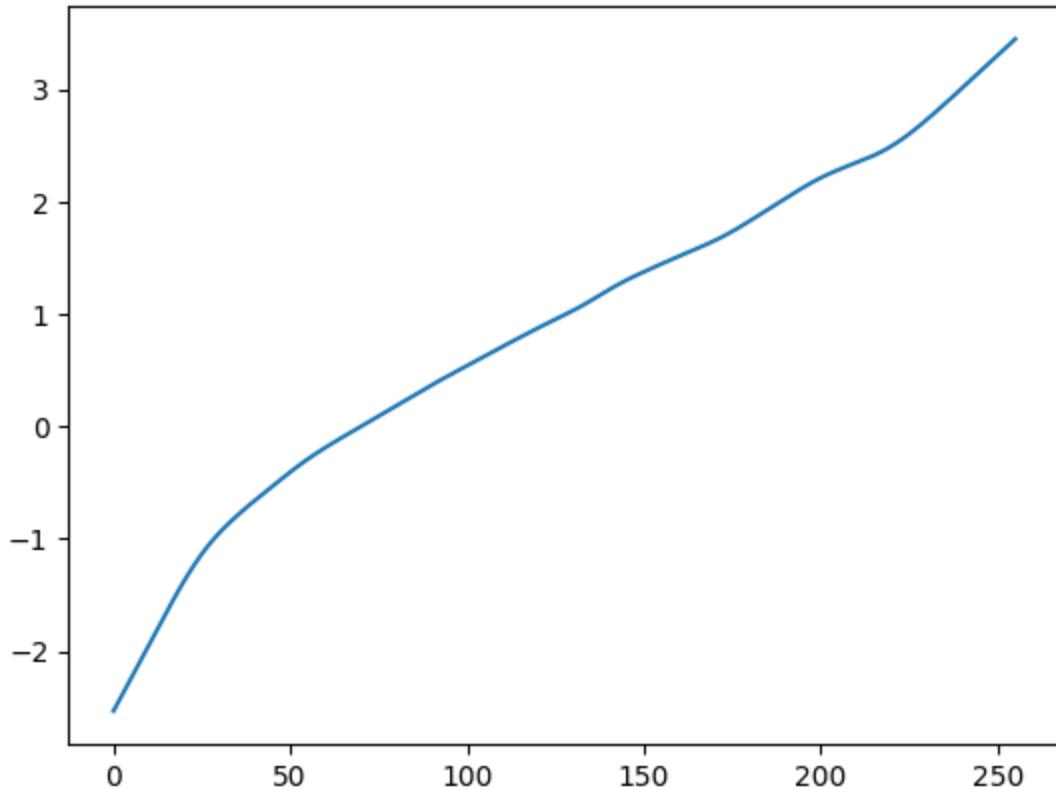
Flags used for dcraw

```
dcraw -v -o 1 -q 3 -4 -T -w
```

- o 1: sRGB image space
- q 3: Interpolate RGGB as four colors
- 4: Write 16-bit linear PPM
- T: save at .tiff
- w: Use camera white balance

### 1.2 Linearize rendered images (25 points)

After linearizing, I recovered the following graph for g wrt 256 values

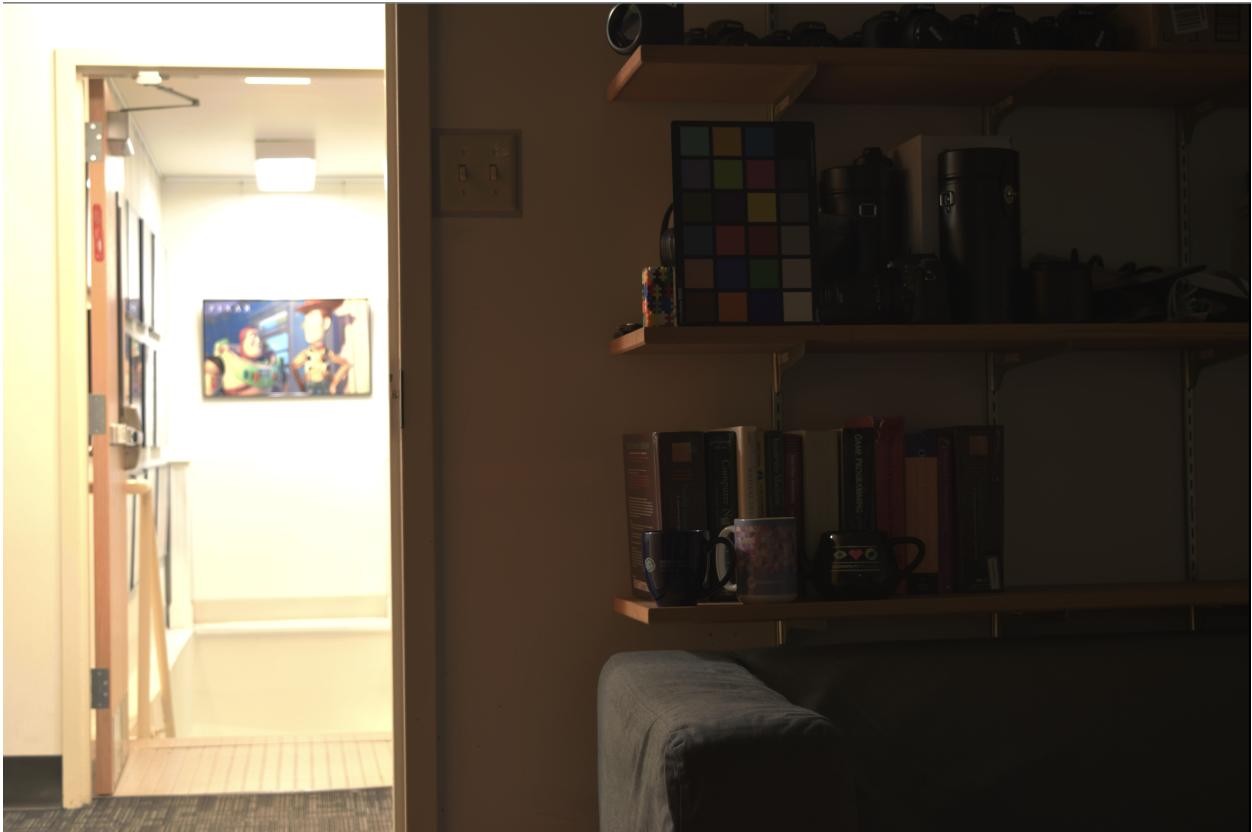


### 1.3 Merge exposure stack into HDR image (30 points)

I picked the recommended values:

$$Z_{\min} = 0.05, Z_{\max} = 0.95$$

After rendering all the images; the ones from the photon mapping looked the best. The images with different weights looked almost the same. The HDR from raw\_stack looked darker in comparison to the one from linearized jpg files.



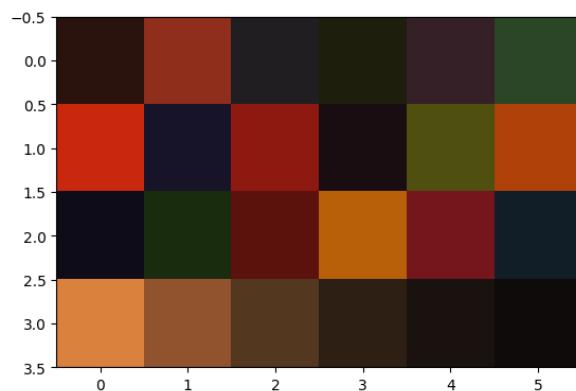
HDR image from raw images stack and photon weighting



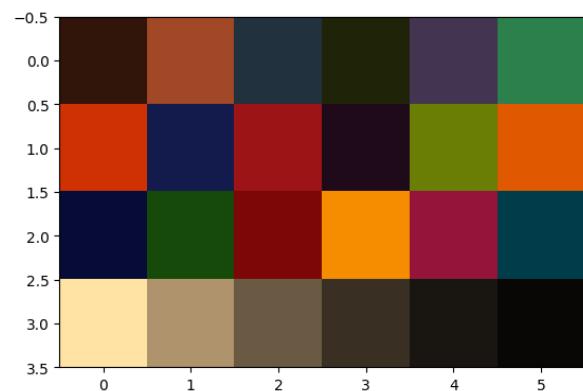
HDR image from linearized jpg images and photon weighting

## 2.1 Color correction and white balancing (20 points)

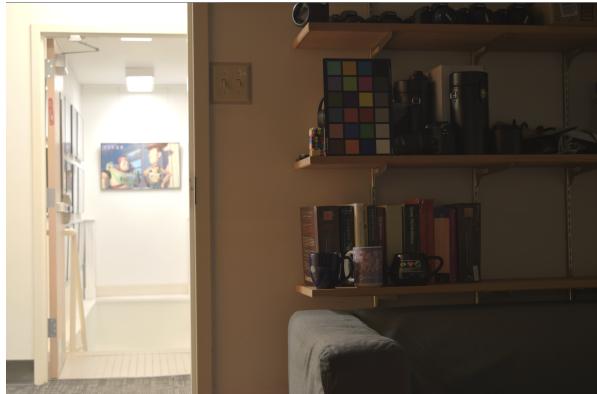
After extracting the coordinates; solved for the affine transformation from image on the left to image on the right



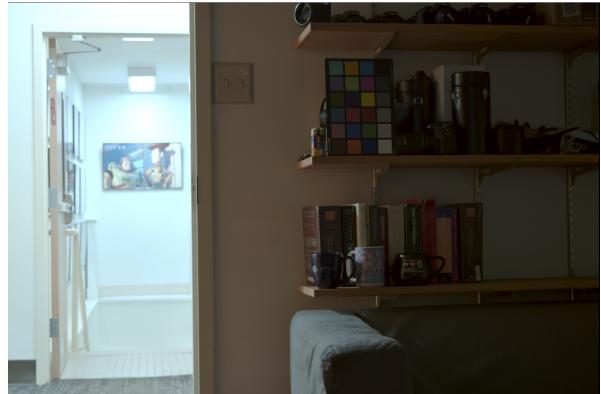
Color checker in the HDR images



Ground-truth color checker



HDR image from linearized jpg images and  
photon weighting



HDR image after color correction



HDR image after color correction and white balancing

The image after white balancing does not have the “warm tint” near the wall.

### 3. Photographic tonemapping (20 points)

I tried both the tone\_mapping pipelines

The xyY tone mapping worked for me with K=0.3 and B = 0.5



Tone-mapping using the method by Reinhard et al. 2002

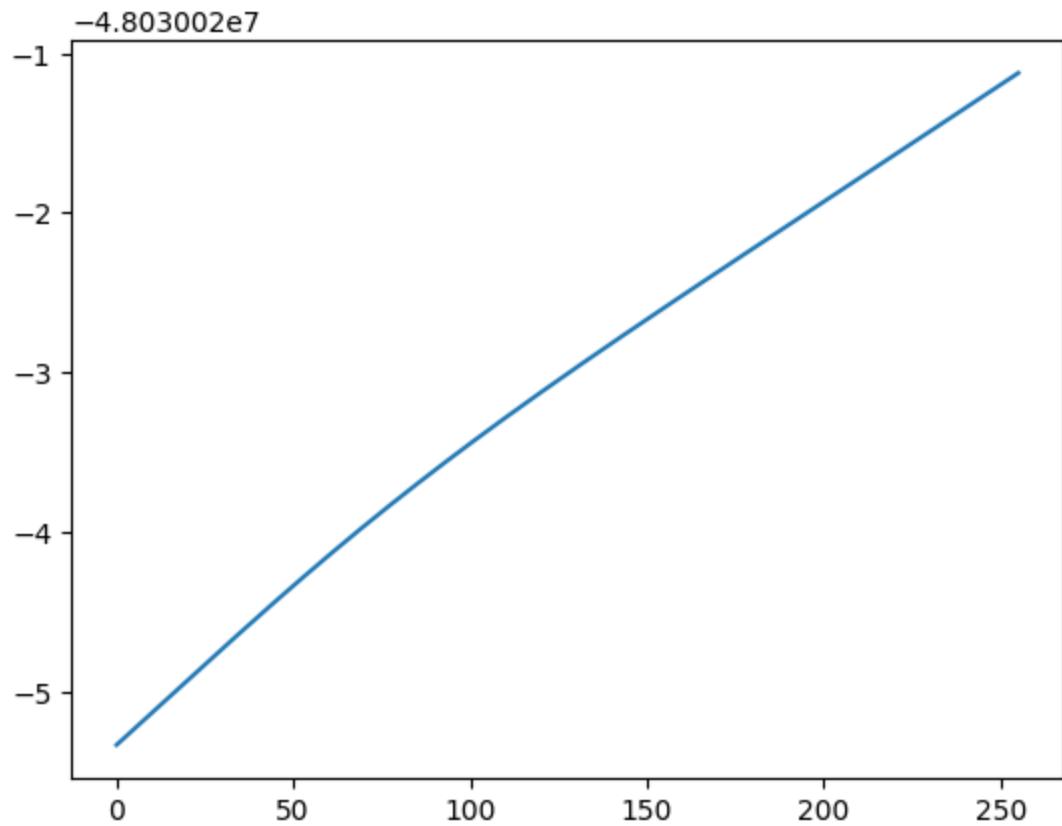


Tone-mapping in xyY space

Tone-mapping in RGB space gives a blue tint to the image.

#### 4. Create and tonemap your own HDR photo (50 points)

1. Image stack from jpg



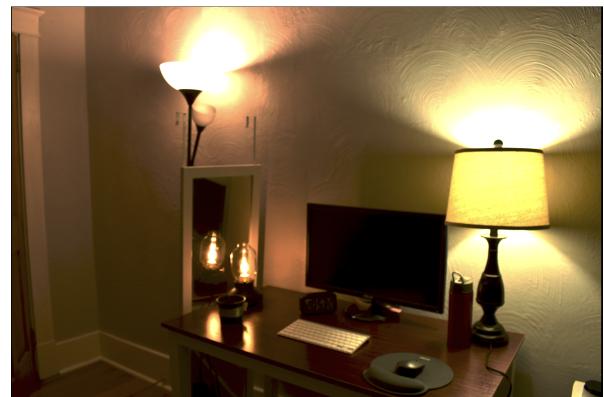
For tonemapping, after experimenting with various values; I used

$$K = 0.2$$

$$B = 0.05$$



HDR image from jpg stack



HDR image after tonemapping

## 5. Noise calibration and optimal weights (50 points)

