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Homework Assignment 1
EE260, Computational Imaging, Fall 2025

1 Developing RAW images

In this problem, we will use the provided RAW image `Thayer.CR2` in order to implement a basic image processing pipeline.

1.1 Implementing a basic image processing pipeline

RAW image conversion. Calling `dcraw -4 -d -v -w -T Thayer.CR2` converts the RAW image to a TIFF file without any color interpolation. We observe the CLI output:

```
Loading Canon EOS 2000D image from Thayer.CR2 ...
Scaling with darkness 2044, saturation 16383, and
multipliers 2.165039 1.000000 1.643555 1.000000
Building histograms...
Writing data to Thayer.tiff ...
```

where our multipliers represent `<r_scale> <g_scale> <b_scale> <g_scale>`, and darkness and saturation represent the black and white levels, respectively.

We then call `dcraw -4 -D -T Thayer.CR2` to convert the RAW image to a TIFF file without any color interpolation or white balancing, obtaining a grayscale image that we will use for the remainder of the problem.

Python initials. Using `skimage` and `imread`,

2 Camera Obscura

2.1 Building the pinhole camera