

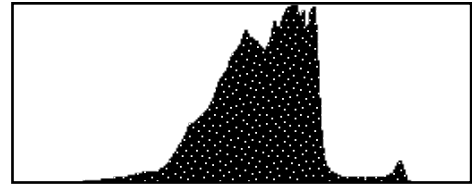
## Problem Set 3

Due 5:30PM on Monday, November 14, 2011.

Type your answers for the following questions in a word processor; we will accept Word Documents (.doc, .docx), PDF documents (.pdf), or plaintext files (.txt, .rtf). Before the due date, place the file into your "**Pset 3**" folder in the Dropbox folder we shared with you from project 1.

1. (5 points) It can take about 30 minutes for your eyes to become completely adjusted to night vision. If you needed a flashlight to illuminate something, what color light would be best to retain your night vision?
2. (5 points) What is bokeh? How do the number of aperture blades of a lens affect it?
3. (5 points) What is the range of depth of field when using the hyperfocal distance?
4. (5 points) How many discrete values are represented by: 8 bits? 1 byte? 16 bits?
5. (5 points) List two reasons why a prime lens might be better than a zoom lens.
6. (5 points) Why is optical zoom preferable to digital zoom?
7. (5 points) Will polarizing and haze/UV filters decrease the amount of light entering a lens? Explain why or why not.
8. (5 points) Explain at least three differences between having image stabilization built into a lens and having it built into the camera's sensor. How does it affect cost, the image viewed through the viewfinder, and stabilization quality?
9. (5 points) Name two situations in which using rear-curtain sync instead of front-curtain sync would be beneficial when taking photos with flash.
10. (5 points) Some flash units have a "high speed sync" mode, which allows a camera to take a photograph with the flash while using a shutter speed that exceeds the X-sync speed, and the photo will not appear with improper light levels. How might this high speed sync mode work?

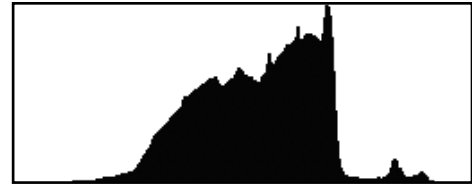
11. (10 points) Consider the *Luminance Histogram* on the right. Does it imply that the exposure is correct from the photograph it represents? Explain why or why not.



*Luminance Histogram*

12. (10 points) Again, consider the *Luminance Histogram*. What does it imply about the dynamic range of the scene?
13. (10 points) How does modifying the contrast of an image change the apparent dynamic range of a photograph?

14. (10 points) Consider the histogram to the right ("*RGB Histogram*"). It is an RGB histogram from the same image as the *Luminance Histogram* above. Explain why it looks so similar to the *Luminance Histogram*.



*RGB Histogram*

15. (10 points) Explain the difference between the values that luminance and RGB histograms measure. What is luminance? Why should you not rely on only one histogram to understand what is happening in a photograph?