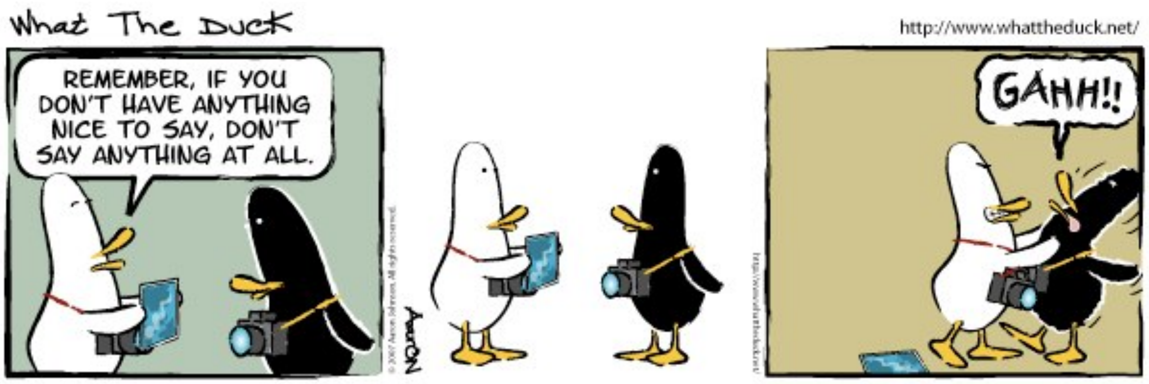
Computer Science E-7: Exposing Digital Photography
Harvard Extension School
Fall 2009

Frames of Mind

Assignment #3. Due 5:30PM on Monday, November 9, 2009.



Part I. Pick Your Brain! (40 points)

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**). Do not submit your answers for this part to Flickr. Instead, before the due date, attach the file to an email and send it to us at this address:

pset@cse7.org

1. (2 points) What is bokeh? How do the number of aperture blades of a lens affect it?

2. (2 points) What is the range of depth of field when using the hyperfocal distance?

3. (2 points) Eight bits represents how many discrete values?

4. (2 points) List two reasons why a prime lens might be better than a zoom lens.

5. (2 points) Why is optical zoom preferable to digital zoom?

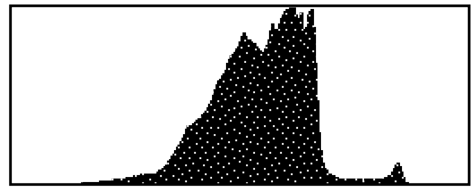
6. (3 points) Will polarizing and haze/UV filters decrease the amount of light entering a lens? Explain why or why not.

7. (3 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?

8. (3 points) Name two situations in which using rear-curtain sync instead of front-curtain sync would be beneficial when taking photos with flash.

9. (4 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.

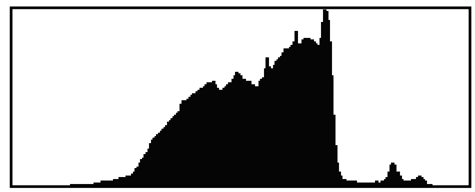
10. (4 points) Again, consider the *Luminance Histogram.* What does it imply about the dynamic range of the scene?



Luminance Histogram

11. (4 points) How does modifying the contrast of an image change the apparent dynamic range of a photograph?

12. (4 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

13. (5 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?

Part II. Click or Treat! (50 points)

Ah, fall. With the leaves changing colors and the mercury starting to drop, many different types of photographic opportunities present themselves. And that means many wonderful scenes ready for you to capture!

Take as many photographs as you can in the next couple of weeks. Select **10** of the best and submit them by the due date for this assignment. As with the last assignment, these should be representative of your best work. Submitting shining examples of your ever-increasing skills demand that you take many photographs (dozens? hundreds?) and hand-pick the keepers. Perfect exposure is a must and you should do your best to obtain interesting compositions and fascinating subjects. Keep an eye on that histogram! These are the restrictions for the ten photographs:

- Submit one photograph of a scene whose **dynamic range you compressed** so that it was possible for you to take the photo without losing important details in the highlights or the shadows. In other words, if you took a photo of the scene without compressing the dynamic range (by adding some supplemental light, for example), you would have lost important details at either extreme. How did you compress the dynamic range? What important details would have been lost if you didn't perform the compression? Give this photo an additional tag of **dynamicrange** when submitting to the group pool.

- Submit two photographs that demonstrate **different perspectives**. Remember that the photos should not be of the same subject. This is an opportunity to experiment with flat perspectives (using long focal lengths) and very deep perspectives (being close to the subject with short focal lengths). Give this photo an additional tag of **differentperspective**.

- Submit one **long exposure** photograph of a **night scene**. The shutter speed should be 1 second or slower. Be sure to use a tripod or some other form of stabilization. The photograph should not have motion blur due to camera shake, but it may (if you choose) have motion blur of a subject for artistic effect. Night photos should be dark, but be careful that your photo is not underexposed. You will not be penalized for overexposure due to direct illumination from street lamps, but you should not have any blooming in your subject nor should any object that is not a street light be overexposed. What were your exposure settings and how did you stabilize the camera? Give this photo an additional tag of **longexposure**.

- Submit one **fast exposure** photograph that **stops action**. The shutter speed should be 1/1000 second or faster. There should be some action to stop in your photograph; some ideas might be quick wildlife or sports. What were your exposure settings? Give this photo an additional tag of **fastexposure**.

- Take two photos that you use to **determine the type of histogram** your camera displays. Remember it may be one of: Luminance, RGB, or Colors. You may already know (*e.g.*, if you looked it up), but use these photos as evidence to support that knowledge. Why do the photos prove it is the type you claim? Why might this information be helpful to you in the future?

  Your camera might allow you to choose which histogram it will show or it might show more than one type. If this is the case, use these two photos to demonstrate when a certain type of photograph benefits from a different histogram. In other words, take one photo that shows when using an RGB histogram will be most useful in ensuring a proper exposure, and take another photo that would demonstrate the same for a luminance histogram. Why are having two histograms useful? In your opinion, which is best for general use and why?

  Give each of these photos an additional tag of **histogram**.

- Pick two of the **following styles** and submit one photograph from each while answering the associated question:
  - Intentional underexposure: how much exposure compensation did you use?
  - Intentional overexposure: how much exposure compensation did you use?
  - Hyperfocal distance: how did you calculate it?
  - Shortest focal length possible by your equipment: what is the focal length?
  - Longest focal length possible by your equipment: what is the focal length?

  For each of these photos provide an additional tag of **anystyle**.

- Submit **any** one photograph of any subject you choose so long as it meets the technical requirements listed below. In other words, submit the one that you thought was your absolute best shot during the three weeks you've spent on this assignment. Why is this your favorite? Provide this photo an additional tag of **bestshot**.

All ten photographs submitted for this assignment must meet the following requirements:

- All must be **unique**. No two can have the same subject. You may submit two photographs from the same location, but the images must be different enough to be considered unique.

- Photographs must be completely **unmodified and unedited**. Do not use any software to retouch or modify the image in any way; submissions should be straight from the camera. If necessary, because of Flickr upload restrictions, you may resize the photo but the EXIF data must remain wholly intact. You may rotate a photo after it has been uploaded to Flickr, if you wish.

- All submissions should be **original photos** taken by you for the purposes of this assignment.

- Use **either the JPEG or RAW** file formats. Though RAW is not required, we will be working with RAW processing in the upcoming weeks and you may find it beneficial to begin forming a collection in this format. But be sure to upload the photos to Flickr in the **JPEG** file format as it doesn't support RAW files. Some cameras allow you to take photos in both RAW and JPEG formats at the same time (sometimes called "RAW+JPEG"); this may be preferable as you can upload the JPEG file and store the RAW file for later use. If you can only take photos in the RAW format you will need to process it using the default options and upload the resulting JPEG.

- Only use one of the **Non-"Easy" Exposure Modes**. To be clear, this means you can use **Manual** (**M**) mode, **Aperture Priority** (**Av**) or **Shutter Priority** (**Tv**). Do not use Program mode, any of the scene modes, or any other shooting/auto-exposure mode. If your camera does not have M, Av, or Tv modes, you will need to borrow one of the course's from Church Street lab.

- To submit these photos by the due date, **upload** them to your Flickr photostream, give them a tag of **FramesOfMind** (notice that there are no spaces!) and, finally, **add** them to the e7 Group pool. If you see your photo in the group pool and it has the appropriate tag then you have successfully submitted it! We use tags as a way to identify photos as being for a specific problem set. Be sure not to remove the image from the group or delete it from Flickr at any time or it may not be graded.

- Type the answers to the questions asked above with your answers from Part I. You may (but don't need to) place the answers as captions with your photos, but we will grade the responses you place with your submission of Part I.

Part III. Everyone's a critic. (10 points)

Taking many photos is certainly a requirement to honing photographic skill. However, taking many photos and not getting feedback on them can be just as limiting as not taking photographs at all.

While you are working on Part II you may find that you are having difficulty with some particular image. Perhaps you are having trouble finding the ideal composition or lighting for a photograph and would like feedback on it. This is where the e7 Flickr group's discussion board comes in.

Post one of your images onto the e7 Flickr group in its own separate thread. If you are having a specific problem with it feel free to pose a direct question regarding the image. Other students and staff will reply to the image and offer suggestions on how, in their opinion, your photo could be refined. After a few suggestions, attempt to retake the photo taking into account one or more of the proposed recommendations. The goal is for you to receive constructive critiques regarding your photograph and modify your image slightly based on an independent reviewer. Part of the inspiration is that you begin to "see" your images from another point of view.

To be clear, these are the requirements:

- **Post no more than one** of your work-in-progress images from Part II onto the e7 Flickr Group discussion board in its own, separate thread. Remember that you can embed an image you've uploaded to your Flickr account into a post by posting its URL within square brackets, like so:

  ```
  [http://www.flickr.com/photos/example/2910192942/]
  ```

- After receiving some suggestions or opinions on your photograph, **retake the image** with one or all of the recommendations in mind.

- Submit both your **original version and the final version** of your image together with the images from Part II. The final version must be one of the 10 required photographs for Part II. The original version does not count as one of the 10 for Part II and should be tagged with **original** along with the same tags that you use for the final version. The end result, then, should be two images that have the same tags except for one that has an additional tag of "original" that differentiates that image from the final version.

- You may post the final version of your image in the thread you started, but you may make no additional changes to the photo if you receive additional comments.

- Along with your text answers for Part I, **include a link to your thread** in the group and a **brief explanation of which suggestion(s) you used** when creating the final version of your photograph. You may post this same information in your thread as well so that others can see what information was most beneficial, but it is the text included with your answers for Part I that will be graded.

- So that everyone receives feedback, please offer constructive feedback and realistic suggestions on at least **2 separate** work-in-progress photographs posted by other students in the discussion board.