

# Great (Focal) Lengths

Assignment #2. Due 5:30PM on Monday, October 19, 2009.



## Part I. Pick Your Brain! (50 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 point) 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?
- (1 point) It is a bright, sunny day and you want to keep your shutter open for as long as possible. You reach into your bag to grab a filter. Which one is the best for the job?
- (2 points) The Sunny 16 Rule says that, on a bright and sunny day, you can set your camera's exposure settings to which of the following?
  - 1/100s, ISO 100, f/16
  - 1/200s, ISO 100, f/11
  - 1/6400s, ISO 400, f/4
  - All of the above
  - None of the above
- (2 points) Describe the symbols for focal plane location and filter size. What is the difference between the two?
- (2 points) How would an image be affected if you manually override the X-sync speed on an SLR camera and take a photograph with flash and a very high shutter speed?

6. (2 points) You notice that you have some dust on your digital SLR's sensor. You remember from class that you can change one of the three exposure values (ISO, shutter speed, or aperture) to make the dust more visible. Which of these three should you change and how should you change it to make the dust visible?
7. (2 points) Does a lens that focuses by extending inward or outward change its focal length? Why or why not?
8. (2 points) What is exposure compensation? Explain why it would be unusual to use this feature when manipulating a camera's exposure settings in the manual mode.
9. (3 points) The Earth is three (3) times as far from the sun as the planet Mercury. How much more intense is light from the sun on Mercury compared to the Earth?
10. (3 points) The guide number for a flash unit is given as 32 feet at ISO 100. The lens on the camera has a maximum aperture of  $f/2.8$  and the flash unit is directly on top of the camera. If the camera is set to ISO 100 and the shutter speed set at the X-sync speed, what should be the F-number if the subject in the photo is 8 feet away? What happens if the subject moves to 16 feet away from the camera?
11. (3 points) Explain why changing your distance from an object changes your perspective of it. If changing your distance **does** change perspective, why does zooming in on that object **not** change perspective?
12. (3 points) If you must use flash to take a photo of a person in a dark location, name two ways you can eliminate red eye without using software such as Photoshop. "Red eye reduction" features rarely work, so that doesn't count!
13. (3 points) How can you take a photo of an event (such as a balloon popping) that occurs faster than your camera's fastest shutter speed? Be specific.
14. (3 points) Explain, in a few sentences, how altering the F-number allows the depth of field to change. If the F-number increases, does depth of field increase or decrease? Include a discussion on the permissible circle of confusion; what is it and how is it related?
15. (3 points) Is nearly every object in a photograph taken with a pinhole camera in focus or out of focus? Prove your answer as correct (you may use your answer to the previous question as evidence, if applicable). If you determine that all objects are in focus, and assuming the camera was perfectly still during the exposure, what are other possible explanations for a pinhole photograph to be blurry?
16. (3 points) Image stabilization technologies are designed to help reduce motion blur. Explain two unique situations in which a photograph that was taken with an optical image stabilization system has motion blur. Assume that the image stabilization system was turned on and working properly at the time of exposure. You may use a diagram, but it can only act as a complement to your explanation and not as a replacement for one.
17. (12 points) Assume a camera has four automatic modes: **Portrait**, **Sport**, **Daytime Landscape**, and **Nighttime Landscape**. For each mode, explain how the camera would bias each of the three exposure values (ISO, shutter speed, and F-number) to be best suited for that mode. Assume the camera is only using available light so flash units are unavailable and cannot be used.

## Part II. Practice makes perfect, but nobody's perfect, so why practice? (40 points)

It should be clear by now that the best way to better your photographs is with practice. Now that your understanding of exposure is top-notch (right?) you should be able to start applying your knowledge and, through practice, become a master of the camera. That is exactly your goal for this assignment.

Take as many photographs as you can these next three weeks; though you will turn in only **10** photographs total. Since we "only" ask for ten, they 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. These are the criteria for the ten photographs:

- Submit two photographs demonstrating the proper use of **hyperfocal distance**. You may calculate the distance by hand or with an online calculator (such as the one found on dofmaster.com), but in either case, tell us how you calculated the distance and include the focal length, F-number, the circle of confusion used in the calculation, where you calculate the depth of field should begin, and list the actual hyperfocal distance. If your camera doesn't allow you to manually set the focus at a specific distance, you may have to get creative and trick the camera into focusing on an object the correct distance away. Give this photo an additional tag of **hyperfocal** when submitting to the group pool.
- Submit two photographs at the **shortest focal length** possible with your equipment. Use this to demonstrate how short focal lengths can distort perspective or, at the very least, use it to isolate a subject from the background. What was the focal length you used? Give these photos an additional tag of **shortestfocal**.
- Submit two photographs at the **longest focal length** possible with your equipment. What was the focal length you used? Similarly, provide an additional tag of **longestfocal**.
- Submit one photograph of a scene with **intentional under-exposure**, and one photograph with **intentional over-exposure**. More specifically, to properly expose the subject the scene requires at least one stop of exposure compensation if you are using Av or Tv modes. Alternatively, you could use this as an opportunity to try isolating a subject against a perfectly black or perfectly white background. Give the photo an additional tag of **intentionalexposure**.
- Submit two photographs in **any style** and of any subject you choose so long as it meets the requirements listed below. In other words, submit the two that you thought were your absolute best shots during the three weeks you've spent on this assignment. Provide an additional tag of **anystyle**.

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.

- Be sure to submit the photos in the **JPEG** file format; this should be the default for many, if not all, cameras. If you prefer taking photos in RAW format, note your camera may have a "RAW+JPEG" setting where it will save a photo in both formats.
- 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 **GreatFocalLengths** (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.