

# The Art and Science of Digital Imaging

CS 197, fall 2005

## Scanning/File Format Assignment

This assignment is intended to get you familiar with scanning and with file formats.

First, go find a physical image. A photograph, perhaps, or an image from a magazine or book.

1) Scan your image into a spatial resolution of **approximately** 500x500. Go no larger than 800 pixels and no smaller than 300 pixels in any dimension. Scan it at 8 bits/pixel, grayscale (might be called "256 shades of gray" or "black and white photo" or "gray" on the scanner you use). If you are scanning a typical 4x6 photo, this would mean scanning at a pixel density of about 100 dpi. **REMEMBER:** The spatial resolution and ppi (or pixel density) are **linked**. Setting one will determine the other automatically. Whichever you choose to do, be sure to check that the spatial resolution is within the desired range for the assignment before you scan!

**The most common mistake in this assignment is scanning your image at TOO HIGH a spatial resolution!**

2) Save your image 4 times using 4 different *file formats*. In Photoshop, this can be done with **File->Save As**, where you will be given a choice of different formats to use. Save them to the Desktop of the computer you're using for now. The formats you need to save as are TIFF (with compression, Macintosh format), JPEG (with maximum quality), JPEG (with minimum quality), and the native file format of your image editing system ("Photoshop" if you're using Photoshop).

Make yourself a folder in the groupshared area on urza and copy/move the files there from the Desktop. Use the same *base name*, i.e., "ChrisPerryImage1" but use different *extensions*. Typical extensions for the formats given above are:

<u>format</u>	<u>extension</u>	<u>example</u>
TIFF:	.tif	ChrisPerryImage1.tif
JPEG:	.jpg	ChrisPerryImage1.jpg
Photoshop:	.psd	ChrisPerryImage1.psd

Since you're saving two versions of JPEG images, you will want to do something to differentiate them on disk (for example, "ChrisPerryImage1.min.jpg" and "ChrisPerryImage1.max.jpg").

3) On a sheet of paper, write down the spatial resolution of the image (if you don't remember from when you scanned it, you can find this info under **Image->Image Size** in Photoshop). Calculate the **total number of pixels** that make it up and write that down too. Then, write down the sizes, in bytes, of the 4 different versions that you have on disk. To do this, click once (aka "select") the image in the Finder and go to **File->Show Info** (NOT in Photoshop! Go to the File menu in the Finder).

4) With a calculator, compute the **effective bit depth** of each of the 4 versions. This is the average number of bytes per pixel *based on the image's size on disk*. You can compute this by simply dividing the number of bytes the image takes on disk by the total number of pixels. List the 4 formats in *descending* order with their effective bit depth. Then convert from bytes per pixel to *bits per pixel* so your answer can be compared to the bit depth you used for scanning (8 bits per pixel).

**Reality check: your effective bit depths should be about the same or LOWER than the bit depth you scanned at. That's what compression is all about.**

(over)

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## Scanning/File Format Assignment (continued)

5) Load each of the 4 versions of the photograph image separately into Photoshop. You do this by double-clicking on the file icon in the Finder. See if you can identify any visual differences between them. Can you? Which formats look different, and in what ways do they look different? Note these differences on the sheet.

6) Finally, hand in your four digital images. Here's how:

- In the classroom, go to the **Go** menu in the Finder. Then find **Connect to Server** and select it. Type in the name **urza** and hit the **Connect** button.
- Log in as **cs197** with password **cs197**.
- Select the **Course Storage** disk as the one to use. After a moment, a new Finder window should appear that shows all the course folders.
- You should see a folder called **cs197**. Inside that there should be a **handin** folder.
- The Hand-In folder is **write only**, which means that you cannot open it to see what's inside. But you can still copy files into the folder.
- Make sure the name of your files indicate that they are YOUR files (aka, your name is in the filename somewhere).
- Drag your files from the Desktop onto the handin folder. This should begin a copy (after asking you for confirmation - say yes!).
- NOTE: if you're copying images from the groupshared folder to the handin folder directly, be sure to make a copy by **option-clicking**. Otherwise you will inadvertently **move** your files and there won't be a copy left you can work with.
- When you're done, drag the Course Storage disk into the trash on your local machine. This frees up the server for others to use.

THIS IS HOW YOU WILL HAND IN ALL ASSIGNMENTS IN THIS CLASS.

Be sure to ask questions if this process is confusing to you in any way.

Don't forget about the resources available to you for help:

- the handout on scanning.
- your classmates (cs197f05@lists.hampshire.edu, or just find them sitting next to you in the classroom).
- the lab monitors (might be helpful, might not be).
- the lab TA Evan Viera (lab hours Monday and Wednesday nights).
- me (office hours on my door, email perry@hampshire.edu)