

LIBR 284-11 (Digitization)

Worksheet for Benchmarking Assignment

Date Due: Sunday, March 28th

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Please complete this worksheet and submit it via Angel's Drop Box for the Benchmarking Assignment under "Assignments." Please Note: Where specific commands are required in the imaging programs, I've tried to supply directions in parentheses (e.g., *Choose Image--> Mode --> Select Grayscale*). These programs may vary slightly based on the program, version, and operating system. If you have problems, please see the Program Help. If you're still confused, contact me and I'll do my best to supply the appropriate commands.

Finally, save your responses to this document using the following style (LastName_2.doc or LastName_2.rtf). PLEASE do not save it "assignment1" or anything like that. If you do so, files may save over each other as I download them and work could be lost.

For questions 1-2, refer to image named "File0003c.tif" within the available image files.

- 1) Think about the original photograph... Look at the complete picture. Based on what you see (defects and all), what kind of original was this likely to be? (Refer to the Cornell tutorial for terminology.) What are the important characteristics of this type of original?

A continuous tone photograph. The photograph is grayscale, with sepia toning. The defining characteristics of a continuous tone record are "items such as photographs, watercolors, and some finely inscribed line art that exhibit smoothly or subtly varying tones." The original record is high resolution.

- 2) If the dimensions of the original are 3" w x 5" h:
(use the formulas provided in the Key Concepts presentation - in class and on Angel)

- a.) Calculate the pixel dimensions it would take to scan the document at 300dpi.

900 x 1500

- b.) Calculate the pixel dimensions it would take to scan the document at 600dpi.

1800 x 3000

c.) What approximate size, in both bytes and kilobytes (remember to use a factor of 1024, not 1000 when converting from bytes to kilobytes), would the file be if you scanned it at:

This question doesn't take into consideration image compression or file format. Trick question!



Image Type	300 dpi (in bytes)	300 dpi (in KB)	100 dpi(in bytes)	100 dpi (in KB)
1-bit bitonal	20250000 bytes	19775KB	2250000bytes	2197 KB
8-bit greyscale or color	129600000bytes	126563KB	144000000bytes	140625KB
24-bit color	11664000000bytes	11390625KB	1296000000bytes	1265625KB

3.) Refer to image “rcm1087047322.jpg” on the CD. Why might a color/grayscale target be included with the image?

Two:

1. Provide a model for reference in QC trials and preservation management. i.e. to ensure the digital image has not degraded or otherwise been compromised. Clearly delineated color guides can be matched against the record’s current colors.
2. Secondly, an end-user aid for measurement and viewing.

4.) Open “File0001c.tif.” [Each exercise below should be performed on File0001c.tif]

- a.) Using Photoshop or Photoshop Elements, duplicate the image (*Choose Image--> Duplicate*).
- b.) On the copy, change it from an 8-bit, color file to 1-bit, 400 dpi, B/W image via a 2-stage process:
 - 1) *Choose Image--> Mode --> Select Grayscale*. Discard color info? Choose Yes.
 - 2) *Choose Image--> Mode --> Select Bitmap*. A pop-up will appear. Make sure it says “400” in the output “pixels/inch” box.

What happens to the file size? (*This info is usually found in the lower left hand part of the Photoshop window*)

5.34 mb to 683.6 kb

- c.) Still on the copy, choose “Save for Web” (*File-->Save for Web*) or “Save As” (*File-->Save As*). If using Save for Web, Choose to Save it as “JPEG,” “Medium Quality” (*or quality=30*). **Rename the file! Save it as “file0001_jpg.”** What happens to the file size?

2.708 mb

- d.) Open the original file (File0001c.tif) and the new image created above in 4b (file0001_jpg) and look at the images. [View them at about 16.7% - View--> Zoom in or out to get there.] Can you perceive a difference in quality in the two?

The JPEG is slightly darker, probably a result of the conversion process. Other than that, it looks comparable at this zoom.

- e.) Look at the histograms for the two images (*Window-->Histogram*). Click on one image and view the histogram. Now click on the other. Did you observe any differences? If so, what?

The JPEG has a series of sharp vertical spikes going across it; the copy has a circle with a slash through it.

- f.) Repeat step a. Change the image to grayscale (*Choose Image--> Mode --> Select Grayscale*). On the new copy, choose "Save for Web" and this time, save it as a GIF file (**rename it file0001_gif**).
- g.) Open all three files onto the Photoshop workspace. Compare all three. Are there compression artifacts visible in the JPEG version? In the GIF version? Make sure to provide details to support your answer.

The gif is heavily distorted at 16.7% zoom and looks like static, becoming clearer and clearer toward 100% zoom. The image is only clear at 100% zoom. Zoom beyond 100% is heavily distorted. The JPEG starts off at 16.7% without any significant artifacts, begins to show signs of artifacts at 33.3%, becomes heavily distorted at 66.7% zoom and returns to normal at 100% zoom. The original TIF copy more or less follows the logic of the JPEG. All show compression artifacts when examined at 100% zoom, but for some of the images it is less obvious in the case of the JPEG and original TIF copy when zoomed out.

- h.) Choose a particular section of the image. Using the Zoom tool (*or View-->Zoom In*), zoom into that area of both pictures. What percentage must you zoom to before seeing clear pixelation in File0001c.tif? In file0001_jpg.jpg? In file0001_gif.gif

I am assuming clear pixelation refers to a state of the image being clear of pixel malformations or artifacts. The TIF copy appears so at 12.5% zoom and becomes obviously granulated beyond that zoom. For the GIF it appears most clear at 100% zoom. The JPG also appears clearest at 12.5% zoom, although it is mostly clear up until 50% zoom.

- i.) Briefly give your view on the trade-offs between file size and quality of images.

As a rule of thumb it is compression and file format rather than file size which determines the quality of an image. While GIFs excel with simple images of 3-4 tones, they are inappropriate for a continuous tone photograph, and result in unnecessarily large file sizes AS WELL as inferior quality. While TIF is a high quality format and rarely degrades (making it excellent for dark archives) it also has poor compression, which means high file sizes. Often the best format for the typical end-user is a high quality JPEG with good compression, as it is a means of resizing the image and lowering the file size while keeping a comparable resolution. JPEG fails however as an archival format due to its susceptibility to degrade in the longterm. Ultimately each format excels within the scope of a function, but none are universal to task.

5.) Open image "rcm1087046753."

- a) What is the bit depth of the image? (*See Image-->Mode*)

8 bit.

- b) Open the image histogram (*Window--> Histogram*).
- c) Experiment with the brightness/contrast adjustments (post-processing options). (*See Image-->Adjustments*). What happens to the image when you adjust the brightness? (Be sure to look at the color bar too). Explain why brightness/contrast functions might be used and why they should be used sparingly.

Increasing brightness flushes the colors out and increases the white level. Increasing brightness shifts the histogram to the right, decreasing shifts it to the left. Increasing contrast spreads the histogram out, decreasing brings the peaks closer together.

You would only modify brightness/contrast to best reproduce the original record in digital form. The idea behind wise digitization is not to create a new record but to properly migrate the record from a hard copy to a soft copy, with as little “lost in translation” as possible.

- d) Next, turn your focus to the caption of the picture (*See View-->Zoom In*). Zoom In. Do you note anything about the text? Describe what you see. Why it might appear as it does?

Some of the details are lost – specifically the subtitle is unintelligible. This is due to a low scanning resolution.


6. Finally, because most major post processing takes place in a batch environment (i.e., a group of actions taken against a group of files in an automated way), you need to batch process the files found in the “practice_batch” folder. You will need to take all files, resize them, change their bit depth and resolution and then save them as a different file type – with one command. This means defining the batch action and then running it against the “practice_batch” folder and saving the new images into a new folder. *In this exercise, you’ll be mimicking processes institutions use to create derivatives (use copies) for their imaging systems.*

Here are the instructions from Photoshop for automating a task:



Automate a task by recording commands and operations in the Actions palette.

If you have to perform the same task on multiple images, you can save time by recording the steps of the task in an action, and then playing the action on each image. An action can include menu commands and most operations you perform with tools from the toolbox. You can even record the playing of other actions. You store the actions in sets within the Actions palette. The Actions palette lists all actions you record, as well as several predefined actions. Before you create an action, break your workflow down into simple steps that can be repeated on other like images.

- Open an image file.
- Click the Actions tab to bring the Actions palette to the front or, if the palette isn't open, choose Window > Actions.

- To create a set that you'll add actions to, click the Create New Set button at the bottom of the Actions palette. Name the set, and click OK.
- Click the New Actions button .
- Type a name that describes the action in the Name text box. Choose the set that you want to add the action to from the Set pop-up menu, and then click Record.
- Choose the commands and perform the operations that you want included in the action.

Note: Photoshop can't automate paint strokes, zoom settings, scrolling, and window selections.

- When you have performed all the steps you want to record, click the Stop button  at the bottom of the Actions palette.
- To test the action, open another file, select the action in the Actions palette, and click the Play button .

Apply the above instructions to the first image in the “practice_batch” folder.

1. Open **allen_16aug.jpg**
2. Click the Actions tab to bring the Actions palette to the front or, if the palette isn't open, choose Window > Actions
3. To create a set that you'll add actions to, click the Create New Set button at the bottom of the Actions palette. Name the set, and click OK. Click on the New Action button and name it. [I named mine "resize,bitdepth,reformat"] It's now recording your actions. You can watch as the set of actions appear under your action name in the actions box.
4. [resize the image] Image--> Image Size --> box appears. Change width dimension to 800. Since dimensions are locked, this will readjust the height too. Click ok.
5. [change the bit depth] Image-->Mode --> Choose Grayscale (discard color info=yes).
6. [change file format] Choose File --> Save For Web. Image preview will appear. Make sure the image type you're creating says GIF in dropdown box (if it says JPEG or PNG or any other file type, *change to GIF*. in “Lossy” [compression] box, click on the small arrow and adjust slider to 35. Then click Save.
7. In the box that appears, create a new folder called “processed_batch” and save your new GIF in that box. Do not change the file name! Click Save.
8. You will be returned to the main Photoshop window. In the actions window, click on the small square to the left of the red dot to stop the action from recording. Take a look at the action you created. It should have all of the steps in that box.
9. Now you're ready to do the batch changes.
10. Go to *File-->Automate-->Batch*
11. In Set, leave as “default.atn” if that's where you stored your action.
12. In Action, choose the action you just recorded.
13. In Source, box should read “folder” and then click “choose” to find your “practice_batch” folder.
14. In Destination, the box should read “folder” and then click choose to find your “processed_batch” folder.

15. Once you have these folders identified, click OK and watched the batch process take place. If a JPEG quality window open, click “ok” to continue process (depends upon the exact steps you took – don’t worry if this does not appear!)

--> keep these. I’ll want to view them and will have you submit the new folder of images from your batch derivative creation process!