

Homework Project # 1 (10 points)**Due Date: 01-24-2019****Part A**

In this project, you'll become familiar with reading and writing image data, and performing simple image queries and manipulations in MATLAB. The image file, "**Data File 1.tif**" is available on Pilot.

Perform the following tasks and answer the questions about the images:

1. Read in the image, Data File 1.tif ("Image A").
2. Display Image A, ensuring that the image is visible to the viewer.
3. In this image, there are three objects that "do not belong"; you should have no trouble in identifying these objects! Use the appropriate command(s) to interactively select one of the objects in Image A (your choice) and save only that portion of the image as a new image ("Image B").
4. Find the maximum and minimum grayscale values in Image A.
5. Find the size of Image A and the size of Image B, and specify whether this is "height x width" or "width x height". How do you know?
6. Is Image A an 8-bit, 12-bit, 16-bit or 24-bit image? How do you know?
7. Is this patient in trouble? Why or why not?
8. Write Image B, in .png format, to a file named "BME7112_HW1A_YLN_ImageB.png," where YLN is your last name. Submit this file to the Pilot dropbox by the due date.

In addition to the output image, submit the sequence of MATLAB commands you used to obtain results/answers. Either save your command window or copy-paste the commands and output into a separate document. Submit the list of commands and their output to the Pilot dropbox as a file named "BME7112_HW1A_YLN_Commands."

Submit your answers to the questions above in a short report named "BME7112_HW1A_YLN_Report."

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Part B

In this project, you'll work with image matrices in MATLAB and consider the ability of the human visual system to discriminate image intensity values.

1. Establish the minimum number of gray levels needed for smooth image display. You may include grayscale images in your report to support your conclusion. With respect to your answer to the preceding question, what would be the minimum bit-depth required for image storage?
2. How does the ambient light in the display environment affect your ability to distinguish gray level transitions?
3. How does the image intensity affect your ability to distinguish gray levels, i.e. over what regions are you more or less likely to differentiate gray levels?

Note: no images are provided for this problem; you are to generate your own image file(s). See Russ Figure 1.16, Equal Increments for a suitable image for this testing.

Submit to Pilot a copy of your MATLAB code ("BME7112_HW1B_YLN_yourfilename.m," along with a short report ("BME7112_HW1B_YLN_Report") that describes your approaches and addresses the questions above.