LAB #2 — REPORT

30 points possible

All materials must be uploaded to Gradescope by 10 am on Tuesday, February 8 2022 (check Brightspace for updates on due date)

NAME:

At the end of the lab, you should have created the following files in your working directory:

- This report, edited and filled out

- Copies of your journal files

- imp\_histogram.png

- imp\_stretched.tif

- imp\_sky\_histogram.png

- imp\_masked.png

- imp\_bb\_histogram.png

- imp\_bb.tiff

- imp\_sky.tif

- juno\_red\_no\_bad\_pixels.tif

- replace\_bad\_pixels.pro

1. (a) Paste “imp\_histogram.png” below (1 pt).

(b) What is the range of values that correspond to the following parts of the scene? (1 pt)

- the black background:

- the shadows:

- the surface:

(c) Paste “imp\_stretched.tif” below. (1 pt)

(d) Paste “imp\_sky\_histogram.png” below (1 pt).

(e) In the av\_img array, what is the approximate range of values in the sky? (1 pts)

2. (a) Paste “imp\_masked.tif” below (1 pt).

(b) Paste “imp\_bb\_histogram.tif” below (1 pt)

(c) What limits will you use to illuminate the shadowed region and why? (2 pt)

(d) Paste “imp\_bb.tiff” below (1 pt)

(e) What is in the darkest part of Barnacle Bill’s shadow? (1 pt)

3. (a) How many pixels are in the valid image portion of av\_img? That is, not counting the black background. (1 pt)

Number of pixels =

(b) How did you isolate the sky? Please be specific and detailed as you describe your method. (2 pts)

(c) How did you remove the other bright (non-sky) objects at the bottom of the scene from the mask? (2 pt)

(d) How many pixels represent the sky in av\_img? (1 pt)

Number of sky pixels =

(e) What percentage of the image is the sky (i.e., (number of sky pixels) / (number of valid image pixels) \* 100)? (1 pt)

Answer: The sky is % of the image.

(e) Paste ”imp\_sky.tif” below. (1 pt)

4. (a) How does changing the width of the median filter to a larger value affect the image? (1 pt)

(b) *In words,* what is your definition of a bad pixel? Will this definition work for most images, or is it unique to this image? (2 pts)

(c) How many "bad" pixels did you find in each of the six raw images? For reference, I replaced about 1% of the pixels with noise. How does your number of bad pixels compare to this? (1 pt)

(d) Critically evaluate your corrected image. Did you remove all of the obvious bright *and* dark bad pixels? Compare to the original image - do you see any evidence that you “over-correct” in some way (replaced apparently good pixels)? (2 pts)

(e) Paste “juno\_red\_no\_bad\_pixels.tif” below. (1 pt)

5. (a) Copy and paste your “replace\_bad\_pixels.pro” code below. (3 pts)

(b) Paste the corrected image you generated with your code below. (1 pt)