

✓ Congratulations! You passed!

Grade received 100% Latest Submission Grade 100%

To pass 80% or higher

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1. The concrete crack images you've been working with are 227x227 `uint8` color images.

1 / 1 point

If each pixel of type `uint8` in each color plane is one byte, how large (in bytes) will each image be?

154587

[Correct](#)

2. Consider saving one of the concrete crack images. Correctly order the resulting image files from smallest to largest file size.

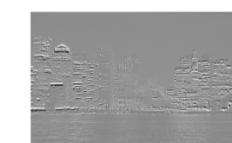
1 / 1 point

- `imwrite(img,"img.jpg","Quality",0.8)`
`imwrite(img,"img.jpg","Quality",70)`
`imwrite(img,"img.png")`
- `imwrite(img,"img.png")`
`imwrite(img,"img.jpg","Quality",70)`
`imwrite(img,"img.jpg","Quality",0.8)`
- `imwrite(img,"img.jpg","Quality",70)`
`imwrite(img,"img.jpg","Quality",0.8)`
`imwrite(img,"img.png")`
- `imwrite(img,"img.png")`
`imwrite(img,"img.jpg","Quality",0.8)`
`imwrite(img,"img.jpg","Quality",70)`

[Correct](#)
Feel free to try this for yourself on one of the concrete crack images. Can you see any differences in quality?

4. Assume you want to visualize the difference between the gamma corrected and rotated image and the original grayscale image. Which figure below correctly displays the difference between the two images?

0 / 1 point



5. How would you ensure that the eagle is oriented with its head at the top and feet at the bottom in the following coin image?

1 / 1 point

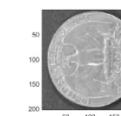


- `img = imrotate(img,-90);`
- `img = imrotate(img,90);`
- `img = imflip(img);`
- `img = imflip(img,"right");`

[Correct](#)

6. The quarter image from the last question has a resolution of 203x203. Which command would give you a cropped image of just the eagle's head?

1 / 1 point



- `imshow(img(40:70),img(85:115))`
- `imshow(img(90,55))`
- `imshow(img(85:115,40:70))`
- `imshow(img(90,:))`
- `imshow(1:203,1:90)`

[Correct](#)

This is the only answer located on the center left of the image.

7. Camera exposure time is an important component of astrophotography.

1 / 1 point

Exposure time is stored as part of the "DigitalCamera" structure in an image's meta-data. Find the exposure time for "half moon.jpg". Enter your answer as a decimal.

0.0166666666666667

[Incorrect](#)

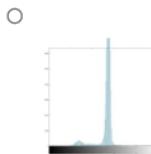
This only shows changes where the adjusted image is greater than the original grayscale image. How do we display changes in both directions?

1. Which of the following best describes image contrast?

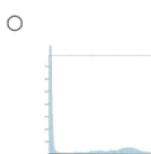
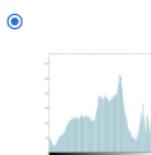
- The ratio of vertical columns of pixels to horizontal rows.
- The visual distinction between the light and dark areas of an image.
- The difference between the lightest and darkest pixel value in an image.
- The ratio of the number of pixels with the brightest value to the number of pixels with the darkest value.

1 point

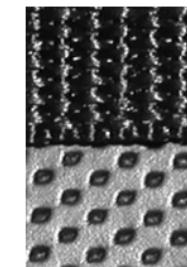
2. Which of the following histograms best matches this image?



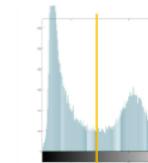
1 point



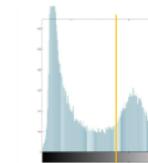
3. Thresholding segments a grayscale image according to brightness values. The details of how imbinarize chooses a threshold are beyond the scope of this course, but looking at an image histogram, it is sometimes possible to guess a good threshold value. Which of the following threshold values do you think would produce the best segmentation for this image?



Threshold = $98/255 = 0.3842$



Threshold = $127/255 = 0.5000$



1 point

✓ Congratulations! You passed!

Grade received **100%**

Latest Submission Grade 100%

To pass 75% or higher

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1. Image Contrast Adjustment

1 / 1 point

Questions 1-5 will use the image `00035.jpg` from the Concrete Crack data set.

Import the image and convert it to grayscale. Segment the image using the `imbinarize` function with the default settings. The lighter background will be selected as the foreground. Invert the image so that the crack is selected as the foreground. This mask will be the baseline for this set of questions.

How many pixels are in the crack?

1800

Correct

2. Adjust the contrast of the grayscale image `00035.jpg` by stretching the histogram. Then perform the same segmentation and inversion as in Question 1.

1 / 1 point

How many pixels are in the crack in this segmentation?

17751

Correct

3. Equalize the image histogram of the grayscale image `00035.jpg`. Perform the same segmentation and inversion as in Question 1.

1 / 1 point

How many pixels are in the crack in this segmentation?

25780

Correct

4. Perform adaptive histogram equalization on the grayscale image `00035.jpg`. Perform the same segmentation and inversion as in Question 1.

1 / 1 point

How many pixels are in the crack in this segmentation?

22638

Correct

5. Which of the four segmentations above best captures the crack?

1 / 1 point

- No adjustment
- Contrast adjustment
- Histogram equalization
- Adaptive histogram equalization

Correct

Images do not always need to have their contrast adjusted before segmenting. This is why it is important to explore your data before you begin processing.

6. Brightening An Image

1 / 1 point

Use the `imlocalbrighten` function to increase the brightness of the `car_3.jpg` image. Calculate the difference in the average luminance of the image before and after the transformation.

Recall: to find the average luminance, find the luminance value of each pixel by converting the image to grayscale, then average the resulting values.

55.5325

Correct

8. Snow Removal

1 / 1 point

Use the `imreducehaze` function to remove some of the snow and frost from the `mountain2.jpg` image. Calculate the difference between the average luminance of the image before and after the transformation.

Note: In this case, we are darkening the image, so the average luminance will be lower in the transformed image. Enter a positive value for the difference in the average luminance values.

46.0584

Correct

7. Adjusting a Single Color Plane

1 / 1 point

Load the `car_2.jpg` image and convert it to the HSV color space. Perform histogram equalization on the Value color plane. Calculate the difference between the average luminance of the image before and after the transformation.

Recall: Converting an image from RGB to HSV changes the data type from `uint8` to `double`. You will need to convert the equalized image back to RGB AND convert the data type back to `uint8`.

82.4245

Correct

9. Counting Objects

1 / 1 point

How many guitar picks are present in `picks.jpg`?

14

Correct

✓ Congratulations! You passed!

Grade received **87.50%**

Latest Submission
Grade 87.50%

To pass 75% or higher

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1. Imagine you have a camera set up to capture snapshots of an outdoor scene throughout the day. Which approach is best to segment out the background in these shots?

1 / 1 point

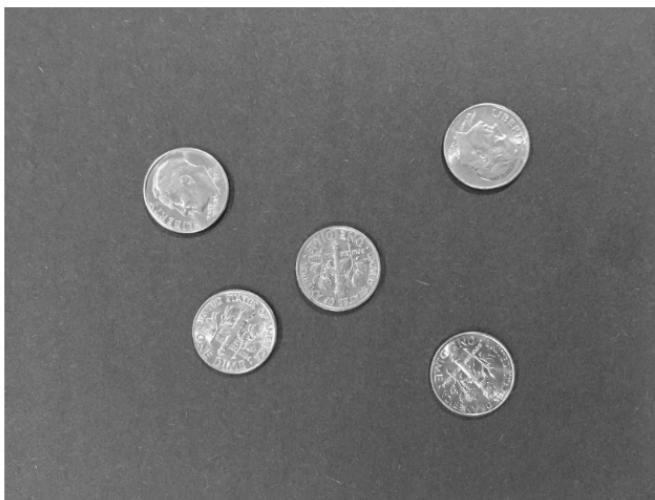
- Multilevel threshold using two threshold values
- Global threshold
- Adaptive threshold

 **Correct**

The background lighting would be different throughout the day, so an adaptive threshold would make the most sense here.

2. For questions 2-6, you will be working with this grayscale image of coins, shown below. Right click on the image and save it with your files so you can import it into MATLAB.

Determine the global threshold calculated from Otsu's method. What is the threshold intensity value? Express your answer as an integer between 0 and 255.



143

 **Correct**

You can use `graythresh` to determine the threshold value in decimal form, and then multiply the value by 255 to get the integer representation.

8. In Thresholding Color Images, you saw how to threshold the blueberries image ("blueberries.jpg") in HSV. Now, try performing the same thresholding in L*a*b* and YCbCr and compare those segmentations. Which color space do you prefer? Share your thoughts in the forums!

1 / 1 point

- HSV
- L*a*b*
- YCbCr

 **Correct**

Great! Why did you prefer YCbCr? Share your thoughts and results in the discussion forums!

3. Using the threshold value from the previous question, segment the image. How many true pixels are in the resulting segmented binary image?

1 / 1 point

594617

 **Correct**

The number of true pixels can be counted using the `nnz` function.

4. What is the effectiveness metric for the dimes image?

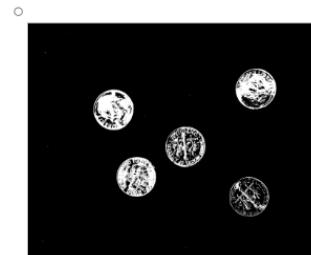
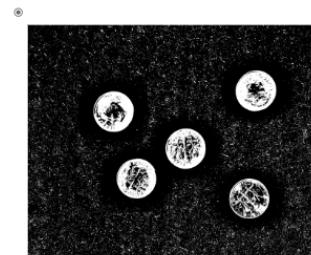
1 point

0.6967

The effectiveness metric can be calculated using the `graythresh` function.

5. Now segment the same image using an adaptive threshold. Which of the following images looks most like the result?

1 / 1 point



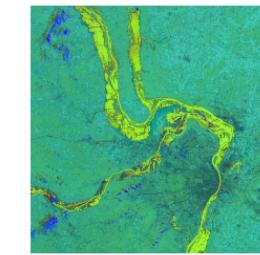
6. Which of the following can only be done with a multilevel threshold (as opposed to an adaptive or global threshold)?

- Isolating three objects, each with their own distinct intensity
- Isolating the foreground from the background in an image
- Isolating the foreground from the background, but you have inconsistent lighting in your image

 **Correct**

Multilevel thresholds can differentiate between multiple different shades in an image.

7. You are working with a satellite image of a flood on a green landscape, but when showing the image using `imshow`, you unexpectedly saw this:



What's the best possible reason for this?

- You accidentally changed the data type of the image into double, but the values are all the same.
- You accidentally inverted the image colors.
- You converted to a different color space and forgot to convert back to RGB before using `imshow`.

 **Correct**

The `imshow` function accepts any `uint8` or `double` 3D matrices with three layers, but assumes the values are in RGB, so passing in an HSV, YCbCr, or L*a*b* image leads to strange results.