

Mastery Assignment #8 Basics

Fall 2022

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This file contains the basics of the eighth mastery assignment. It is intended to provide a basic overview of the assignment and help with any tricky parts.

General Overview:

- Submit your code on Zybooks in the “37. Mastery Assignment #8” section
- All code is automatically graded by Zybooks
- You can submit your code as many times as needed before the deadline
- The assignment is due Sunday, November 20th, 2022 by 11:59pm
- No late work is accepted
- There are no known errors in the grading script as of November 12th, 2022

Problem 1:

Task 1:

- Remember, for this problem, you can only use the functions listed in the prompt and cannot use implicit loops!
- The ‘imread’ function will be useful here
- What feature distinguishes a normal matrix from an image? Hint: think about the dimensions of a normal matrix vs. an image

Task 2:

- Using a nested loop here is a great idea
- You only need to check one layer since this is a grayscale image
- It is more efficient to assume the tumor is present and then test whether this assumption is wrong
- Think of ways to cut down on how many pixels need to be scanned since your runtime is limited to 30 seconds
- Remember, you must check the entire image!

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Task 3:

- Using some nested loop here is a great idea
- You can find the average brightness of the tumor image by dividing the sums of its pixel values (from 1 layer since it grayscale) by the total amount of pixels in 1 layer)
- Remember, the red layer = 1, the blue layer = 2, and the green layer = 3!
- Remember, decreasing a value by 50% is the same as multiplying it by 0.5
- The 'image' function will be useful here

Problem 2:

Task 1:

- Remember, for this problem, you can only use the functions listed in the prompt and cannot use implicit loops!
- Remember, the brightness of a pixel is proportional to the sum of its RGB values
- The 'sum', 'max', 'min', and 'find' functions will be useful here
- Using a nested loop here is a great idea
- I do not recommend using masking for this task since you are only swapping colors

Task 2:

- Remember, the red layer = 1, the blue layer = 2, and the green layer = 3!
- You are simply applying the formula given in the prompt to an image
- The 'cat' function will be useful here
- You can code this solution efficiently in 2 lines

Task 3:

- Remember, the red layer = 1, the blue layer = 2, and the green layer = 3!
- You are simply applying the formula given in the prompt to an image
- The 'cat' function will be useful here

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Task 4:

- Recall how to call a function in your main script
- The 'subplot', 'imshow', 'title', and 'figure' functions will be useful here
- You will have to call the 'subplot', 'imshow', and 'title' functions 4 times each to complete the first bullet point
- You will have to concatenate the images together and call the 'figure', 'imshow', and 'title' functions to complete the second bullet point

Mastery Assignment #8 is the last MA you encounter in this course. Luckily, it is one of the easier and more enjoyable MA's to complete. The concepts covered in this MA could, but are unlikely to, appear on the final. However, you should still complete this MA because nested loops are used and those will appear on the final. Please make sure you can complete all of MA8 by yourself without the aid of notes or other people. Also, before the final exam, make sure you can complete MA8 in the recommended proficiency time of 35 - 50 minutes for Problem #1 and 25 - 40 minutes for Problem #2.