

1- (a) and (b) (20) Develop a graphical interface to draw a transform function as shown in Fig.3-10 (a). For example if you were supposed to produce exactly Fig.10(a), you should right-click on mouse at points (r_1, s_1) and (r_2, s_2) only. When the point selection procedure is finished, you can decide the termination process by for example clicking on an icon that you design, or simply double left-click.

By default, $(0,0)$ will be collected to the first selected point, and the last selected point will be connected to point $(255,255)$. Upon termination of this routine, the shape of transform function $T(r)$ should be displayed.

Using this routine you should be able to define any shape of transformation function.

(b) Design one transform function similar to Fig.3.10(a) and another one similar to Fig.3.11(c).

(c) (10) read two images, apply the above transform functions to them, and show, transform function, input and output images on 3 separate windows.

2-(25) Write your own code to implement Histogram equalization. Note that you are not supposed to call the function provided in Matlab. Compare the output image of your code with that of Matlab, by displaying the difference of two output images and also the summation of absolute value of pixel-wise differences between these two images.

3- (15) Use Matlab histogram equalization function to apply local histogram equalization with a given window size. Image name and window size are two input parameters to this function. You should write two nested loop to move on original image, and at each position, calculate histogram equalization.

4- (30) Write an interface to design the overall shape of a histogram for histogram specification routine.

Download an image and display its histogram, the graphical shape of histogram you design should be very similar to the histogram of this image but with some significant modifications.

As output, you should show the process of designing new histogram, the final version of histogram, the original and the result of applying histogram specification.

Note: you are not supposed to call the Matlab function for histogram specification, but should write your own code.

Notes:

a) 1-(15) means the 1st question has 15 marks from 100.

b) About comments in the program:

Each question should be written as one function in Matlab, if the question has more than one independent part, each of those parts should be written as a function.

In a function, the input and output should be specified.

Bellow each function, a short description of function should be given, also you should describe the input and output parameters or variables as follows:

Description: Here you should give a brief description on what the function is supposed to do.

Input: name each input and its description. For example if the input is an image to this function

you can write: Input: img1: color input image, or monochrome input image.

Output: same as described for Input.

The main part of the code, calls each function in an order. You can have "waite(0)" in the main between two function calls, to wait for pressing a key, to start executing the next function.

Deadline Monday 17 Azar.

In case of delay (until 48 hours (2 days) after the dead line), your grade will be multiplied by 0.7.

From the 3rd day to end of 5th day after the initial deadline dead line, your grade will be multiplied by 0.3.

After the 5th day, I am sorry to say that you will lose the grade for this assignment.

This grading policy is for the first 2 assignments and after that we can accept only the first 2 days delay.