**Date: 25-09-2017 Assignment # 01**

**Subject: Digital Image Processing**

**Total Marks: 100**

**Note**: Submit your assignment (Matlab code) online on Slate. A zero grade will be given if your assignment is found copied. Oral interview is mandatory; I will randomly call you all for an **oral interview** to validate your effort. **Deadline** for submission is **16:00 PKT, Sunday 08th October 2017**.

**Question # 01:**

Develop a Matlab application that lets its user to browse a **grayscale** **image** (use Matlab GUI + Forms and Buttons) and displays the browsed image as well as its size. In case of RGB or binary image provided as input, the **application must prompt the user** to input grayscale image again. The application should provide buttons to perform the following basic operations:

1. The application should provide a button to flip the image vertically. Using this button on an example image i.e., image Moon.bmp should give you results as shown below:

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1. The application should also provide a button to generate the negative of an image. This means that a new image is created in which the pixel values are all equal to 1.0 minus the pixel value in the original image.
2. A button to display the **contrast value (use average pixel difference definition)** of the image. Use appropriate formula to calculate contrast value.
3. A button to **calculate and display** the average intensity value of the pixels in the image e.g., Moon.bmp and then **thresholds this image** based on this average intensity. Thresholding means that a new image is generated in which each pixel has intensity 1.0 if the corresponding pixel in the original image has a value above the threshold and 0 otherwise.

**Hint:** To calculate the average intensity of the pixels in an image simply iterate through every pixel in the image, summing all of their values and finally divide this sum by the total number of pixels. This program should have the following effect on Moon.bmp:

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| --- | --- |
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1. A button to perform each of the following enhancements on the input image: **log transformation, contrast stretching** (given the stretching points from the input image’s intensity values).
2. The application should also provide a **save button** to save the changed image after each operation.

**xxx------- Good Luck! -------xxx**