German University in Cairo
Faculty of Media Engineering and Technology
Spring 2020

DMET 1001 – Image Processing

Assignment #1

(Due on: March 20, 2020 at mid-night)

Problem 1

Implement the histogram equalization algorithm. Your function should take a gray-scale image as an input. The function should output the image after histogram equalization, the histogram of the image before equalization and after equalization. Apply your function to the image "Sphinx.png".

Deliverables:

- Your code.
- The output image after equalization. Name the image "Eq.jpg".
- A plot of the histogram before equalization. Name the plot "Before_Eq.jpg".
- A plot of the histogram after equalization. Name the plot "After_Eq.jpg".

Problem 2

Implement a function that applies a high-boost filter to an input gray-scale image. Your filter should use the butterworth high-pass filter. The function should take as inputs the input image, the order of the filter, the cutoff distance of the high-pass filter D_0 and the constant A. It should output the filtered image. Apply the filter to the image "Moon.jpg".

Deliverables:

- Your code.
- The output image obtained using 1st order butterworth filter with $D_0 = 50$ and $A = 1.5$. Name the output image "MoonHB_1.jpg".
- The output image obtained using 1st order butterworth filter with $D_0 = 50$ and $A = 2$. Name the output image "MoonHB_2.jpg".
- The output image obtained using 2nd order butterworth filter with $D_0 = 50$ and $A = 2$. Name the output image "MoonHB_3.jpg".