

## Assignment# 1

### Introduction to Image Processing

Total Marks: 70

Submission Deadline: 11<sup>th</sup> Nov 2023

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**Q1:** Take a grayscale image as an input. You can also convert an RGB to grayscale to use the image as input. **(Marks: 10 + 10 + 10)**

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**(a)** Store the most significant (8<sup>th</sup> bit) of the input grayscale image into a new image of the same size at its least significant (1<sup>st</sup> bit).

**(b)** Now save the most significant (8<sup>th</sup> bit) of the input grayscale image into a new image of the same size at its most significant (8<sup>th</sup> bit).

**(c)** Now save the least significant (1<sup>st</sup> bit) of the input grayscale image into a new image of the same size at its most significant (8<sup>th</sup> bit).

For the above subtasks write the (MATLAB or Python) code and display the output images. Also write down is there any difference in the output images as a result of bit storing differences you have done in (a), (b) and (c).

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**Q2:** Use the same input image as used for Q1. **(Marks: 10 + 10 + 10 + 10)**

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**(a)** Write a code that shows an output image based on its 3<sup>rd</sup>, 4<sup>th</sup>, and 5<sup>th</sup> bit planes.

**(b)** Write a code that shows an output image based on its 6<sup>th</sup>, 7<sup>th</sup>, and 8<sup>th</sup> bit planes.

**(c)** Show the output images on a single figure (2 rows, 4 columns), where the first row contains 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup> and there combined (resultant) output image. The second row contains 6<sup>th</sup>, 7<sup>th</sup>, 8<sup>th</sup> and there combined (resultant) output image.

Do you find them different? If yes, write the reason.

**(d)** Find out the required memory these images (a), (b) require? Compared to the original image, does the images (a) and (b) require less memory for storage.

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The unprepared mind cannot see the outstretched hand of opportunity.

-Alexander Fleming (1881 – 1955 CE)