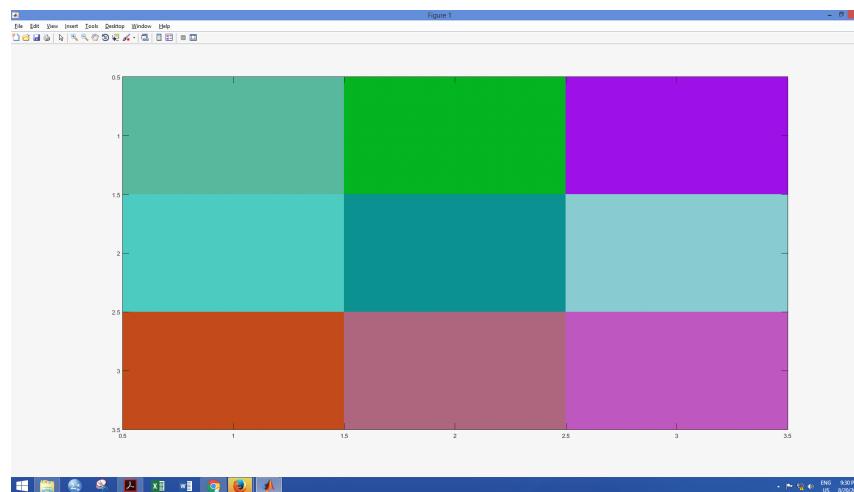


CE-712: Digital Image Processing of Remotely Sensed Data

Laboratory Exercise 3

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Q1. True color composite – 8 bit



True color composite – 16 bit



These are the same as the colors are just extrapolated.

Q2. Interp1 is one dimensional interpolation Function.

For $yi = \text{interp1}(x, Y, xi)$ interp1 interpolates to find yi , the values of the underlying function Y at the points in the vector or array xi . x must be a vector. Y can be a scalar, a vector, or an array of any dimension, subject to the following conditions:

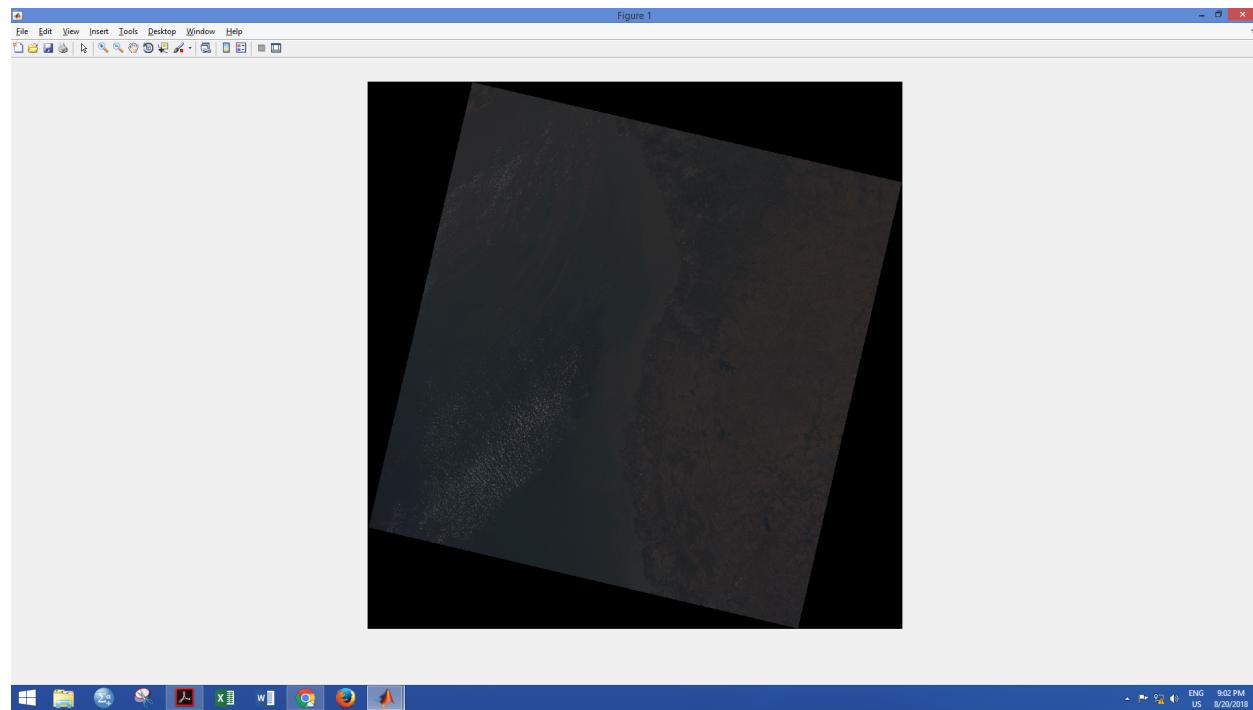
- If Y is a scalar or vector, it must have the same length as x . A scalar value for x or Y is expanded to have the same length as the other. xi can be a scalar, a vector, or a multidimensional array, and yi has the same size as xi .
- If Y is an array that is not a vector, the size of Y must have the form $[n, d1, d2, \dots, dk]$, where n is the length of x . The interpolation is performed for each $d1$ -by- $d2$ -by-...- dk value in Y . The sizes of xi and yi are related as follows:
- If xi is a scalar or vector, $\text{size}(yi)$ equals $[\text{length}(xi), d1, d2, \dots, dk]$.
- If xi is an array of size $[m1, m2, \dots, mj]$, yi has size $[m1, m2, \dots, mj, d1, d2, \dots, dk]$.

Q3.

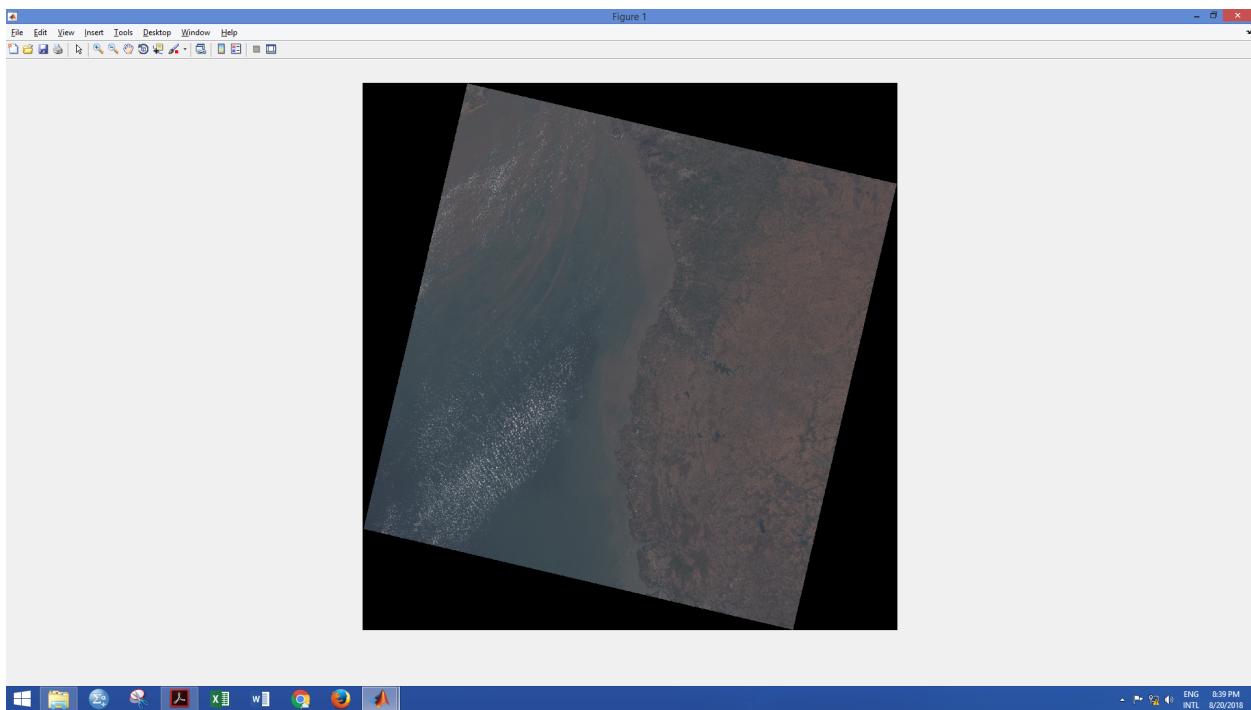
A colormap does not apply for a true color RGB image. RGB images don't have colormaps, which are essentially lookup tables to convert a gray level into a color. To change the color of a pixel in an RGB image you just do it directly by changing the R, G, and B values. There is no single "index" or gray level like there is with an indexed image. If you want to convert your RGB image into an indexed image, you can do so with the `rgb2gray()` function.

Q4.

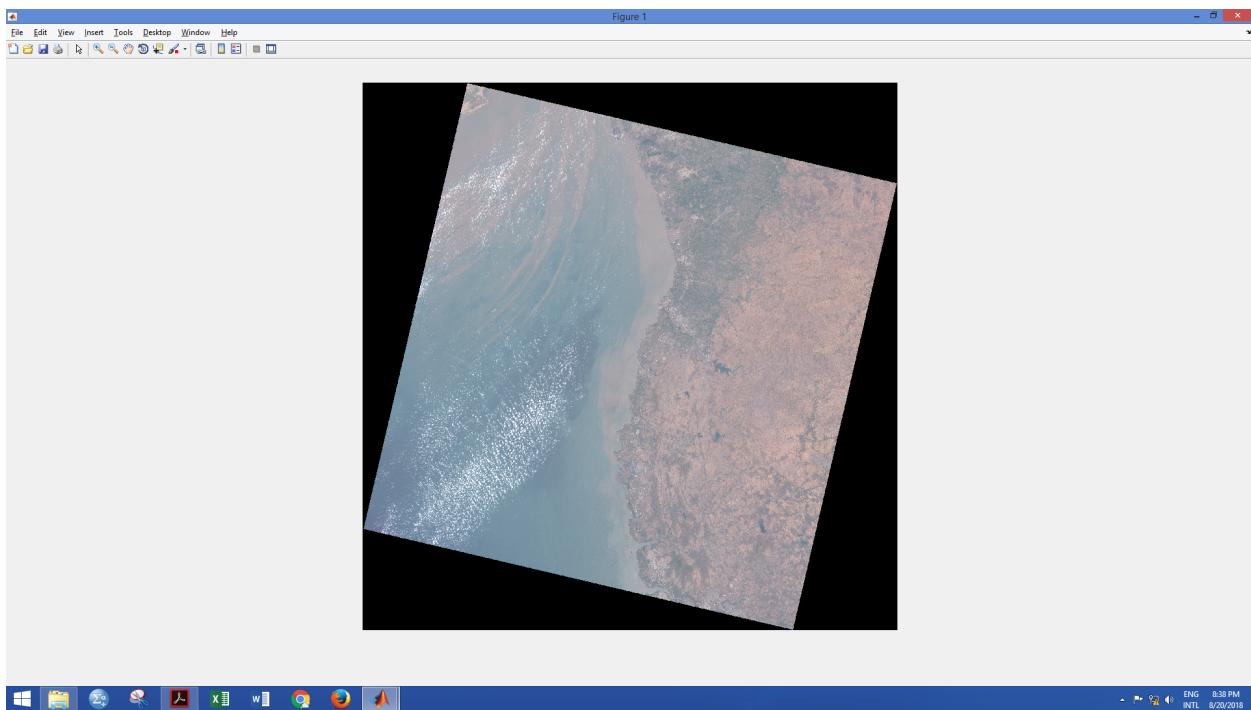
TCC:



TCC 2x:



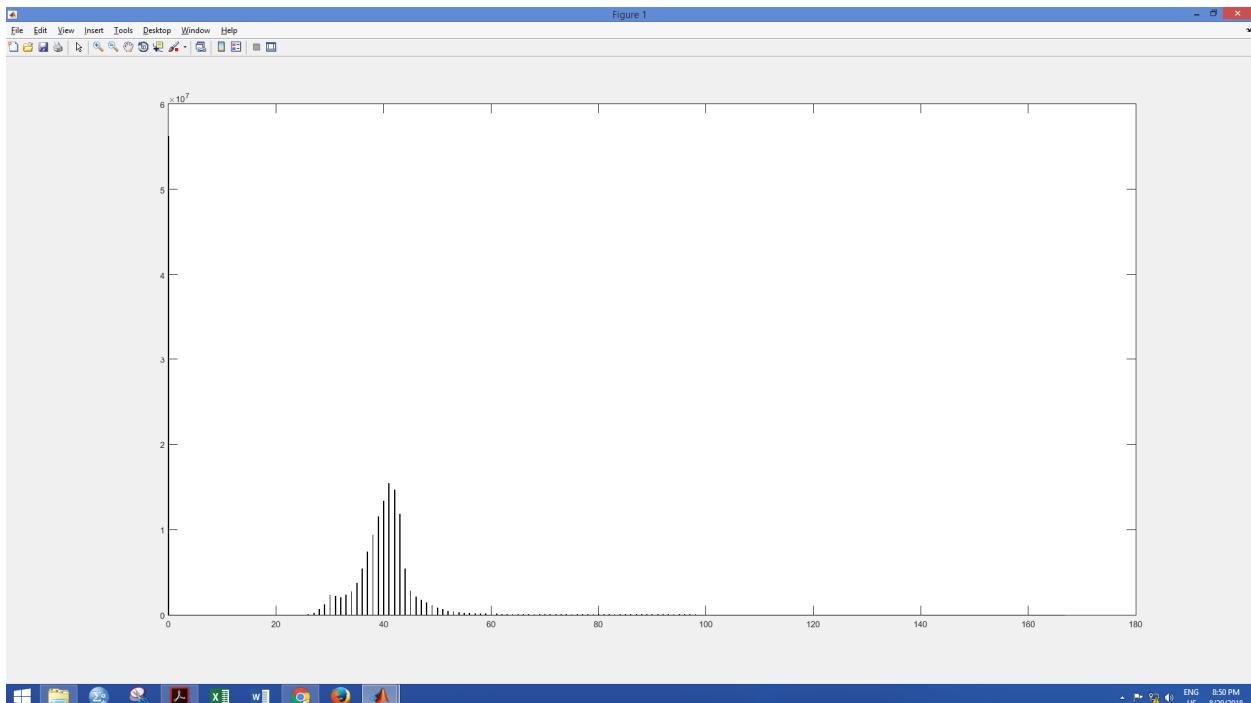
TCC 4x:



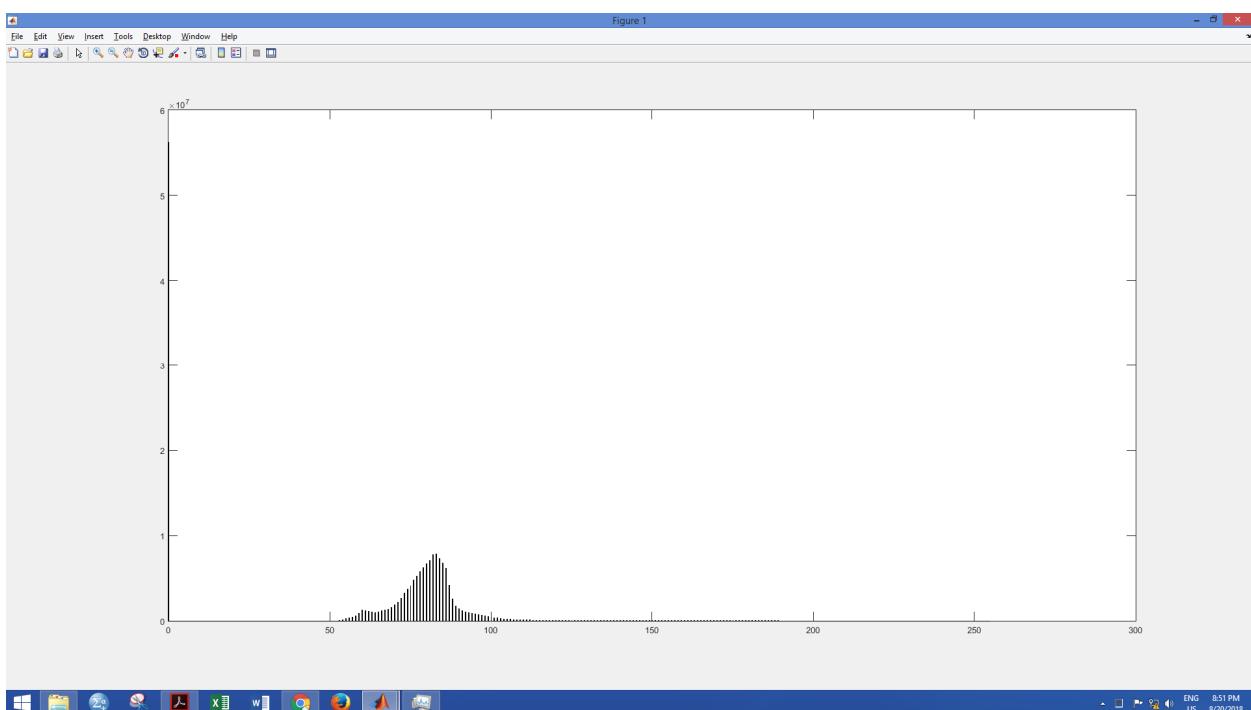
Difference: The brightness is changing but the contrast remains the same.

Histograms:

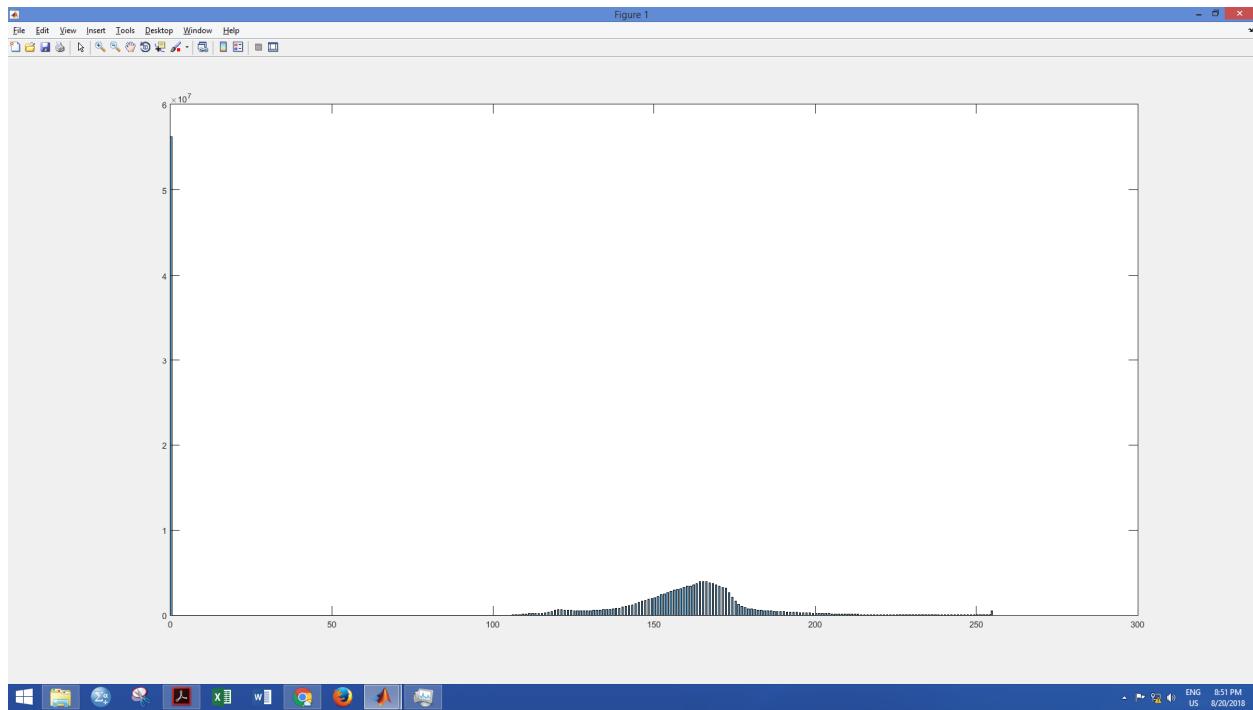
TCC:



TCC2x:



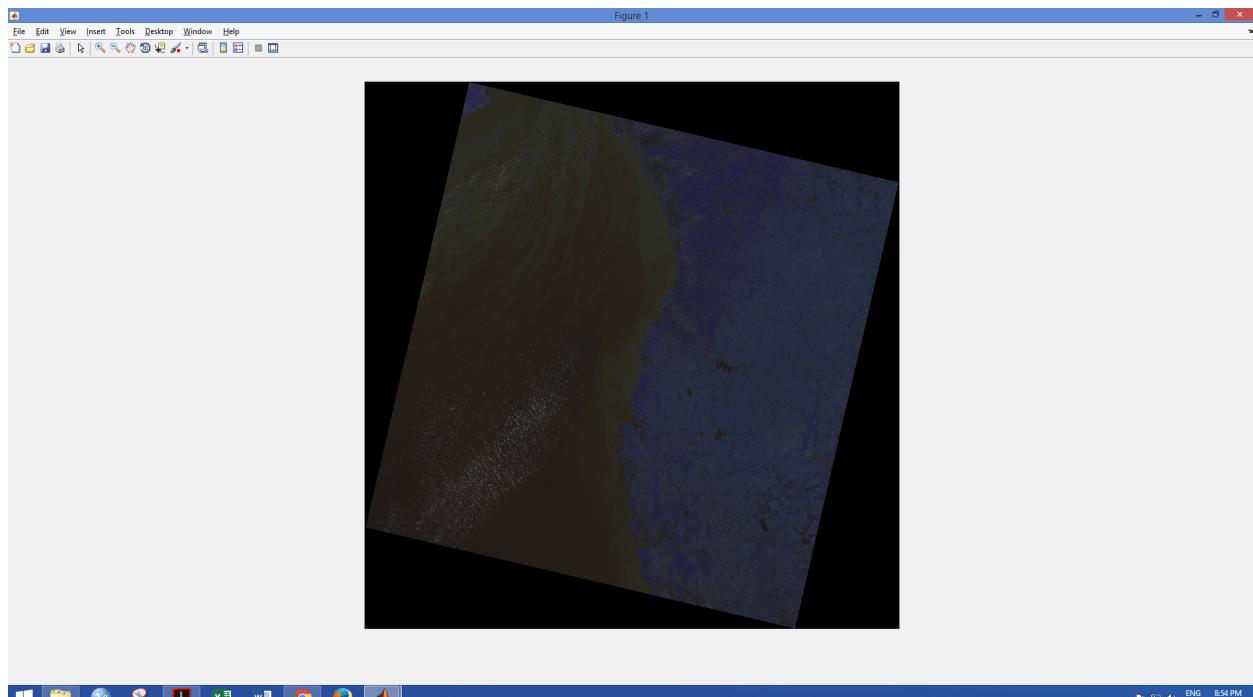
TCC4x:



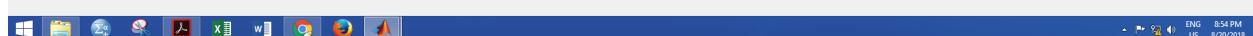
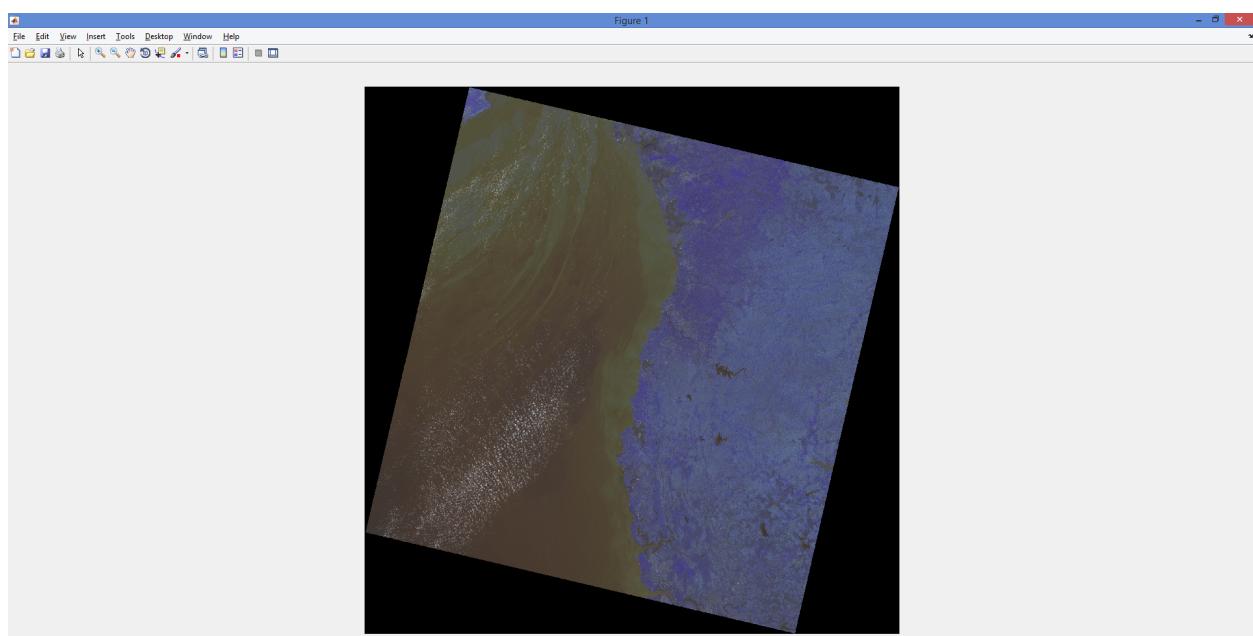
We see that when multiplying a image with each digital number, it shifts rightward. For example peak is approx. 40, during shift it becomes 80 and the whole graph shifts rightward. This is as per the expected behavior. But unexpectedly, the height of histogram also decreases.

Q5.

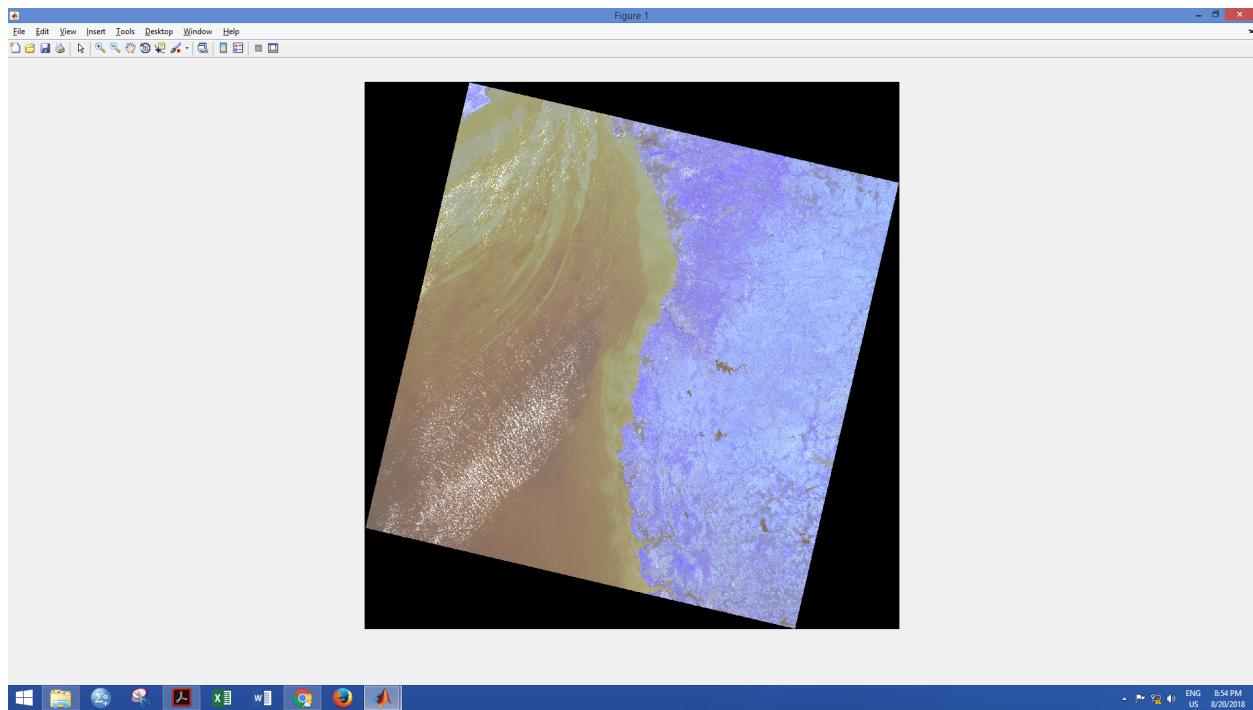
FCC:



FCC2x:

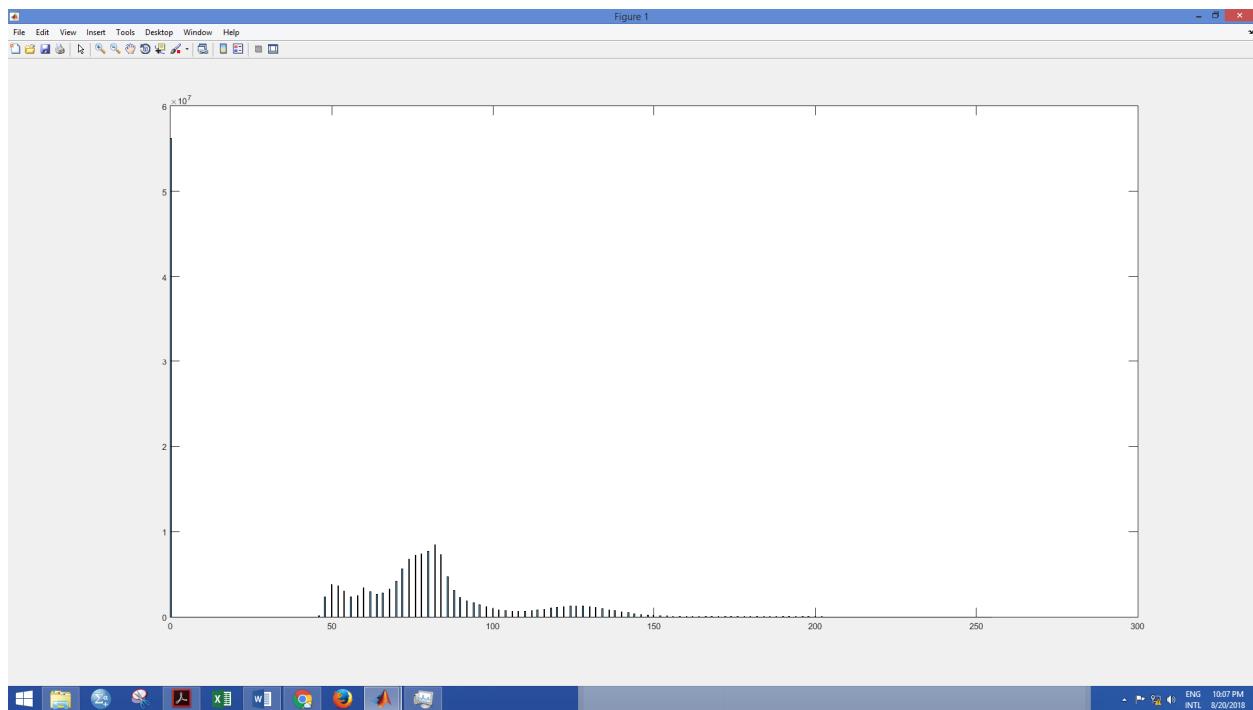


FCC4x:

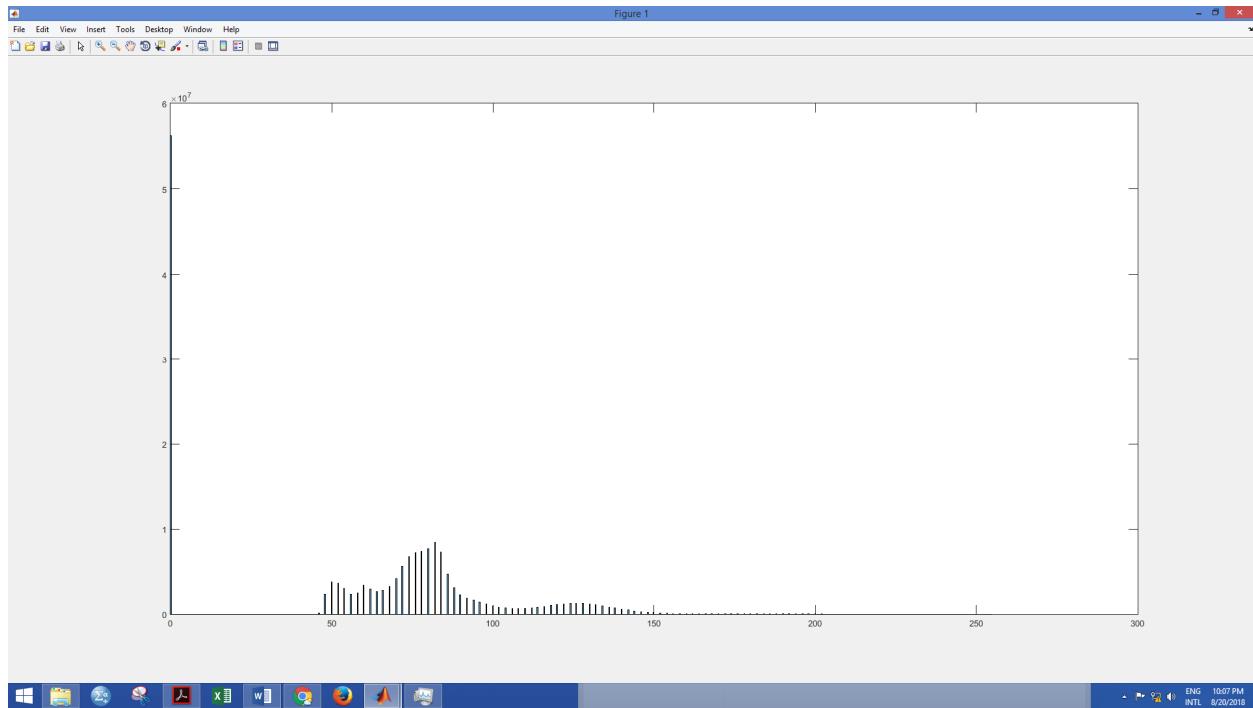


Histogram:

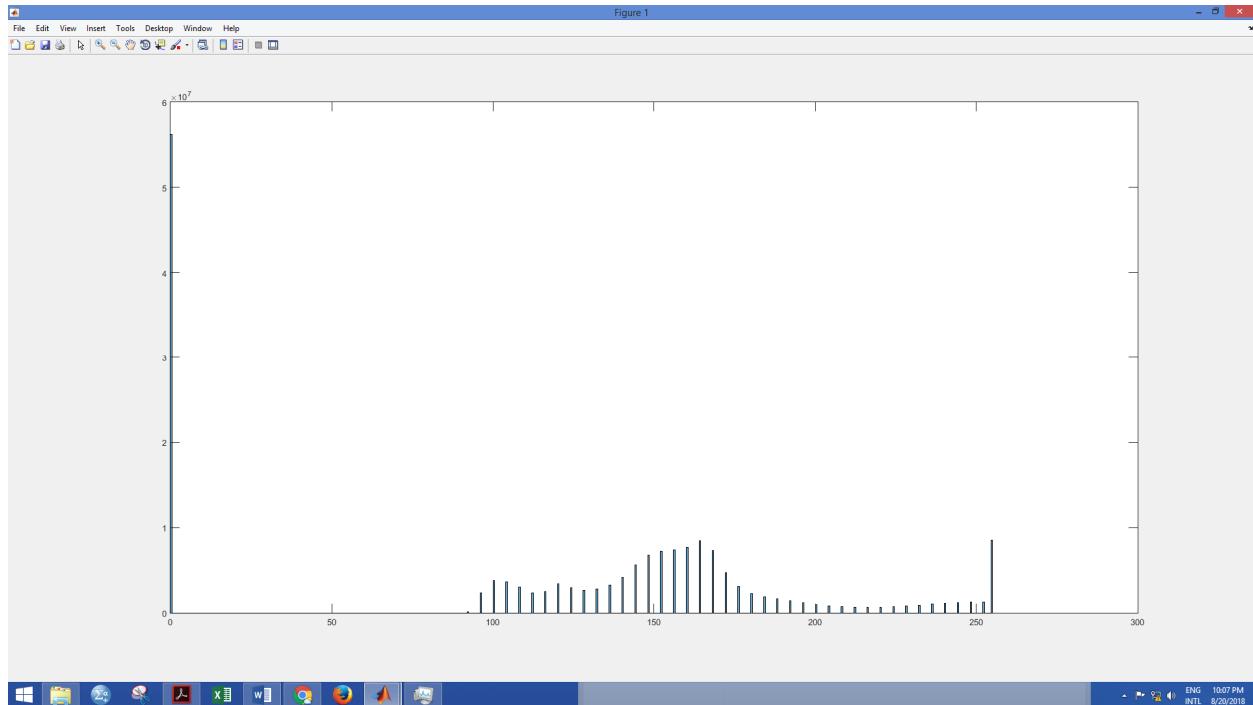
FCC:



FCC2x:

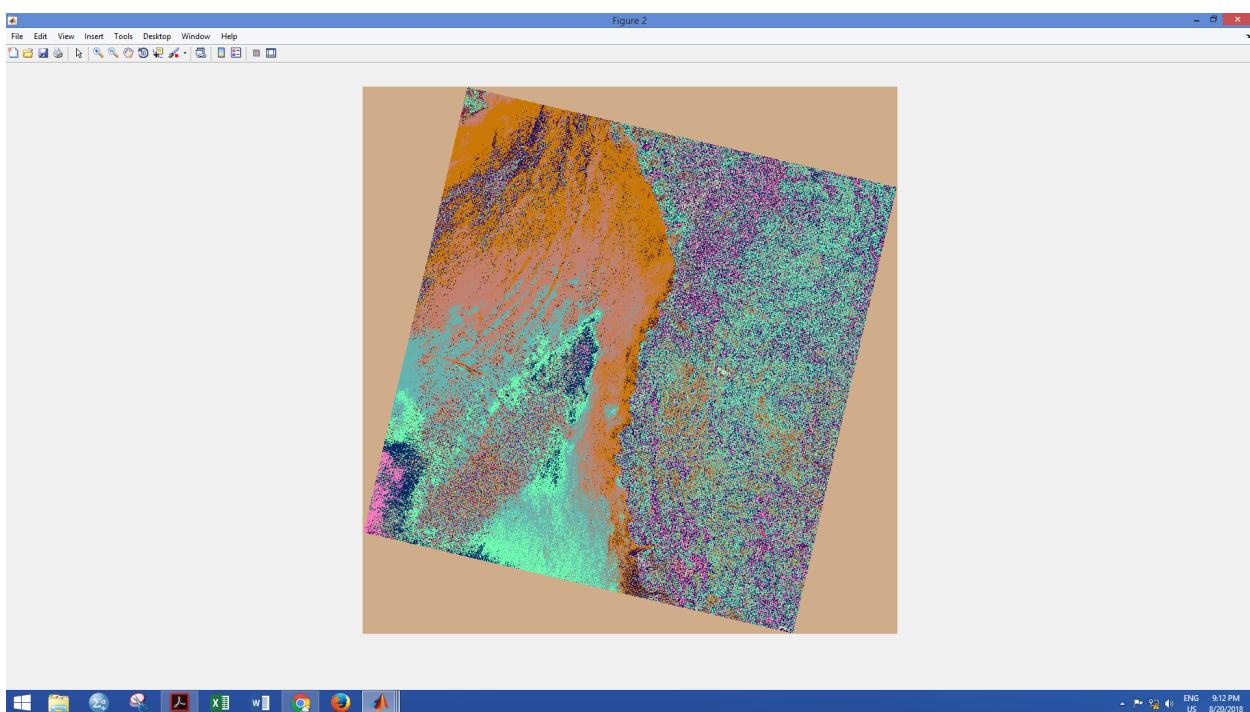
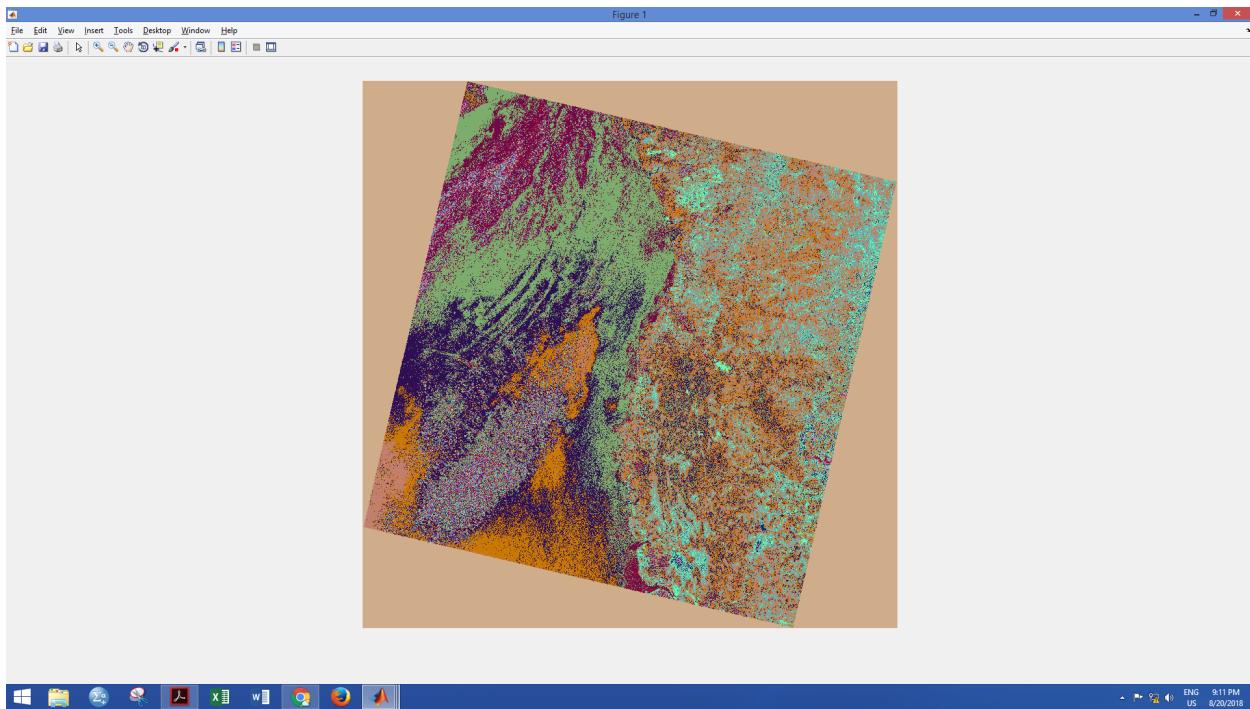


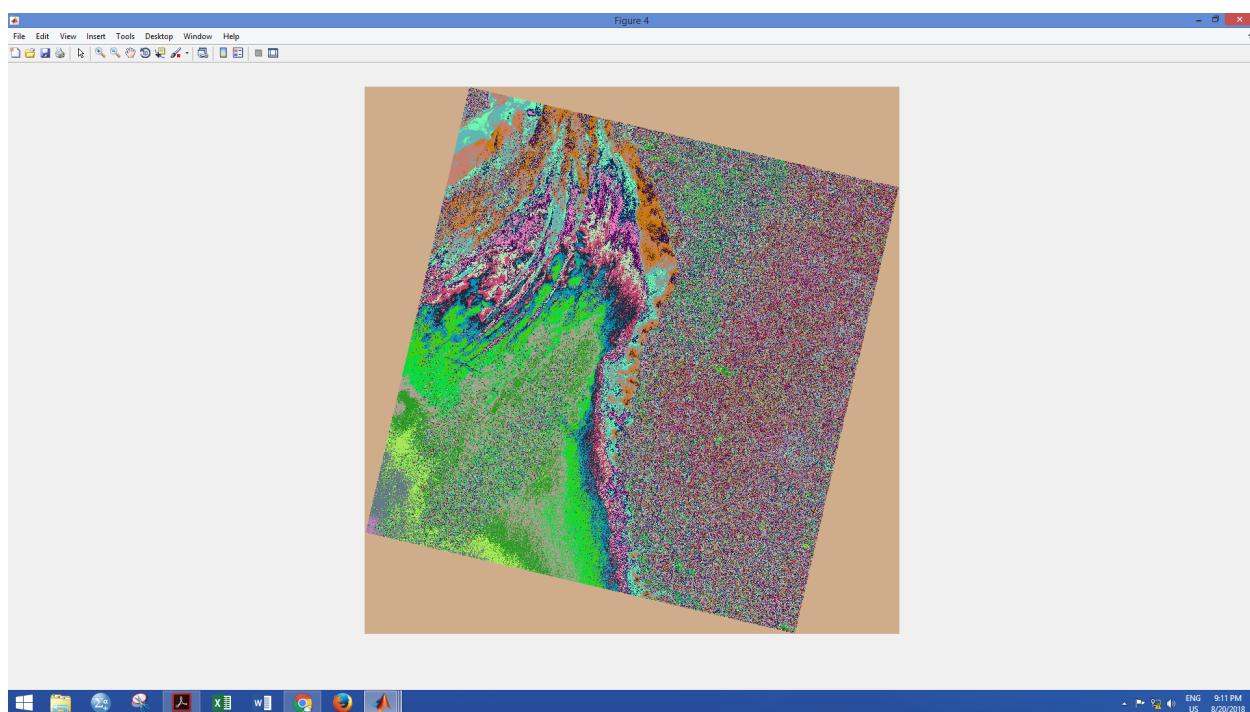
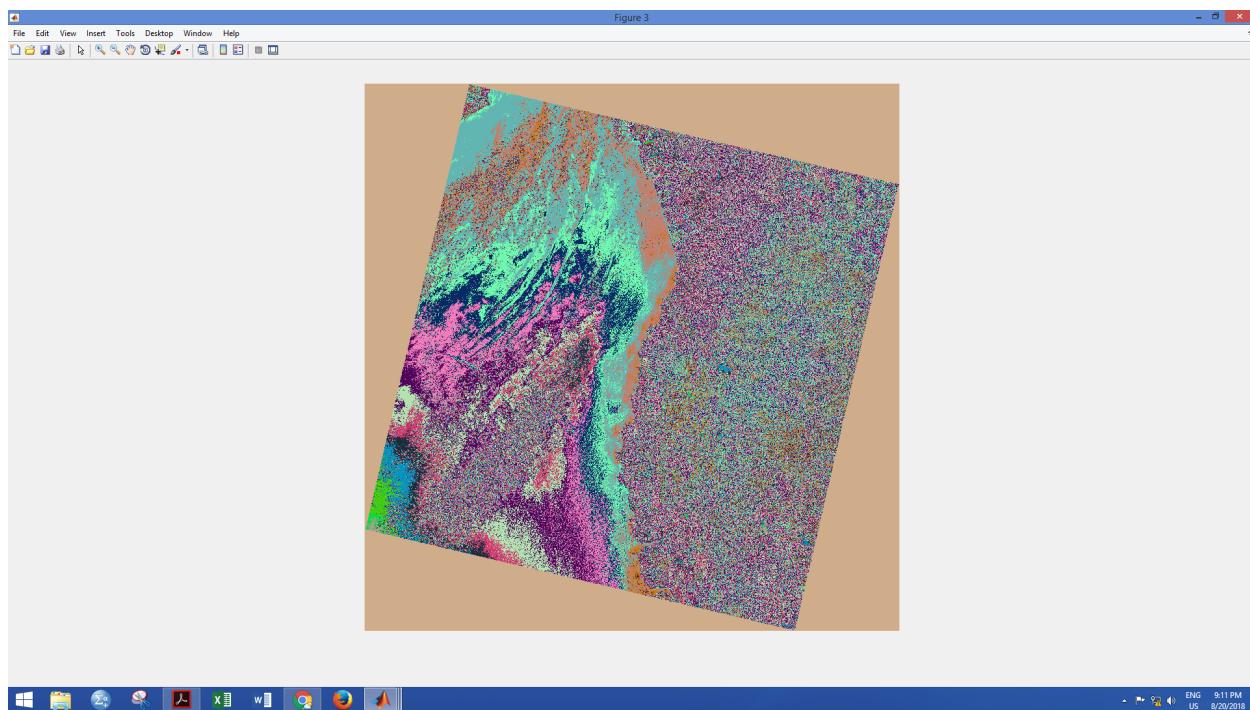
FCC4x:

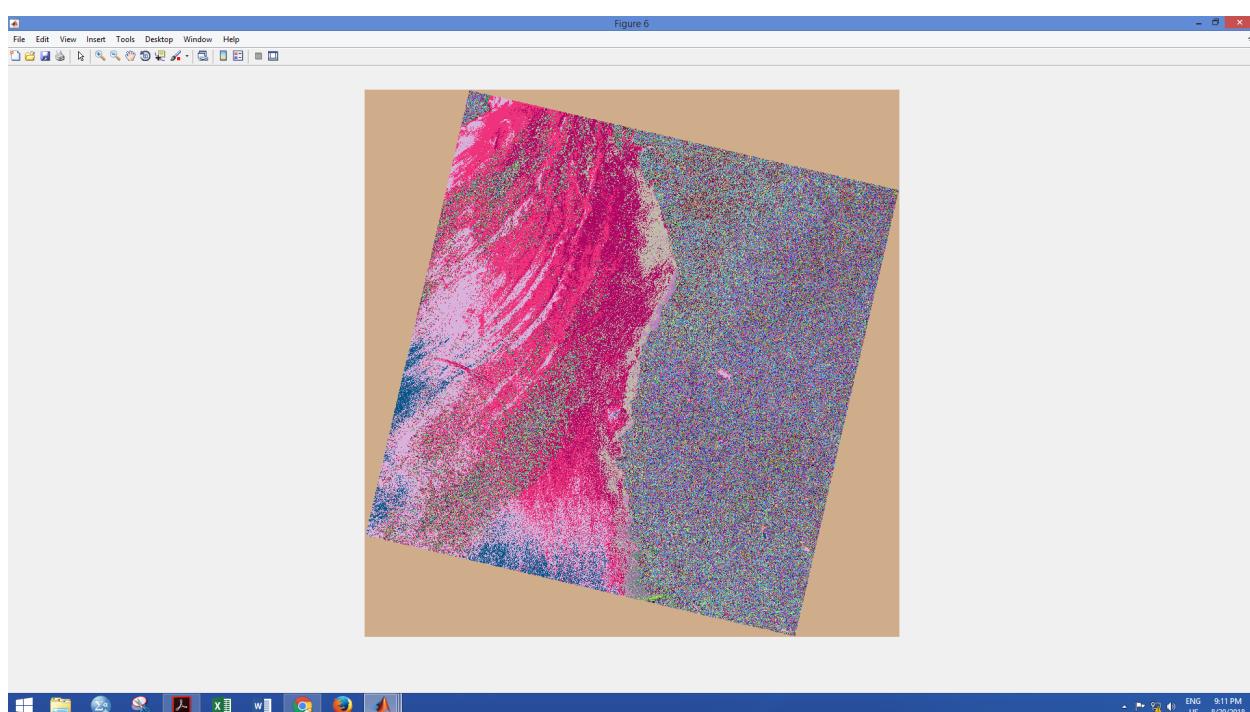
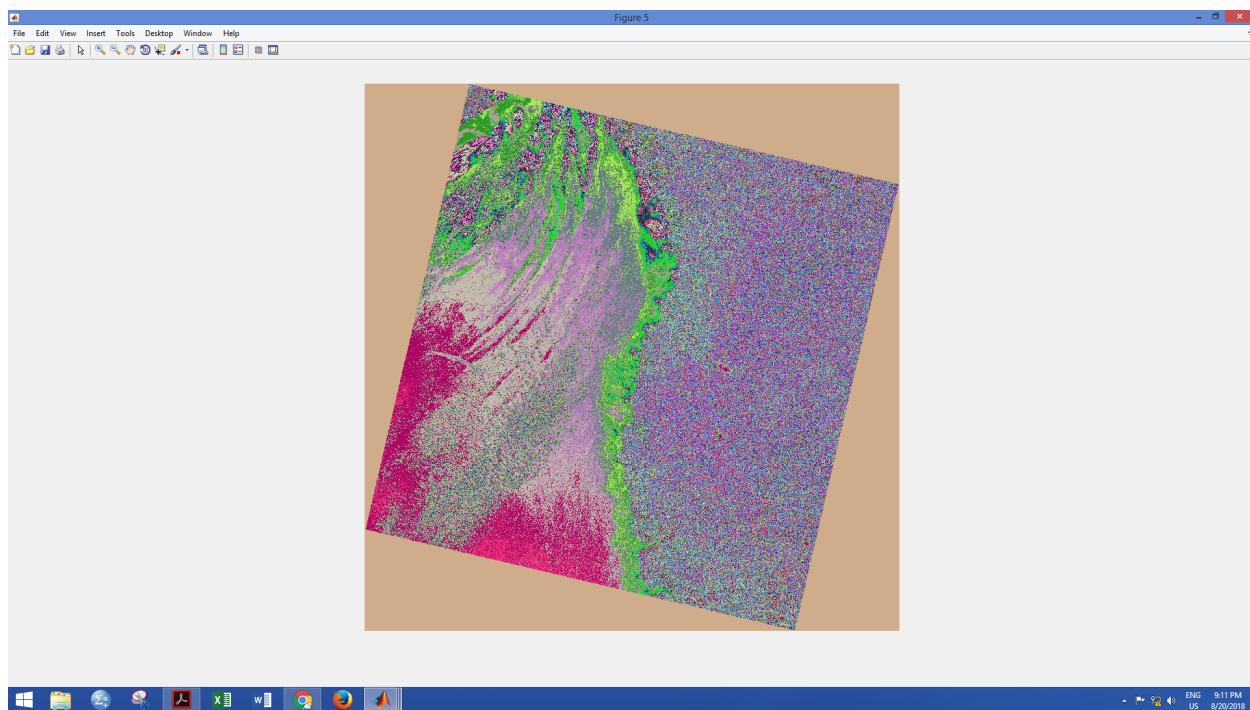


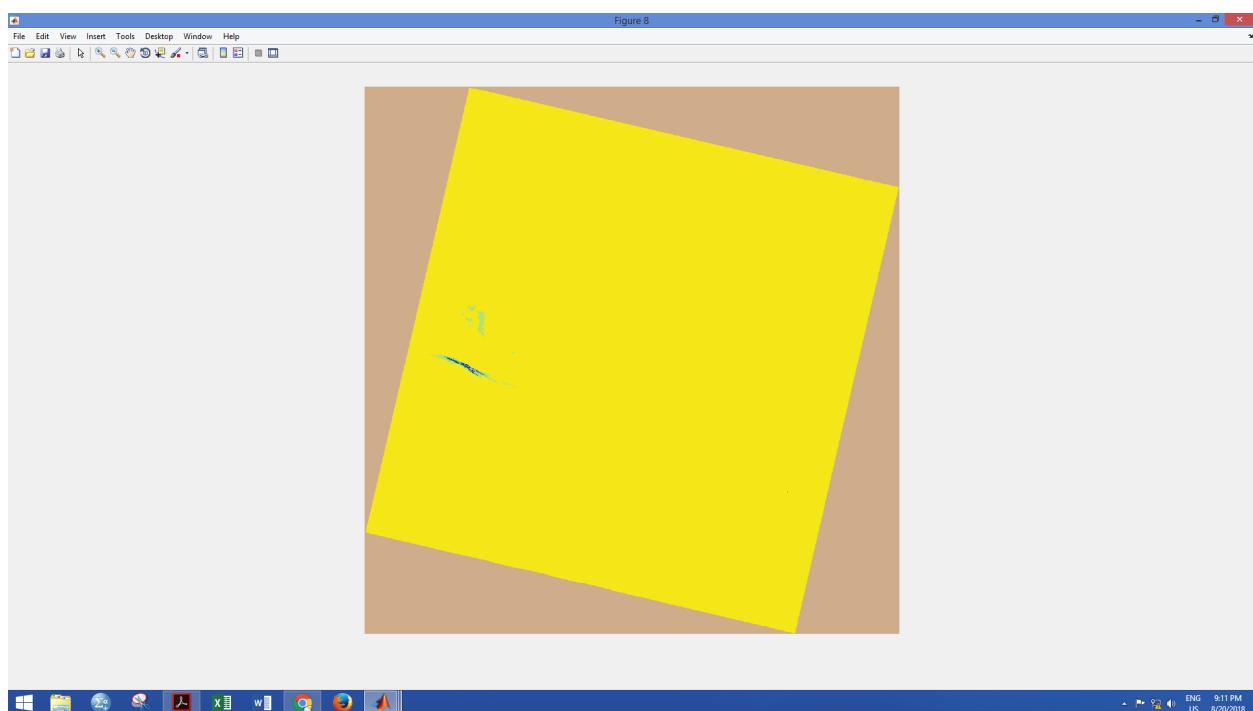
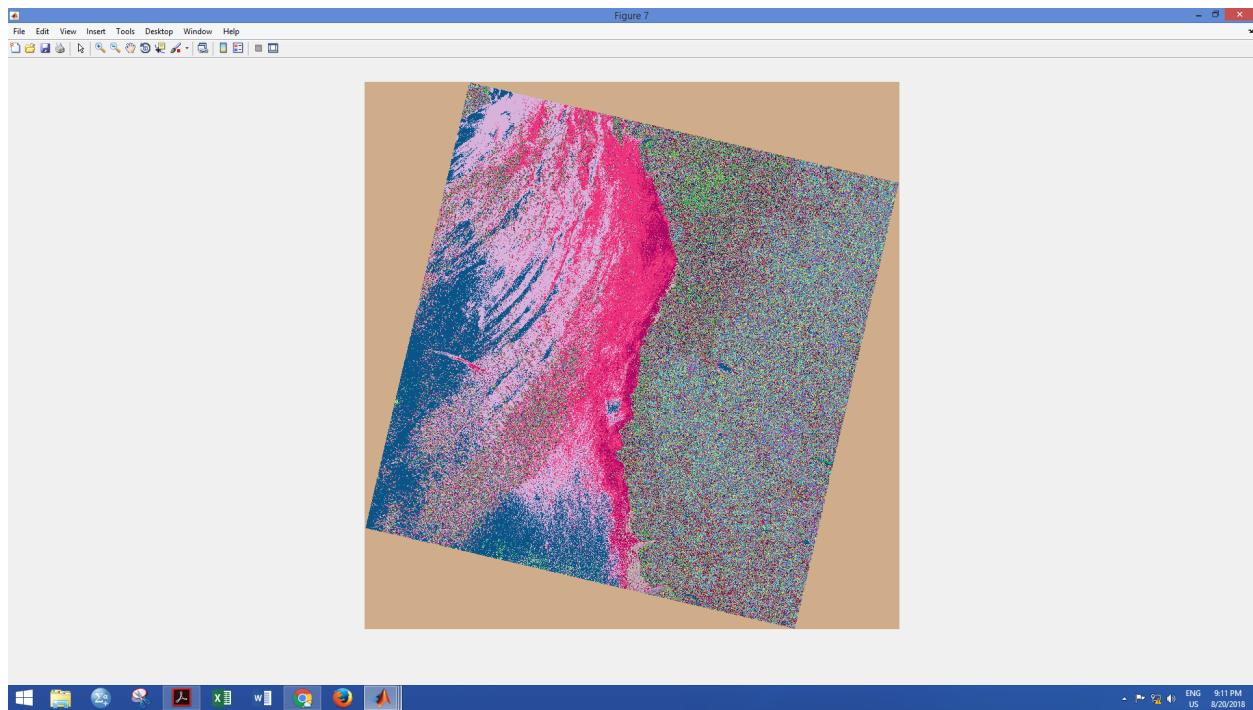
In this case, for 4x the given range 0 to 255 is not sufficient to accommodate the multiplied numbers, so the extra numbers gets trimmed out.

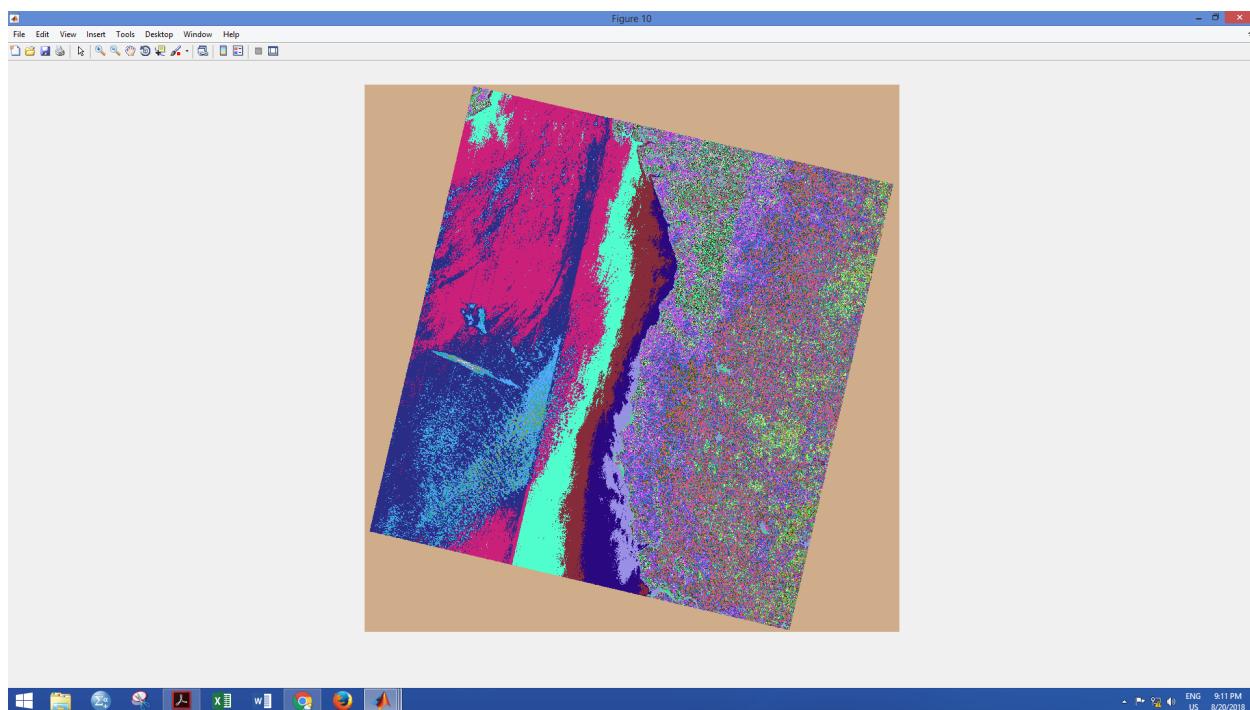
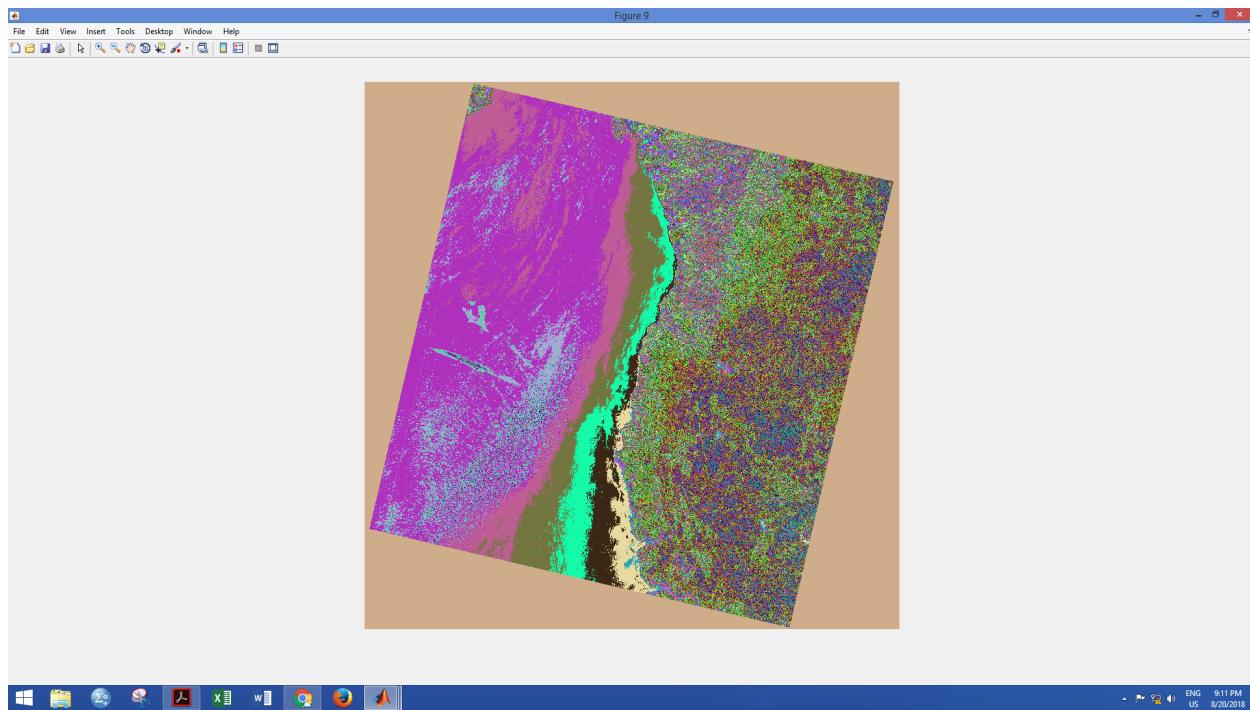
Q6. For loop:











Conclusion:

We can convert an image type to 8bit or 16bit as per our convenience. This can be done for various reasons such as due to size constraints in image arithmetic which involve addition, subtraction, multiplication, division or many more. Moreover, we can display the values of any matrix as an image using concatenation.

An image type is a particular method of associating matrix values with pixel colors. MATLAB has three basic image types:

- TrueColor--generated by digital cameras and widely used in computer graphics
- Indexed and scaled indexed--often used to display scientific and engineering data with an associated color scale representing the data units

In a TrueColor image, every image pixel has three values associated with it: the red, green, and blue components.

If we change the associated values of color, it becomes a false color composite. This is achieved using color mapping. **Color mapping** is a function that maps (transforms) the colors of one (source) image to the colors of another (target) image. A color mapping may be referred to as the algorithm that results in the mapping function or the algorithm that transforms the image colors

In simple words assigning a **COLOR TO A DIFFERENT COLOR TO DIFFERENTIATE AND ANALYSE VARIOUS FEATURES IN A DIGITAL PICTURE.**