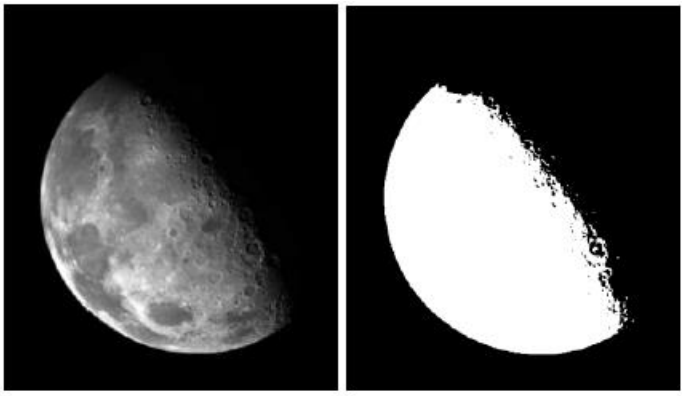
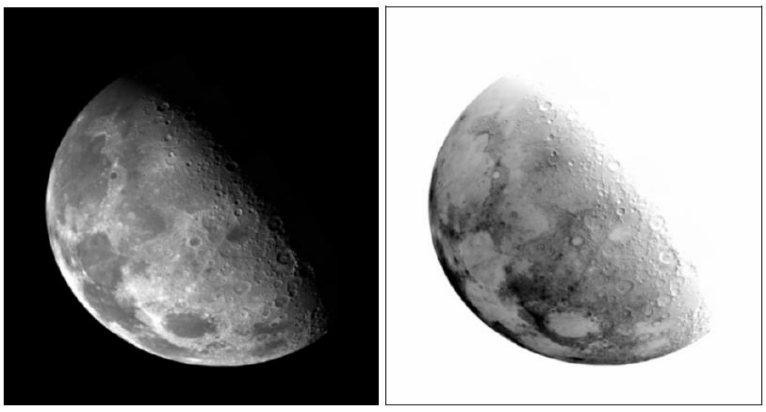
Programming Assignment - 1

1. Write a function **flipImage** which flips an image either vertically or horizontally. The function should take two parameters – the matrix storing the image data and a flag to indicate whether the image should be flipped vertically or horizontally. Use this function from the command line to flip a given image both vertically and horizontally which should give the following results.

2. Write a program that calculates the average intensity value of the pixels in the image Moon.bmp and then thresholds this image based on this 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. Use this new function from the command line on the image moon.tif and it should have the following effect:



3. Write a program which generates 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. When this is used with the image moon.tif the results are as follows:



4. Write a computer program capable of reducing the number of intensity levels in an image from 256 to 2 (in various integer powers of 2 i.e from 1 to 8). Try displaying all the images in one figure to compare the difference (use subplot utility if you are using matlab). When this is used with a given image the results are as below.

5. Write a computer program capable of zooming and shrinking an image by pixel replication. Assume that the desired zoom/shrink factors are integers. Take any image and use your program to shrink the image by a factor of 10. Use your program to zoom the image back to the resolution of the original. Explain the reasons for their differences.
6. Take an image and add to it random noise. Repeat this N times. Add the resulting images and take an average. What do you observe?
7. Use Matlab function to rotate any given image by 45 and 90 degrees. Try using different interpolation methods and see if there is any perceptible effect.