D.O.P.: **L.D.O.S.:**

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Branch:ce	Batch:2
Date of Experiment:17/7/25	Date of Submission:17/7/2025
Grade:	Faculty:

Experiment No. 1:

Aim: Apply image-processing algorithms on the test image to obtain new image.

i. Open, show and save images using different techniques.

ii. To observe the effect of different gray level images on their corresponding image matrix.

iii. Image conversion (Color to Gray, Gray to Binary, Color to Binary).

iv. Convert image formats.

Comment on subjective quality of the image for obtained output.

Prerequisite:

1. Knowledge about MATLAB Software.
2. Basic image Processing command.

Objectives:

1. Opening, closing and saving of images.
2. Observing gray levels of image.
3. Converting a colour image to grey and binary image.
4. Converting different image formats and observe image matrix.

Outcome:

1. Outline the fundamental operations of digital image processing system.

Theory:

A gray scale image is a digital image in which each pixel only contains one scalar value, which is its intensity. The number of possible amplitude levels (intensity values) depends on the numerical type encoding the image.

Gray images are referred as monochrome (one-color) images. They contain gray level information no colour information. The number of bits used for each pixel determines number of gray levels available.

For example, an image encoded with n = 8 bits will only have L = 2_8 = 256 possible intensity values going from 0 representing black to L-1 = 255 representing white.

In applications like medical imaging and astronomy, 12 or 16 bits/pixels images are used. These extra gray levels become useful when a small section of the image is/are made much larger to discern details.

Colour images are based on the fact that a variety of colours can be generated by mixing the three primary colours i.e. Red, Green, Blue, in proper proportion. In colour images each pixel is composed of RGB values and each of these colours require 8 bits for its representation. Hence each pixel is represented by 24 bits.

A 24 bit colour image supports 16,777,216 different combinations of colours.

Colour image can be easily converted to grey scale image using the equation

$$X = 0.3*R + 0.59*G + 0.11*B$$

A formula that could achieve similar results is

$$X= (R+G+B)/3$$

To Reading an Image File: Use following command to read image file:

myImage = imread (‘File name with path’);

If name of the image file is test.bmp and if it is in /home/abc folder above commands can be written as:

myImage = imread(‘/home/abc/test.bmp’);

The image filename can be given as a full file path or as a file path relative to the Matlab current directory. The current directory can be changed from the main Matlab interface window or by cd (change directory command). The supported file formats include ‘bmp’, ‘gif’, ‘jpg’ and ‘png’.

After giving above command image data is available in **myImage** variable. You can use any variable name.

To Know size of Matrix:

Syntax:

[rows, cols] = size(A);

This function gives size of matrix Above command gives result: rows=3, cols=3

To Displaying an Image : After reading image data using above function, we can display images in Matlab using **imshow** function. This function simply takes the array storing the image values as its only parameter.

Syntax:

imshow(<variable name>)

Example:

imshow(myImage);

To Know Size of Image in Pixels:

Size of the [illegible]e in pixels can be found out by following command:

[Rows, Cols] = size(myImage)

Image res[illegible] Image resizing can be done by following command:

imresize(Image,{Parameters});

For examp[illegible]
Consider t[illegible] read the image in variable myImage using imread function than we can resize the image stor[illegible]his variable by following command imresize(myImage,[256,256],'nearest'); This com[illegible]will convert image of any size into image of 256x256 using nearest neighbor technique.

Displaying [illegible]iple images in single figure.

1. [illegible]splay multiple images simultaneously we can use function figure(figure_number). [illegible]e function will create new figure window for each image to be displayed.
2. [illegible]splay multiple images in single window we can use function subplot(m,n,p). where [illegible]or number of rows in which figure window is divided, n is number of columns and [illegible]cates section number. [illegible]xample if we write subplot(2,2,1) will divide the figure window in four subsections [illegible]mage will be plotted in first section.

1	2
3	4

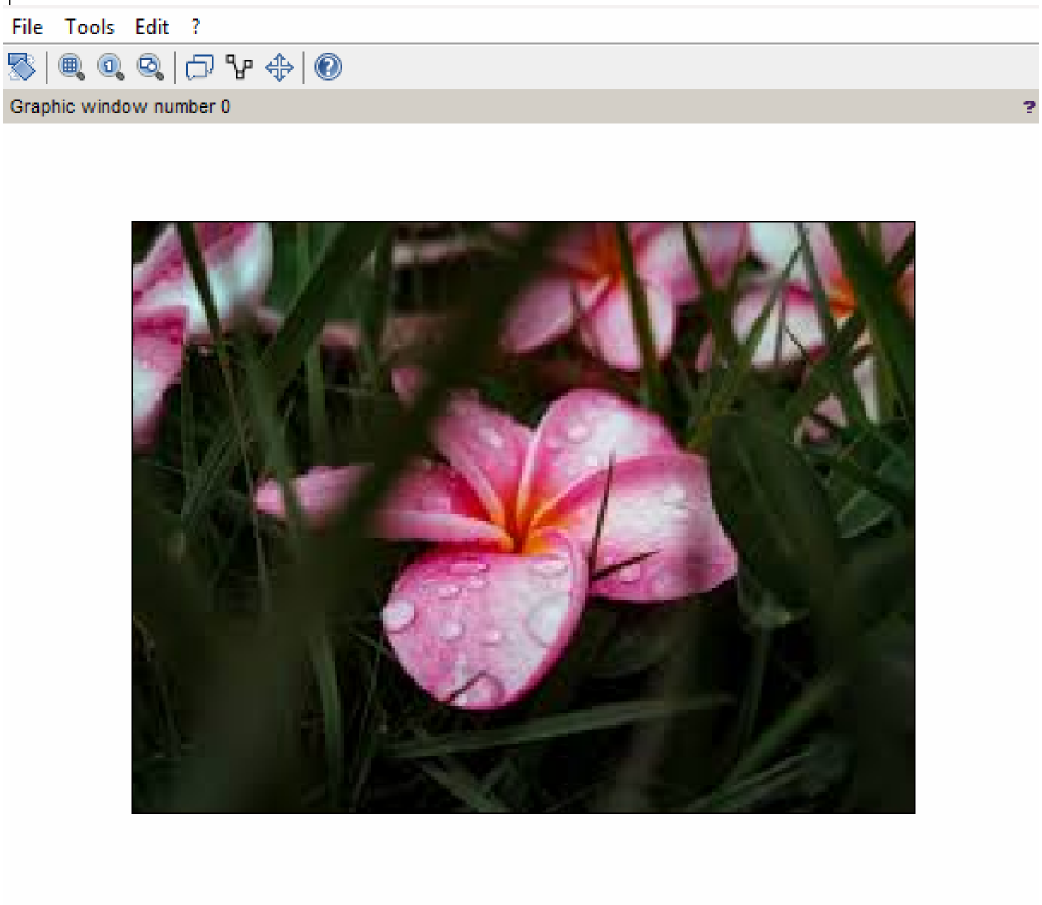
Write image to file.

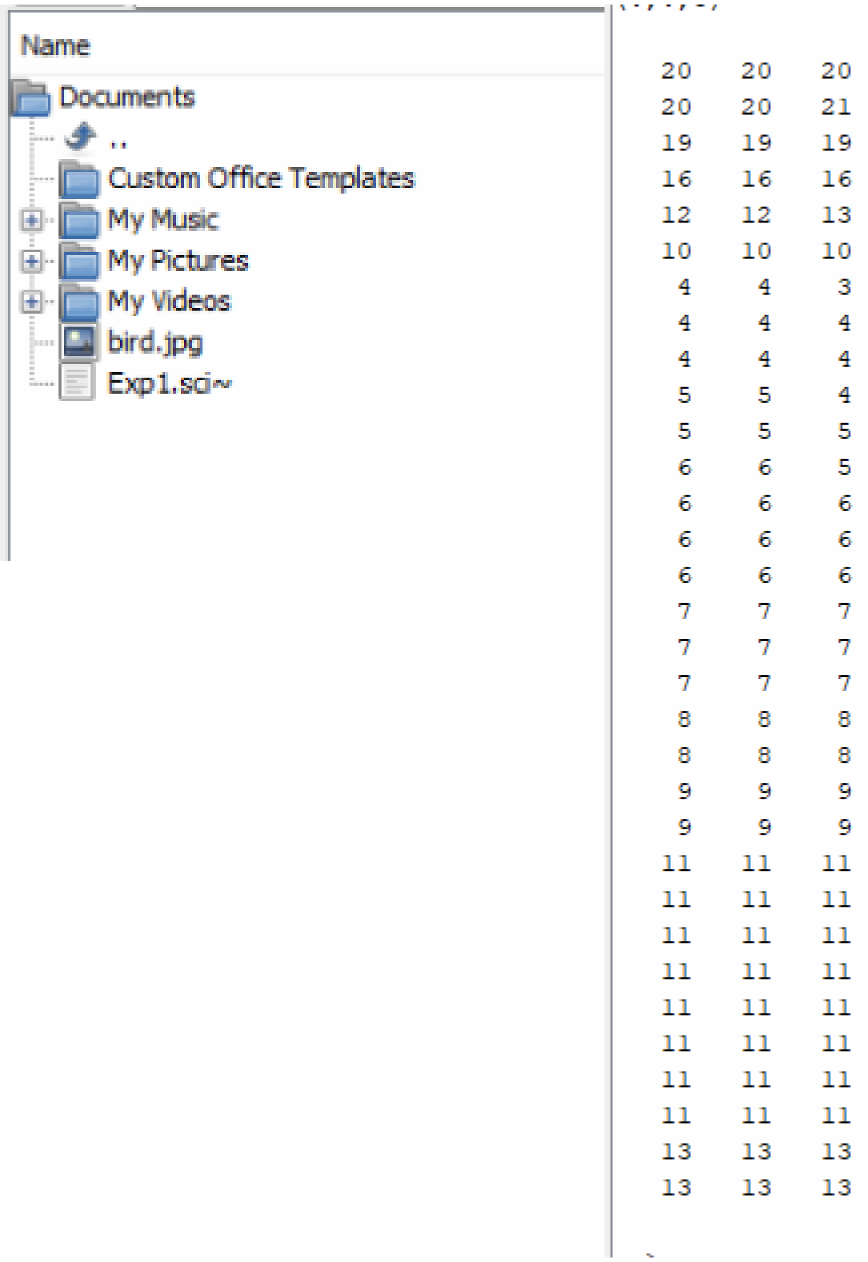
Generated image can be written to image file using function imwrite ('filename.extension').

Code for :
1. Opening, closing and saving of images.

```
CODE :-
clc;
clear;
close;
img = imread(&quot;C:\Users\indore.lab\Desktop\image.jpeg&quot;);
imshow(img);
```

Input and output images





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   16   16   16
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   10   10   10
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    4    4    4
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   11   11   11
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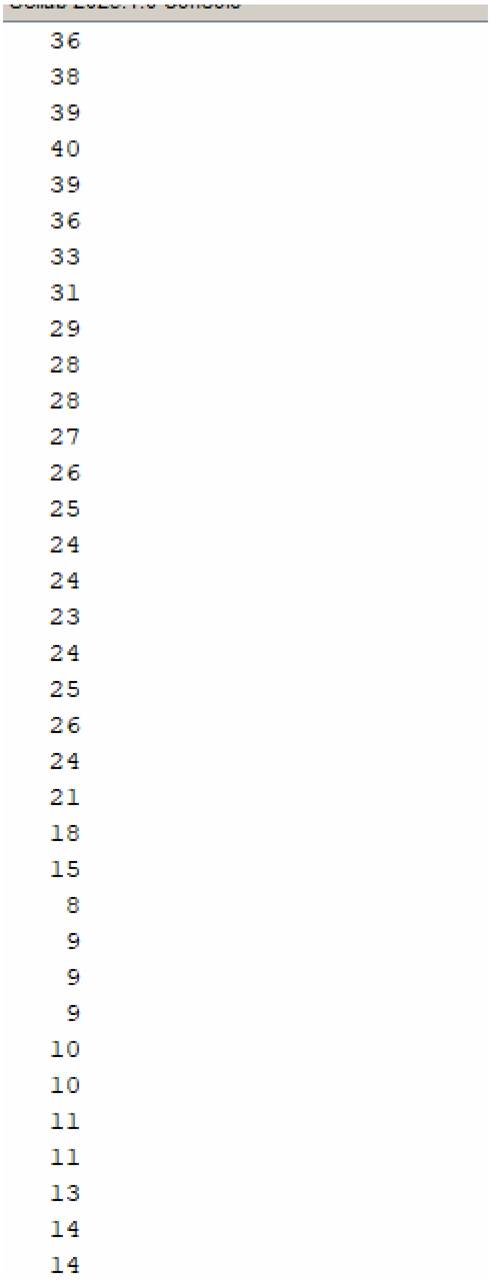
   13   13   13
```

2. To observe the effect of different gray level images on their corresponding image matrix.

```
clc;
clear;
close;
img = imread("C:\Users\indore.lab\Desktop\image2.jpeg");
grayimg=rgb2gray(img);
imshow(grayimg);
```

Input and output images



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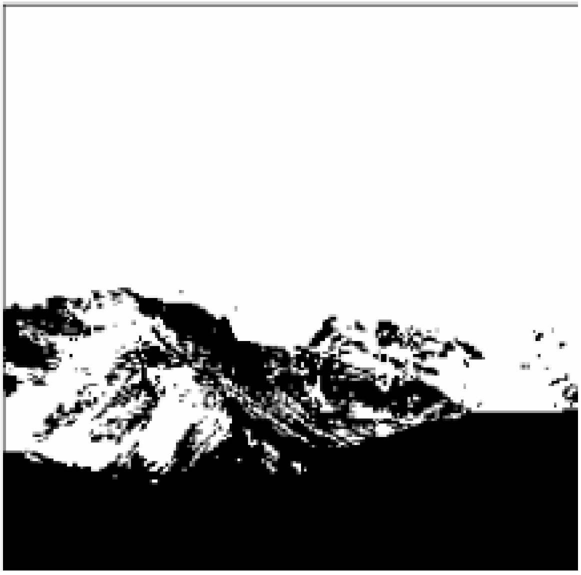
3. Image conversion
For color image

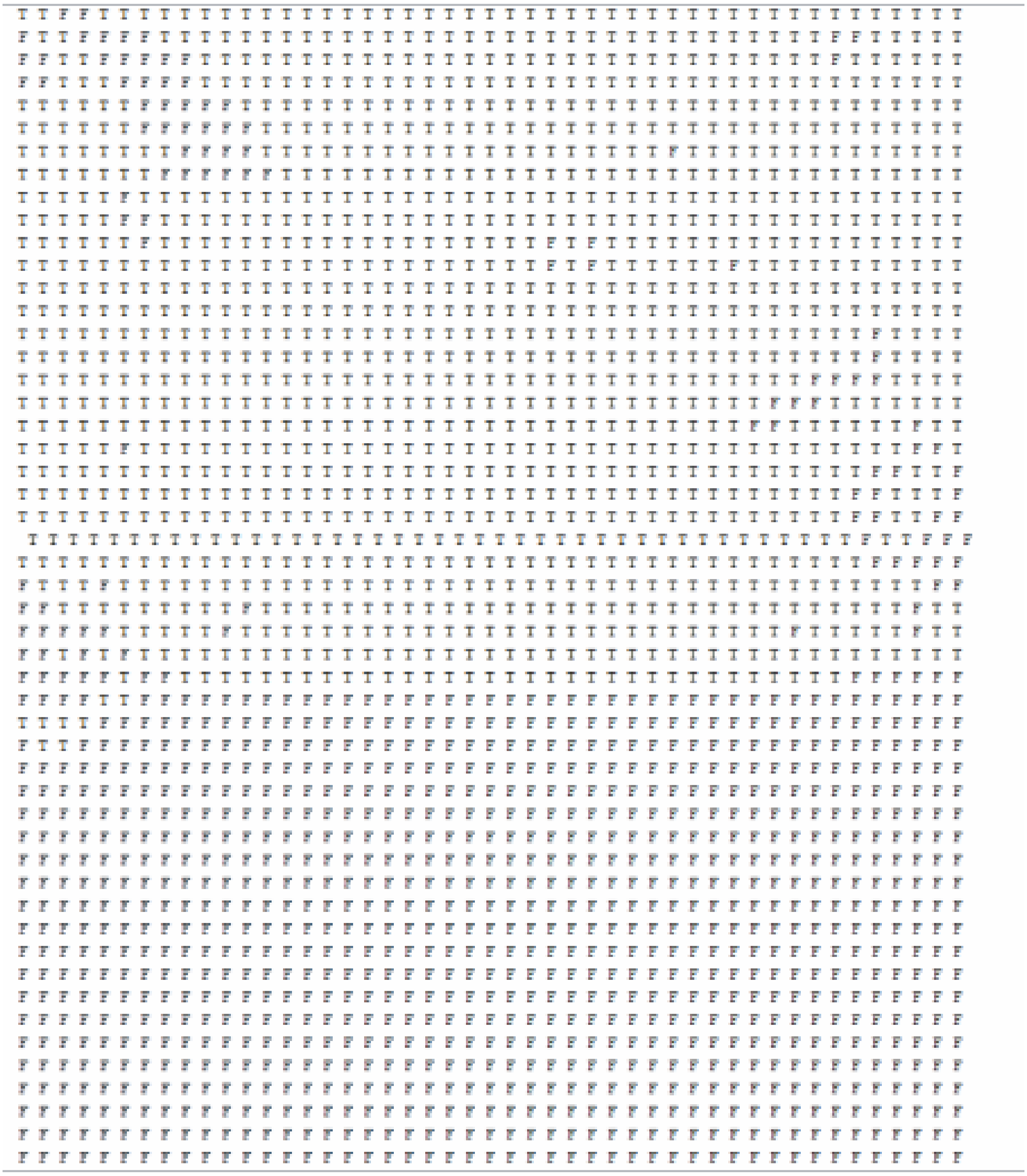
```
clc;
clear;
close;
img=imread("C:\Users\indore.lab\Documents\gray.jpg");
threshold=128;
bin=img>threshold ;
imshow(bin);
```

Input and output images



For grey image

Input and output images



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Procedure:

1. Select an image [grey or color or binary type].
2. Apply different operations as suggested by the faculty supervisor.
3. Observe the effect of different gray level images on their corresponding image matrix, as suggested by the faculty supervisor.
4. Load [Read] colour image.
5. Convert it into grey image then into binary image.
6. Select a grey image and convert it into binary image.
7. Display input image, input color image, converted gray image and converted binary image.
8. Observe different image format and covert image format into other format as suggested by the faculty supervisor.

Conclusion:

Questions:

1. Enlist two applications for image resizing, image rotation and image conversion operation.
2. ______no. of bits are required to represent a Gray image.
3. ______no. of bits are required to represent a Color image.

Grade **Signature of Faculty In-charge**