Submit by:

AYESHA SHAHBAZ(BIT21242)

Submitted to:

MAM FOUQIA ZAHEER

EXERCISE 1:

Write a program which can read an image as an input and do the following automatically.

Show the results of all steps. 1.Find the type of image: binary, gray or RGB.

2.Find the issue in image, over dark, over bright, low contrast, or normal. (Hint: can use histogram).

3.Resolve the issue if any and show the final image after enhancement.

4.Test your program on following images

```
Function main()
   % Test images (Replace these with actual file paths)     testImages =
{‘flower.jpeg’, ‘house.jpeg’, ‘nature.jpeg’};

   % Process each image
   For I = 1:length(testImages)
      Fprintf(‘Processing: %s\n’, testImages{i});
processImage(testImages{i});     end
end

function processImage(filePath)
   % Read the input image
   Image = imread(filePath);

   % Step 1: Detect the type of image       imageType =
detectImageType(image);      fprintf(‘Image Type: %s\n’,
imageType);

   % Step 2: Analyze the image for issues
   Issue = analyzeImageIssues(image);
   Fprintf(‘Detected Issue: %s\n’, issue);
```

```
    % Step 3: Resolve issues and enhance the image      enhancedImage =
resolveIssues(image, issue);

    % Display the original and enhanced images
    Figure;
    Subplot(1, 2, 1);
    Imshow(image);
    Title('Original Image');

    Subplot(1, 2, 2);
    Imshow(enhancedImage);
    Title('Enhanced Image');
End

Function imageType = detectImageType(image)
    % Detect whether the image is Binary, Grayscale, or RGB If ndims(image) ==
2              uniqueValues = unique(image);              if length(uniqueValues) == 2
imageType = 'Binary';          else
            imageType = 'Grayscale';          end
    elseif ndims(image) == 3          imageType
= 'RGB';      else          imageType =
'Unknown';      end
end

function issue = analyzeImageIssues(image)
    % Analyze the image for over dark, over bright, low contrast, or normal      If
ndims(image) == 3
        gray Image = rgb2gray(image); % Convert RGB to Grayscale      else          gray Image
= image;      end
```

```
    % Compute mean and standard deviation of pixel intensities      mean Intensity
= mean(gray Image( ☺ );     stringently = std(double(gray Image( ☺ ));

   % Classify the issue based on thresholds
    If mean Intensity < 50
       Issue = ‘Over Dark’;
    Elseif mean Intensity > 200
       Issue = ‘Over Bright’;
    Elseif stringently < 40
       Issue = ‘Low Contrast’;
    Else
       Issue = ‘Normal’;
    End
End

Function enhancedImage = resolveIssues(image, issue)
    % Resolve the detected issue in the image
    Switch issue        Case ‘Over Dark’            enhancedImage =
misadjust(image, [], [], 1.2); % Brighten        case ‘Over Bright’
enhancedImage = misadjust(image, [], [], 0.8); % Darken        case ‘Low
Contrast’           if ndims(image) == 3 % RGB Image               lab Image =
rgb2lab(image);
              L = lab Image(:, :, 1);               L = histeq(L / 100) *
100;               lab Image(:, :, 1) = L;               enhancedImage
=  lab2rgb(lab  Image);                   else  %  Grayscale  Image
enhancedImage = histeq(image);
          end
       otherwise
          enhancedImage = image; % No enhancement needed     end
end
```