CSE438:Digital Image Processing
[Fall23]

Lab 3

Submitted for
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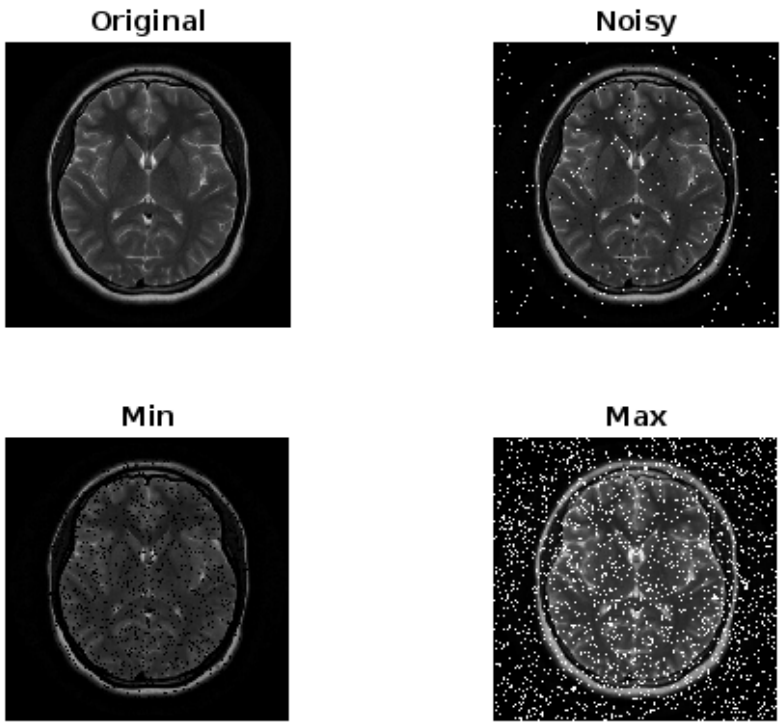
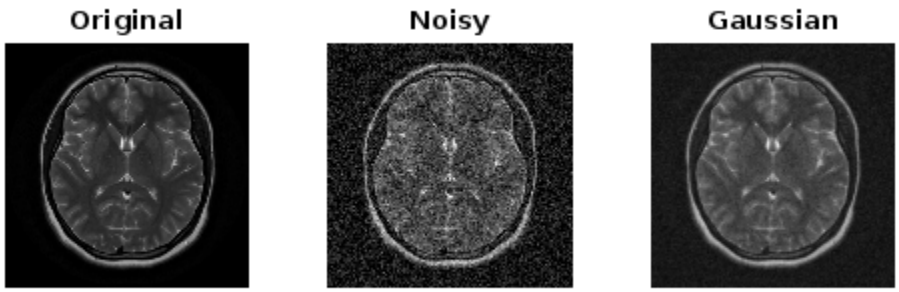
Question 1

```
img = imread('/MATLAB Drive/Lab 3/image3.jpg');
noisyImage = imnoise(img, "salt & pepper", 0.02);
minImage = ordfilt2(noisyImage, 1, ones(3));
maxImage = ordfilt2(noisyImage, 9, ones(3));
figure;
subplot(2, 2, 1), imshow(img);
title("Original");
subplot(2, 2, 2), imshow(noisyImage);
title("Noisy");
subplot(2, 2, 3), imshow(minImage);
title("Min");
subplot(2, 2, 4), imshow(maxImage);
title("Max")
```



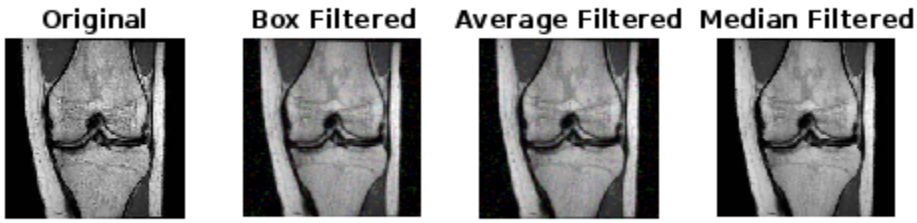
Question 2

```
img = imread('/MATLAB Drive/Lab 3/image3.jpg');
noisyImage = imnoise(img, "gaussian", 0.08);
gaussianImage = imgaussfilt(noisyImage, 1.5);
figure;
subplot(1, 3, 1), imshow(img);
title("Original");
subplot(1, 3, 2), imshow(noisyImage);
title("Noisy");
subplot(1, 3, 3), imshow(gaussianImage);
title("Gaussian");
```



Question 3

```
img = imread('/MATLAB Drive/Lab 3/image4.jpg');
noisyImage = imnoise(img, "salt & pepper", 0.02);
grayNoisy = rgb2gray(noisyImage);
boxImage = imboxfilt(noisyImage, 3);
avgImage = imfilter(noisyImage, ones(3)/9);
medImage = medfilt2(grayNoisy, [3, 3]);
figure()
subplot(1, 4, 1), imshow(img);
title("Original");
subplot(1, 4, 2), imshow(boxImage);
title("Box Filtered");
subplot(1, 4, 3), imshow(avgImage);
title("Average Filtered");
subplot(1, 4, 4), imshow(medImage);
title("Median Filtered");
```



Question 4

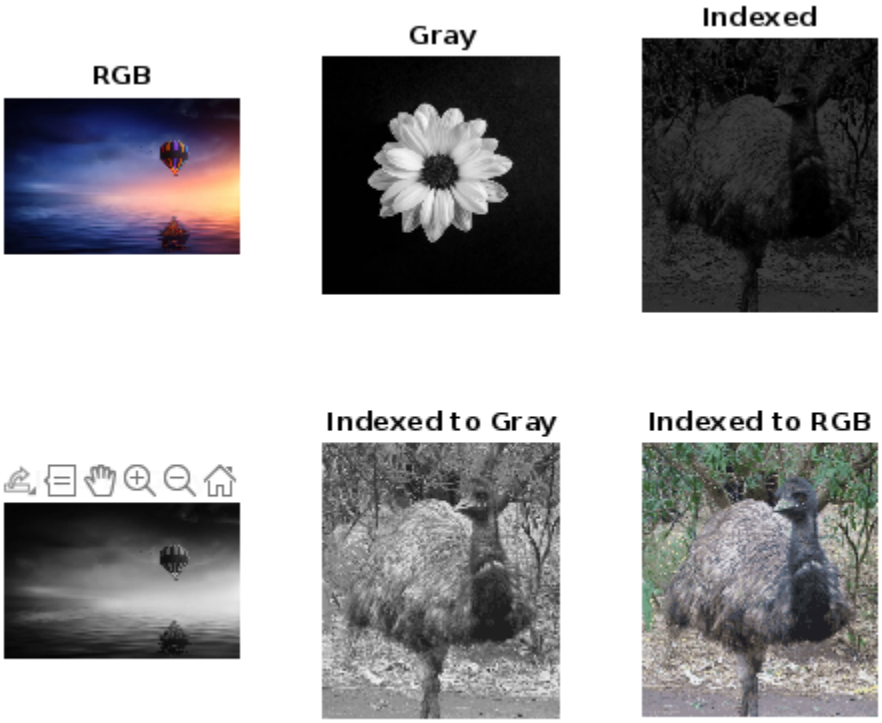
```
img = imread('/MATLAB Drive/Lab 3/image7.jpg');
figure;
imshow(img);
title("Original Image");
disp('Matrix form of the image:');
pixelValue = img(10, 78);
disp(['Pixel value at (10, 78): ' num2str(pixelValue)]);
imageSize = size(img);
disp(['Size of the image: ' num2str(imageSize(1)) ' x '
num2str(imageSize(2))]);
imageInfo = imfinfo('/MATLAB Drive/Lab 3/image7.jpg');
disp('Information of the image:');
disp(imageInfo);
```

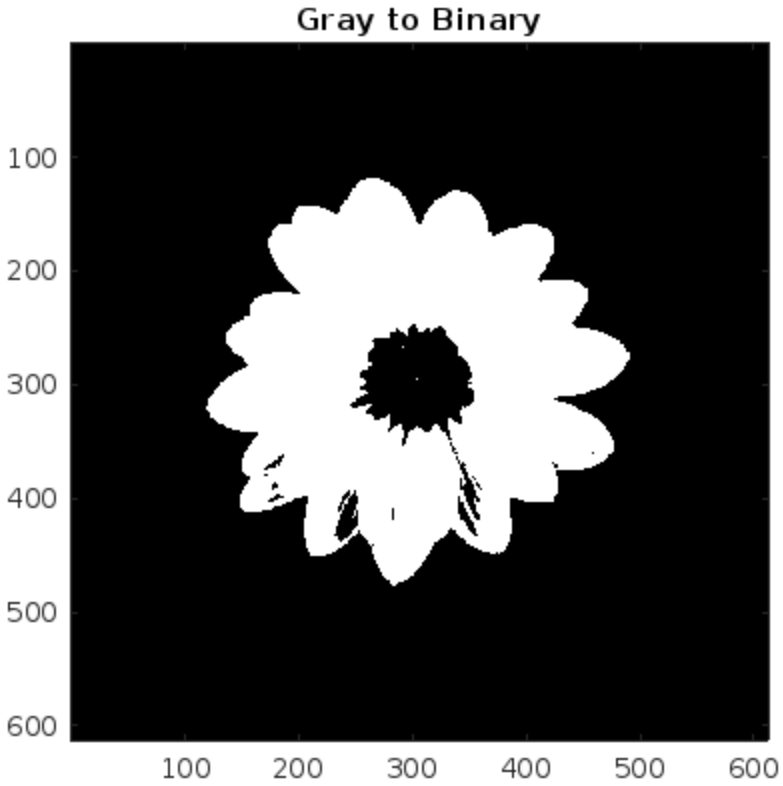
```
Matrix form of the image:
Pixel value at (10, 78): 18
Size of the image: 227 x 222
Information of the image:
          Filename: '/MATLAB Drive/Lab 3/image7.jpg'
       FileModDate: '25-Dec-2023 12:21:50'
          FileSize: 16362
            Format: 'jpg'
     FormatVersion: ''
             Width: 222
            Height: 227
          BitDepth: 24
         ColorType: 'truecolor'
   FormatSignature: ''
   NumberOfSamples: 3
      CodingMethod: 'Huffman'
     CodingProcess: 'Sequential'
           Comment: {}
```

Question 5

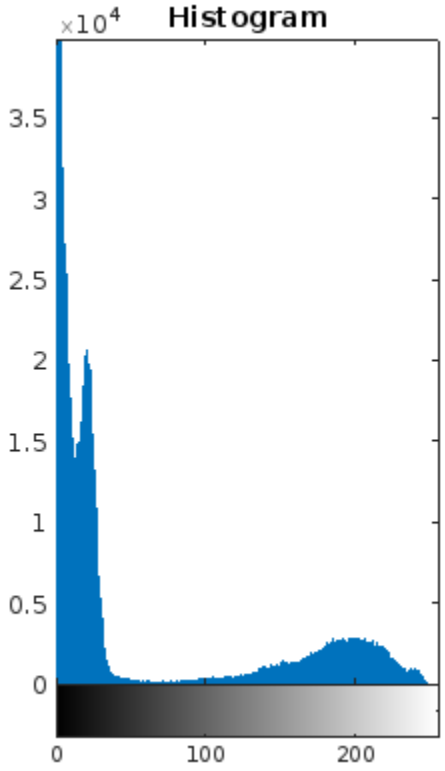
```
% Read the images
rgbImg = imread('/MATLAB Drive/Lab 3/image6.png');
grayImg = imread('/MATLAB Drive/Lab 3/image2.jpg');
[indexedImg, map] = imread('/MATLAB Drive/Lab 3/image1.png');
% Display the original images
figure;
subplot(2, 3, 1), imshow(rgbImg);
title("RGB");
subplot(2, 3, 2), imshow(grayImg);
title("Gray");
subplot(2, 3, 3), imshow(indexedImg);
title("Indexed");
% Convert images to different color spaces
rgbToGray = rgb2gray(rgbImg);
indexedToGray = ind2gray(indexedImg, map);
indexedToRgb = ind2rgb(indexedImg, map);
% Display the converted images
subplot(2, 3, 4), imshow(rgbToGray);
title("RGB to Gray");
subplot(2, 3, 5), imshow(indexedToGray);
title("Indexed to Gray");
subplot(2, 3, 6), imshow(indexedToRgb);
title("Indexed to RGB");
% Convert gray image to binary
grayToBinary = imbinarize(grayImg);
% Display the binary image
figure;
image(grayToBinary);
colormap("gray");
axis image;
title("Gray to Binary");
% Display gray image and histogram
figure;
subplot(1, 2, 1), imshow(grayImg);
title("Gray Image");
subplot(1, 2, 2), imhist(grayImg);
title("Histogram");
% Invert and blur the RGB image
invertedImg = imcomplement(rgbImg);
window = ones(9) / 9^2;  % Corrected normalization factor
blured = imfilter(rgbImg, window);
% Display the original, inverted, and blurred images
figure;
subplot(1, 3, 1), imshow(rgbImg);
title("Original");
subplot(1, 3, 2), imshow(invertedImg);
title("Inverted");
```

```
subplot(1, 3, 3), imshow(blured);
title("Blurred Image");  % Typo corrected
```




Gray to Binary
100
200
300
400
500
600
100
200
300
400
500
600

Gray Image


Histogram
×10^4
3.5
3
2.5
2
1.5
1
0.5
0
0
100
200

Original

Inverted

Blurred Image