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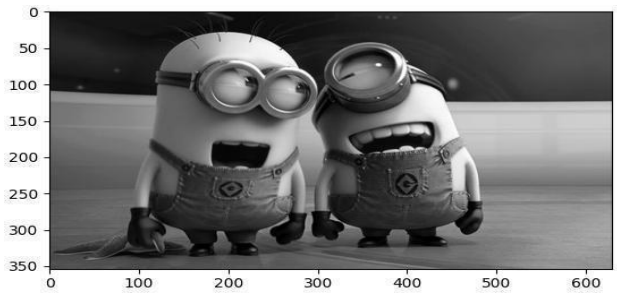
PRACTICAL 1

A. DISPLAY OF AN IMAGE AND CONVERSION OF GRAY SCALE

```
import PIL
import matplotlib.pyplot as plt
img = PIL.Image.open("image.jpg")
gray_img = img.convert("L")
plt.imshow(gray_img, cmap='gray')
plt.savefig("gray_pic.jpg")
```

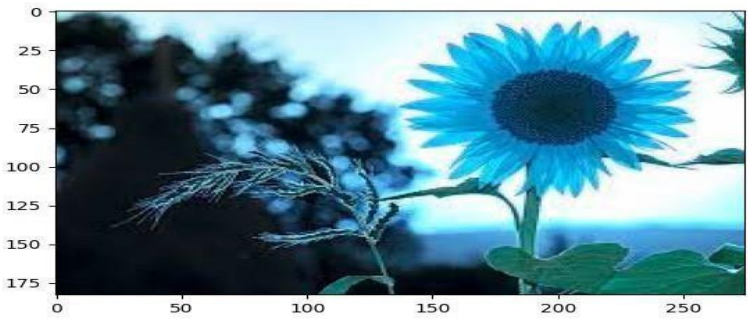
OUTPUT:

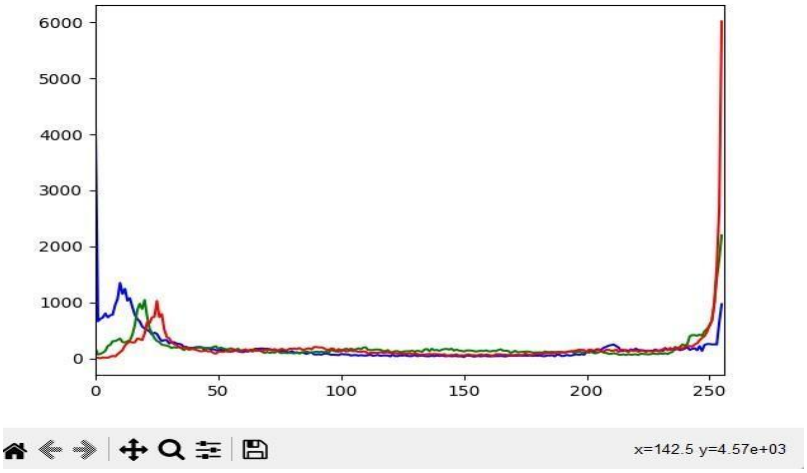


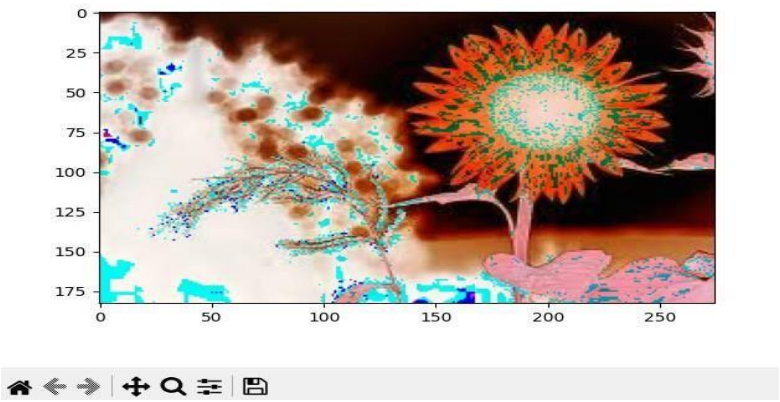
B. NEGATIVE TRANSFORM OF AN IMAGE

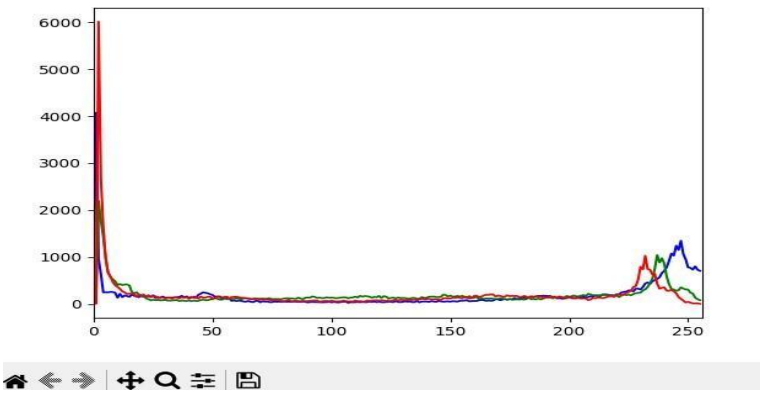
```
import cv2
import matplotlib.pyplot as plt
img_bgr = cv2.imread('image.jpg', 1)
plt.imshow(img_bgr)
plt.show()
color = ('b', 'g', 'r')
for i, col in enumerate(color):
    histr = cv2.calcHist([img_bgr],[i], None,[256],[0, 256])
    plt.plot(histr, color = col)
    plt.xlim([0, 256])
plt.show()
img_neg = 1 - img_bgr
plt.imshow(img_neg)
plt.show()
color = ('b', 'g', 'r')
for i, col in enumerate(color):
    histr = cv2.calcHist([img_neg],[i], None, [256],[0, 256])
    plt.plot(histr, color = col)
    plt.xlim([0, 256])
plt.show()
```

OUTPUT:


0
25
50
75
100
125
150
175
0
50
100
150
200
250


6000
5000
4000
3000
2000
1000
0
0
50
100
150
200
250
x=142.5 y=4.57e+03


0
25
50
75
100
125
150
175
0
50
100
150
200
250

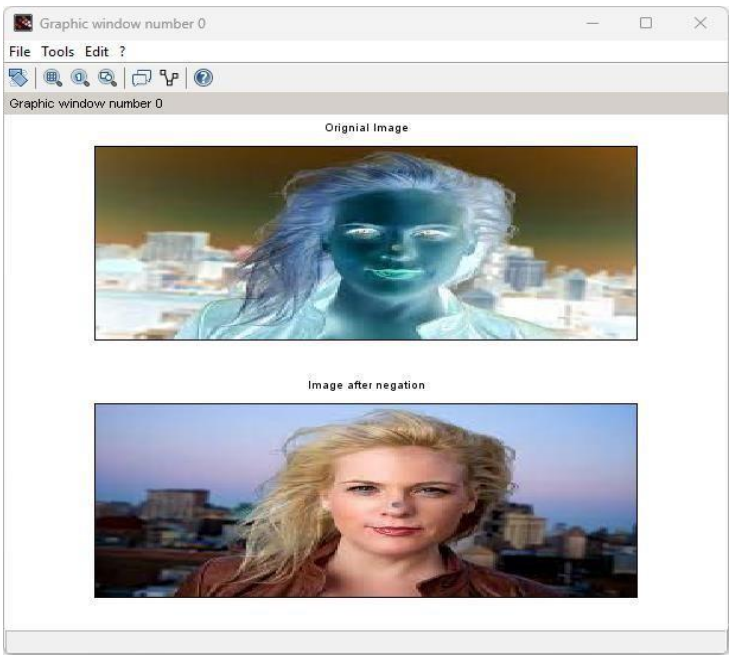

6000
5000
4000
3000
2000
1000
0
0
50
100
150
200
250

PRACTICAL 2

A) TO PERFORM IMAGE NEGATION

```
clc;
clear all;
A
=imread("C:\Users\Student\Desktop\NA\negimg.jpg");
subplot(2,1,1);
imshow(A);
title('Orignial Image');
R = A(:,:,1);
G = A(:,:,2);
B = A(:,:,3);
[row col]=size(A);
for x=1:row
   for y=1:col
      R(x,y)=255-R(x,y);
      G(x,y)=255-G(x,y);
      B(x,y)=255-B(x,y);
   end
end
A(:,:,1)=R;
A(:,:,2)=G;
A(:,:,3)=B;
subplot(2,1,2);
imshow(A);
title('Image after negation');
```

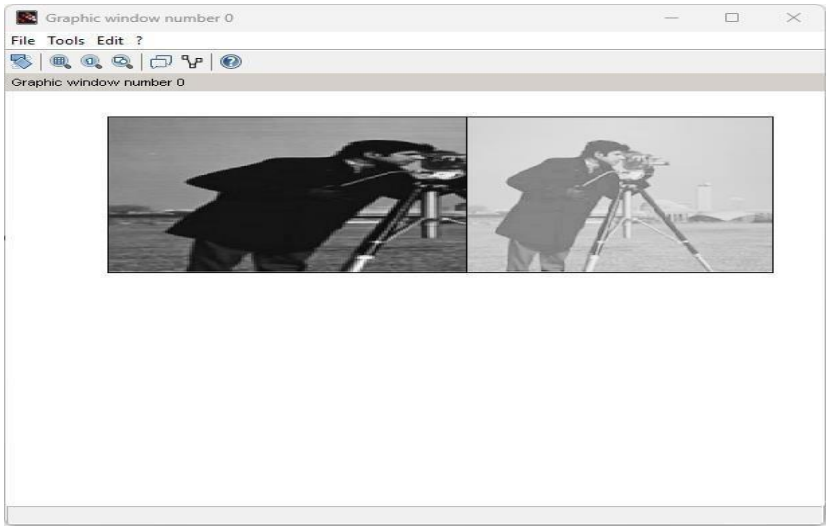
OUTPUT:



B) LOG TRANS

```
clc;
clear all;
a=imread("C:\Users\Student\Downloads\camera.png");
a=rgb2gray(a);
subplot(2,1,1);
imshow(a);
c=1;
[r1,c1]=size(a);
for i=1:r1
   for j=1:c1
      b=double(a(i,j));
      s(i,j)=c*log10(1+b);
   end
end
new1=uint8(s*100);
//imshow(new1);
subplot(2,2,2);
imshow(new1);
```

OUTPUT:

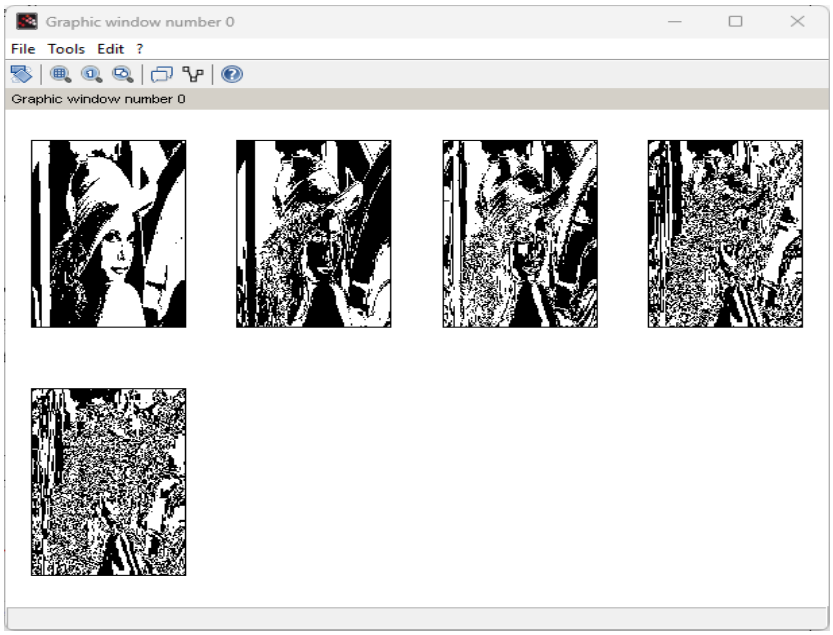


C) BIT PLANE SLICING

```
clc;
clear all;
f=imread("C:\Users\Student\Downloads\lenag.jpeg");
f=double(f);
[r,c]=size(f);
com=[128 64 32 16 8 4 2 1];
for k=1:1:length(com);
   for i=1:r
      for j=1:c
      new(i,j)=bitand(f(i,j),com(k));
   end
```

```
    subplot(2,4,k);
    imshow(new);
    end
end
```

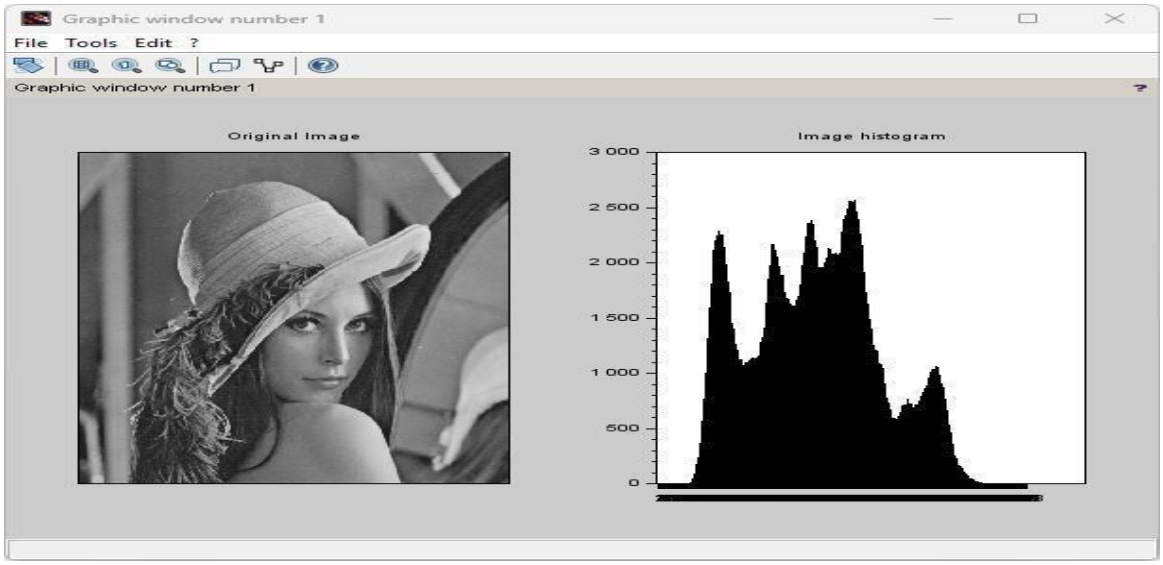
OUTPUT:



D) HISTOGRAM

```
clc;
clear all;
a=imread('C:\Users\Student\Downloads\lena.jpeg');
a=rgb2gray(a);
h=zeros(1,258);
[r,c]=size(a);
for i=1:r
    for j=1:c
        if (a(i,j)==0)
            h(0)=h(0)+1;
        end
        k=a(i,j);
        h(k)=h(k)+1;
    end
end
figure(1);
subplot(1,2,1);
imshow(uint8(a));
title('Original Image')
subplot(1,2,2);
bar(h);
title('Image histogram');
```

OUTPUT:

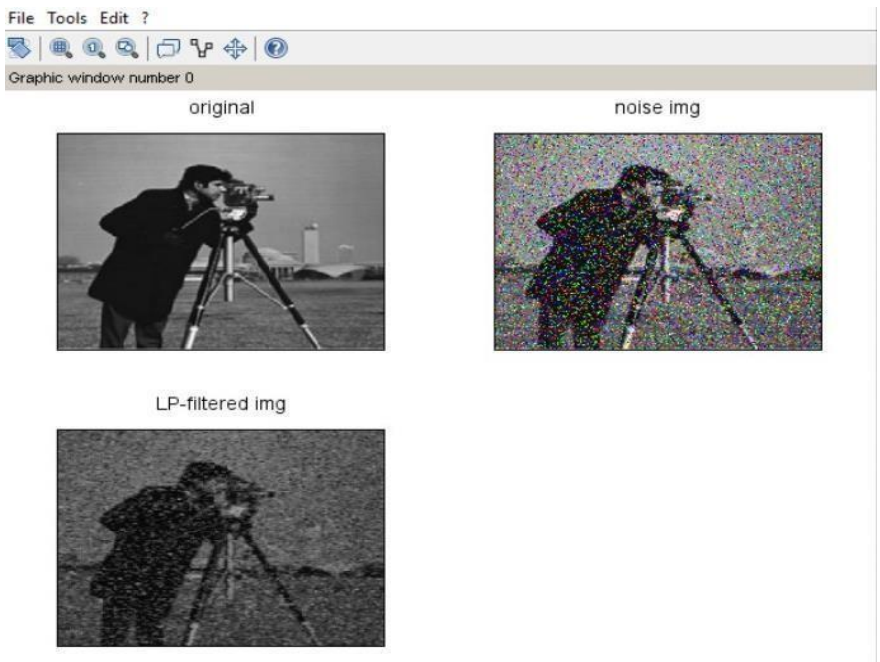

Graphic window number 1
File Tools Edit ?
Graphic window number 1
Original Image
Image histogram
3 000
2 500
2 000
1 500
1 000
500
0

PRACTICAL 3

A. HIGH PASS

```
a=imread('C:\Users\Student\Downloads\NA\OIP.jpg'
);b=double(a);
c=imnoise(a,'salt & pepper',0.2);
d=double(c);
subplot(2,2,1);
imshow(a);
title('original');
subplot(2,2,2);
imshow(c);
title('noise img');
m=[-1 -1 -1;-1 8 -1;-1 -1 -1];
[r1,c1]=size(a);
for i=2:1:r1-1
    for j=2:1:c1-1
   new(i,j)=(m(1)*d(i-1,j-1))+(m(2)*d(i-1,j))+(m(3)*d(i-1,j+1))    +(m(4)*d(i,j
1))+(m(5)*d(i,j))+(m(6)*d(i,j+1)) +(m(7)*d(i+1,j-1))+(m(8)*d(i+1,j))+(m(9)*d(i+1,j+1));
    end
end
subplot(2,2,3);
imshow(uint8(new));
title('LP-filtered img');
```

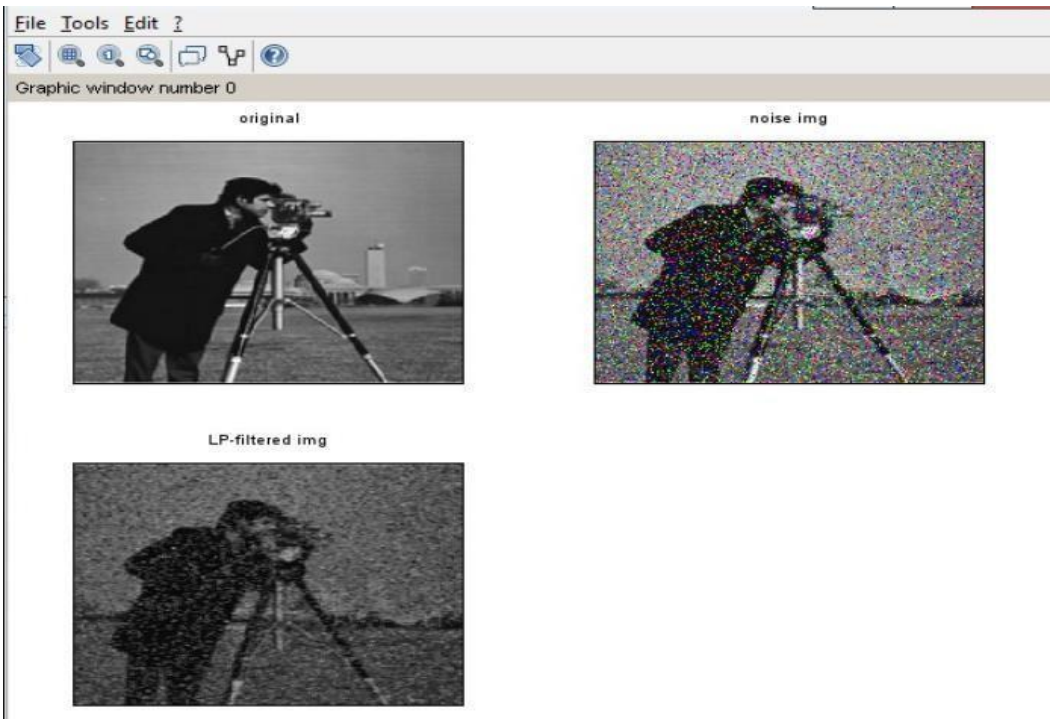
OUTPUT:



B. LOW PASS

```
clc;
clear all;
a=imread('C:\Users\Student\Downloads\NA\camera (1)
(1).png');b=double(a);
c=imnoise(a,'salt & pepper',0.2);
d=double(c);
subplot(2,2,1);
imshow(a);
title('original');
subplot(2,2,2);
imshow(c);
title('noise img');
m=(1/9)*(ones(3,3));
[r1,c1]=size(a);
for i=2:1:r1-1
    for j=2:1:c1-1
  new(i,j)=(m(1)*d(i-1,j-1))+(m(2)*d(i-1,j))+(m(3)*d(i-1,j+1))    +(m(4)*d(i,j
1))+(m(5)*d(i,j))+(m(6)*d(i,j+1))  +(m(7)*d(i+1,j-
1))+(m(8)*d(i+1,j))+(m(9)*d(i+1,j+1));
    end
end
subplot(2,2,3);
imshow(uint8(new));
title('LP-filtered img');
```

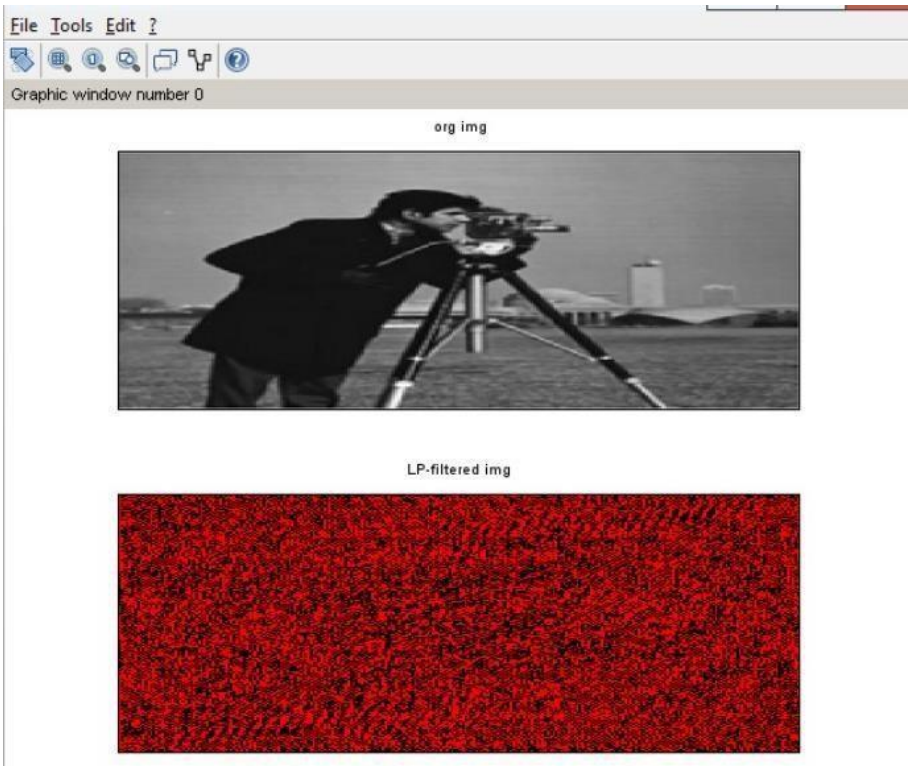
OUTPUT:



C. DISCRETE FOURIER TRANSFORM

```
a=imread('C:\Users\Student\Downloads\camera (1).png');
subplot(2,1,1);
imshow(a);
title('org img');
b=double(a);
c=fft(b);
subplot(2,1,2);
imshow(c);
title('LP-filtered img');
```

OUTPUT:

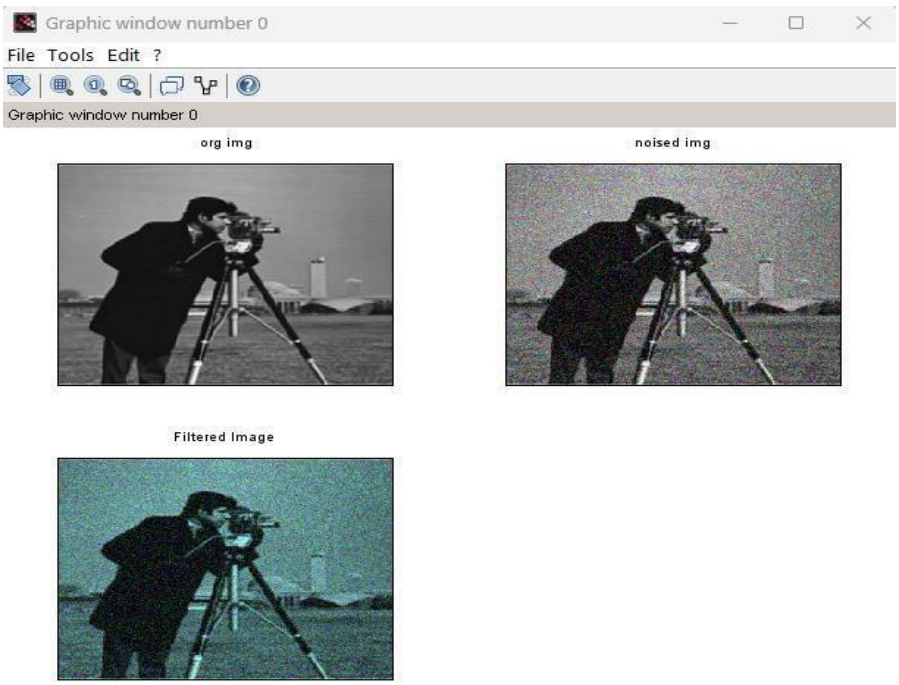


PRACTICAL 4

A) MEAN FILTER

```
a=imread('C:\Users\Student\Downloads\NA\camera (1)
(1).png');b1=double(a);
c=imnoise(a,'gaussian');
d=double(c);
b=d;
m=(1/9)*(ones(3,3));
[r1,c1]=size(a);
subplot(2,2,1);
imshow(a);
title('org img');
subplot(2,2,2);
imshow(c);
title('noised img');
for i=2:r1-1
for j=2:c1-1
a1=d(i-1,j-1)+d(i-1,j)+d(i-1,j+1)+d(i,j-1)+d(i,j)+d(i,j+1)+d(i+1,j-1)+d(i+1,j)+d(i+1,j+1);
b(i,j)=a1*(1/9);
end
end
subplot(2,2,3);
imshow(uint8(b));
title('Filtered Image');
clc;
clear all;
```

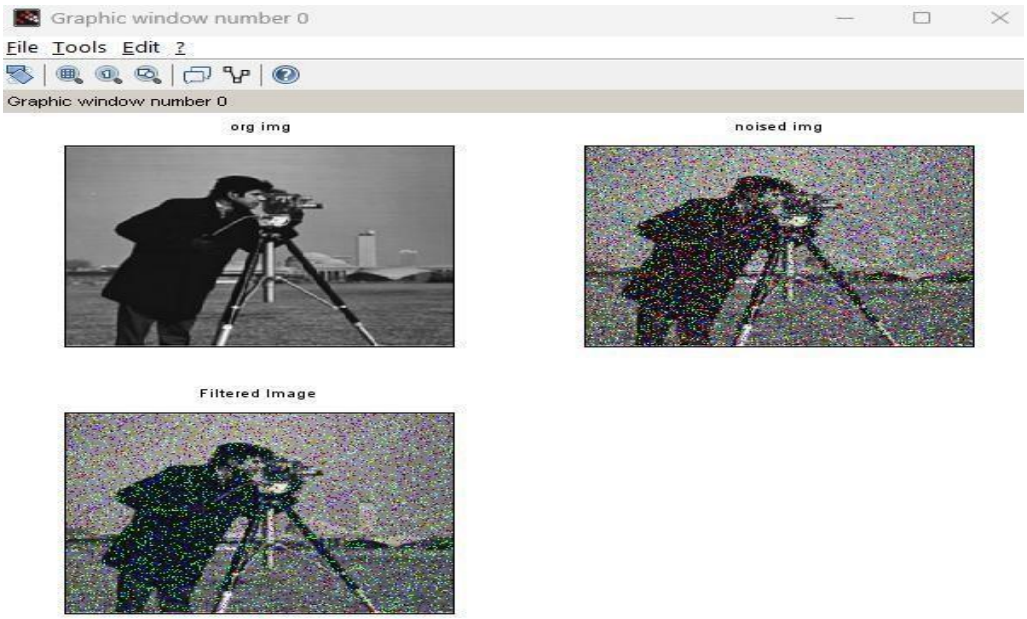
OUTPUT:



B) MEDIAN FILTER

```
a=imread("C:\Users\Student\Downloads\NA\camera (1)
(1).png');b1 = double(mtlb_double(a));
c = imnoise(a,"salt & pepper",0.2);
d = double(mtlb_double(c));
b = d;
m = (1/9)*ones(3,3);
subplot(2,2,1);
imshow(a);
title('org img');
subplot(2,2,2);
imshow(c);
title('noised img');
[r1,c1] = size(mtlb_double(a));
for i = 2:r1-1
      for j = 2:c1-1
      a1 = [d(i-1,j-1),d(i-1,j),d(i-1,j+1),d(i,j-1),d(i,j), d(i,j+1),d(i+1,j1),d(i+1,j),d(i+1,j+1)];
      a2 = gsort(a1,"g","i");//gsort(A,'g','i') sort the elements of the array A in the
increasing order.
      med = a2(5);
      b(i,j) = med;
      end;
end;
subplot(2,2,3);
imshow(uint8(b));
title('Filtered Image');
```

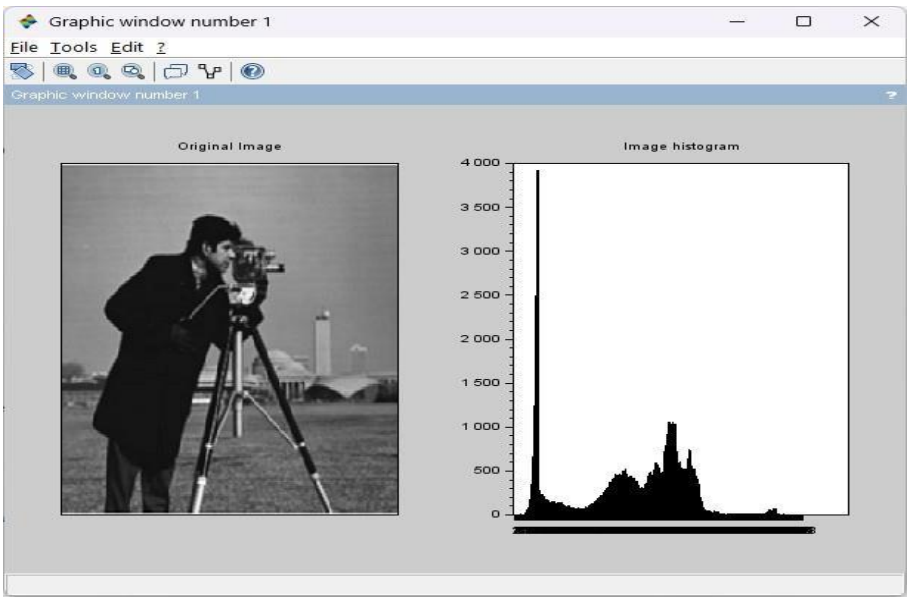
OUTPUT:



C) HISTOGRAM

```
clc;
clear all;
a=imread('C:\Users\Student\Downloads\NA\camera (1)
(1).png');a=rgb2gray(a);
h=zeros(1,258);
[r,c]=size(a);
for i=1:r
   for j=1:c
      if (a(i,j)==0)
         h(0)=h(0)+1;
      end
      k=a(i,j);
      h(k)=h(k)+1;
   end
end
figure(1);
subplot(1,2,1);
imshow(uint8(a));
title('Original Image')
subplot(1,2,2);
bar(h);
title('Image histogram');
```

OUTPUT:



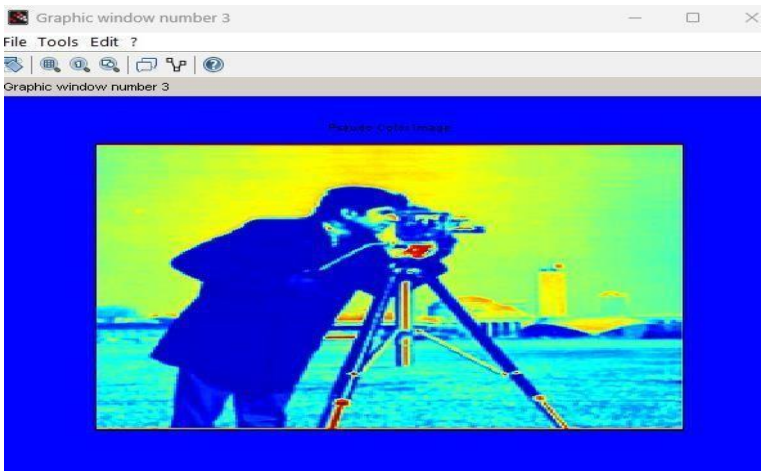
PRACTICAL 5

A) GRAY TO FALSE COLOR

```
clc;


close;
a = imread('C:\Users\Student\Downloads\NA\camera (1) (1).png');
//Displaying Original RGB image
figure(1);
imshow(a);
title("Original Image")
//Displaying Gray level image
b = rgb2gray(a);
figure(2);
imshow(b);
title("Gray Level Image")
//Displaying False coloring(Pseudo) image
figure(3)
imshow(b,jetcolormap(256));
title("Pseudo Color Image");
```

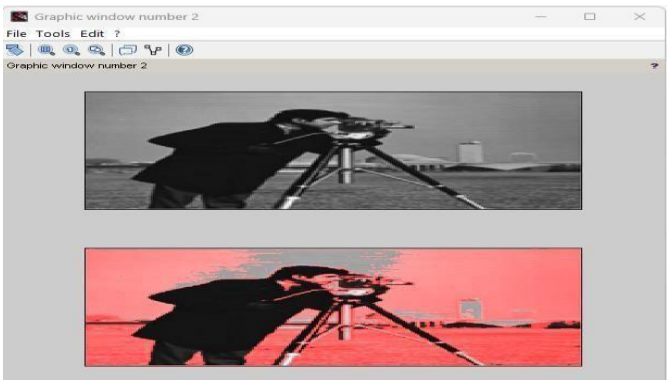
OUTPUT:



B) GRAY LEVEL WITH BG

```
clc;
clear all;
a=imread('C:\Users\Student\Downloads\NA\camera (1)
(1).png');a1=58; // This value is user defined
b1=158; // This value is user defined
[r,c]=size(a);
figure(2);
subplot(2,1,1);
imshow(a);
for i=1:r
   for j=1:c
      if (a(i,j)>a1 & a(i,j)<b1)
         x(i,j)=255;
 else
         x(i,j)=a(i,j);
      end
   end
end
x=uint8(x);
subplot(2,1,2);
imshow(x);
```

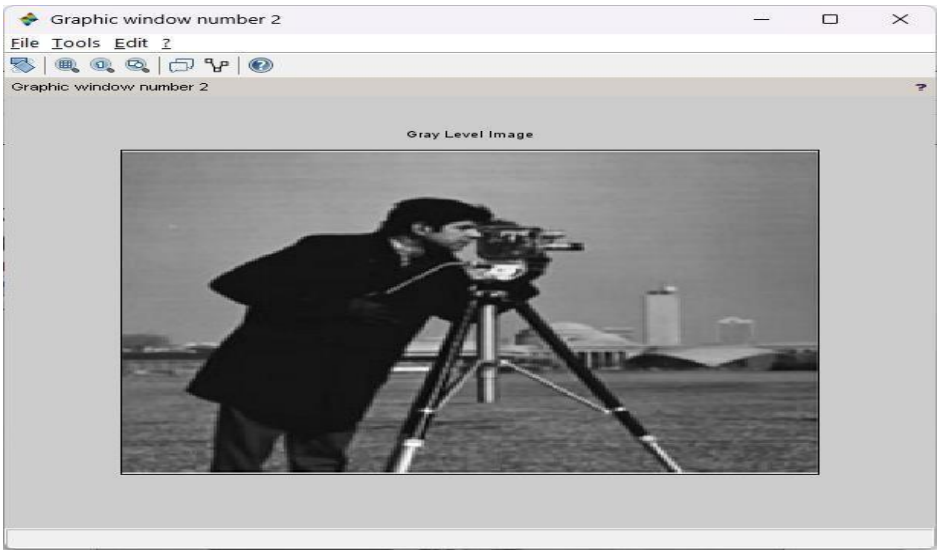
OUTPUT:

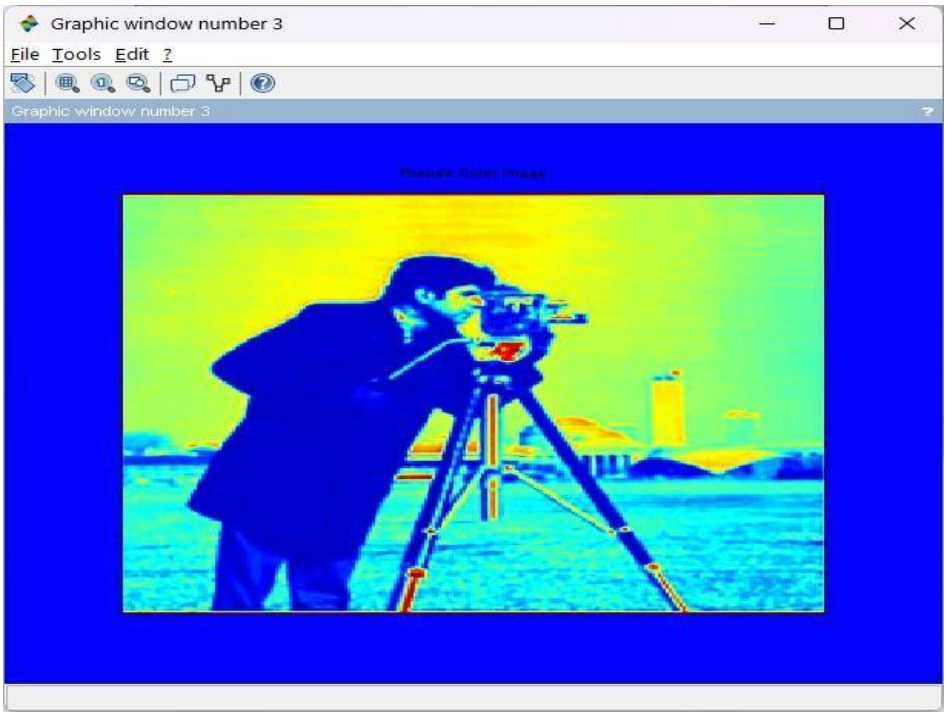


C) GRAY TO COLOR

```
clc;
close;
a = imread('C:\Users\Student\Downloads\NA\camera (1) (1).png');
//Displaying Original RGB image
figure(1);
imshow(a);
title("Original Image")
//Displaying Gray level image
b = rgb2gray(a);
figure(2);
imshow(b);
title("Gray Level Image")
//Displaying False coloring(Pseudo) image
figure(3)
imshow(b,jetcolormap(256));
title("Pseudo Color Image");
```

OUTPUT:


Graphic window number 2
File Tools Edit ?
Graphic window number 2
Gray Level Image


Graphic window number 3
File Tools Edit ?
Graphic window number 3

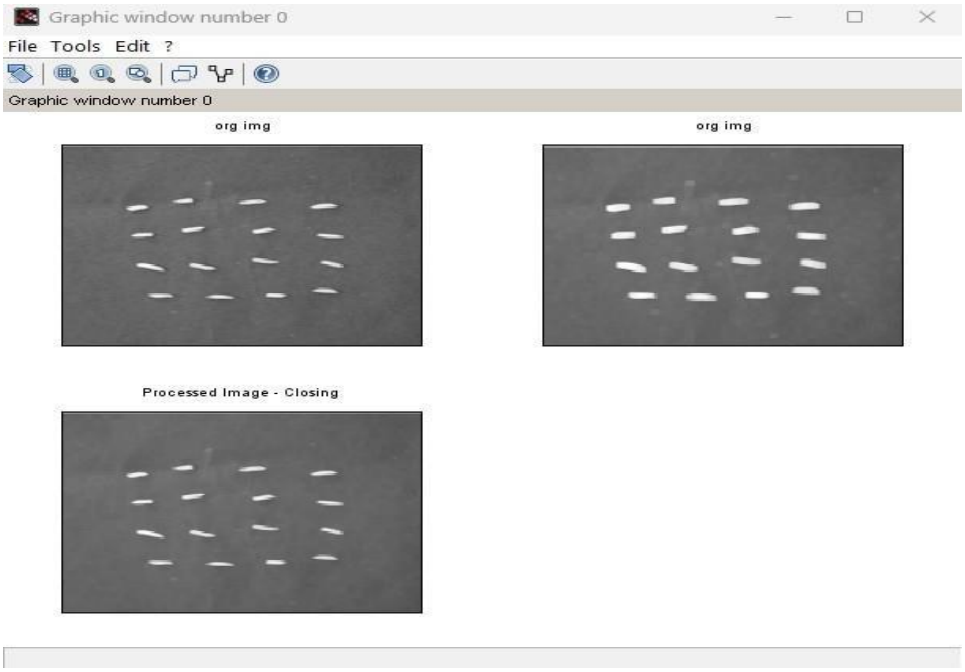
PRATICAL 6

Aim: To implement Morphological operations

A) Closing

```
clc;
clear all;
a=imread('C:\NA\rice.jpeg'
);a=rgb2gray(a);
d=a;
A2=d;
A1=d;
subplot(2,2,1);
imshow(a);
title('org img');
[r,c]=size(d);
m=[1 1 1;1 1 1;1 1 1];
for i=2:1:r-1
for j=2:1:c-1
new=[(m(1)*d(i-1,j-1)) (m(2)*d(i-1,j)) (m(3)*d(i-1,j+1)) (m(4)*d(i,j-1)) (m(5)*d(i,j))
(m(6)*d(i,j+1)) (m(7)*d(i+1,j-1)) (m(8)*d(i+1,j)) (m(9)*d(i+1,j+1))];
A2(i,j)=max(new);
end
subplot(2,2,2);
imshow(A2);
title('org img');
end
d = A2;
A1=A2;
[r,c]=size(d);
for  i=2:1:r-1
for j=2:1:c-1
new=[(m(1)*d(i-1,j-1)) (m(2)*d(i-1,j)) (m(3)*d(i-1,j+1)) (m(4)*d(i,j-1)) (m(5)*d(i,j))
(m(6)*d(i,j+1))(m(7)*d(i+1,j-1)) (m(8)*d(i+1,j)) (m(9)*d(i+1,j+1))];
A1(i,j)=min(new);
end
subplot(2,2,3);
imshow(A1);title('Processed Image - Closing');
end
```

OUTPUT:

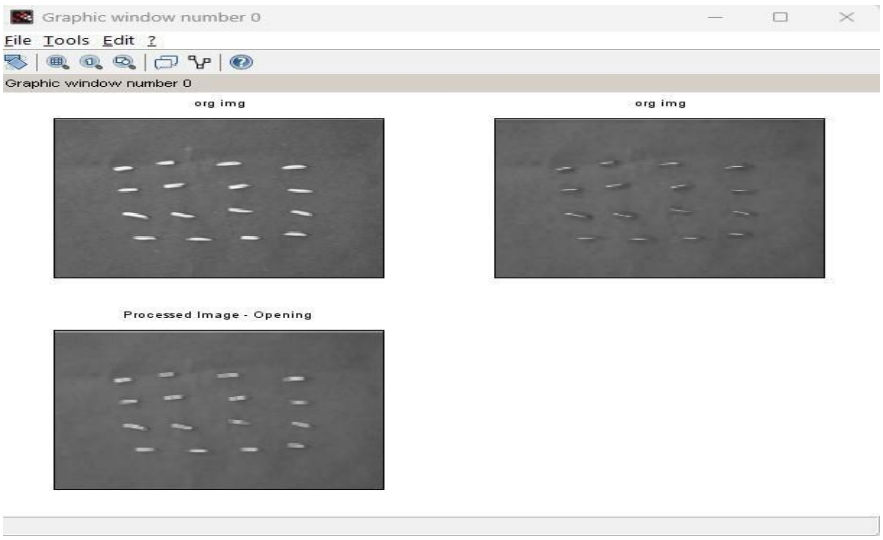


B) Opening

```
clc;
clear all;
a=imread("C:\NA\rice.jpeg"
);a=rgb2gray(a);
d=a;
A2=d;
A1=d;
subplot(2,2,1);
imshow(a);
title('org img');
[r,c]=size(d);
m=[1 1 1;1 1 1;1 1 1];
for i=2:1:r-1
for j=2:1:c-1
new=[(m(1)*d(i-1,j-1)) (m(2)*d(i-1,j)) (m(3)*d(i-1,j+1))
(m(4)*d(i,j-1)) (m(5)*d(i,j)) (m(6)*d(i,j+1))
(m(7)*d(i+1,j-1)) (m(8)*d(i+1,j)) (m(9)*d(i+1,j+1))];
A2(i,j)=min(new);
end
subplot(2,2,2);
imshow(A2);
title('org img');
end
d = A2;
A1=A2;
```

```
[r,c]=size(d);
for  i=2:1:r-1
for j=2:1:c-1
new=[(m(1)*d(i-1,j-1)) (m(2)*d(i-1,j)) (m(3)*d(i-1,j+1))
(m(4)*d(i,j-1)) (m(5)*d(i,j)) (m(6)*d(i,j+1))
(m(7)*d(i+1,j-1)) (m(8)*d(i+1,j)) (m(9)*d(i+1,j+1))];
A1(i,j)=max(new);
end
subplot(2,2,3);
imshow(A1);title('Processed Image - Opening');
end
```

OUTPUT:



C)Dialation

```
clc;
clear all;
a=imread('C:\NA\rectb.png'
);a=rgb2gray(a);
d=a;
A1=a;
[r,c]=size(d);
subplot(2,1,1);
imshow(a);
title('org img');
m=[1 1 1;1 1 1;1 1 1];
// m=ones(5,5);
for i=2:1:r-1
for j=2:1:c-1
```

```
new=[(m(1)*d(i-1,j-1)) (m(2)*d(i-1,j)) (m(3)*d(i-1,j+1)) (m(4)*d(i,j-1)) (m(5)*d(i,j))
(m(6)*d(i,j+1)) (m(7)*d(i+1,j-1)) (m(8)*d(i+1,j)) (m(9)*d(i+1,j+1))];
A1(i,j)=max(new);
end
subplot(2,1,2);
imshow(A1);title('Processed Image - dilation');
end
```

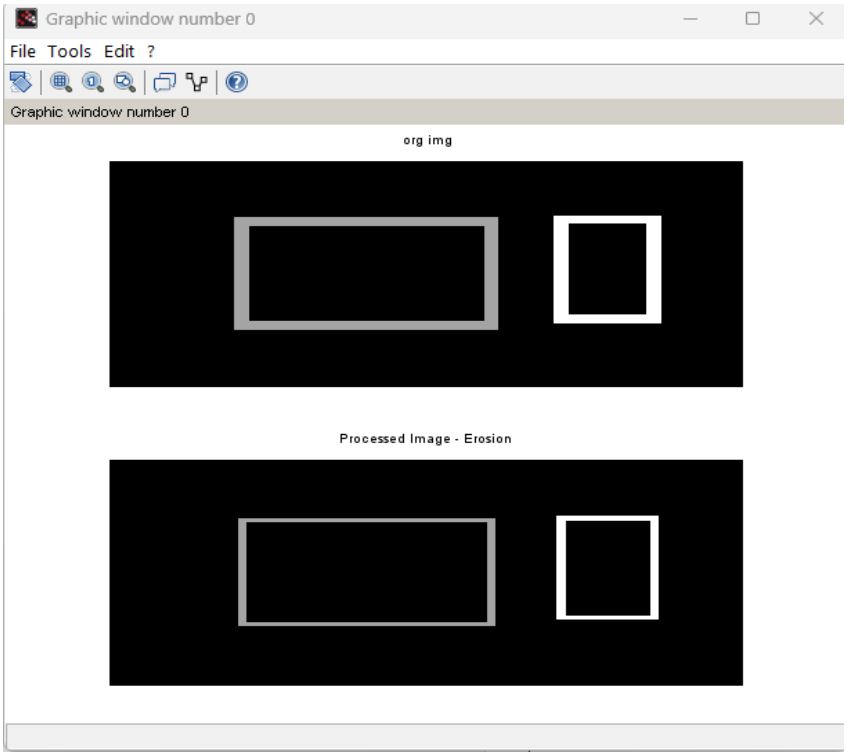
OUTPUT:

D) Erosion

```
clc;
clear all;
a=imread('C:\NA\rectb.png'
);a=rgb2gray(a);
subplot(2,1,1);
imshow(a);
title('org img');
A1=a;
d=a;
[r,c]=size(d);
m=[1 1 1;1 1 1;1 1 1];
// m=ones(5,5);
for i=2:1:r-1
for j=2:1:c-1
   new=[(m(1)*d(i-1,j-1)) (m(2)*d(i-1,j)) (m(3)*d(i-1,j+1)) (m(4)*d(i,j-1))
(m(5)*d(i,j)) (m(6)*d(i,j+1)) (m(7)*d(i+1,j-1)) (m(8)*d(i+1,j)) (m(9)*d(i+1,j+1))];
A1(i,j)=min(new);
end
subplot(2,1,2);
```

```
title('org img');imshow(A1);title('Processed Image - Erosion');
end
```

OUTPUT:

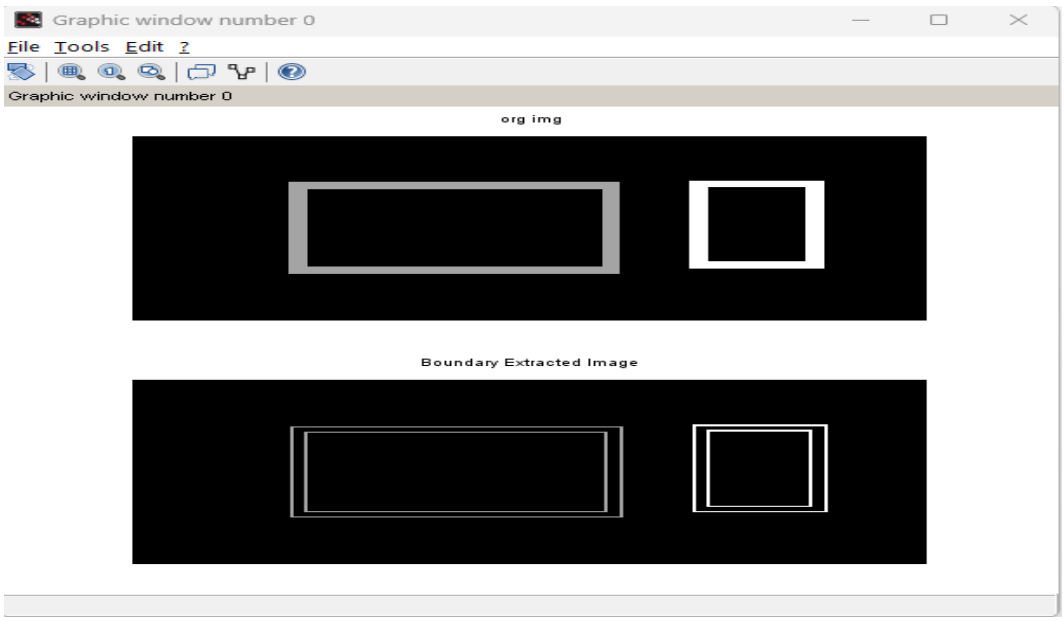


PRACTICAL 7

Aim : To implement Boundary

```
clc;
clear all;
a=imread('C:\NA\rectb.png'
);a=rgb2gray(a);
subplot(2,1,1);
imshow(a);
title('org img');
d=a;
[r,c]=size(d);
m=[1 1 1;1 1 1;1 1 1];
for i=2:1:r-1
for j=2:1:c-1
new=[(m(1)*d(i-1,j-1)) (m(2)*d(i-1,j)) (m(3)*d(i-1,j+1))
(m(4)*d(i,j-1)) (m(5)*d(i,j)) (m(6)*d(i,j+1))
(m(7)*d(i+1,j-1)) (m(8)*d(i+1,j)) (m(9)*d(i+1,j+1))];
A2(i,j)=min(new);
aa(i,j)=d(i,j)-A2(i,j);
end
end
subplot(2,1,2);
imshow(aa);title('Boundary Extracted Image');
```

OUTPUT:



PRATICAL 8

Aim: To perform Addition and subtraction on two image

```
clc;
clear all;
A=imread('C:\NA\circle.png');
B=imread('C:\NA\camera
(2).png');A=rgb2gray(A);
B=rgb2gray(B);
C=imadd(B, A);
D=imsubtract(B, A);
figure(1);
subplot(2,2,1);
imshow(A);
subplot(2,2,2);
imshow(B);
subplot(2,2,3);
imshow(C);
subplot(2,2,4);
imshow(D);
```

OUTPUT: