PRACTICAL REPORT
ON
IMAGE PROCCESING

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ROLL NO: 01

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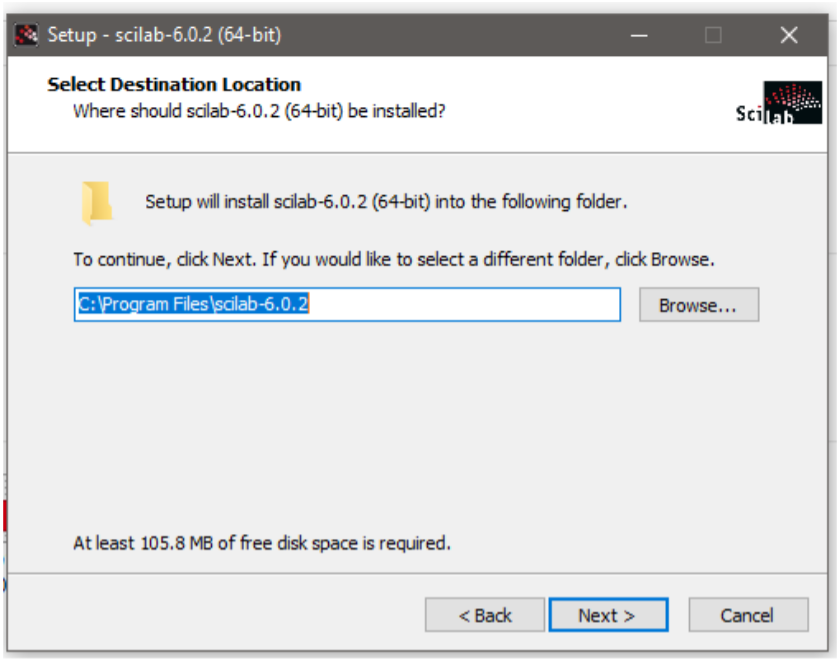
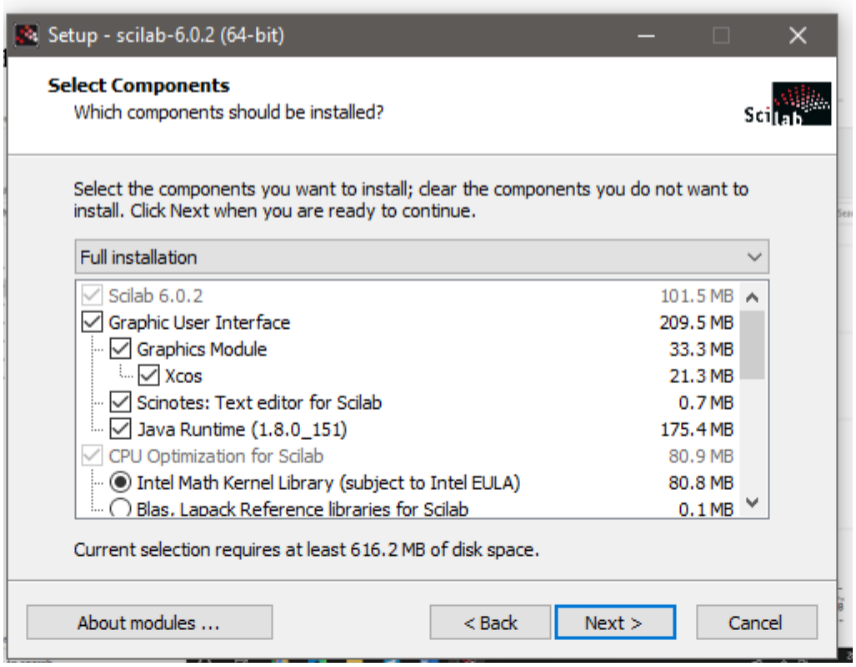
Practical No 1

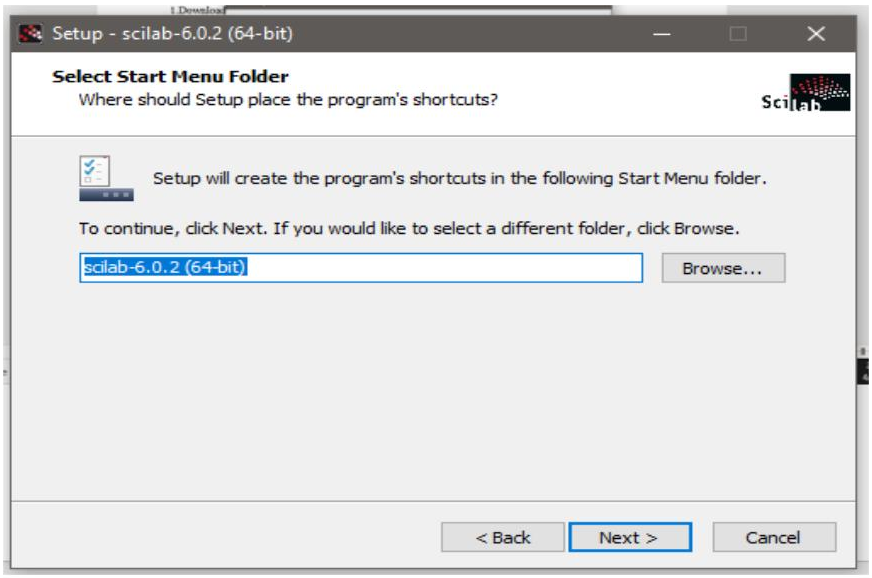
Required Software for Image Processing-

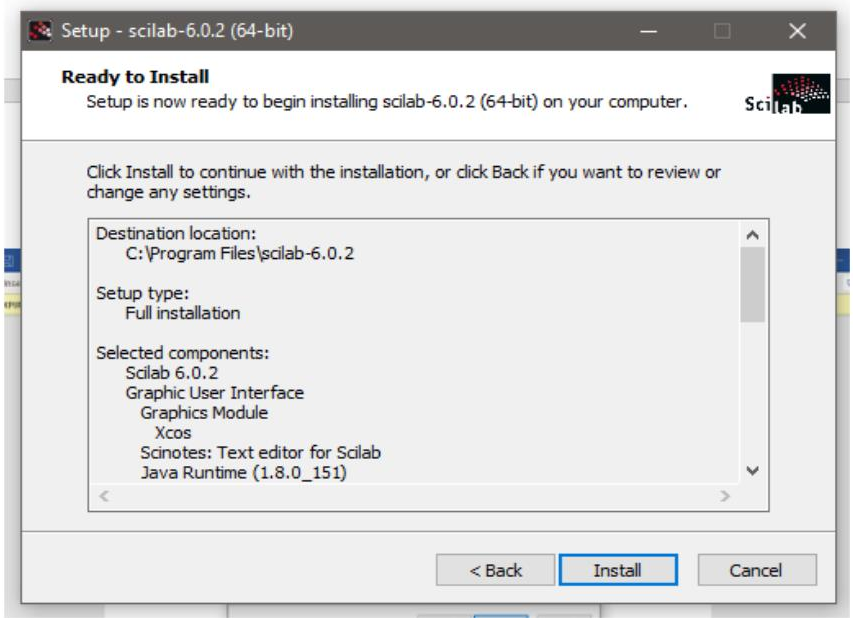
Steps:

1. Download and Install Scilab 6.0.2



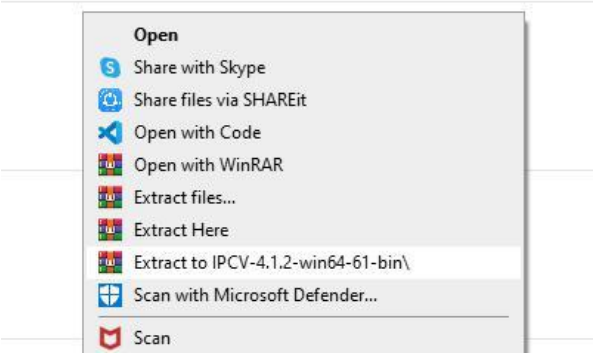




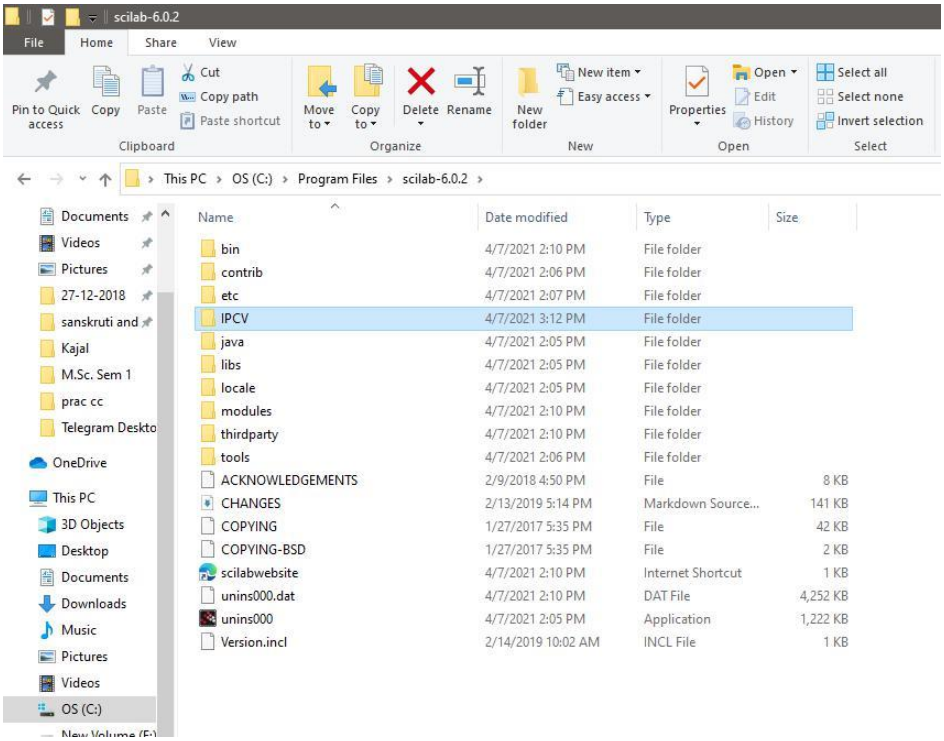


2. Download IPCV zip file

Extract IPCV folder => Paste in scilab folder

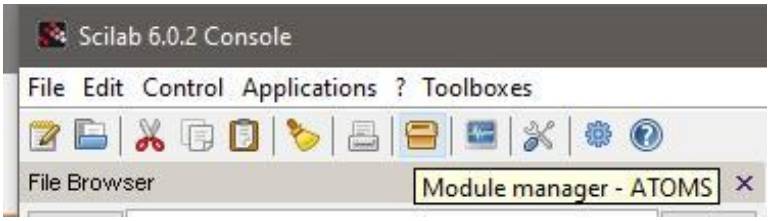


3. Paste IPCV folder in C:\Program Files\scilab-6.0.2

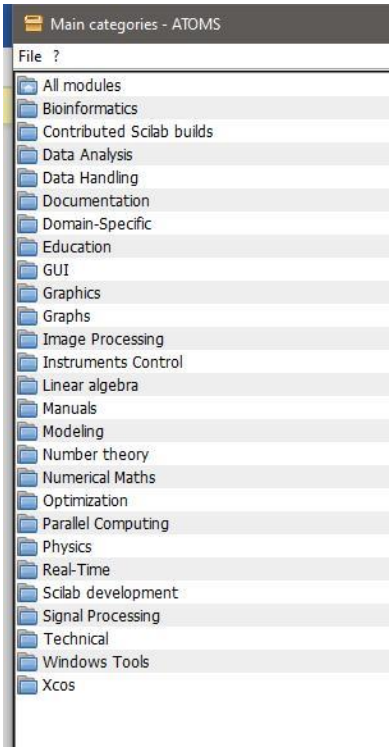


4. Open scilab 6.0.2. Go to start → Search scilab → Open.

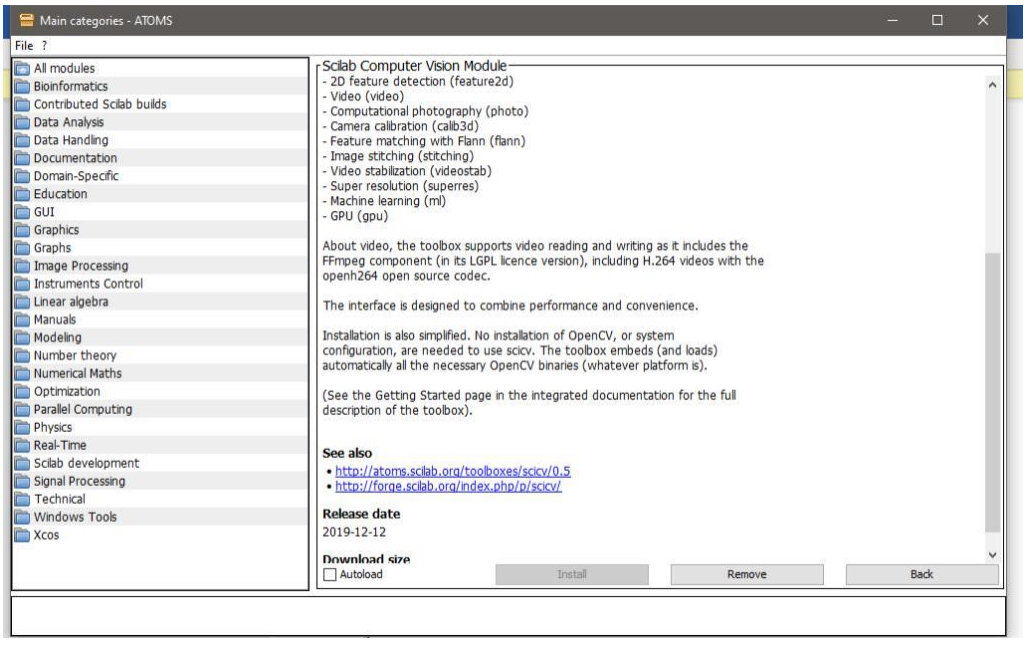
5. Click on Modul Manager.



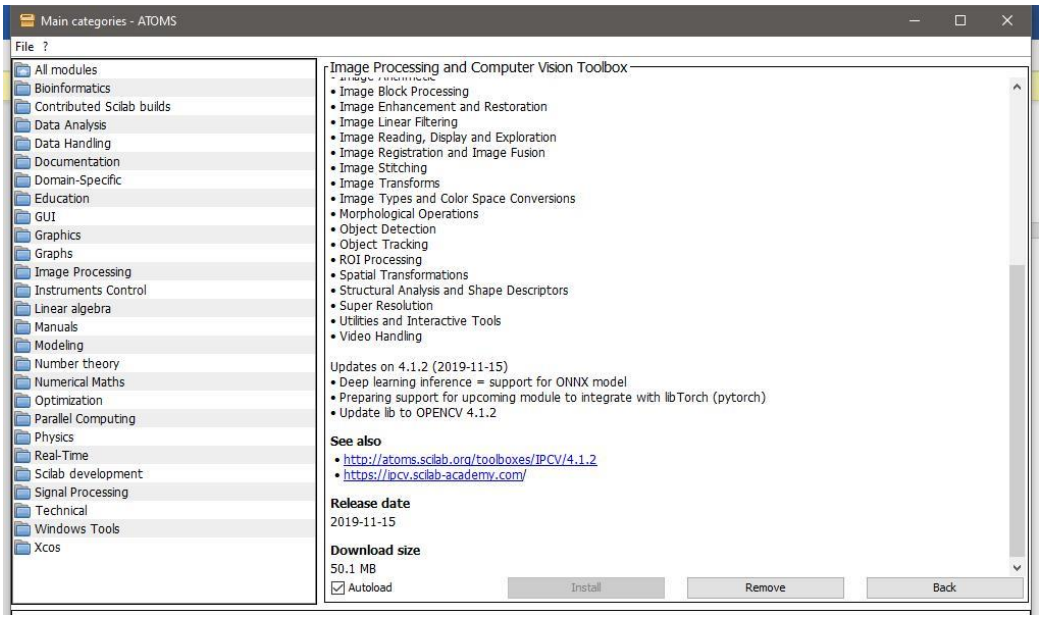
6. Click on Image Processing.



7. Install Scilab computer vision modules



8. Install image processing and computer vision toolbox.



9. Open scilab 6.0.2 console

   atomsInstall("C:\Users\Downloads\IPCV-4.1.2-win64-61-bin")

Part A:

Aim- Program to calculate number of samples required for an image.

Code-

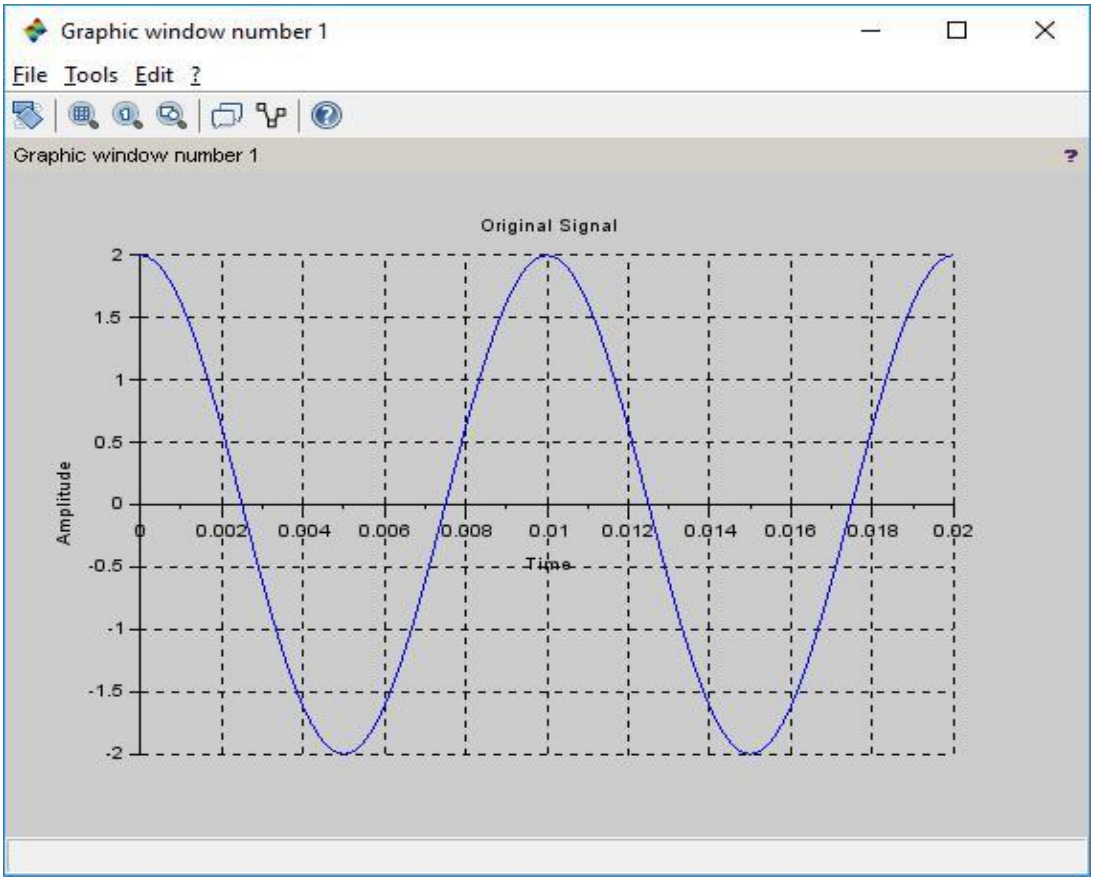
```
clc;
clear all;
fm=input('Input signal frequency');
k=input('no. of cycles');
A=input('Enter amplitude signal');

tm=0:1/(fm*fm):k/fm;
x=A*cos(2*%pi*fm*tm);
figure(1);
a=gca();
a.x_location="origin";
a.y_location="origin";
plot(tm,x);
```

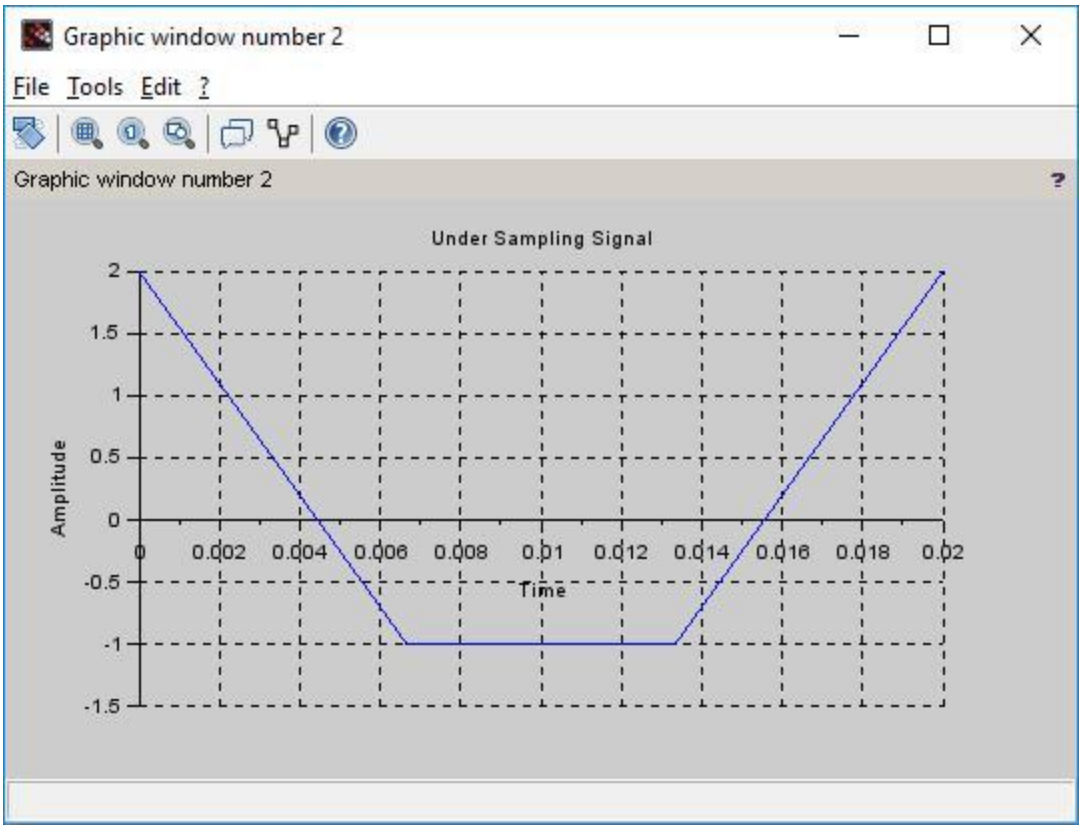
```
title('Original Signal');
xlabel('Time');
ylabel('Amplitude');
xgrid(1)

fnsq=2*fm;
fs=(3/4)*fnsq;
n=0:1/fs:k/fm;
x=A*cos(2*%pi*fm*n);
figure(2);
a=gca();
a.x_location="origin";
a.y_location="origin";
plot(n,x);
title('Under Sampling Signal');
xlabel('Time');
ylabel('Amplitude');
xgrid(1)

fnyq=2*fm;
fo=fnyq;
o=0:1/fo:k/fm;
x=A*cos(2*%pi*fm*o);
figure(3);
a=gca();
a.x_location="origin";
a.y_location="origin";
plot(o,x);
title('nyquist Sampling');
xlabel('Time');
ylabel('Amplitude');
xgrid(1)

fo=10*fnyq;
o=0:1/fo:k/fm;
x=A*cos(2*%pi*fm*o);
figure(4);
a=gca();
a.x_location="origin";
a.y_location="origin";
plot2d3('gnn',o,x);
plot(o,x,'r');
title('Over Sampling signal');
xlabel('Time');
ylabel('Amplitude');
xgrid(1)
```

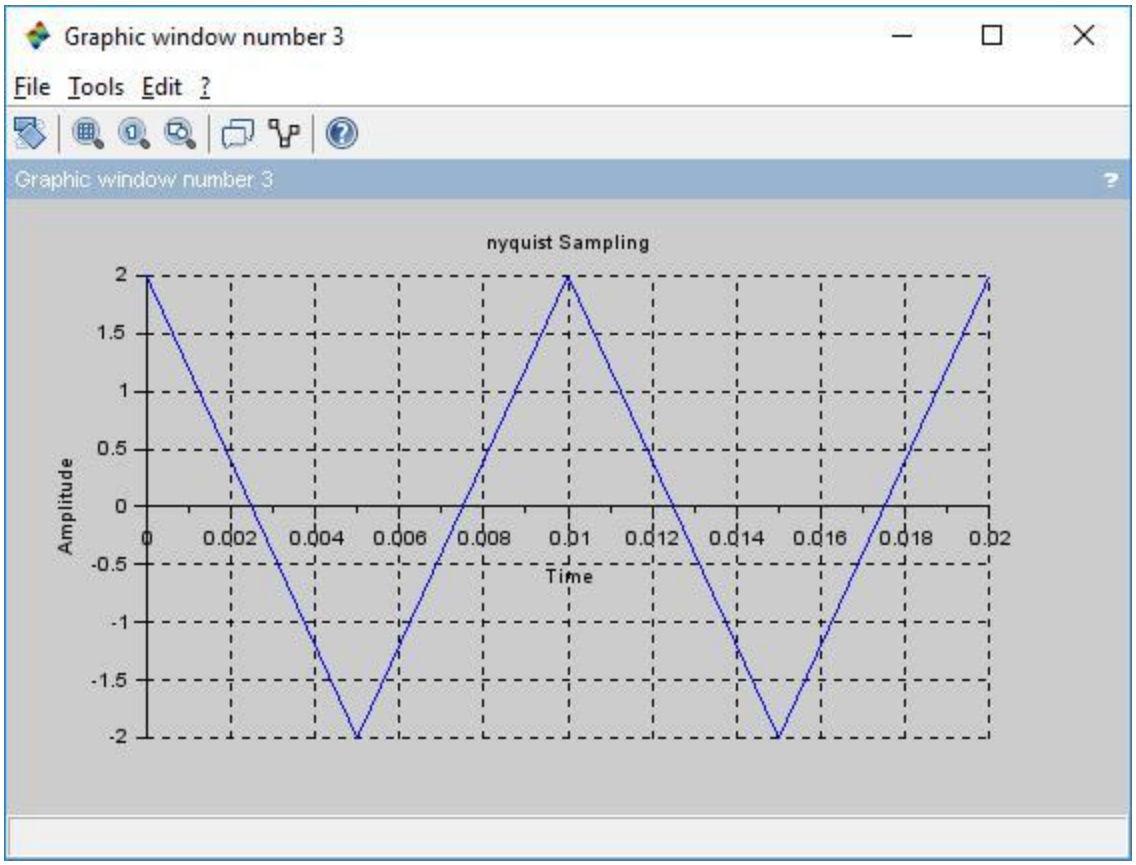
Input- (Example of Input-100,2,2)

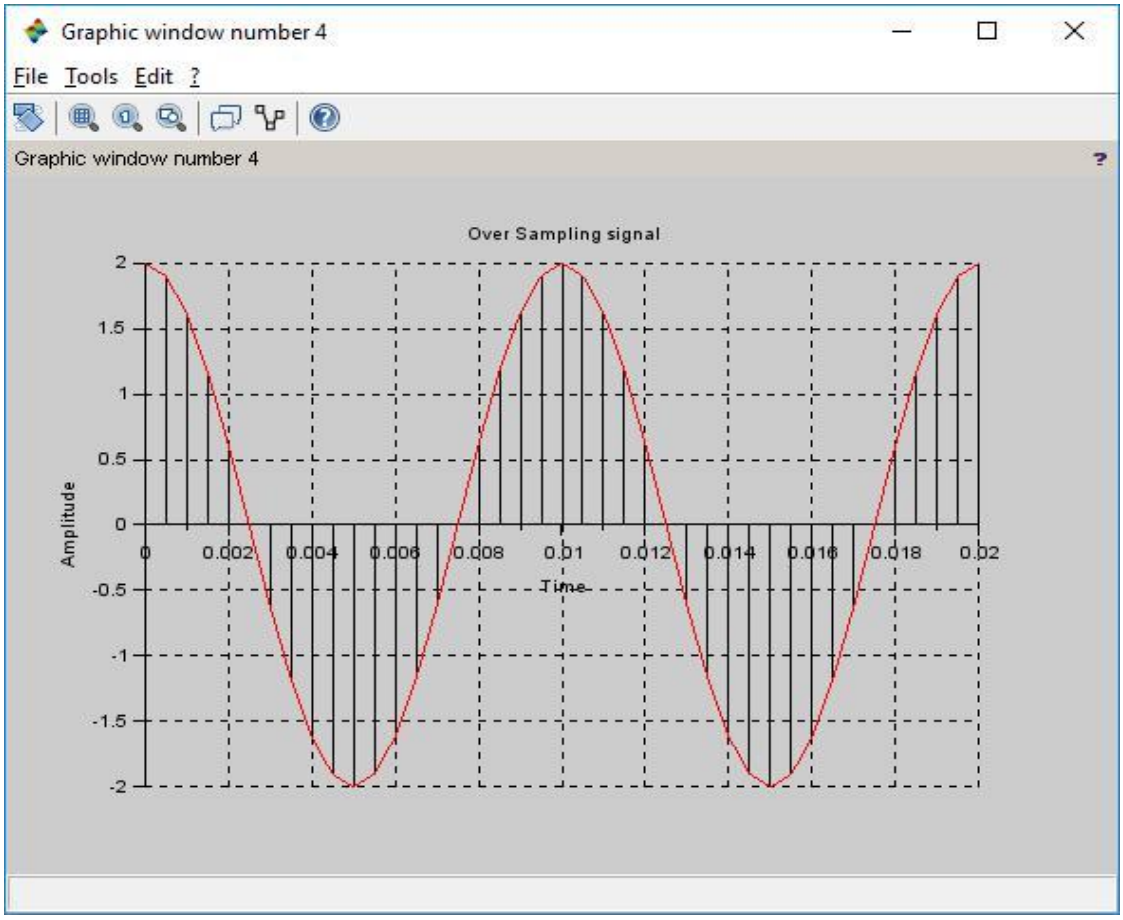
```
Input signal frequency100

no. of cycles2

Enter amplitude signal2


-->
```

Output-




Graphic window number 2
File Tools Edit ?
Graphic window number 2
Under Sampling Signal
Amplitude
Time
2
1.5
1
0.5
0
-0.5
-1
-1.5
0
0.002
0.004
0.006
0.008
0.01
0.012
0.014
0.016
0.018
0.02


Graphic window number 3
File Tools Edit ?
Graphic window number 3
nyquist Sampling
Amplitude
Time
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
0
0.002
0.004
0.006
0.008
0.01
0.012
0.014
0.016
0.018
0.02



Part B:

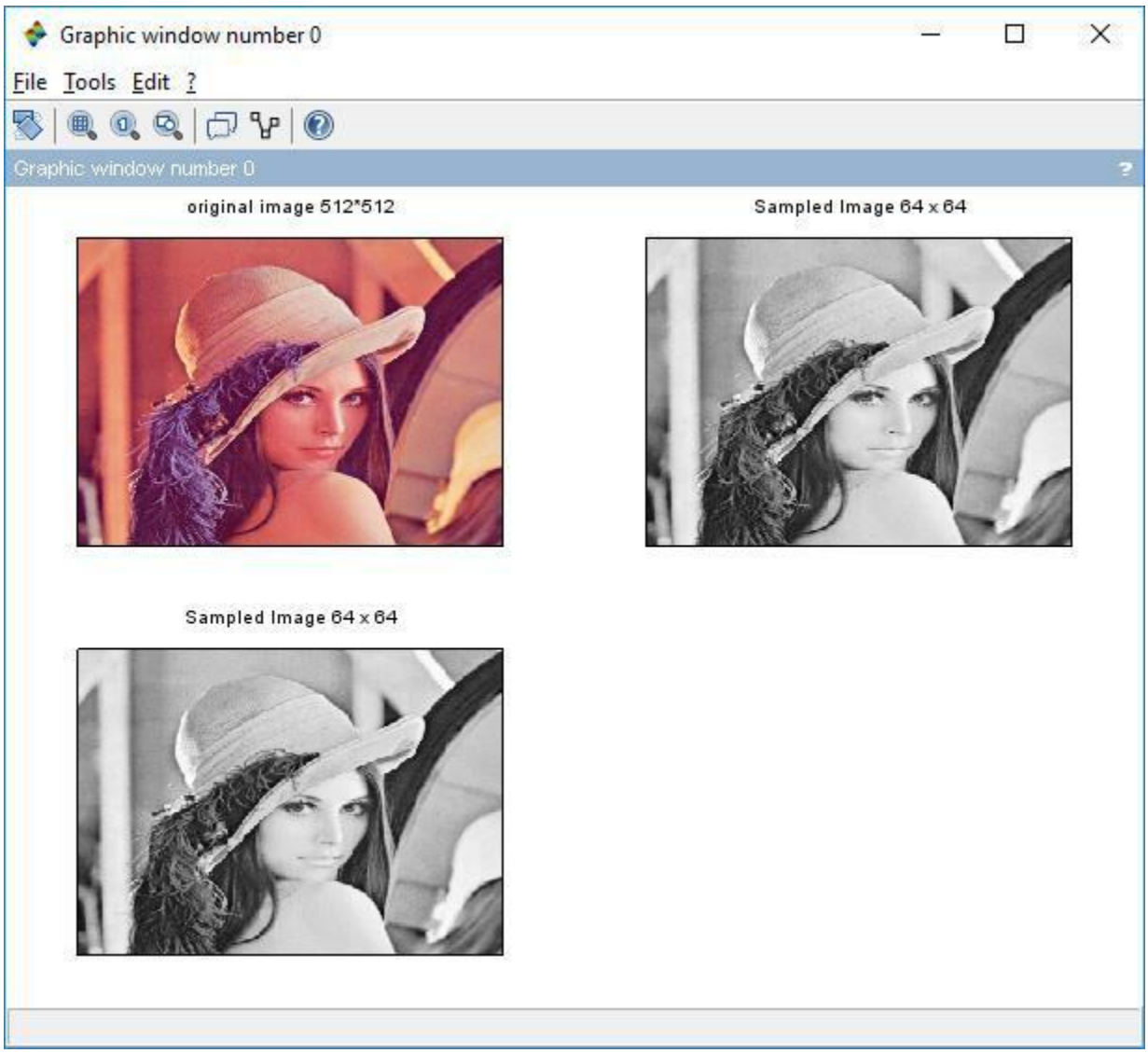
Aim- Program to study the effects of reducing the spatial resolution of a digital image.

Code-

```
clc;
clear all;

Img=imread('C:\Program Files (x86)\scilab-6.0.2\IPCV\images\lena.png');
subplot (2,2,1),imshow (Img), title('original image 512*512');

samp= zeros(256);
for i=1:1:512
   for j=1:1:512
      if modulo(i,2)==0
         m=i/2;
         if modulo(j,2)==0
            n=j/2;
            samp(i-m,j-n)=Img(i,j);
         else
            n=0;
```

```
            end
          end
          m=0
       end
   end

sampImg128=mat2gray(samp);
subplot(2,2,2),imshow(sampImg128),title('Sampled Image 64 x 64');

samp= zeros(32);
for i=1:1:512
    for j=1:1:512
        if modulo(i,16)==0
            m=i/16*4;
            if modulo(j,16)==0
                n=j/16*4
                samp(i-m,j-n)= Img(i,j);
            else
                n=0;
               end
           end
           m=0
       end
   end
  samImg64=mat2gray (samp);
  subplot(2,2,3), imshow(sampImg128),title('Sampled Image 64 x 64');
  samp = zeros(32);
  for i=1:1:512
      for j=1:1:512
        if modulo(i,16)==0
            m=i/16*4;
            if modulo(j,16)==0
                n=j/16*4
                samp(i-m,j-n)= Img(i,j);
            else
                n=0;
               end
           end
           m=0
       end
   end
```

Output-



Part C:

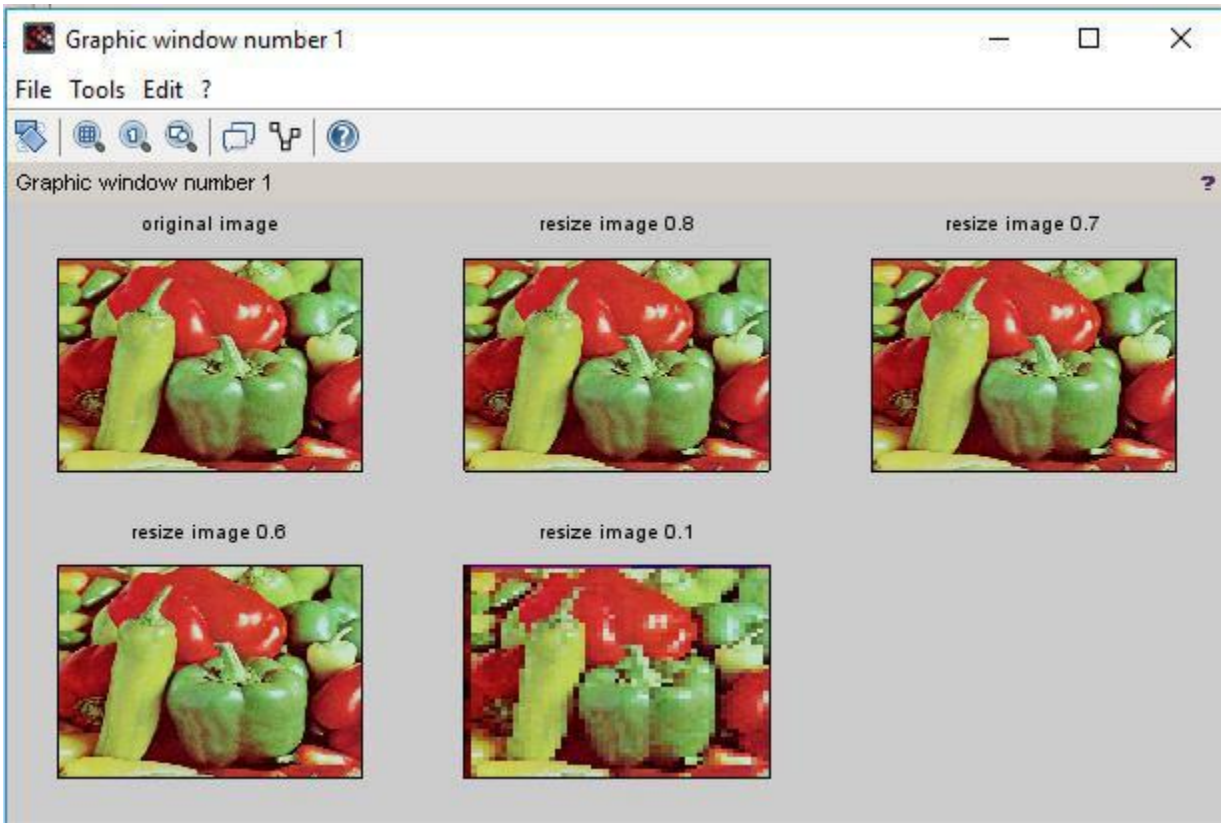
Aim- Program to study the effects of varying the number of intensity levels in a digital image.

Code-

```
clc;
clear all;
figure(1)
///cheak board
subplot(3,3,1);
i=imread('C:\Program Files (x86)\scilab-6.0.2\IPCV\images\peppers.png'); imshow(i);
title('original image');
```

```
subplot(3,3,2);
j=imresize(i,0.8);
imshow(j);
title('resize image 0.8');

subplot(3,3,3);
j=imresize(i,0.7);
imshow(j);
title('resize image 0.7');

subplot(3,3,4);
j=imresize(i,0.6);
imshow(j);
title('resize image 0.6');

subplot(3,3,5);
j=imresize(i,0.1);
imshow(j);
title('resize image 0.1');
```

Output-



Practical No 2

Aim-Image Enhancement.

Part A:

Aim- Basic Intensity Transformation functions.

1. Program to perform Image negation.
2. Program to perform threshold on an image.
3. Program to perform Log transformation.
4. Power-law transformations.
5. Piecewise linear transformations.
    a) Contrast Stretching.
    b) Gray-level slicing with and without background.
    c) Bit-plane slicing.

Part B:

1. Program to plot the histogram of an image and categories.
2. Program to apply histogram equalization.

Part C:

Aim- Write a program to perform convolution and correlation.

Part D:

Aim- Write a program to apply smoothing and sharpening filters on grayscale and color images.

1. Low Pass.
2. High Pass.

Code-

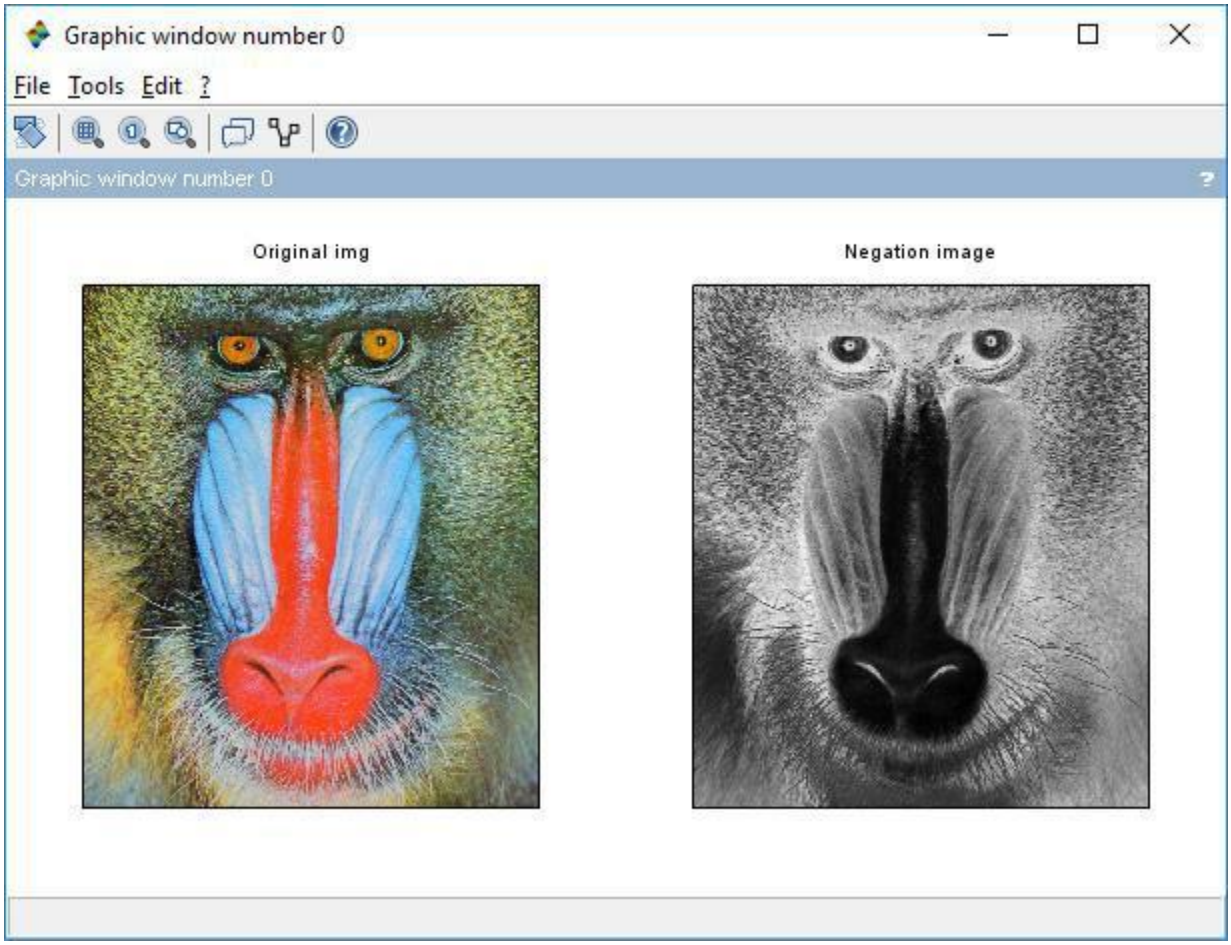
1. Image negation.

Code-

```
clc;
clear all;
a = imread('C:\Program Files\scilab-
6.0.2\IPCV\images\baboon.png'); subplot(1,2,1);
imshow(a)
title('Original img')

[m,n] = size(a);
for i = 1:m
   for j = 1:n
      c(i,j) = 255 - a(i,j)
   end
```

```
end

subplot(1,2,2);
imshow(c)
title('Negation image')
```

Output-

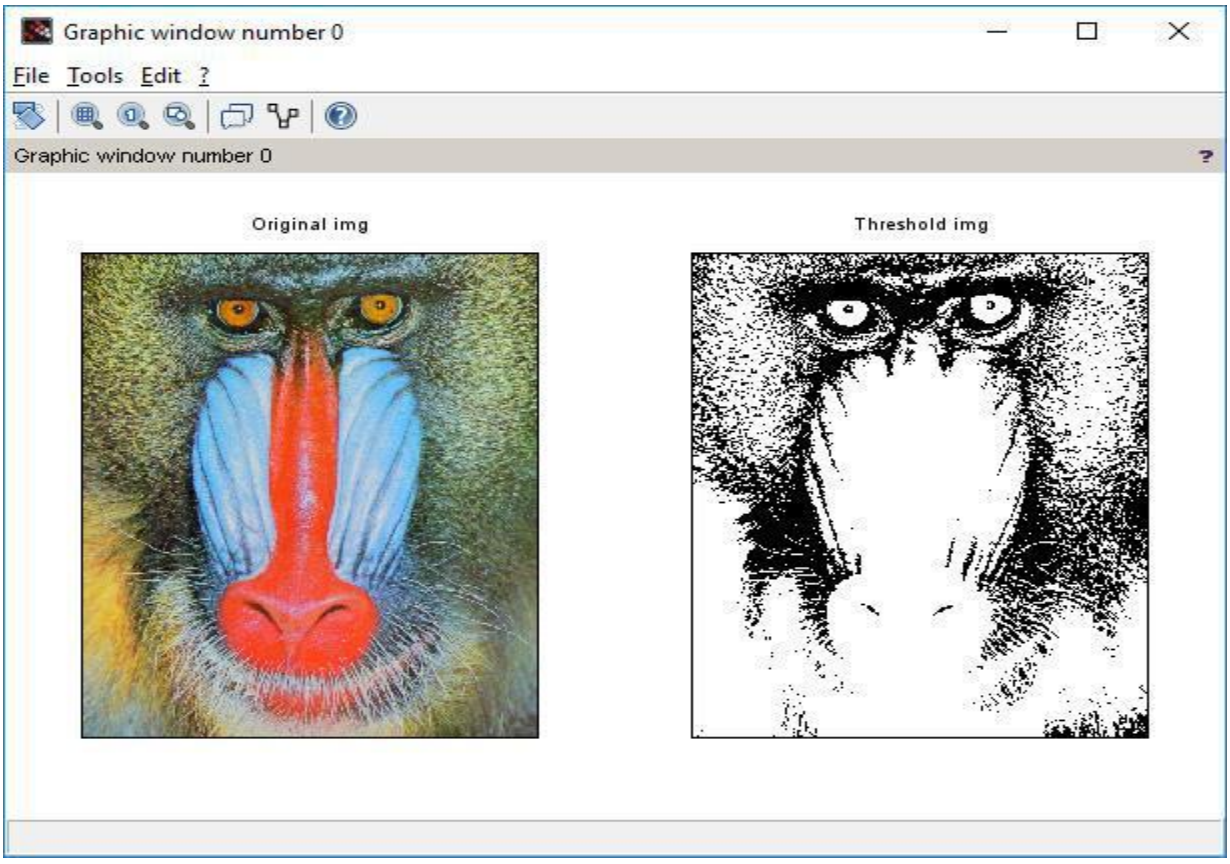


2. Threshold on an image. Code-

```
clc;
clear all;
clc;
clear all;
a = imread('C:\Program Files (x86)\scilab-6.0.2\IPCV\images\baboon.png'); b=double(a);
```

```
subplot(1,2,1);
imshow(a);
title('Original img');

t=100;
[m,n] = size(b);
for i = 1:m
for j = 1:n
if(b(i,j)<t)
c(i,j)=0;
else
c(i,j)=255;
end
end

end

subplot(1,2,2);
imshow(c);
title('Threshold img');
```

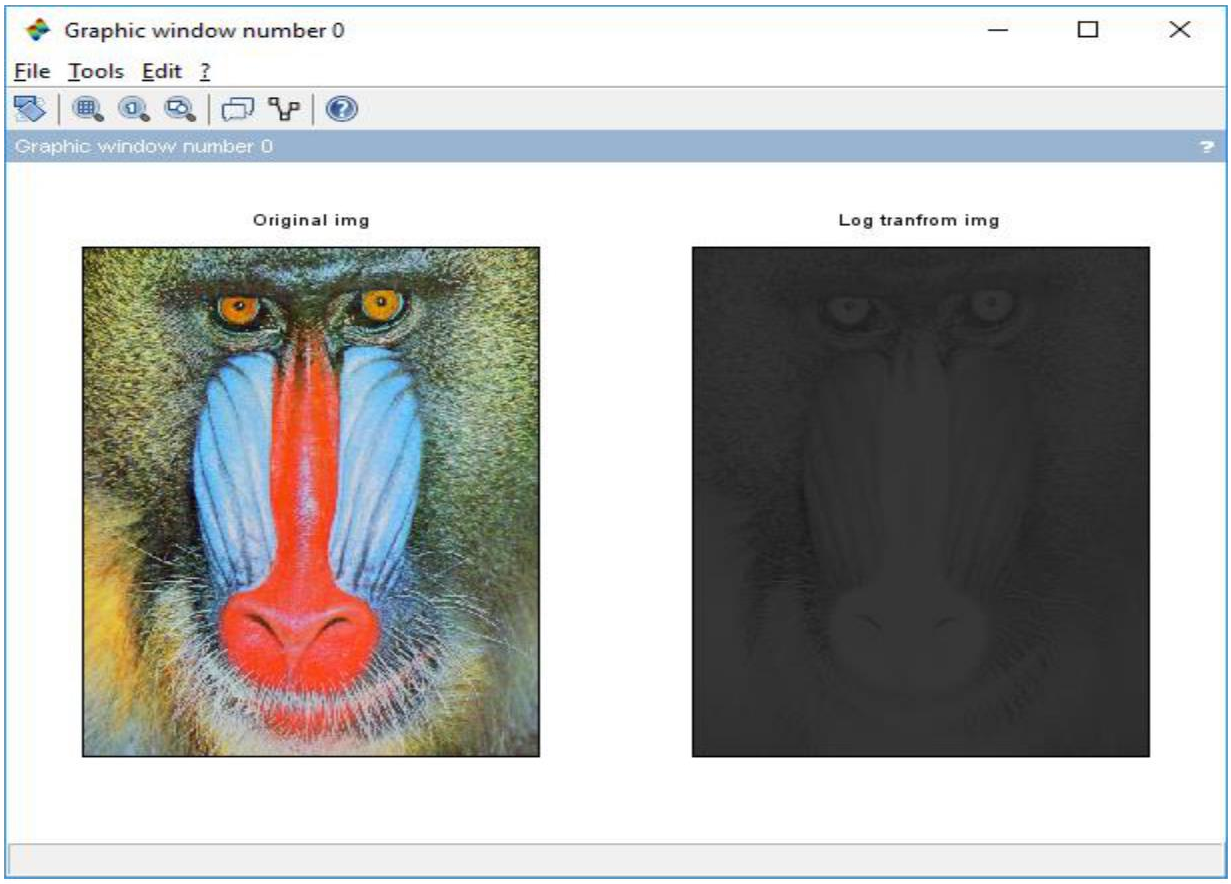
Output-



3. Program to perform Log transformation. Code-

```
clc;
clear all;
a = imread('C:\Program Files (x86)\scilab-6.0.2\IPCV\images\baboon.png'); b=double(a);
subplot(1,2,1);
imshow(a);
title('Original img');

t=10; //constant value
[m,n] = size(b);
for i = 1:m
for j = 1:n
c(i,j)=t*log(1+b(i,j)); //s=k*log(1+r)
end

end
subplot(1,2,2);
imshow(uint8(c));
title('Log tranfrom img');
```

Output-



Variable Browser

	Name	Value	Type	Visibility
int	a	512x512x3	Integer	local
	b	512x512x3	Double	local
int	c	512x512	Integer	local
	i	512	Double	local
	j	512	Double	local
	m	512	Double	local
	n	512	Double	local
	t	10	Double	local

4. Power-law

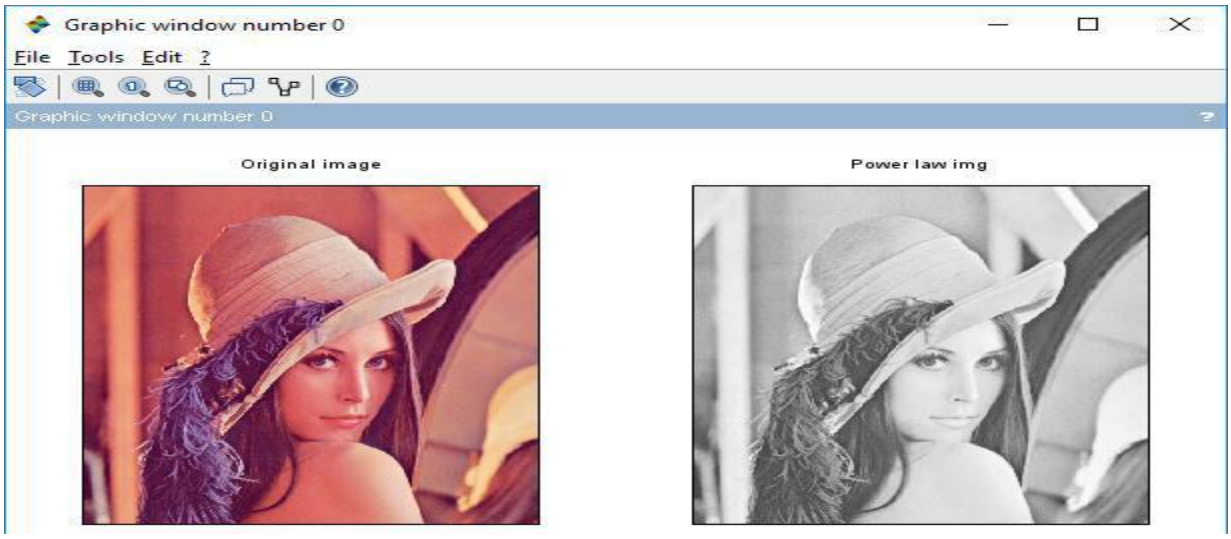
transformations. Code-

clear all;

a = imread('C:\Program Files (x86)\scilab-6.0.2\IPCV\images\lena.png'); b=double(a)

```
subplot(1,2,1);
imshow(a);
title("Original image");
k=1;
gamma=1;
[m,n]=size(b);
for i=1:m
   for j=1:n
      c(i,j)=k*(b(i,j)^gamma);
end
end
subplot(1,2,2);
imshow(uint8(c));
title("Power law img");
```

Output-



5. Piecewise linear transformations.

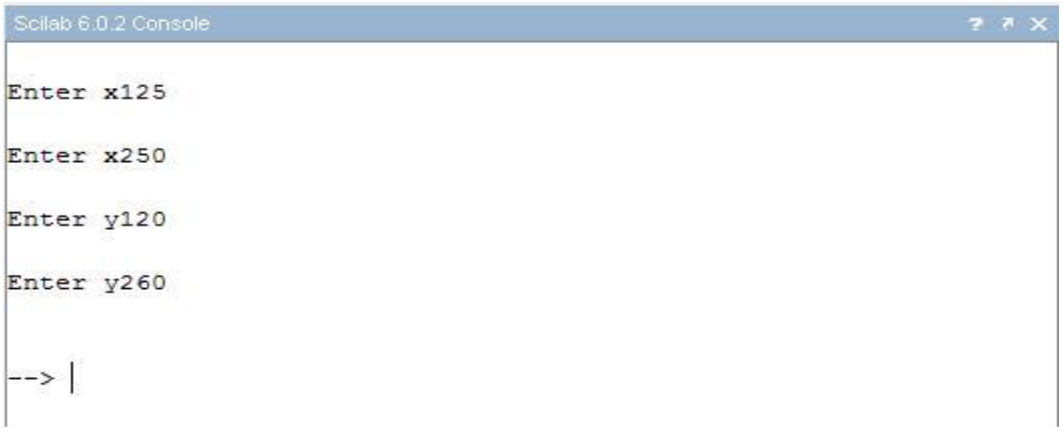
a) Contrast Stretching. Code-

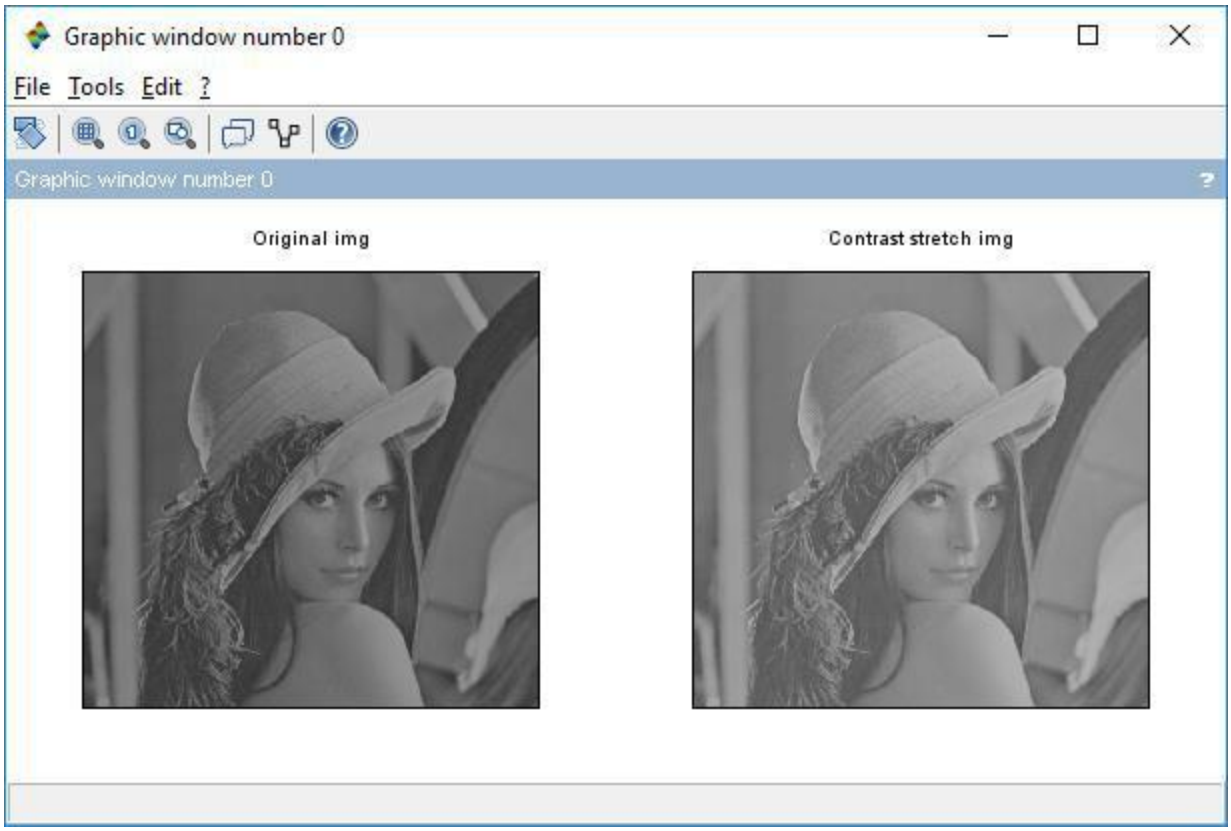
```
clc;
clear all;
a = imread('C:\Program Files (x86)\scilab-6.0.2\IPCV\images\Lena_dark.png'); b=double(a);
[m,n]=size(b);//to get digital image in the form of matrix m by n
x1=input('Enter x1');
x2=input('Enter x2');
```

```
y1=input('Enter y1');
y2=input('Enter y2');

slope1=y1/x1;
slope2=(y2-y1)/(x2-x1);
slope3=(255-y2)/(255-x2);

inter1=y1-slope2*x1;
inter2=y2-slope3*x1;

ics=zeros(m,n);
for i=1:m
   for j=1:n
      if(0<b(i,j)&&b(i,j)<x1)
         ics(i,j)=slope1*b(i,j);
      else if(x1<b(i,j)&&b(i,j)<x2)
            ics(i,j)=slop2*b(i,j)+inter1;
      else if(x2<b(i,j)&&b(i,j)<255)
            ics(i,j)=slope3*b(i,j)+inter2;
            end
         end
      end
   end
end
subplot(1,2,1);
imshow(a);
title('Original img');
subplot(1,2,2);
imshow(uint8(ics));
title('Contrast stretch img');
```

Output-

Input-





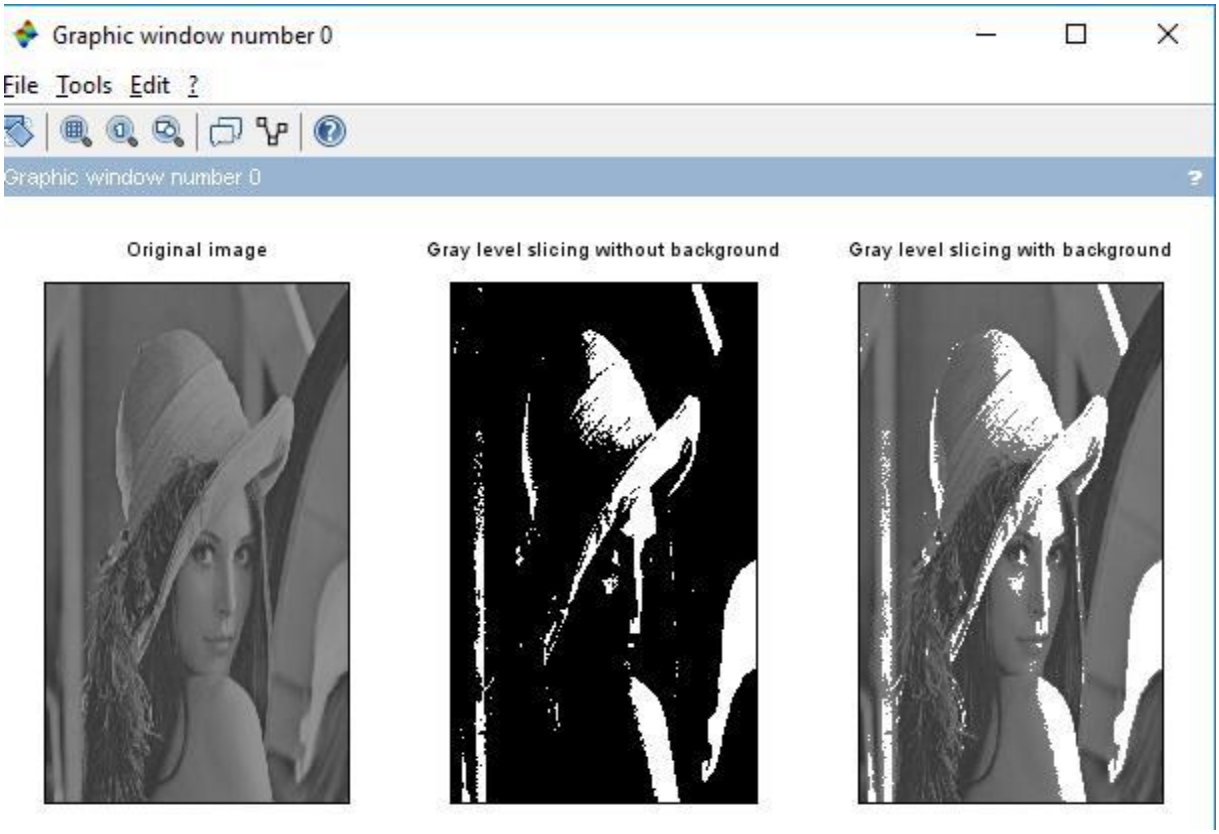
b) Gray-level slicing with and without background. Code-

```
clc;
clear all;
a = imread('C:\Program Files (x86)\scilab-6.0.2\IPCV\images\Lena_dark.png'); b=double(a);
[m,n]=size(b);
x1=input("Enter  x1");
x2=input("Enter x2");

c=zeros(m,n);
d=zeros(m,n);
for i=1:m
   for j=1:n
      if(b(i,j)>=x1 && b(i,j)<=x2);
         c(i,j)=255;
      else
         c(i,j)=0;
      end
   end
end
for i=1:m
   for j=1:n
```

```
      if(b(i,j)>=x1 && b(i,j)<=x2)
d(i,j)=255;
else
d(i,j)=b(i,j);
end
end
end
subplot(1,3,1);
imshow(a);
title("Original image");

subplot(1,3,2);
imshow(uint8(c));
title("Gray level slicing without background");

subplot(1,3,3);
imshow(uint8(d));
title("Gray level slicing with background");
```

Output-

Input-

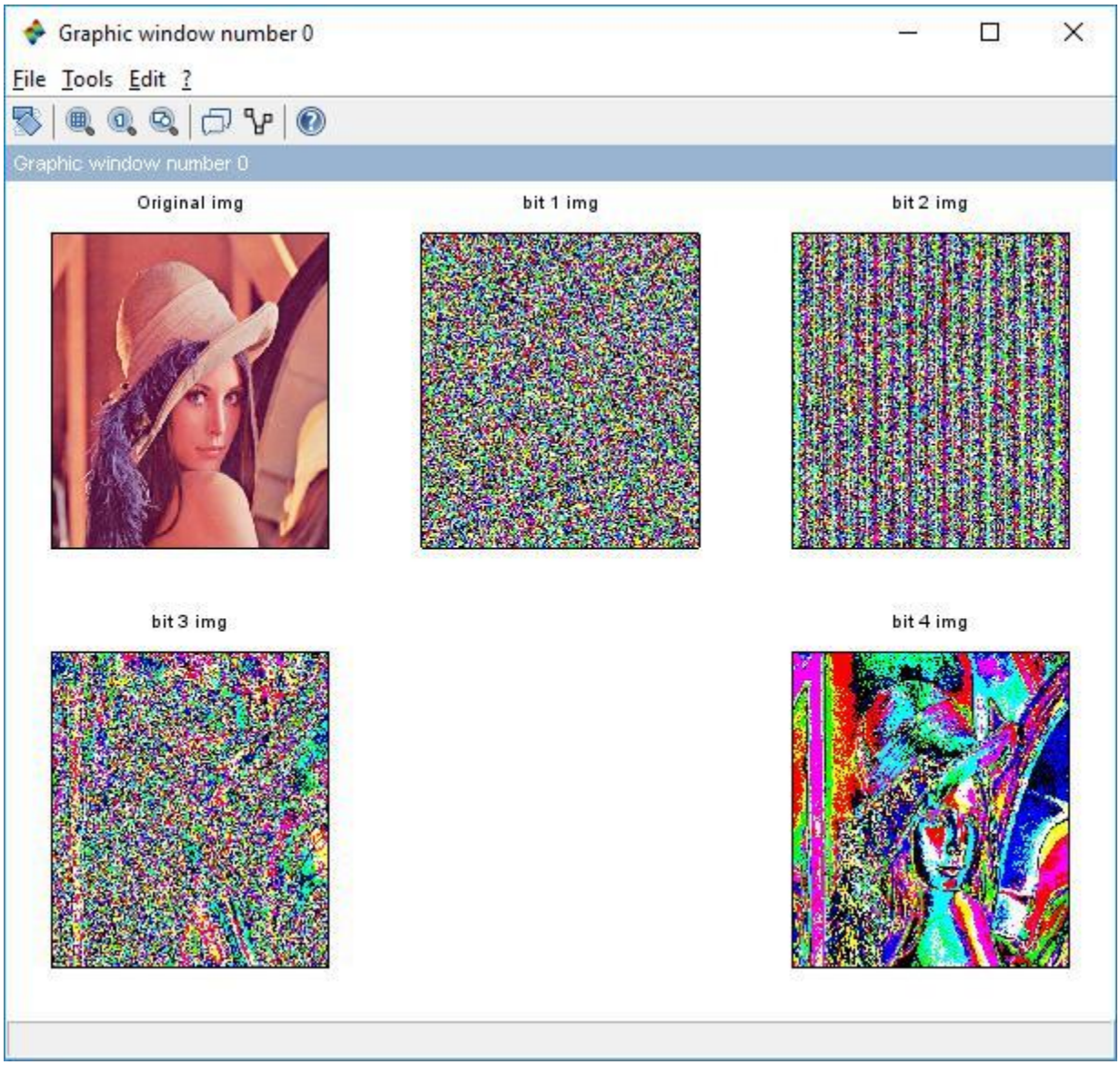


c) Bit-plane slicing. Code-

```
clc;
clear all;
a = imread('C:\Program Files (x86)\scilab-6.0.2\IPCV\images\lena.png'); b=double(a);
subplot(2,3,1);
imshow(a);
title("Original img");

f1=bitget(b,1),
subplot(2,3,2);
imshow(f1);
title("bit 1 img");

f2=bitget(b,2),
subplot(2,3,3);
imshow(f2);
title("bit 2 img");
```

```
f3=bitget(b,4),
subplot(2,3,4);
imshow(f3);
title("bit 3 img");

f4=bitget(b,6),
subplot(2,3,6);
imshow(f4);
title("bit 4 img");
```

Output-



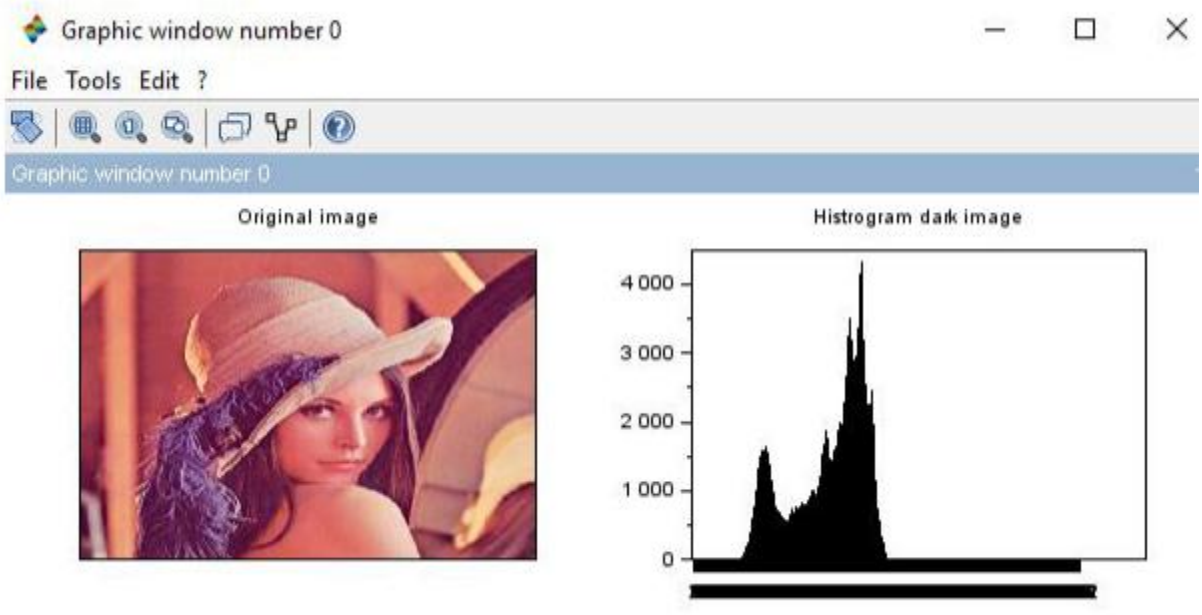
Part B:

1. Program to plot the histogram of an image and categories.

Code-

```
clc;
clear all;
Img= imread('C:\Program Files (x86)\scilab-
6.0.2\IPCV\images\lena.png'); Img1=double(Img);
[row col]=size(Img1);
h=zeros(row,col); for
n=1:1:row
   for m=1:1:col;
      if Img1(n,m)==0;
         Img1(n,m)=1;
      end
   end
end
for n=1:1:row
   for m=1:1:col
      t=Img1(n,m);
      h(t)=h(t)+1;
end
end
subplot(2,2,1),imshow(Img),title('Original image')
subplot(2,2,2),bar(h),title('Histrogram dark image');
```

Output-



2. Program to apply histogram

equalization. Code-

Part C:

Write a program to perform convolution and correlation.

1. convolution

```
clc;
x=[4,5,6;7,8,9];
h=[1;1;1];
y=conv2(x,h);
disp(y);
```

Output-

```
    4.    5.    6.
    11.   13.   15.
    11.   13.   15.
    7.    8.    9.

-->
```

2. Correlation.

```
clc;
x=input('Enter first sequence');
h=input('Enter second sequence');
y=xcorr(x,h);

disp(x);
disp(h);
disp(y);
```

Output-

```
Enter first sequence[1 2 3 4]

Enter second sequence[4 3 2 1]


   1.   2.   3.   4.

   4.   3.   2.   1.

   1.   4.   10.   20.   25.   24.   16.

-->
```

Part D:

Write a program to apply smoothing and sharpening filters on grayscale and color images.

1. Low Pass.

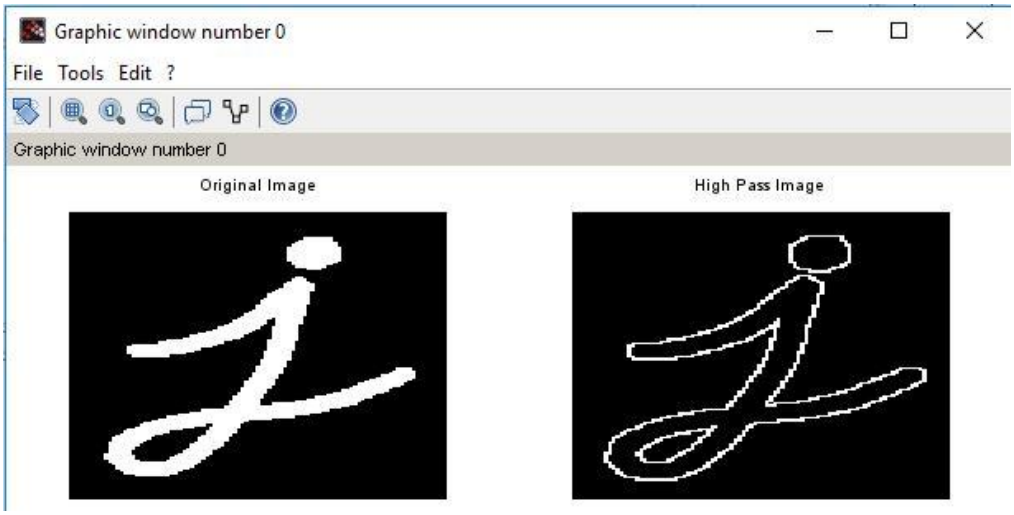
```
//low pass filter for smooting
clc;
clear all;
a1=imread('C:\Program Files (x86)\scilab-6.0.2\IPCV\images\morpex.png');
a=double(a1);
[m,n]=size(a);
w=[1 1 1; 1 1 1; 1 1 1];
for i=2:m-1
   for j=2:n-1
      b(i,j)=(w(1)*a(i-1,j+1)+w(2)*a(i,j+1)+w(3)*a(i+1,j+1)+w(4)*a(i-
1,j)+w(5)*a(i,j)+w(6)*a(i+1,j)+w(7)*a(i-1,j-1)+w(8)*a(i,j-1)+w(9)*a(i+1,j-1))
end
end
subplot(2,2,1), imshow(a1),title('Original Image');
subplot(2,2,2), imshow(uint8(b)),title('Low Pass Image');
```

Output-

2. High Pass.

```
//high pass filter for smooting
clc;
clear all;
a1=imread('C:\Program Files (x86)\scilab-6.0.2\IPCV\images\morpex.png');
a=double(a1);
[m,n]=size(a);
w=[-1 -1 -1; -1 8 -1; -1 -1 -1];
for i=2:m-1
   for j=2:n-1
      b(i,j)=(w(1)*a(i-1,j+1)+w(2)*a(i,j+1)+w(3)*a(i+1,j+1)+w(4)*a(i-
1,j)+w(5)*a(i,j)+w(6)*a(i+1,j)+w(7)*a(i-1,j-1)+w(8)*a(i,j-1)+w(9)*a(i+1,j-1))
end
end
subplot(2,2,1), imshow(a1),title('Original Image');
subplot(2,2,2), imshow(uint8(b)),title('High Pass Image');
```

Output



Practical No 3

Aim- Filtering in Frequency Domain.

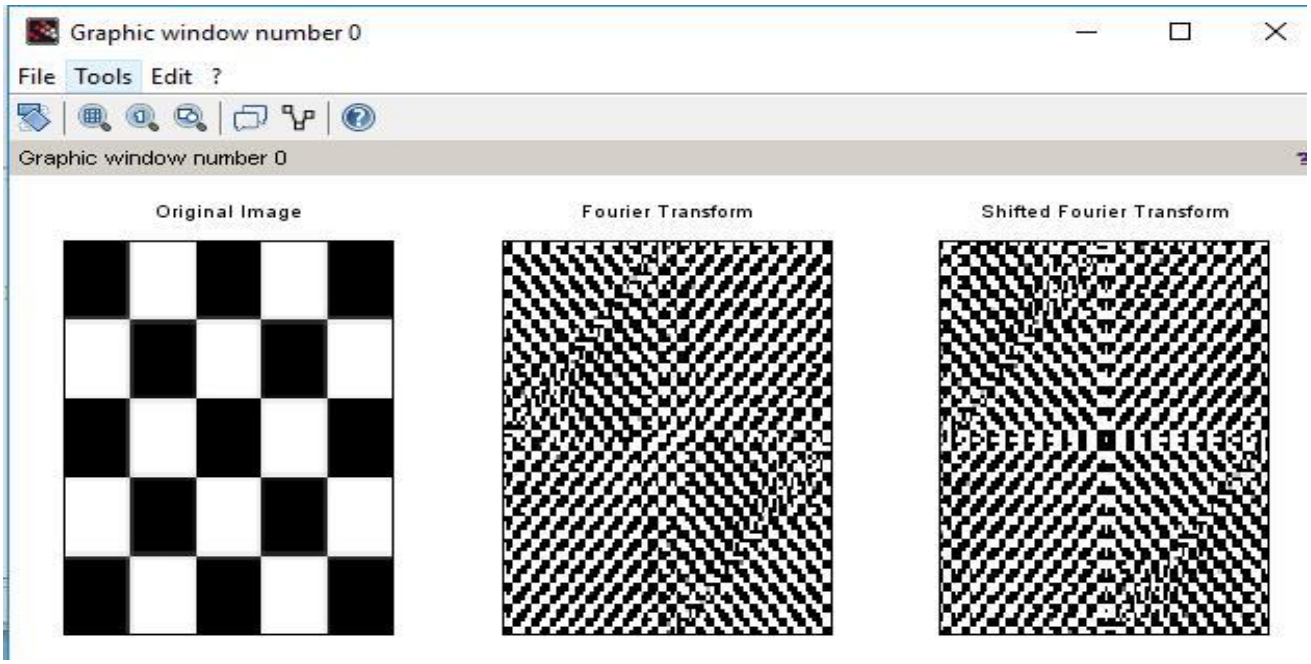
Part A:

Aim- Program to apply Discrete Fourier Transform on an image.

Code-

```
clc;
clear;
close;
I=imread('C:\Program Files (x86)\scilab-6.0.2\IPCV\images\checkerbox.png');
subplot(1,3,1)
imshow(I)
title("Original Image")
I=double(I);
J=fft2(I);

subplot(1,3,2)
imshow(J)
title("Fourier Transform")
L=fftshift(real(J));
subplot(1,3,3)
imshow(L)
title("Shifted Fourier Transform")
```

Output-



Part B:

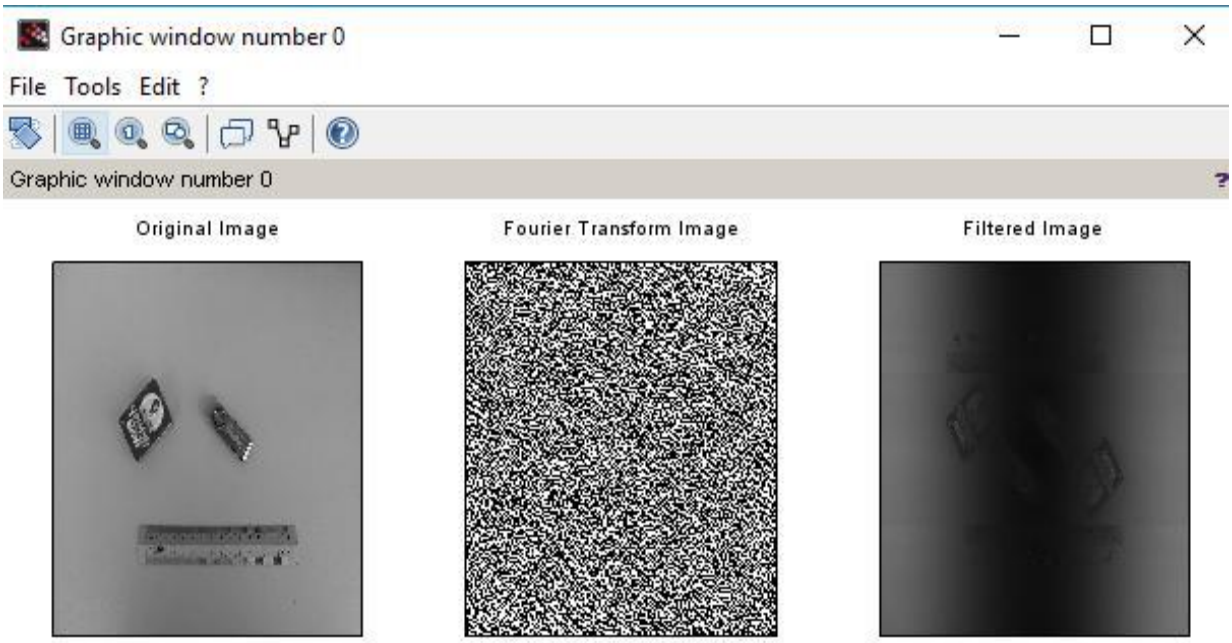
Aim- Program to apply Low pass and High pass filters in frequency domain.

Low pass filter-

Code-

```
S=imread("C:\Program Files (x86)\scilab-6.0.2\IPCV\images\measure_gray.jpg");
S2=fft2(im2double(S));

h=ffilt('lp',3,0.2,0.6);

img=imfilter(S2,h);

S4=real(ifft(img));

subplot(1,3,1);
imshow(S);
title("Original Image");

subplot(1,3,2);
imshow(S2);
title("Fourier Transform Image");

subplot(1,3,3);
imshow(S4);
title("Filtered Image");
```

Output-

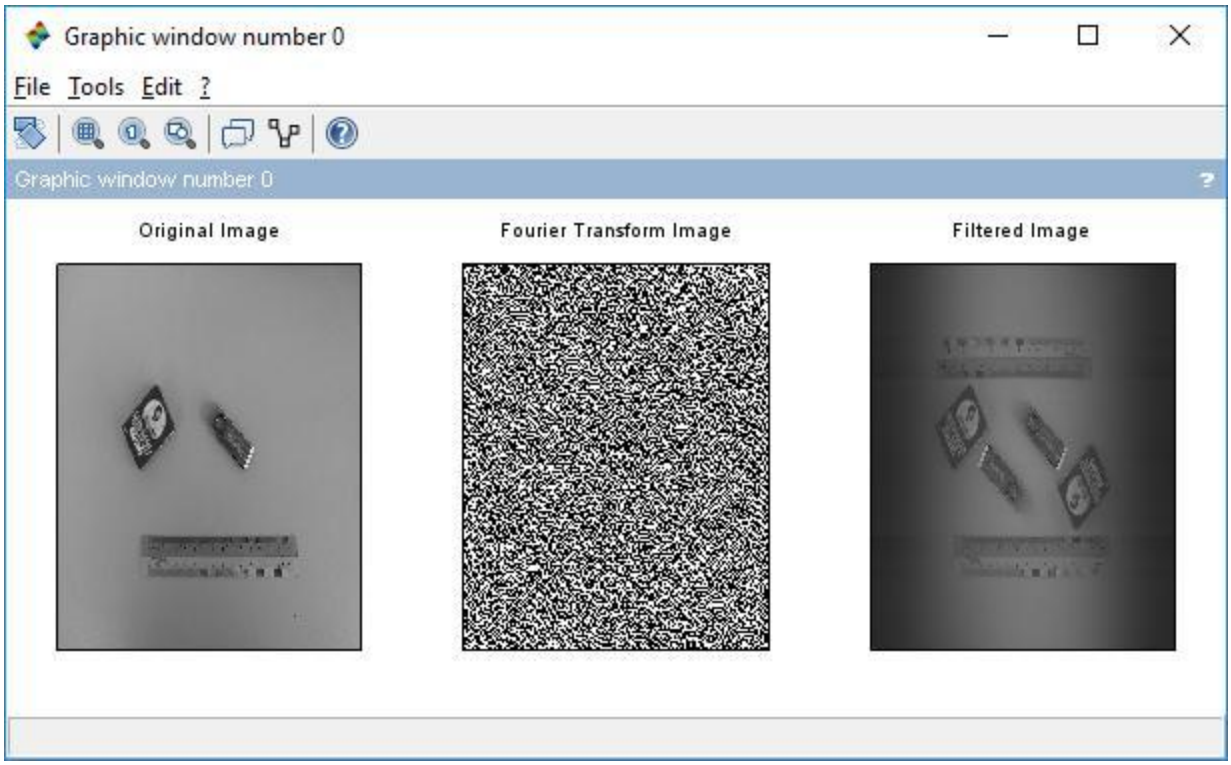


High pass filter-

Code-

```
S=imread("C:\Program Files (x86)\scilab-6.0.2\IPCV\images\measure_gray.jpg");
S2=fft2(im2double(S));

h=ffilt('hp',3,0.2,0.6);

img=imfilter(S2,h);

S4=real(ifft(img));

subplot(1,3,1);
imshow(S);
title("Original Image");

subplot(1,3,2);
imshow(S2);
title("Fourier Transform Image");

subplot(1,3,3);
imshow(S4);
title("Filtered Image");
```

Output-



Part C:

Aim- Program for butterworth and gaussion filter in frequency domain.

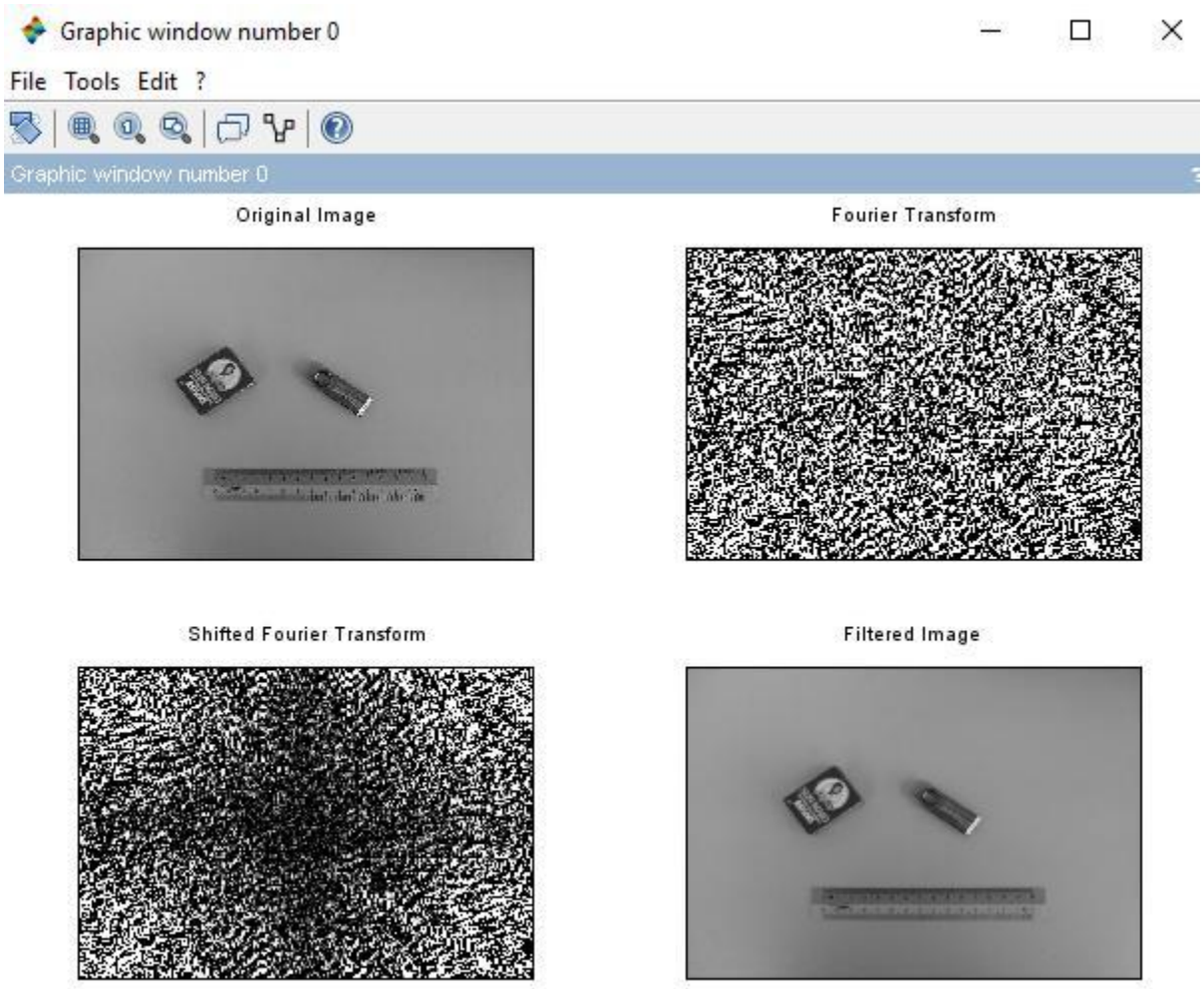
Butterworth-

Code-

```
S=imread(fullpath(getIPCVpath()+"/images/measure_gray.jpg"));

h=mkfftfilter(S,'butterworth1',0.4);
S2= fft2(im2double(S));
S3 = S2.*fftshift(h);
S4 = real(ifft(S3));

subplot(2,2,1);
imshow(S);
title("Original Image");

subplot(2,2,2);
imshow(S2);
title("Fourier Transform");

subplot(2,2,3);
imshow(S3);
```

```
title("Shifted Fourier Transform");

subplot(2,2,4);
imshow(S4);
title("Filtered Image");
```

Output-



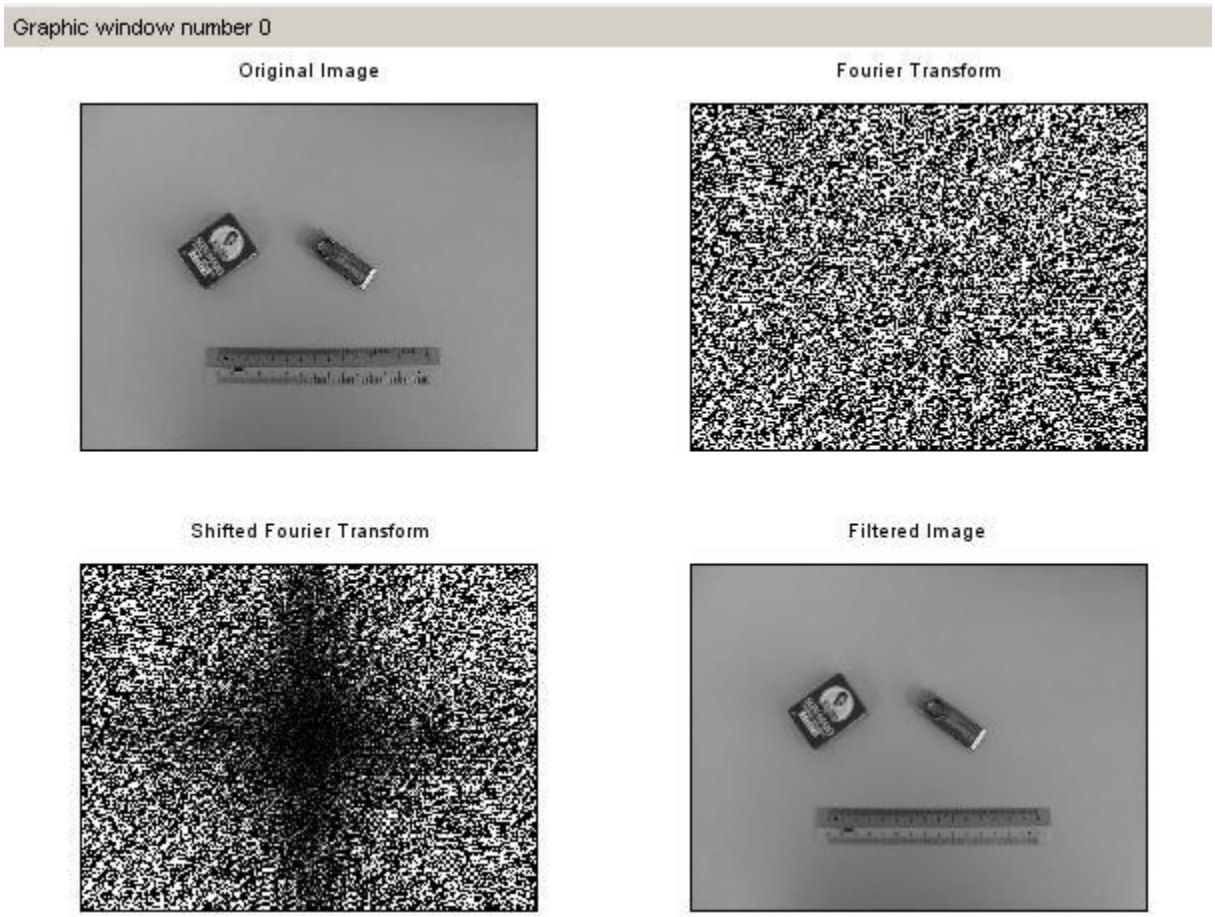
Gaussion filter-

Code-

```
S=imread(fullpath(getIPCVpath()+"/images/measure_gray.jpg"));

h=mkfftfilter(S,'gauss',0.8);
S2= fft2(im2double(S));
S3 = S2.*fftshift(h);
S4 = real(ifft(S3));
```

```
subplot(2,2,1);
imshow(S);
title("Original Image");

subplot(2,2,2);
imshow(S2);
title("Fourier Transform");

subplot(2,2,3);
imshow(S3);
title("Shifted Fourier Transform");

subplot(2,2,4);
imshow(S4);
title("Filtered Image");
```

Output-



Practical No 4

Aim-Image Denoising.

Part A:

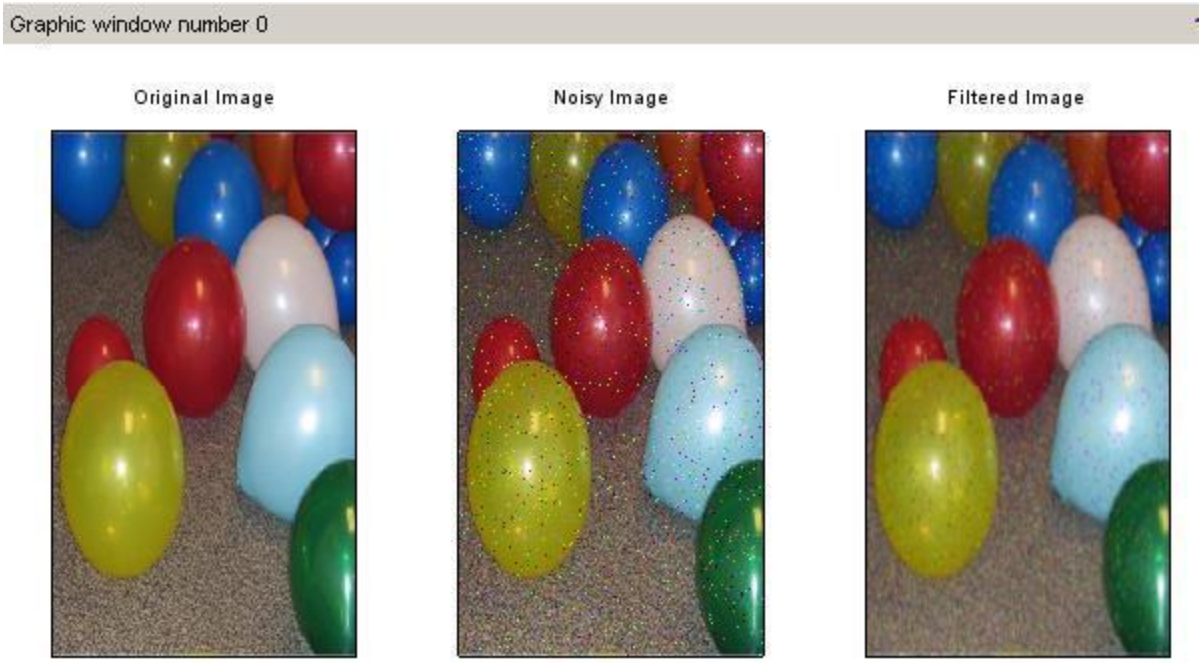
Aim- Program to denoise using spatial mean, median.

Mean-

Code-

```
Image=imread('C:\Program Files (x86)\scilab-6.0.2\IPCV\images\balloons.png'); //Image=rgb2gray(Image);
NoisyImage=imnoise(Image,'salt & pepper', 0.02);
F1=fspecial('average',3);
FilterImage=imfilter(NoisyImage,F1);

subplot(1,3,1);
imshow(Image);
title('Original Image');

subplot(1,3,2);
imshow(NoisyImage);
title('Noisy Image');

subplot(1,3,3);
imshow(FilterImage);
title('Filtered Image');
```

Output-



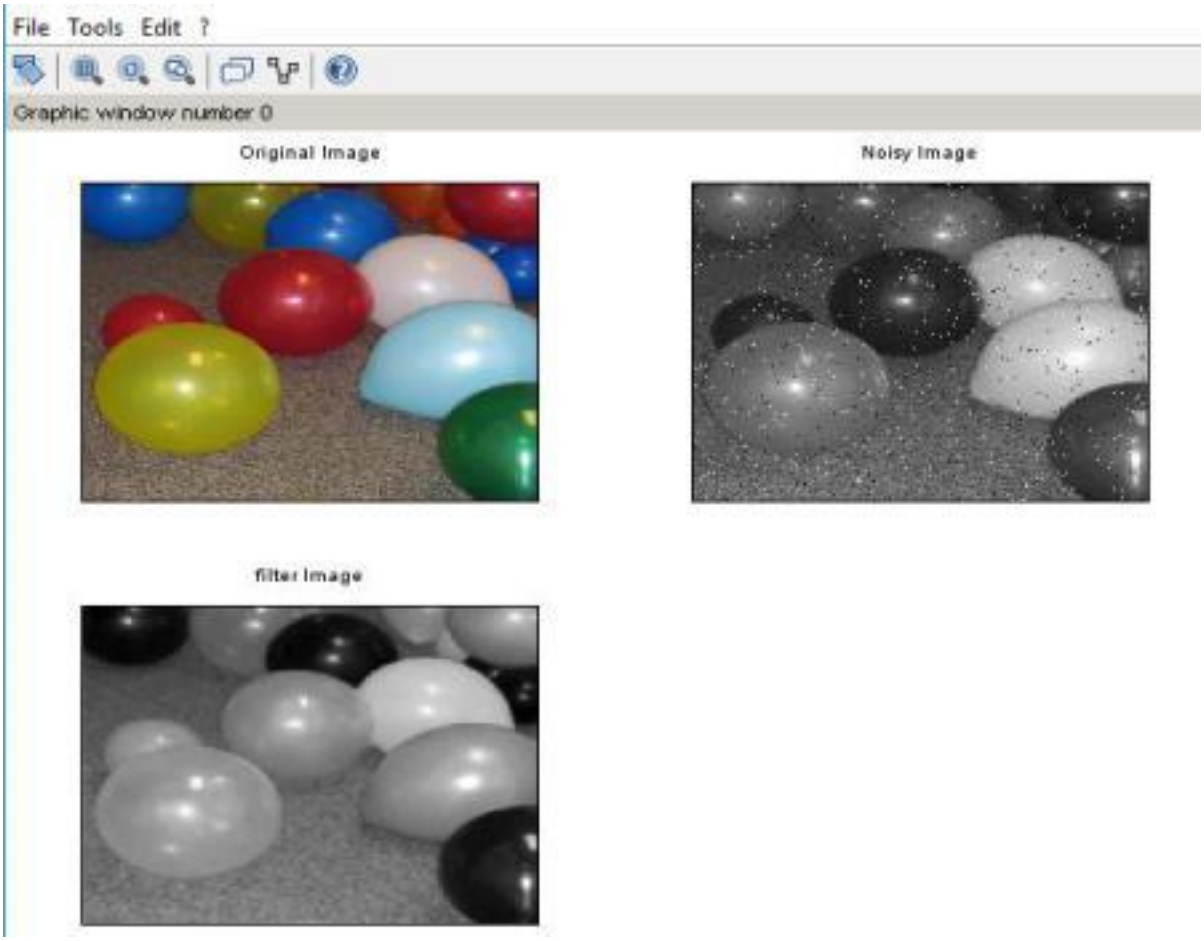
Median-

Code-

```
clc;
clear all;
a= imread('C:\Program Files (x86)\scilab-6.0.2\IPCV\images\balloons.png');
image=rgb2gray(a);
NoisyImage = imnoise(image,'salt & pepper',0.02);

[m n]=size(a);
for i=2:m-1
   for j=2:n-1
      output(i,j)=median([a(i-1,j+1),a(i,j+1),a(i+1,j+1),a(i-1,j),a(i+1,j),a(i-1,j-1),a(i,j-1),a(i+1,j-
1)]);
   end
end

subplot(2,2,1);
imshow(a);
title('Original Image');

subplot(2,2,2);
imshow(NoisyImage);
title('Noisy Image');

subplot(2,2,3);
imshow(output);
```

title('filter Image');

Output-

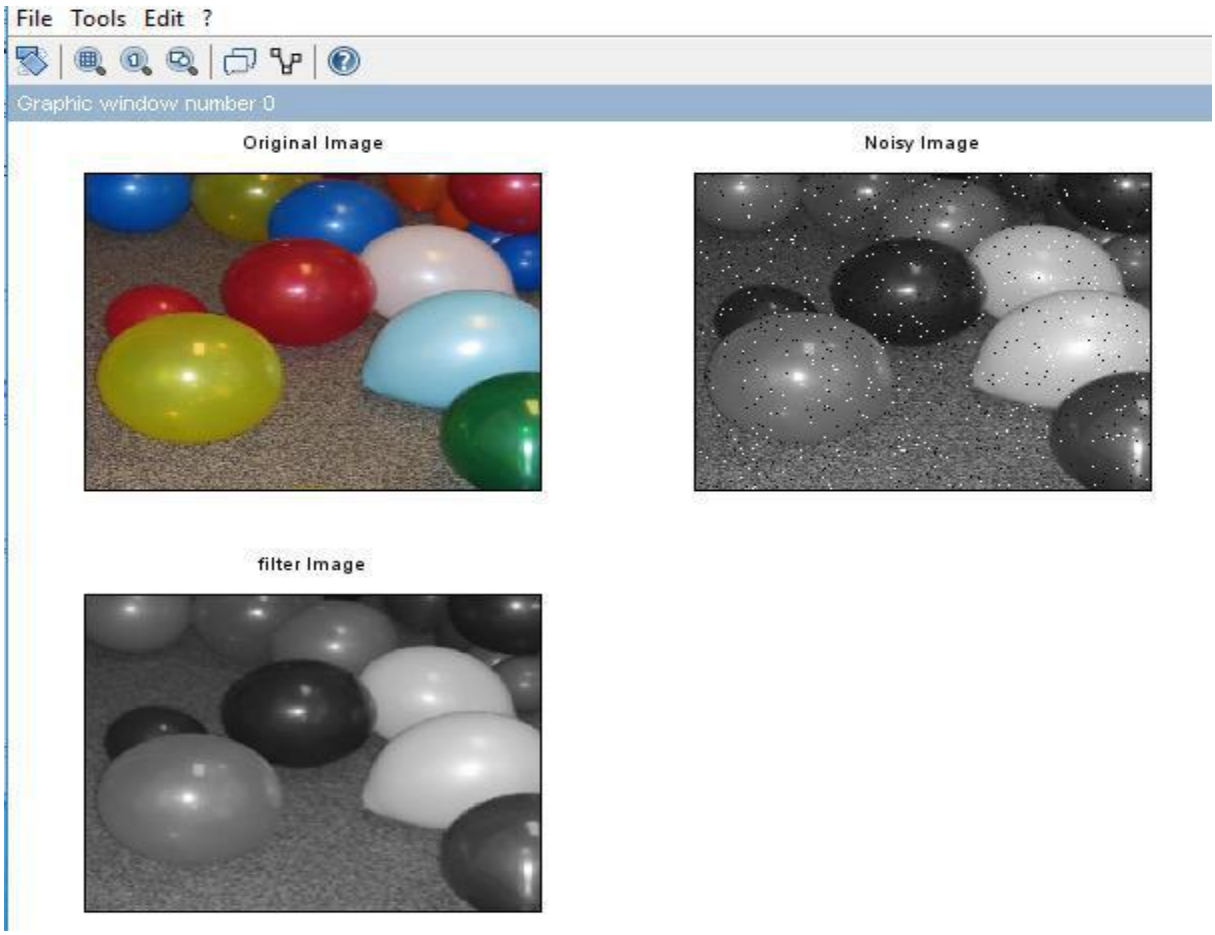


Code-

```
clc;
clear all;
a= imread('C:\Program Files (x86)\scilab-6.0.2\IPCV\images\balloons.png');
image=rgb2gray(a);

NoisyImage = imnoise(image,'salt & pepper',0.02);

output=immedian(NoisyImage,[3,3]);

subplot(2,2,1);
imshow(a);
title('Original Image');
```

```
subplot(2,2,2);
imshow(NoisyImage);
title('Noisy Image');

subplot(2,2,3);
imshow(output);
title('filter Image');
```

Output-



Part B:

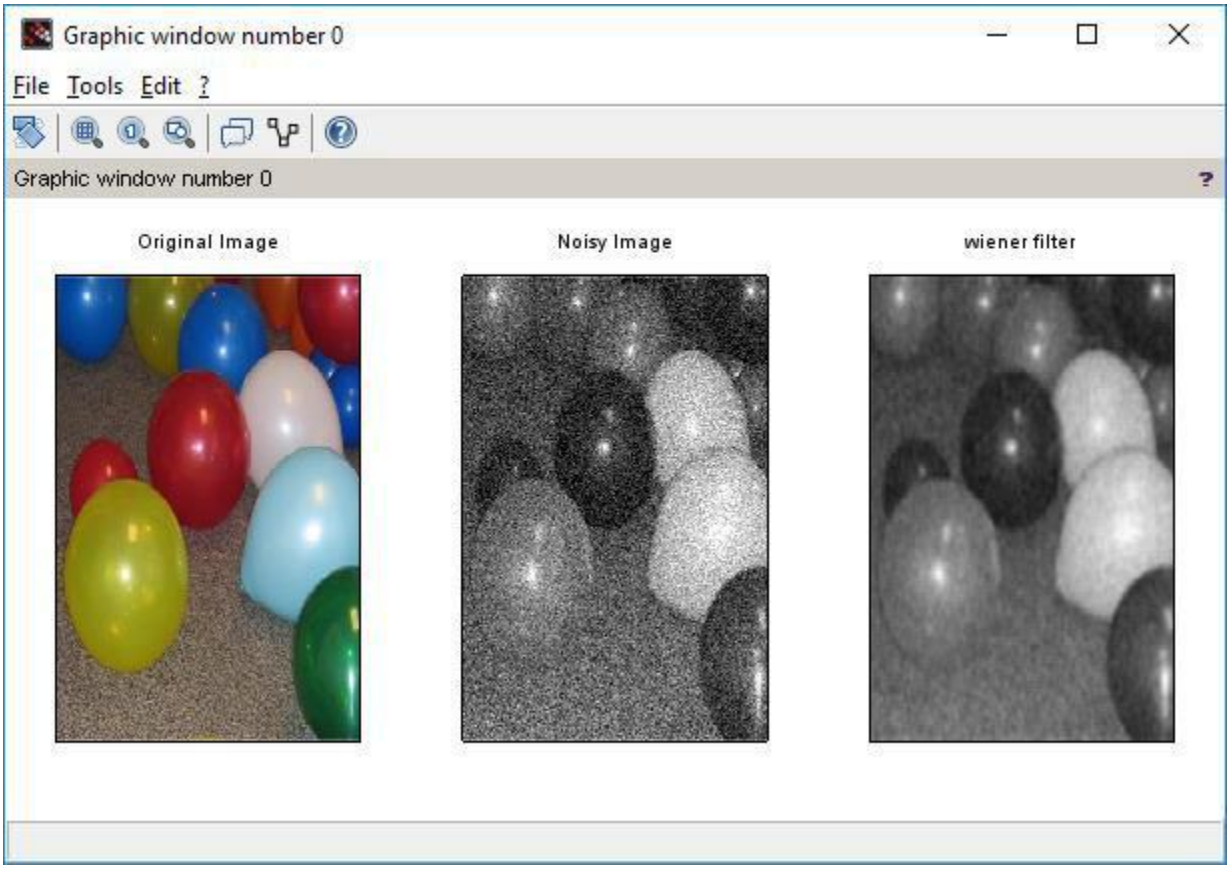
Aim- Program for Image Weiner filters.

Code

```
clc;
clear all;
a= imread('C:\Program Files (x86)\scilab-6.0.2\IPCV\images\balloons.png');
image=rgb2gray(a);
```

```
NoisyImage = imnoise(image,'gaussian',0.02);

wienerfilter=imwiener2(NoisyImage,[5,5],0.2);

subplot(1,3,1);
imshow(a);
title('Original Image');

subplot(1,3,2);
imshow(NoisyImage);
title('Noisy Image');

subplot(1,3,3);
imshow(wienerfilter);
title('wiener filter');
```

Output-



Practical No 5

Aim- Color Image Processing.

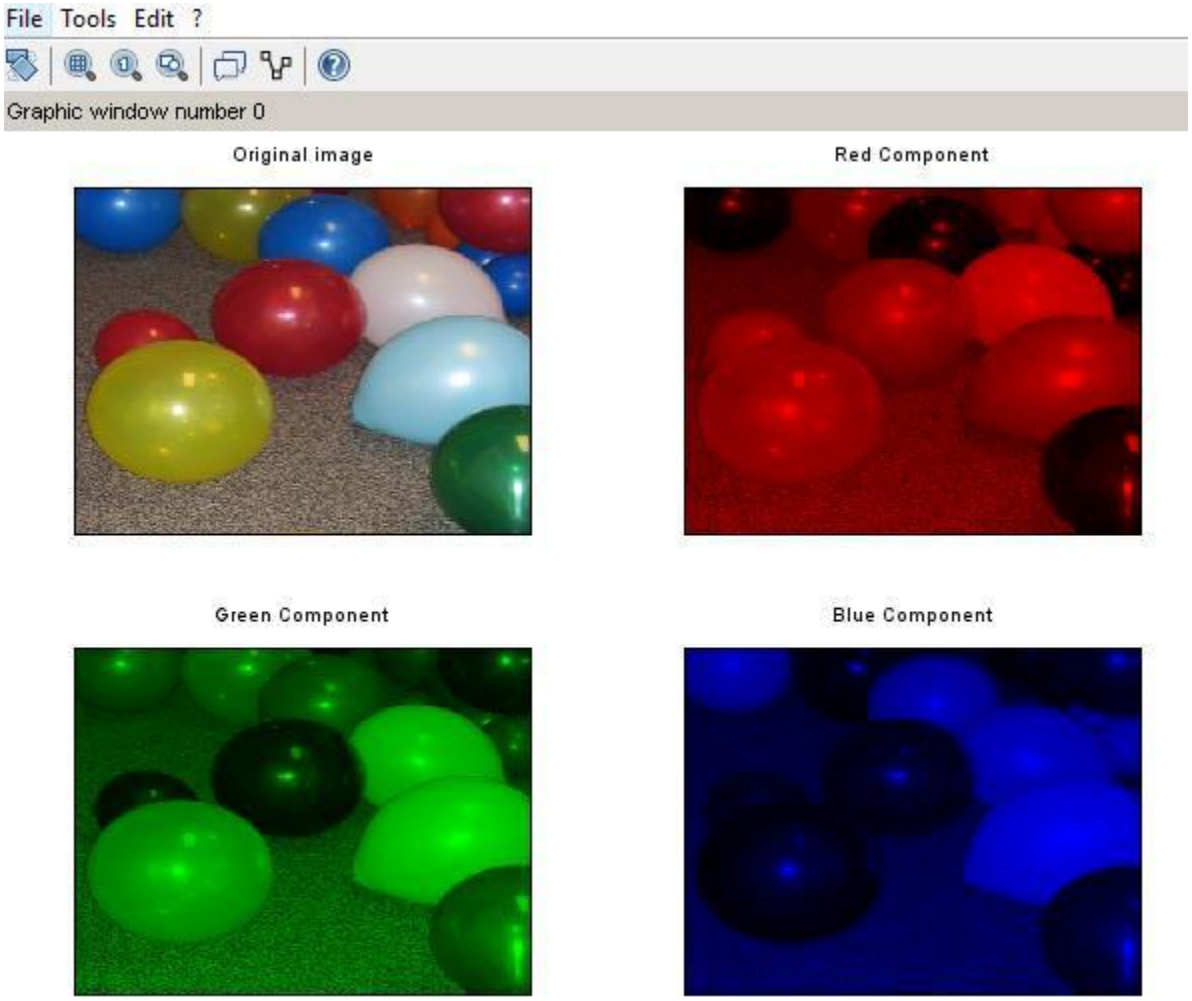
Part A:

Aim- Program to read a color image and segment into RGB planes, histogram of color image.

Code-

```
clc;
I = imread('C:\Program Files (x86)\scilab-6.0.2\IPCV\images\balloons.png');

//rows and columns of image.
r=size(I,1);
c=size(I,2);

//creating zero matrices.
R=zeros(r,c,3);
G=zeros(r,c,3);
B=zeros(r,c,3);

//storing the corresponding color plane

//red plane
R(:,:,1) = I(:,:,1);

//green plane
G(:,:,2) = I(:,:,2);

//blue plane
B(:,:,3) = I(:,:,3);

subplot(2,2,1);
imshow(I);
title('Original image');

subplot(2,2,2);
imshow(uint8(R));
title('Red Component');

subplot(2,2,3);
imshow(uint8(G));
title('Green Component');

subplot(2,2,4);
imshow(uint8(B));
title('Blue Component');
```

Output-



Part B:

Aim- Program for converting from one color model to another model.

1.

Code-

```
clc;
rgb=imread('C:\Program Files (x86)\scilab-6.0.2\IPCV\images\peppers.png');

hsv=rgb2hsv(rgb);

subplot(2,3,1);
imshow(rgb);
title('Original RGB Image');
```

```
subplot(2,3,2);
imshow(hsv);
title('HSV Image');

subplot(2,3,3);
imshow(hsv(:,:,3));
title('Intensity Component');

subplot(2,3,4);
imshow(hsv(:,:,1));
title('Hue component');

subplot(2,3,5);
imshow(hsv(:,:,2));
title('Saturation Component')
```

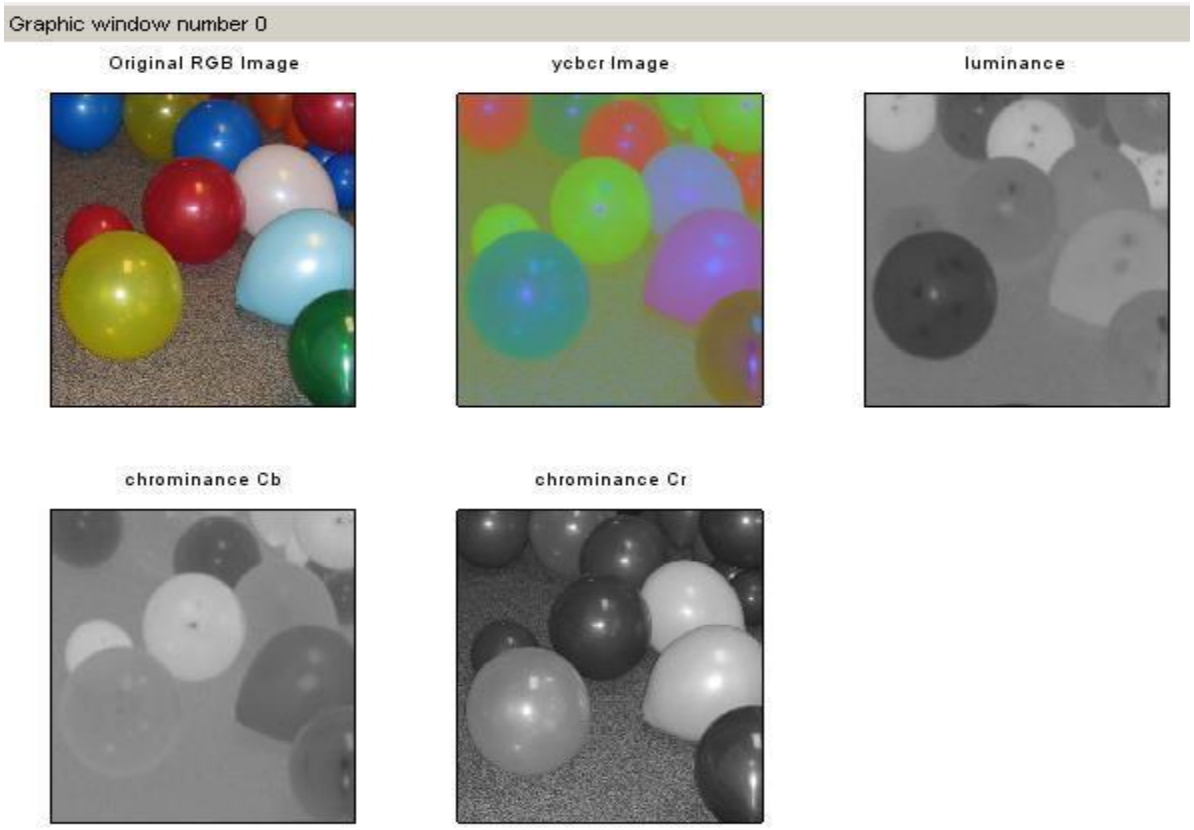
Output-

2.

Code-

```
clc;
rgb = imread('C:\Program Files (x86)\scilab-6.0.2\IPCV\images\balloons.png');

ycbcr=rgb2ycbcr(rgb);

subplot(2,3,1);
imshow(rgb);
title('Original RGB Image');

subplot(2,3,2);
imshow(ycbcr);
title('ycbcr Image');

subplot(2,3,3);
imshow(ycbcr(:,:,1));
title('luminance');

subplot(2,3,4);
imshow(ycbcr(:,:,2));
title('chrominance Cb');

subplot(2,3,5);
imshow(ycbcr(:,:,3));
title('chrominance Cr')
```

Output-



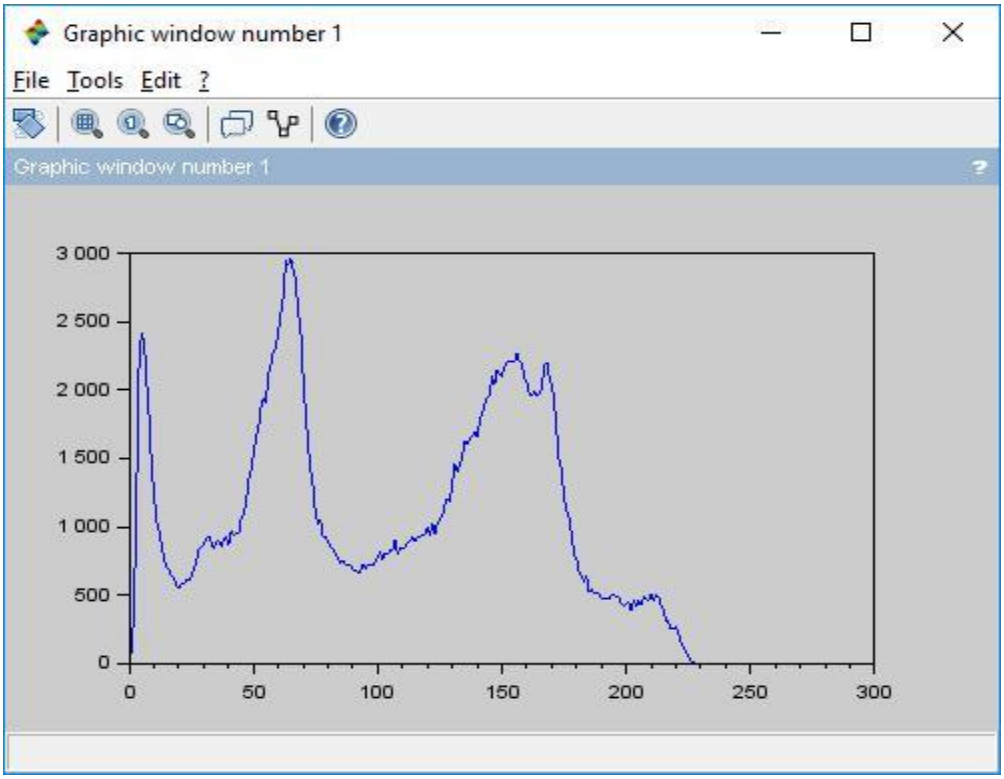
Part C:

Aim- Program to apply false colouring (pseudo) on a gray scale image.
Code-

```
clc;
rgb = imread('C:\Program Files (x86)\scilab-
6.0.2\IPCV\images\peppers.png'); Image = rgb2gray(rgb);

subplot(1,3,1);
imshow(rgb);
title('Original RGB Image');

subplot(1,3,2);
imshow(Image);
title('Gray RGB Image');

subplot(1,3,3);
```

```
imshow(Image,jetcolormap(256));
title('Pseudo Color Image');

Histogram = imhist(Image);
figure();
plot(0:255,Histogram');
```

Output-


Graphic window number 1
File Tools Edit ?
Graphic window number 1
3 000
2 500
2 000
1 500
1 000
500
0
0
50
100
150
200
250
300

Practical No 6

Aim- Fourier Related Transforms.

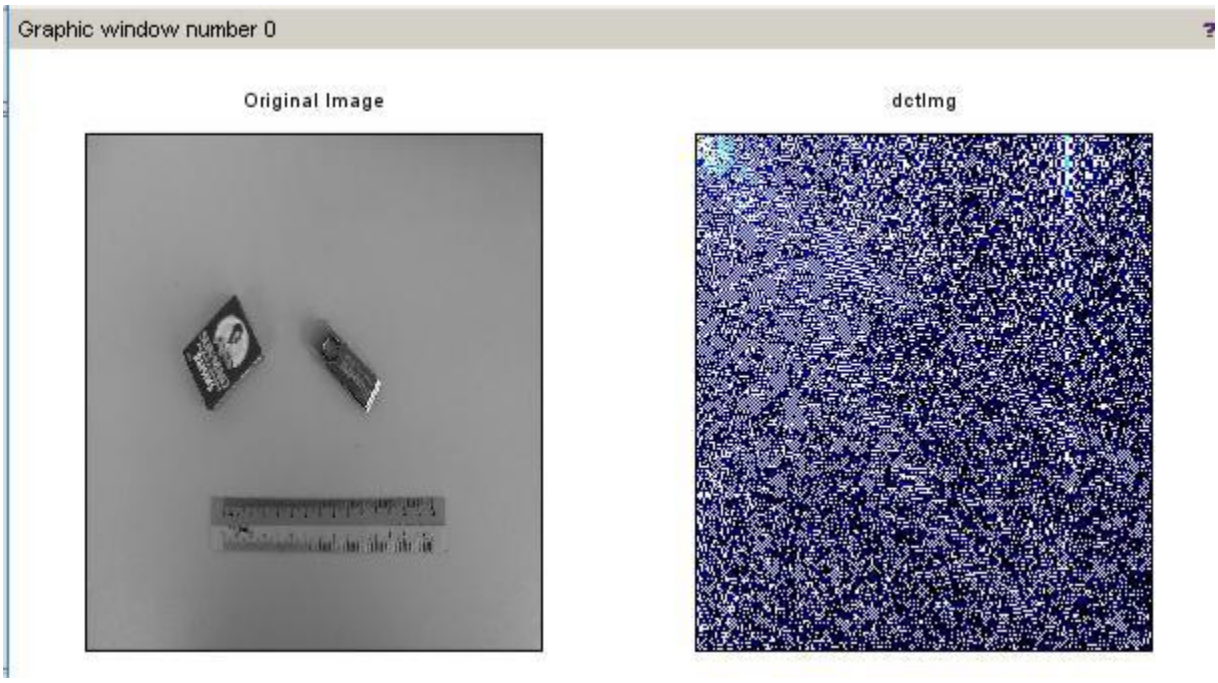
Part A:

Aim- Program to compute Discrete Cosine Transforms.

Code-

```
clear all;
a=imread("C:\Program Files (x86)\scilab-6.0.2\IPCV\images\measure_gray.jpg");
dctImg=imdct(a);
subplot(1,2,1);
imshow(a);
title('Original Image');

subplot(1,2,2);
imshow(dctImg, jetcolormap(256));
title('dctImg');
```

Output-



Practical No 7

Aim- Morphological Image Processing.

Part A:

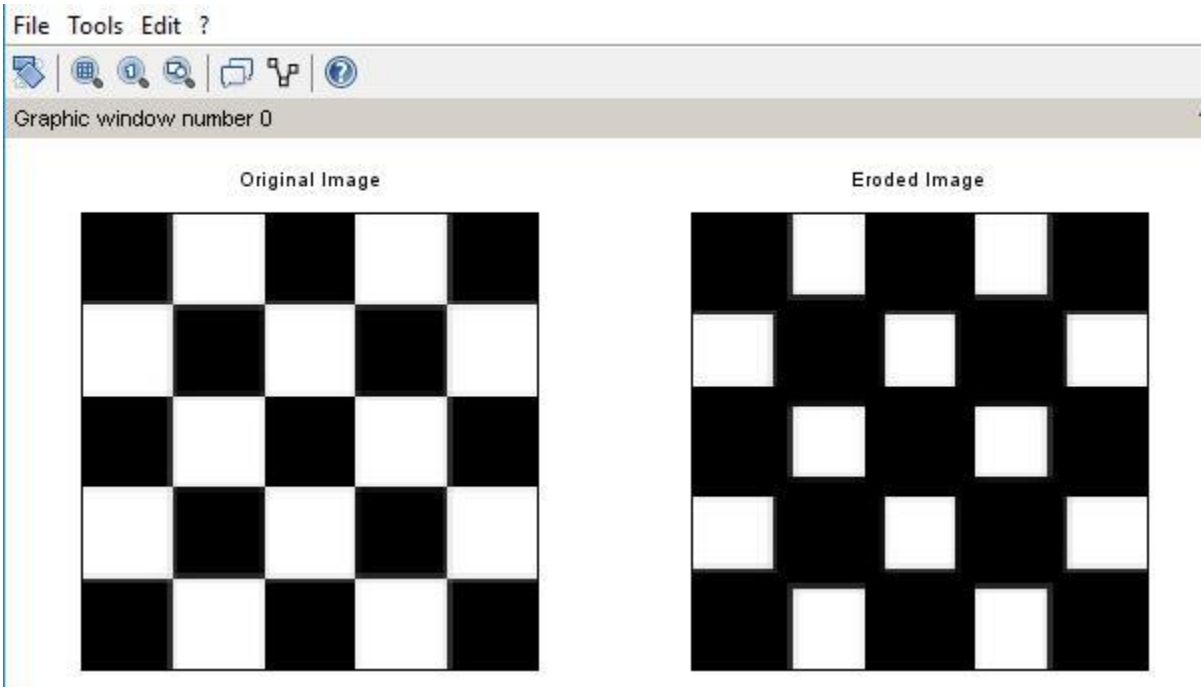
Aim- Program to apply erosion, dilation, opening, closing.

Erosion-

Code-

```
clear all ;
a= imread('C:\Program Files (x86)\scilab-6.0.2\IPCV\images\checkerbox.png');

se = imcreatese('rect',5,5);
erosion = imerode(a,se);

subplot(1,2,1);
imshow(a);
title('Original Image');

subplot(1,2,2);
imshow(erosion);
title('Eroded Image');
```

Output-

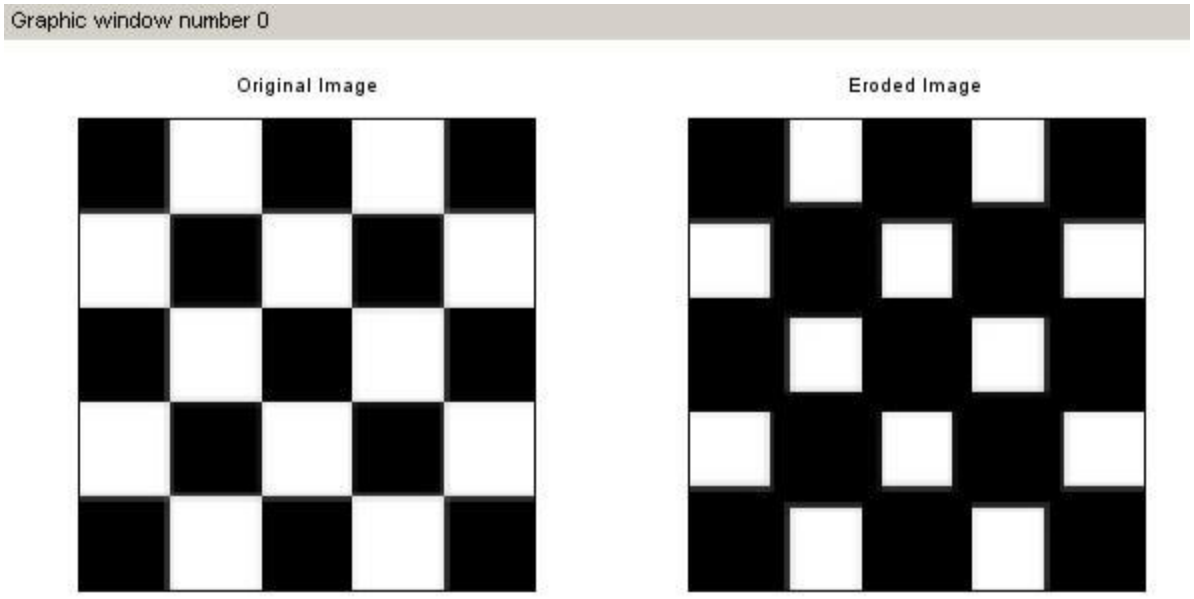


Erosion2-

Code-

```
a= imread('C:\Program Files (x86)\scilab-6.0.2\IPCV\images\checkerbox.png');

//se = imcreatese('rect',5,5);
se=[1,1,1,1,1;
   1,1,1,1,1;
   1,1,1,1,1;
   1,1,1,1,1;
   1,1,1,1,1];
erosion = imerode(a,se);

subplot(1,2,1);
imshow(a);
title('Original Image');

subplot(1,2,2);
imshow(erosion);
title('Eroded Image');
```

Output-

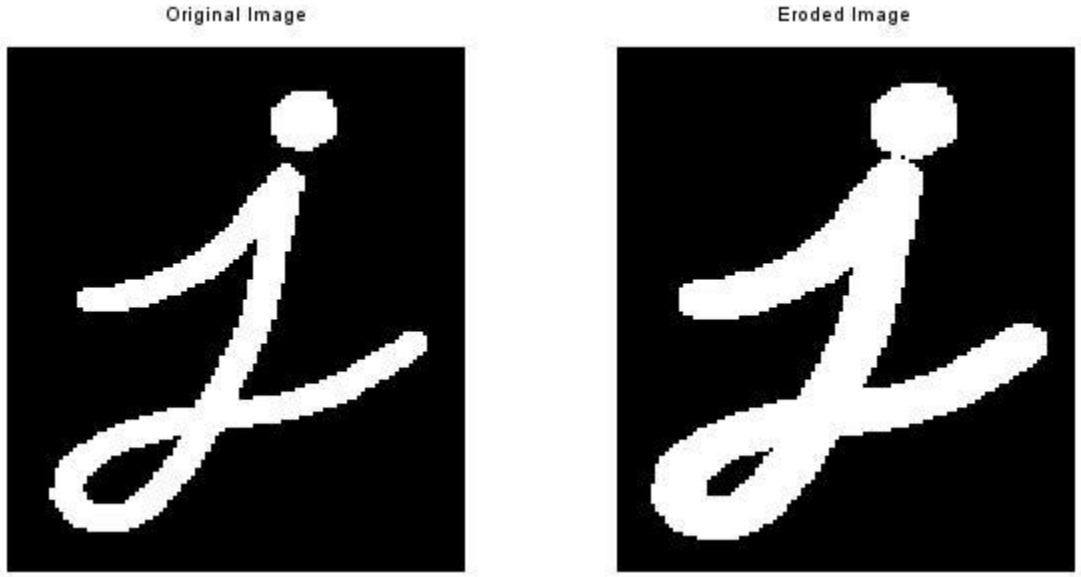


Dilation -

Code-

```
a= imread('C:\Program Files (x86)\scilab-6.0.2\IPCV\images\morpex.png');

se = imcreatese('ellipse',5,5);
dilation = imdilate(a,se);

subplot(1,2,1);
imshow(a);
title('Original Image');

subplot(1,2,2);
imshow(dilation);
title('Eroded Image');
```

Output-



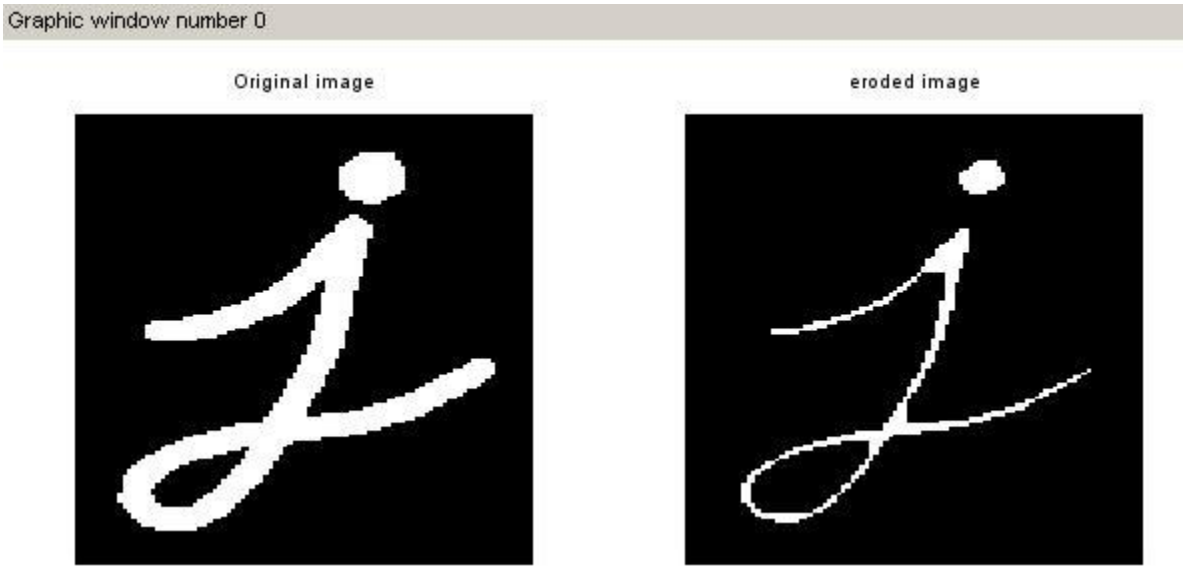
Dilation2 -

Code-

```
clear all;
a=imread('C:\Program Files (x86)\scilab-6.0.2\IPCV\images\morpex.png')
se=[1,1,1,1,1;
   1,1,1,1,1;
   1,1,1,1,1;
   1,1,1,1,1;
```

```
   1,1,1,1,1]
erosion=imerode(a,se);

subplot(1,2,1);
imshow(a);
title('Original image');

subplot(1,2,2);
imshow(erosion);
title('eroded image');
```

Output-



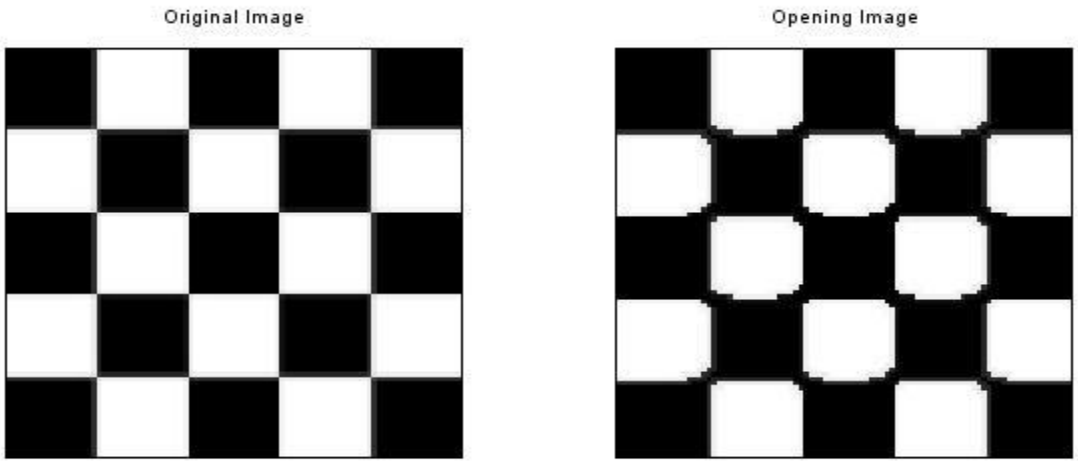
Opening-

Code-

```
a= imread('C:\Program Files (x86)\scilab-6.0.2\IPCV\images\checkerbox.png');

se = imcreatese('ellipse',10,10);
erosion = imerode(a,se);

opening = imdilate(erosion,se)

subplot(1,2,1);
imshow(a);
title('Original Image');

subplot(1,2,2);
```

```
imshow(opening);
title('Opening Image');
```

Output-

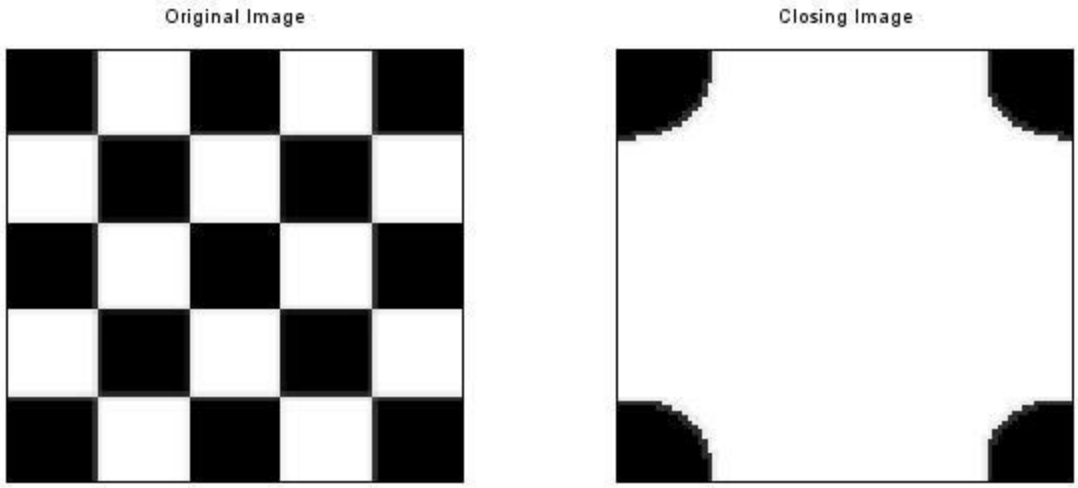


Closing-

Code-

```
clc;
clear all;
a= imread('C:\Program Files (x86)\scilab-6.0.2\IPCV\images\checkerbox.png');

se = imcreatese('ellipse',30,30);
dilate = imdilate(a,se);
closing = imerode(dilate,se)

subplot(1,2,1);
imshow(a);
title('Original Image');

subplot(1,2,2);
imshow(closing);
title('Closing Image');
```

Output-



If I change the image with lena.png then output like this.

Part B:

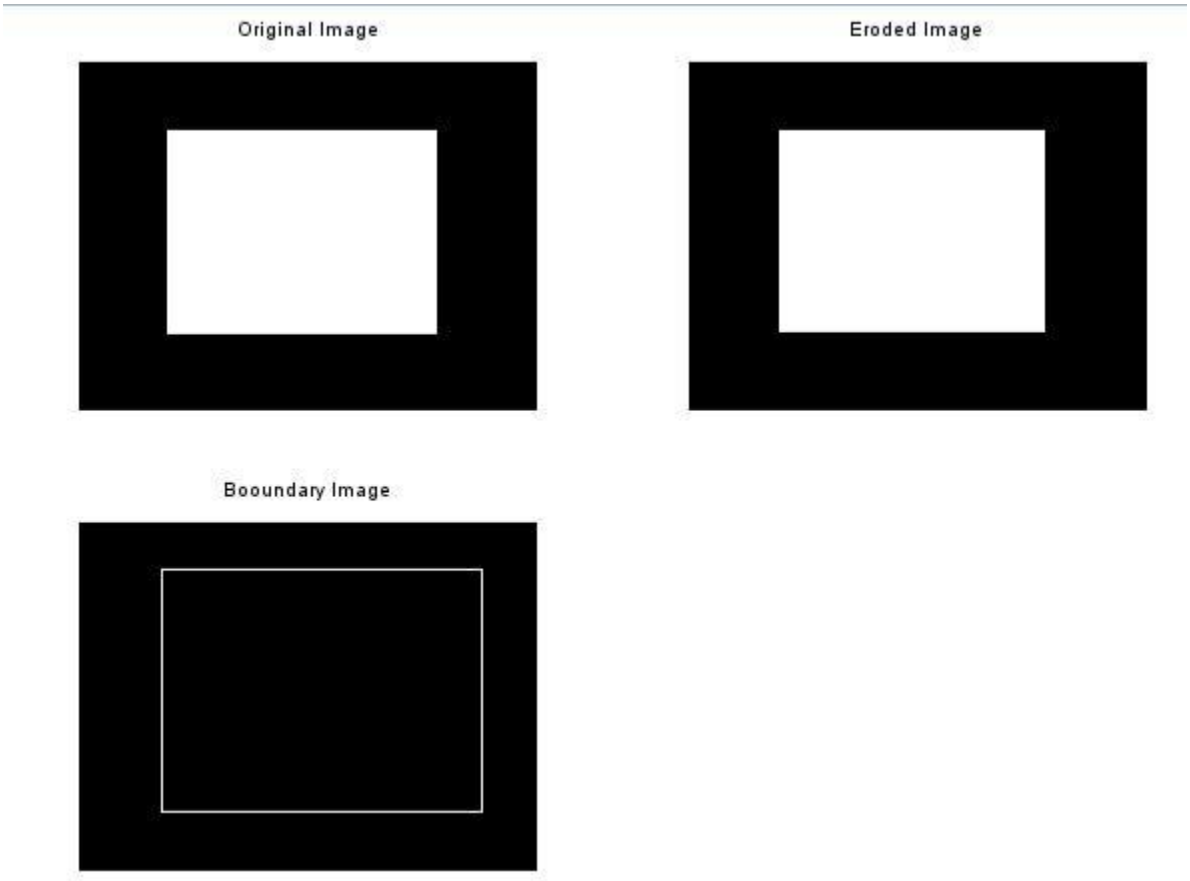
Aim- Program for detecting boundary of an image.

Code-

```
Clear all;
a= imread('C:\Program Files (x86)\scilab-6.0.2\IPCV\images\big_sq.png');

se = imcreatese('ellipse',3,3);
erosion = imerode(a,se);
Boundary = a-erosion

subplot(2,2,1);
```

```
imshow(a);
title('Original Image');

subplot(2,2,2);
imshow(erosion);
title('Eroded Image');

subplot(2,2,3);
imshow(Boundary);
title('Booundary Image');
```

Output- (Below box if your move the arrow then box is come)



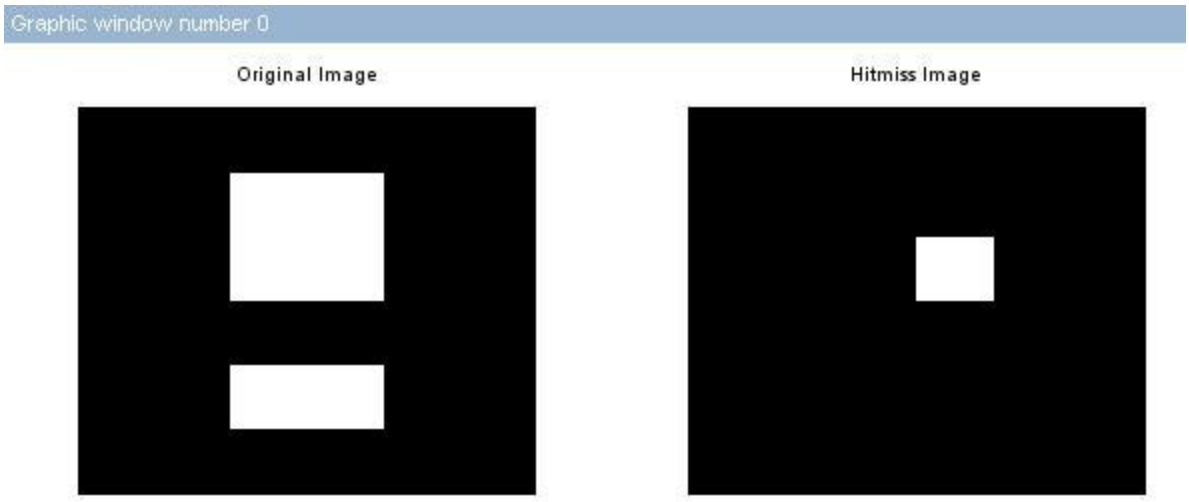
Part C:

Aim- Program to apply Hit-or-Miss transform.

Code-

```
clc;
clear all;
disp('Practical perform by Ragini')
a=[0 0 0 0 0 0;
   001100;
   001100;
   000000;
   001100;
   000000];

a =im2bw(a,0.5);

se = [0 0 0 0;
      0110;
      0110;
      0000];

//se = increatese('ellipse',5,5);
S2 = imhitmiss(a,se);
//imshow(a);
//imshow(S2);

subplot(1,2,1);
imshow(a);
title('Original Image')

subplot(1,2,2);
imshow(S2);
title('Hitmiss Image')
```

Output-



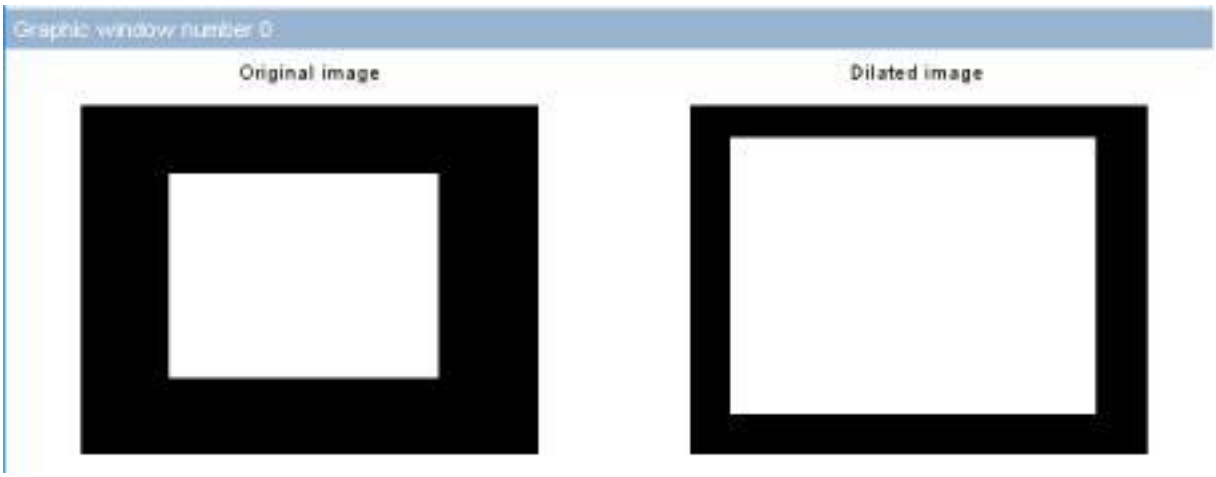
Part D:

Aim- Program to apply morphological gradient on an image.

Code-

```
a=imread("C:\Program Files (x86)\scilab-6.0.2\IPCV\images\big_sq.png");

se=imcreatese('rect',55,55);
dilation=imdilate(a,se);
erosion=imerode(a,se);

gradient=dilation-erosion

subplot(2,2,1);
imshow(a);
title("Original image");
subplot(2,2,2);
imshow(dilation);
title("Dilated image");

subplot(2,2,3);
```

Output-



Part E:

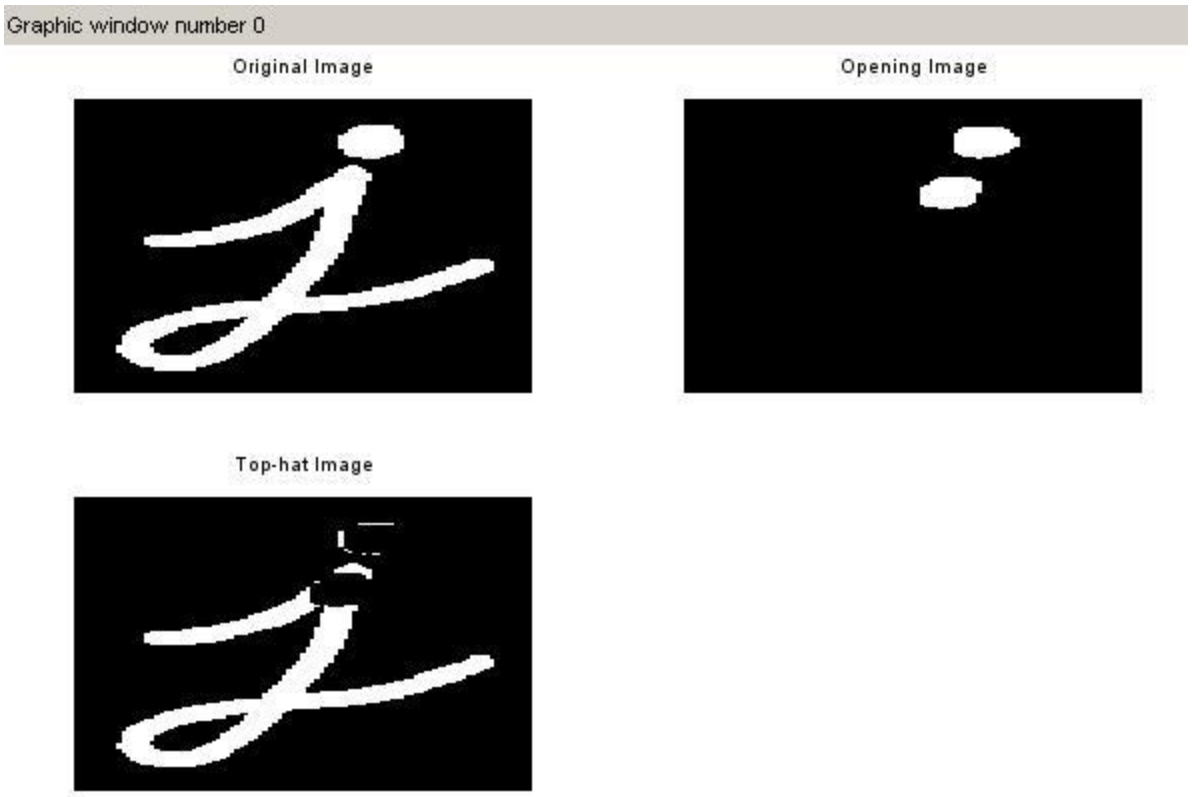
Aim- Program to apply Top-Hat/Bottom-hat Transformations.

Top-Hat-

Code-

```
a= imread('C:\Program Files (x86)\scilab-6.0.2\IPCV\images\morpex.png');

se = imcreatese('ellipse',10,10);
erosion = imerode(a,se);
opening = imdilate(erosion,se)

Top_Hat= a-opening
subplot(2,2,1);
imshow(a);
title('Original Image');

subplot(2,2,2);
imshow(opening);
title('Opening Image');

subplot(2,2,3);
imshow(Top_Hat);
title('Top-hat Image');
```

Output-

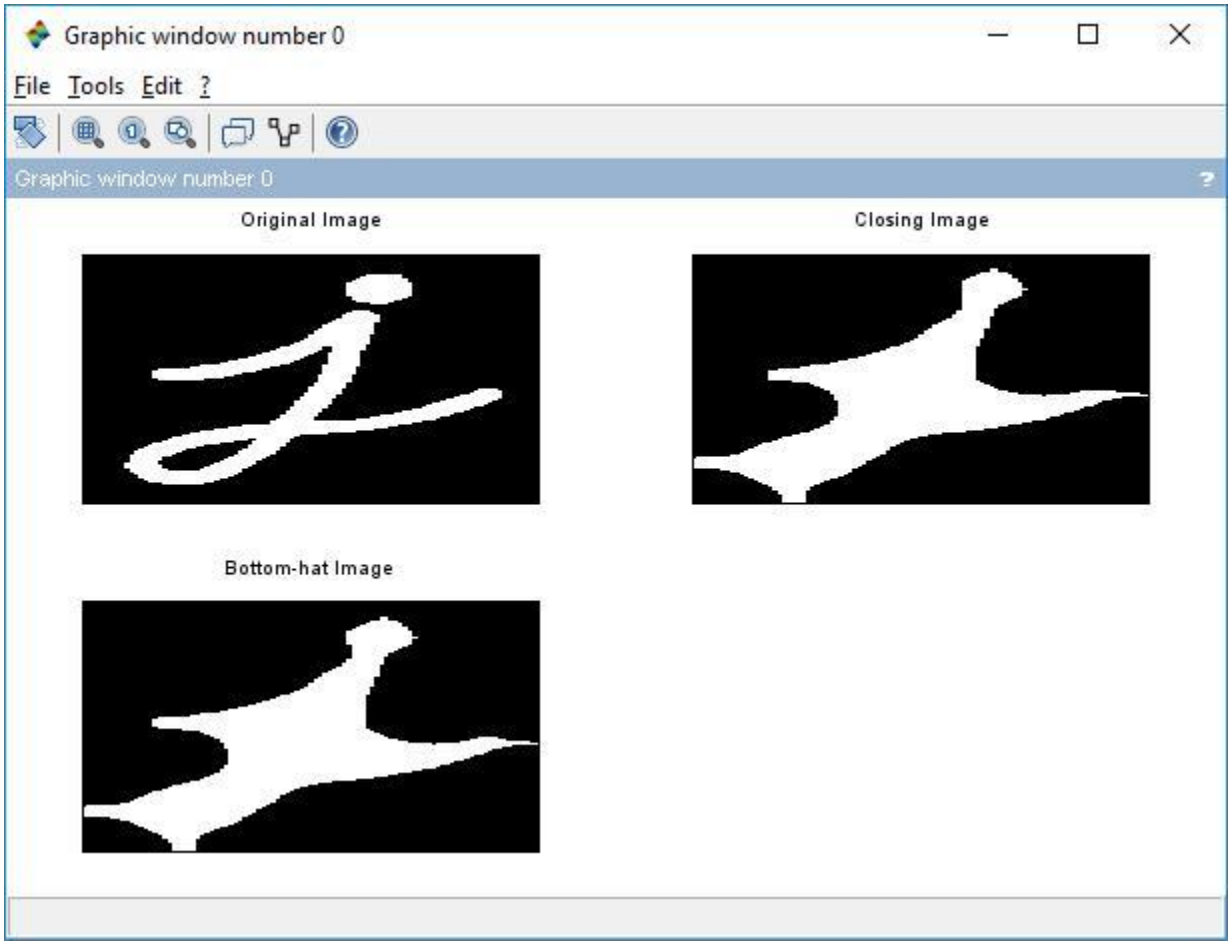


Bottom-hat-

Code-

```
a= imread('C:\Program Files (x86)\scilab-6.0.2\IPCV\images\morpex.png');

se = imcreatese('ellipse',30,30);
dilate = imdilate(a,se);
closing = imerode(dilate,se)

bottom_hat=a+closing

subplot(2,2,1);
imshow(a);
title('Original Image');

subplot(2,2,2);
imshow(closing);
title('Closing Image');

subplot(2,2,3);
imshow(bottom_hat);
title('Bottom-hat Image');
```

Output-


Graphic window number 0
File Tools Edit ?
Graphic window number 0
Original Image
Closing Image
Bottom-hat Image

Practical No 8

Aim- Image Segmentation.

Part A:

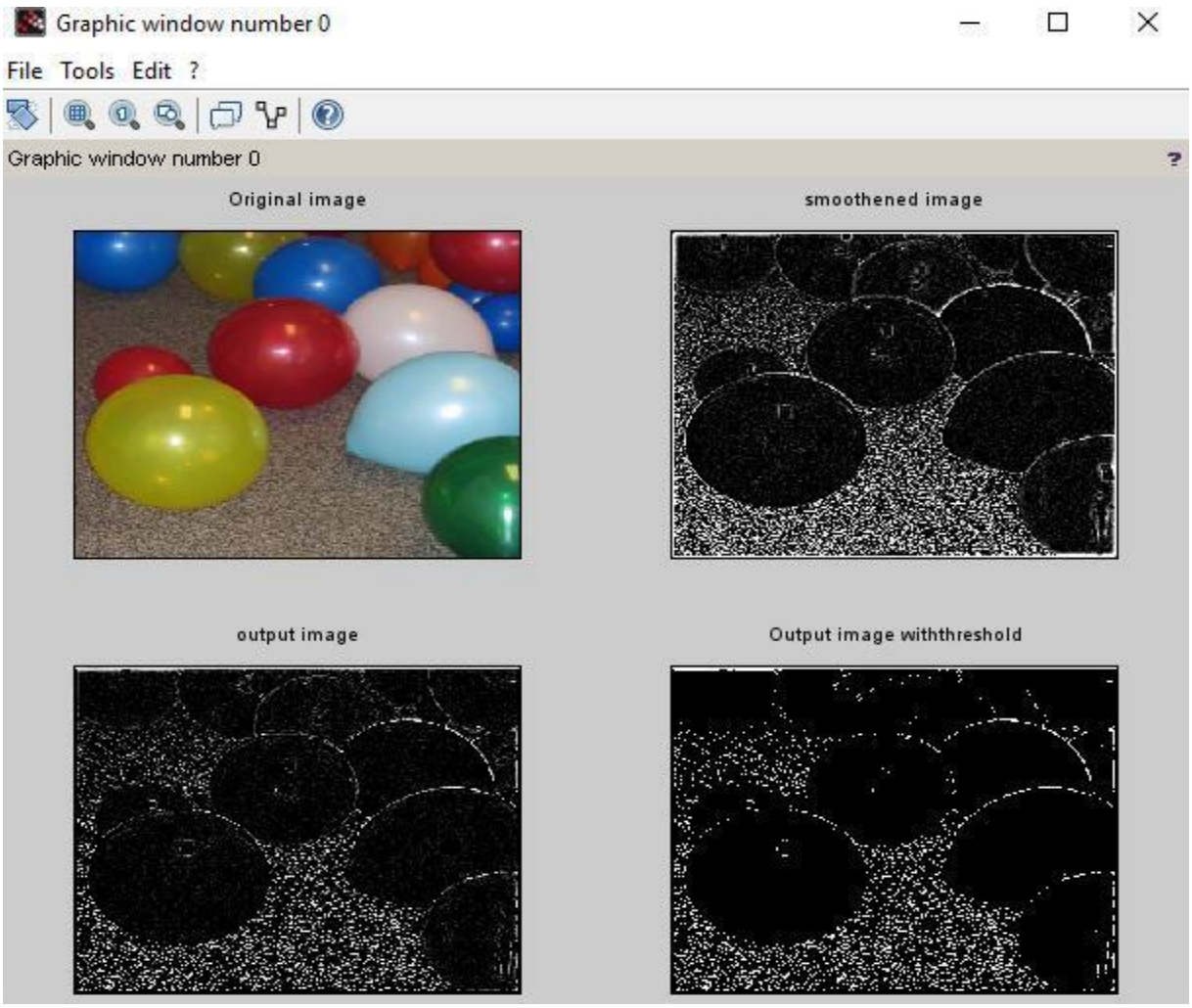
Aim- Program for Edge detection using Sobel, Prewitt.
Edge Detection using Sobel-

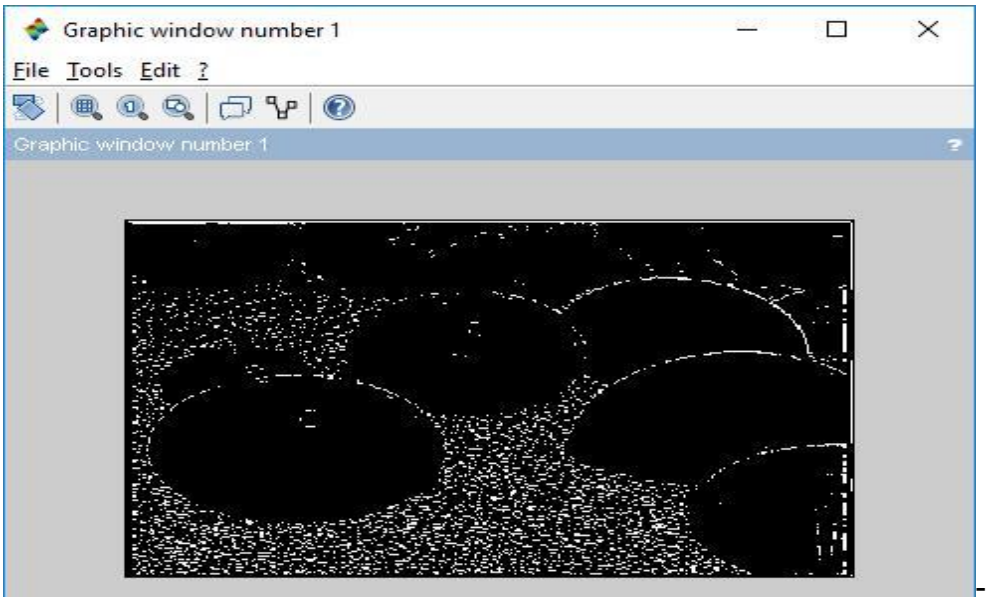
Code-

```
//Marr-Hildreth(Laplassian of Gaussian)
clear all;
im= imread('C:\Program Files (x86)\scilab-
6.0.2\IPCV\images\balloons.png'); im=im2double(im);
//%smoothening the image with a filter
gfilter=[0 0 1 0 0;
         01210;
         12-1621;
         01210;
         00100];
smim=conv2(im,gfilter)
//% finding the zero crossings
[rr,cc]=size(smim);
zc=zeros([rr,cc]);
for i= 2:rr-1
   for j=2:cc-1
      if(smim(i,j)>0)
         if(smim(i,j+1)>=0 && smim(i,j-1)<0) || (smim(i,j+1)<0 && smim(i,j-1)>=0)
            zc(i,j)=smim(i,j+1);
         elseif(smim(i+1,j)>=0 && smim(i-1,j)<0) || (smim(i+1,j)<0 && smim(i-1,j)>=0)
            zc(i,j)=smim(i,j+1);
         elseif(smim(i+1,j+1)>=0 && smim(i-1,j-1)<0) || (smim(i+1,j+1)<0 && smim(i-1,j-
1)>=0)
            zc(i,j)=smim(i,j+1);
         elseif(smim(i-1,j+1)>=0 && smim(i+1,j-1)<0) || (smim(i-1,j+1)<0 && smim(i+1,j-
1)>=0)
            zc(i,j)=smim(i,j+1);
         end
      end
   end
end
otpt=im2uint8(zc);
//%tresholding
otptth = otpt>105;
figure;
   subplot(2,2,1);imshow(im);title('Original image');
   subplot(2,2,2);imshow(smim);title('smoothened image');
```

```
    subplot(2,2,3);imshow(otpt);title('output image');
    subplot(2,2,4);imshow(otptth);title('Output image withthreshold');
//% final result
figure,imshow(otptth);
```

Output-



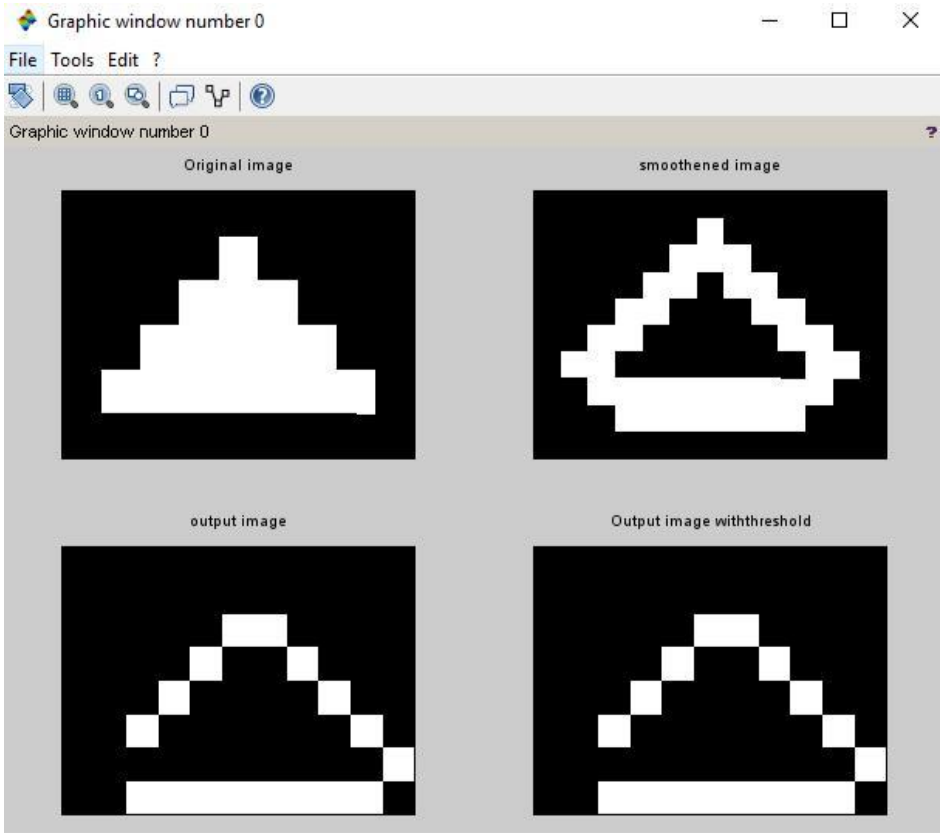


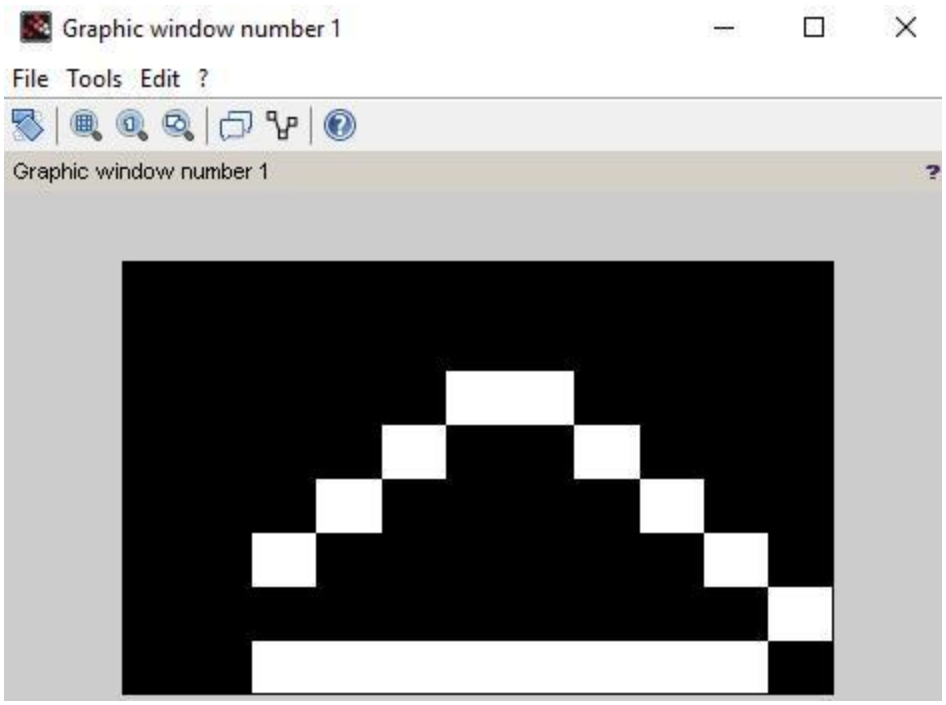
Edge Detection using Prewitt-
Code-

```
//Marr-Hildreth(Laplassian of Gaussian)
clc;
clear all;
//im= imread('C:\Program Files\scilab-6.0.2\IPCV\images\balloons.png');
im = [0 0 0 0 0 0 0 0 0;
     000010000;
     000111000;
     001111100;
     011111110;
     000000000];
im=im2double(im);
//%smoothening the image with a filter
gfilter=[0 0 1 0 0;
          01210;
          12-1621;
          01210;
          00100];
smim=conv2(im,gfilter)
disp(smim)
//% finding the zero crossings
[rr,cc]=size(smim);
zc=zeros([rr,cc]);
disp([rr,cc])
for i= 2:rr-1
   for j=2:cc-1
      if(smim(i,j)>0)
         if(smim(i,j+1)>=0 && smim(i,j-1)<0) || (smim(i,j+1)<0 && smim(i,j-1)>=0)
```

```
            zc(i,j)=smim(i,j+1);
        elseif(smim(i+1,j)>=0 && smim(i-1,j)<0) || (smim(i+1,j)<0 && smim(i-1,j)>=0)
            zc(i,j)=smim(i,j+1);
        elseif(smim(i+1,j+1)>=0 && smim(i-1,j-1)<0) || (smim(i+1,j+1)<0 && smim(i-1,j-
1)>=0)
            zc(i,j)=smim(i,j+1);
        elseif(smim(i-1,j+1)>=0 && smim(i+1,j-1)<0) || (smim(i-1,j+1)<0 && smim(i+1,j-
1)>=0)
            zc(i,j)=smim(i,j+1);
        end
      end
   end
end
otpt=im2uint8(zc);
//%tresholding
otptth = otpt>105;
figure;
   subplot(2,2,1);imshow(im);title('Original image');
   subplot(2,2,2);imshow(smim);title('smoothened image');
   subplot(2,2,3);imshow(otpt);title('output image');
   subplot(2,2,4);imshow(otptth);title('Output image withthreshold');
//% final result
figure,imshow(otptth);
```

Output :




Graphic window number 1
File Tools Edit ?
Graphic window number 1