INDEX

PRACTICAL NO: 1

Aim: 1A) Program to calculate number of samples required for image.

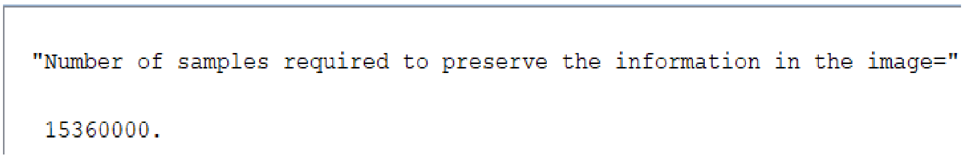
Description :

The program will only calculate the number of samples required for an image.

Code :

```
clc;
close;
m=4;
n=6;
N=400;
N2=2*N;
Fs=m*N2*n*N2;
disp('Number of samples required to preserve the informationin the image = ',Fs);
```

Output:



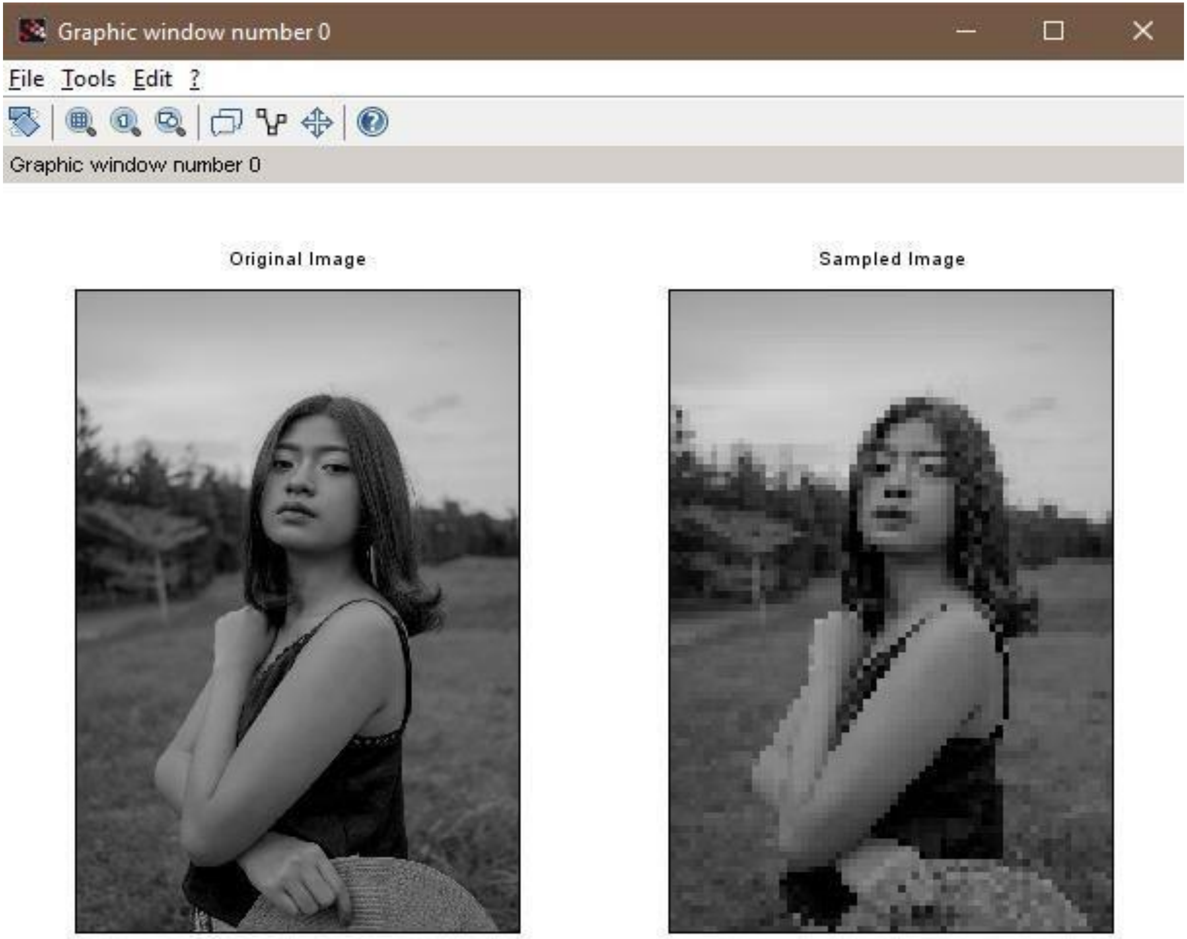
```
"Number of samples required to preserve the information in the image="

 15360000.
```

Aim: 1B) Program to study the effects of reducing the spatial resolution of adigital image.

Code:

```
n = input('Enter the input samples');
img=rgb2gray(imread('E:\IT\DIP TYCS\lena.jpg'));
a=size(img);
w=a(2);
h=a(1);
im=zeros(100);
for i=1:n:h
for j=1:n:w
for k=0:n-1
for l=0:n-1
   im(i+k,j+l)=img(i,j);
end
end
end
end
subplot(1,2,1);
imshow(uint8(img));title('Original image');
subplot(1,2,2);
imshow(uint8(im));title('sampled image');
```

Output:



PRACTICAL NO: 2

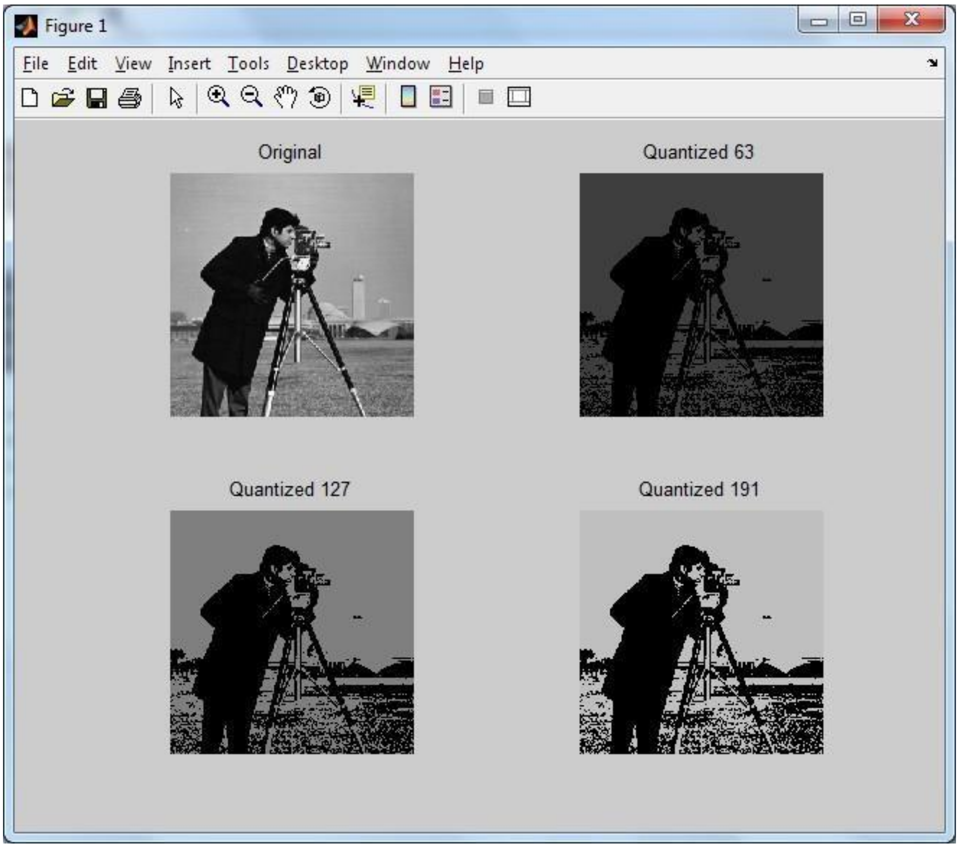
Aim: WAP to study the effect of reducing the quantization values and spatial resolution.

QUANTIZATION

Code :

```
a=imread('cameraman.tif');
[m,n]=size(a);
for i=1:m
for j=1:n
b(i,j)=(a(i,j))/255*63;
c(i,j)=(a(i,j))/255*127;
d(i,j)=(a(i,j))/255*191;
end
end
subplot(2,2,1),imshow(a),title('Original');
subplot(2,2,2),imshow(b),title('Quantized 63');
subplot(2,2,3),imshow(c),title('Quantized 127');
subplot(2,2,4),imshow(d),title('Quantized 191');
```

Output:

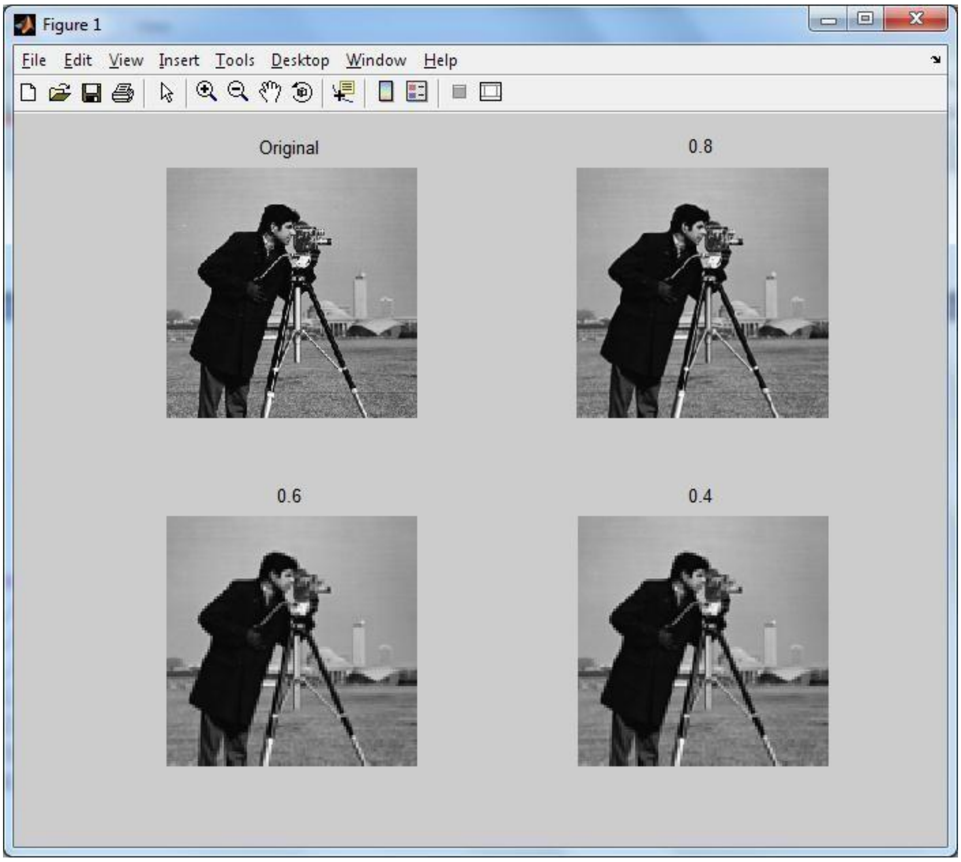


SPATIAL RESOLUTION

Code :

```
i=imread('cameraman.tif');
a=imresize(i,0.8);
b=imresize(i,0.6);
c=imresize(i,0.4);
 subplot(2,2,1),imshow(i),title('Original');
 subplot(2,2,2),imshow(a),title('0.8');
 subplot(2,2,3),imshow(c),title('0.6');
 subplot(2,2,4),imshow(c),title('0.4');
```

Output :



PRACTICAL NO: 2

Aim: Image Enhancement.

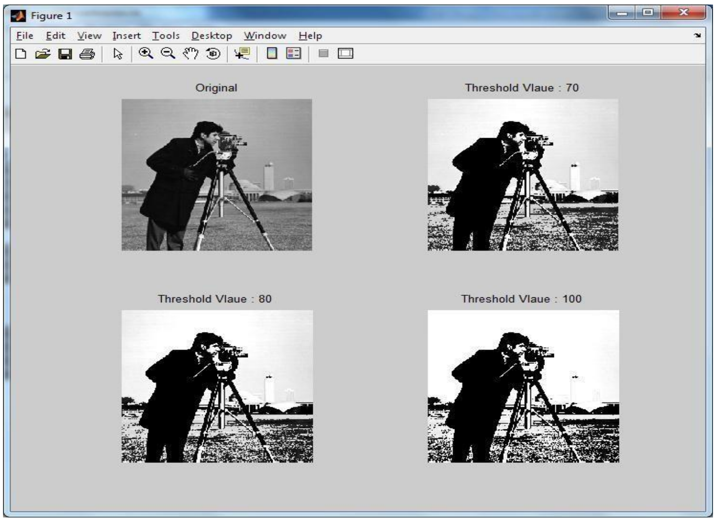
a. Thresholding
b. Contrast adjustment
c. Brightness adjustment
d. Gray level slicing

A) THRESHOLDING:

Code :

```
a=imread('cameraman.tif');
[m,n]=size(a);
for i=1:m
for  j=1:n
x=a(i,j);
if x >= 128
b(i,j)=a(i,j)+70;
c(i,j)=a(i,j)+80;
d(i,j)=a(i,j)+100;
else
b(i,j)=a(i,j)-70;
c(i,j)=a(i,j)-80;
d(i,j)=a(i,j)-100;
end
end
end
subplot(2,2,1),imshow(a),title('Original');
subplot(2,2,2),imshow(b),title('Threshold Vlaue : 70');
subplot(2,2,3),imshow(c),title('Threshold Vlaue : 80');
subplot(2,2,4),imshow(d),title('Threshold Vlaue : 100');
```

Output:

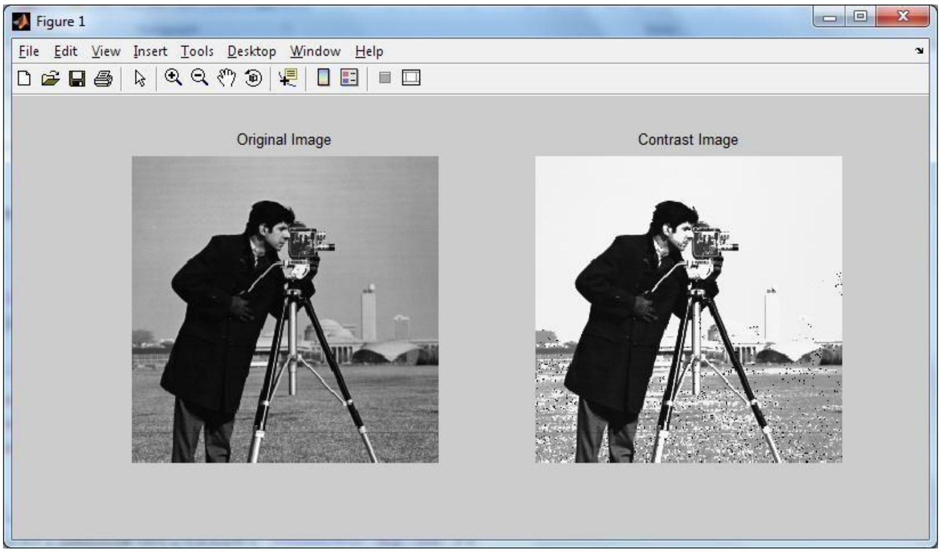


B) CONTRAST ADJUSTMENT:

Code :

```
a=imread('cameraman.tif');
r1=100;
r2=140;
s1=150;
s2=240;
l=s1/r1;
m=(s2-s1)/(r2-r1);
n=(255-s2)/(255-r2);
s=size(a);
for i=1:s(1)
for j=1:s(2)
if ((a(i,j) > 0) && (a(i,j) < r1))
b(i,j) = a(i,j)*l;
end
if ((a(i,j) > r1) && (a(i,j) < r2))
b(i,j) = (m*(a(i,j)-120))+s1;
end
if ((a(i,j) > r2) && (a(i,j) < 256))
b(i,j) = (n*(a(i,j)-150))+s2;
end
end
end
subplot(1,2,1),imshow(a),title('Original Image');
subplot(1,2,2),imshow(uint8(b)),title('Contrast Image');
```

Output:

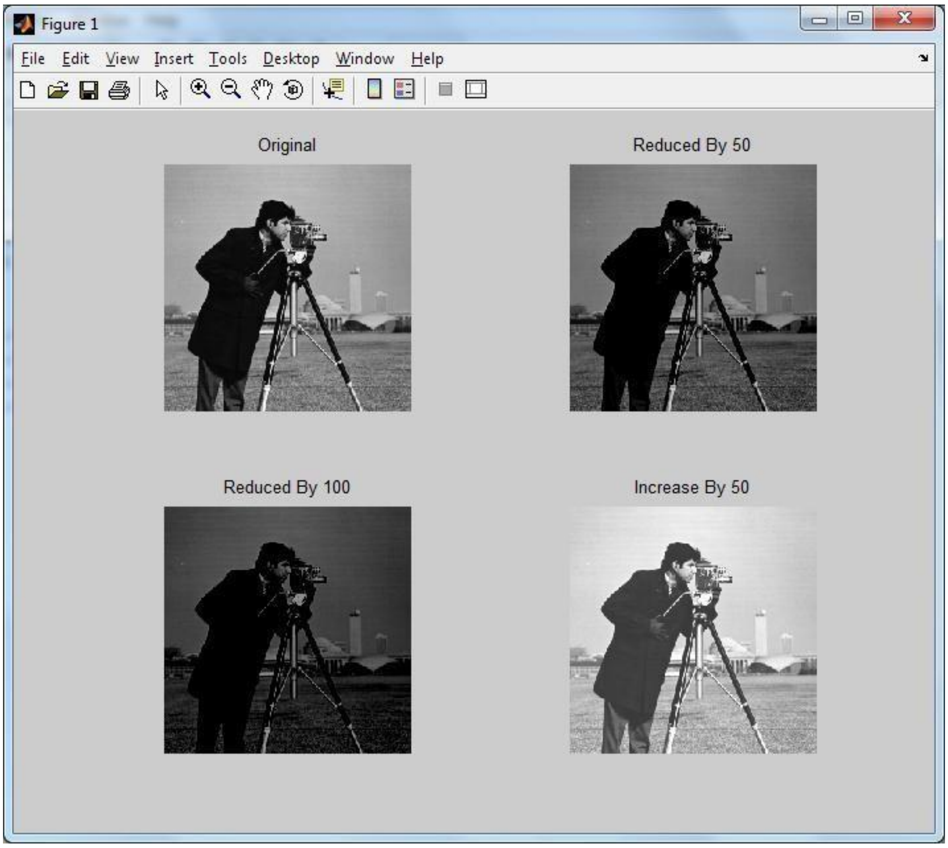


C) BRIGHTNESS ADJUSTMENT:

Code :

```
a=imread('cameraman.tif');
[m,n]=size(a);
for i=1:m
for j=1:n
b(i,j)=a(i,j)-50;
c(i,j)=a(i,j)-100;
d(i,j)=a(i,j)+50;
end
end
subplot(2,2,1),imshow(a),title('Original');
subplot(2,2,2),imshow(b),title('Reduced By 50');
subplot(2,2,3),imshow(c),title('Reduced By 100');
subplot(2,2,4),imshow(d),title('Increase By 50');
```

Output:

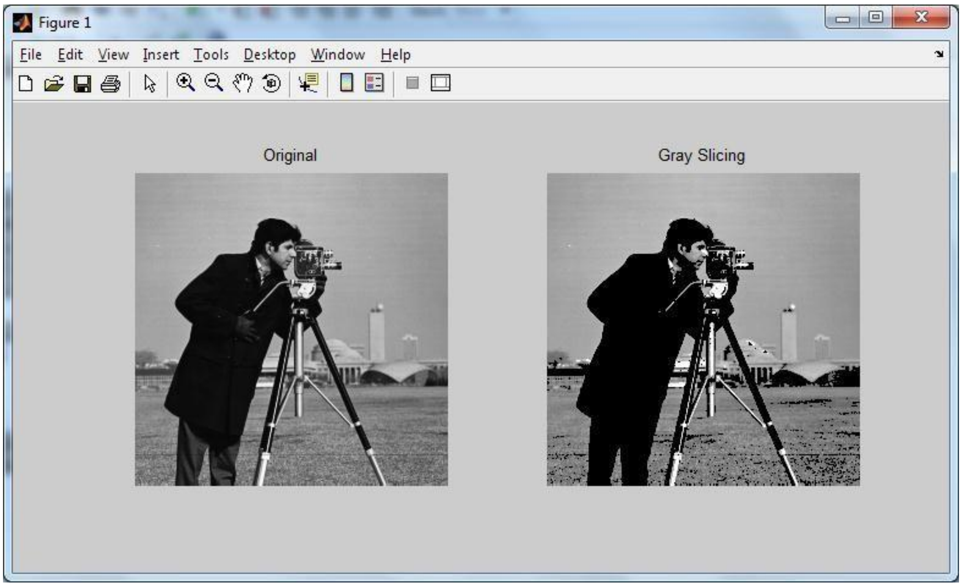


D) GRAY LEVEL SLICING:

Code :

```
a=imread('cameraman.tif');
[m,n]=size(a);
min = 100;
 max= 200;
 for i=1:m
 for j=1:n
 x=a(i,j);
  if x > min && x < max
  b(i,j)=a(i,j);
  elseif x > max
  b(i,j)=255;
  else
  b(i,j)=0;
  end
  end
  end
  end
  subplot(1,2,1),imshow(a),title('Original');
  subplot(1,2,2),imshow(b),title('Gray Slicing');
```

Output:



PRACTICAL NO: 3

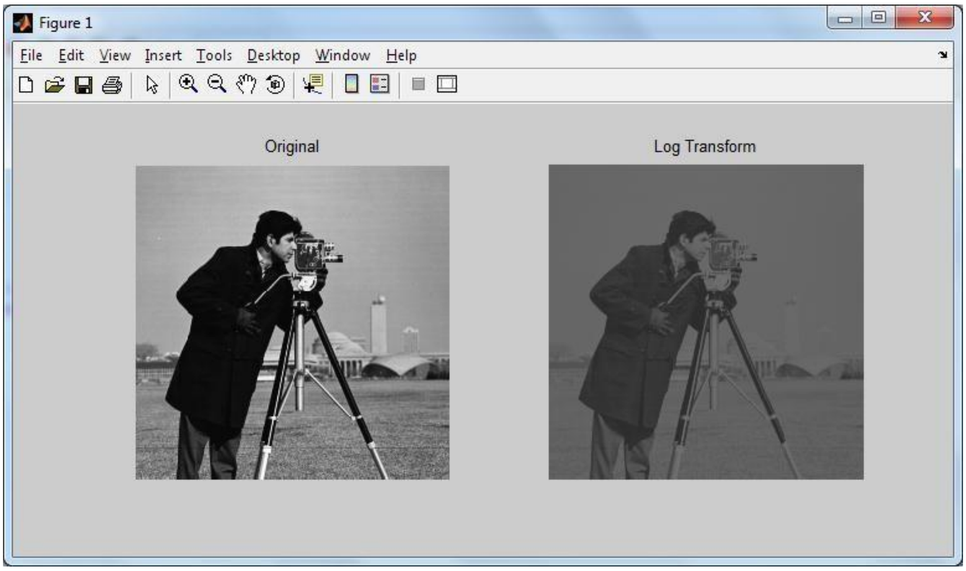
Aim: Basic Transformation

LOG TRANSFORMATION :

Code :

```
a=imread('cameraman.tif');
[m,n]=size(a);
for i=1:m
for  j=1:n
x=a(i,j);
b(i,j)=20*log(1+double(x));
end
end
subplot(1,2,1),imshow(a),title('Original');
subplot(1,2,2),imshow(b),title('Log Transform');
```

Output :



POWER LAW TRANSFORMATION:

Code :

```
a=imread('cameraman.tif');
[m,n]=size(a);
for i=1:m
for j=1:n
x=double(a(i,j));
b(i,j)=20*(x^0.4);
c(i,j)=20*(x^0.6);
d(i,j)=20*(x^0.9);
end
end
subplot(2,2,1),imshow(a),title('Original');
subplot(2,2,2),imshow(b),title('Power Law Transform : Gamma = 0.4');
subplot(2,2,3),imshow(c),title('Power Law Transform : Gamma = 0.6');
subplot(2,2,4),imshow(d),title('Power Law Transform : Gamma = 0.9');
```

Output :

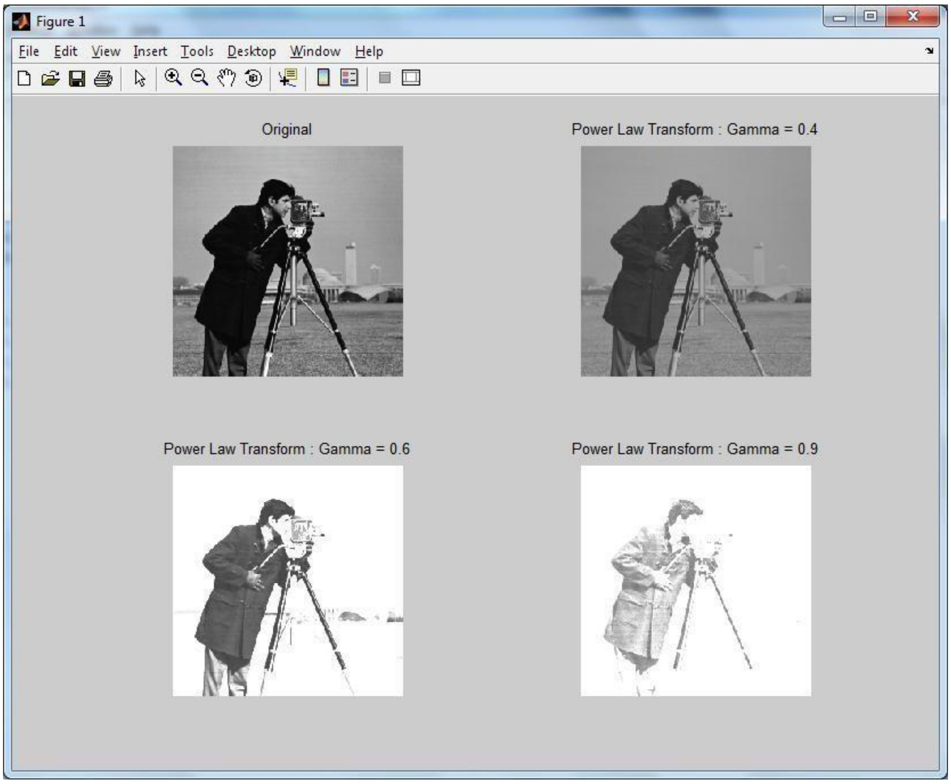


Figure 1
File Edit View Insert Tools Desktop Window Help
Original
Power Law Transform : Gamma = 0.4
Power Law Transform : Gamma = 0.6
Power Law Transform : Gamma = 0.9

C. NEGATION CODE :

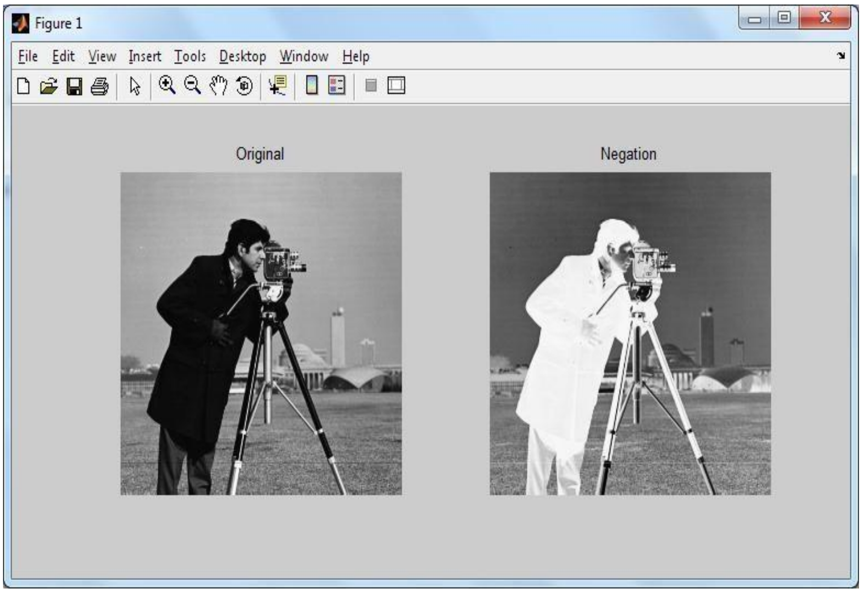
Description:

When you are working with gray-scale images, sometimes you want to modify the intensity values. For instance, you may want to reverse black and the white intensitiesor you may want to make the darks darker and the lights lighter. An application of intensity transformations is to increase the contrast between certain intensity values sothat you can pick out things in an image. For instance, the following two images showan image before and after an intensity transformation.

Code :

```
a=imread('cameraman.tif');
[m,n]=size(a);
for i=1:m
for j=1:n
      b(i,j)=255 - a(i,j);
end
end
subplot(1,2,1),imshow(a),title('Original');
subplot(1,2,2),imshow(b),title('Negation');
```

Output :

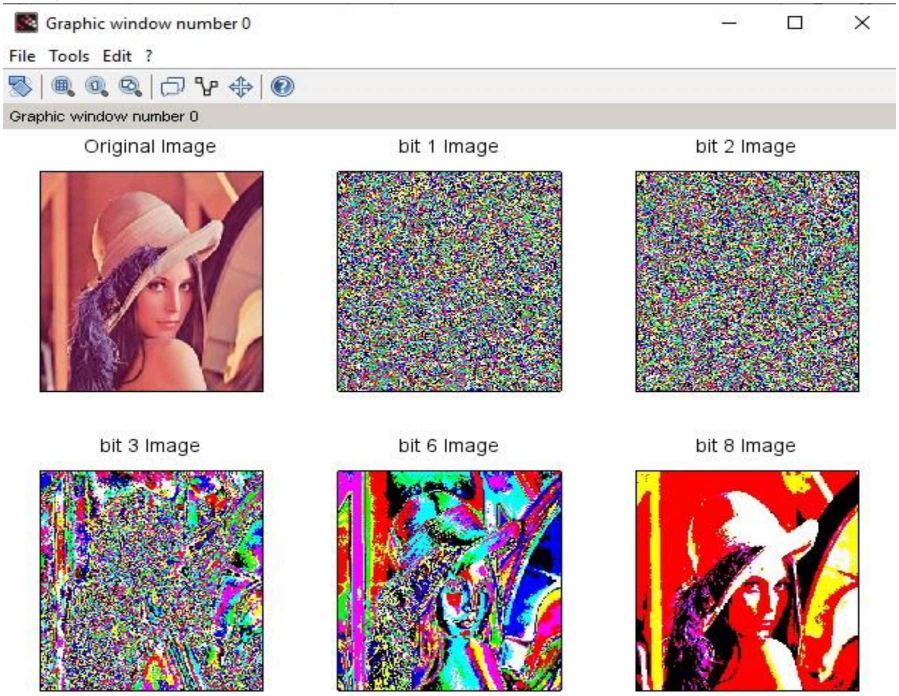


D. Piecewise linear transformations

Code:

```
clc;
clear all;
a=imread('E:\IT\DIP TYCS\lena.jpg');
b=double(a);
subplot(2,3,1);
imshow(a);
title('Original Image');
f1=bitget(b,1);
subplot(2,3,2);
imshow(f1);
title('bit 1 Image');
f2=bitget(b,2);
subplot(2,3,3);
imshow(f2);
title('bit 2 Image');
f3=bitget(b,4);
subplot(2,3,4);
imshow(f3);
title('bit 3 Image');
f4=bitget(b,6);
subplot(2,3,5);
imshow(f4);
title('bit 6 Image');
f5=bitget(b,8);
subplot(2,3,6);
imshow(f5);
title('bit 8 Image');
```

Output:



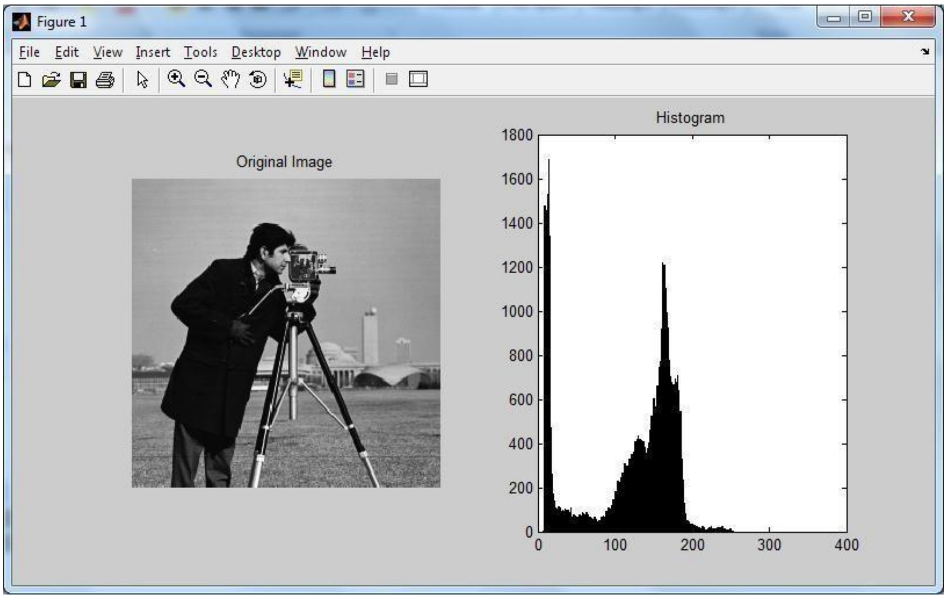
PRACTICAL NO: 4

Aim: A) Write a program to plot a Histogram for Colour and Grayscale Images.

Code :

```
a = imread('cameraman.tif');
a = double(a);
[row col] = size(a);
h = zeros(1,300);
for n  =  1:1:row
for m = 1:1:col
if a(n,m) == 0
a(n,m) = l;
end
end
end
for n = 1:1:row
for  m  = 1:1:col
t = a(n,m);
h(t) = h(t)+1;
end
end
subplot(1,2,1),imshow(uint8(a)); title('Original Image');
subplot(1,2,2),bar(h),title('Histogram');
```

Output :



B) Write a program to apply histogram equalization.

Code :

```
a = imread('cameraman.tif');
a = double(a);
big = 256;
[row col d] = size(a);
c = row*col;
h = zeros(1,300);
z = zeros(1,300);
for e = 1:1:d
for n = 1:1:row
for m = 1:1:col
if a(n,m,e) == 0
a(n,m,e) = 1;
end
end
end
end
for n = 1:1:row
for m = 1:1:col
t = a(n,m);
h(t) = h(t)+1;
end
end
pdf = h/c;
cdf(1) = pdf(1);
for x = 2:1:big
cdf(x) = pdf(x) + cdf(x-1);
end
new = round (cdf*big);
new = new + 1;
for r = 1:1:d
for p = 1:1:row
for q = 1:1:col
temp = a(p,q,r);
b(p,q,r) = new(temp);
t = b(p,q,r);
z(t) = z(t) + 1;
end
end
end
b = b-1;
subplot(2,2,1); imshow(uint8(a)); title('Image');
subplot(2,2,2); bar(h); title('hist');
subplot(2,2,3); imshow(uint8(b)); title('After hist Image');
subplot(2,2,4); bar(z); title('Eq Hist');
```

Output:

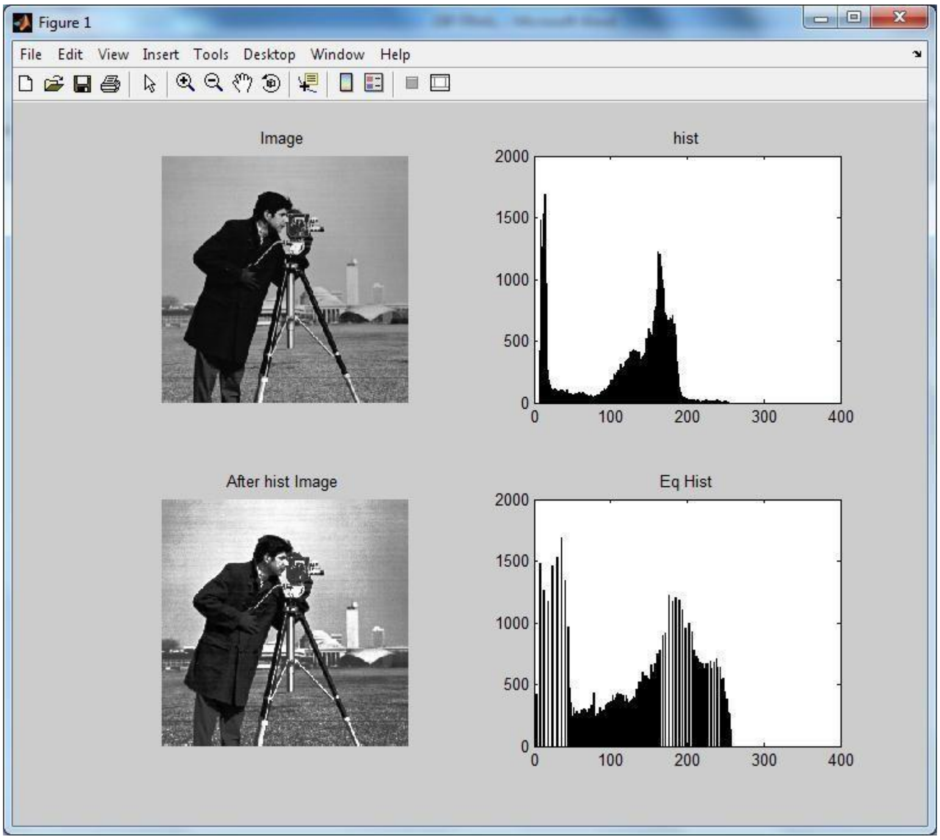


Figure 1
File Edit View Insert Tools Desktop Window Help
Image
hist
2000
1500
1000
500
0
0
100
200
300
400
After hist Image
Eq Hist
2000
1500
1000
500
0
0
100
200
300
400

PRACTICAL NO: 5

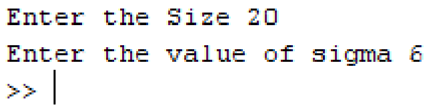
Aim: Write a program to apply Gaussian filter on an image.

Code :

```
m=input('Enter the Size ');
s=input('Enter the value of sigma ');
sum1=0;
a=m/2;
p=0;q=0;
r=1;
t=1;
w=floor(a);
for i=-w:w
for j=-w:w
p=i*i;
q=j*j;
g(r,t)=exp(-(p+q)/(2*s*s));
sum1=sum(sum(g(r,t)+sum1));
t=t+1;
end
t=1;
r=r+1;
end
for r=1:m
for t=1:m
h(r,t)=g(r,t)/sum1;
t=t+1;
end
t=1;
r=r+1;
end
im=imread('cameraman.tif');
p=double(im);
s1=0;
[M N]=size(p);
for x=0:M-m
for y=0:N-m
for s=1:m
for z=1:m
s1=(h(s,z)*(p(x+s,y+z)))+s1;
end
end
N_img(x+1,y+1)=s1;
s1=0;

end
end
```

```
subplot(1,2,1),imshow(uint8(im)),title('Original Image');
subplot(1,2,2),imshow(uint8(N_img)),title('Image After Gaussian Filter');
```

Output :



```
Enter the Size 20
Enter the value of sigma 6
>> 
```

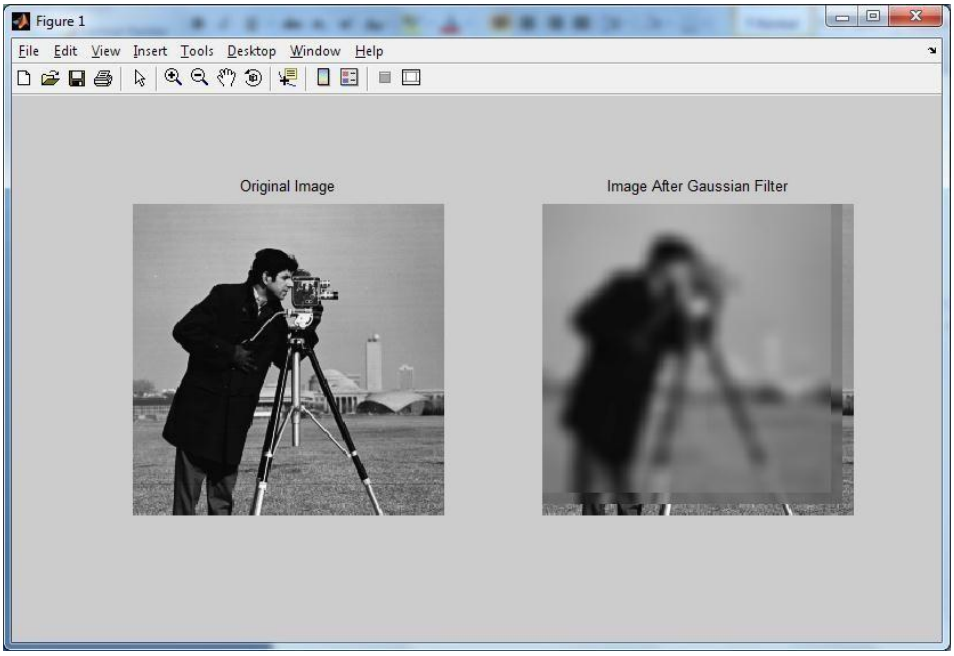


Figure 1
File Edit View Insert Tools Desktop Window Help
Original Image
Image After Gaussian Filter

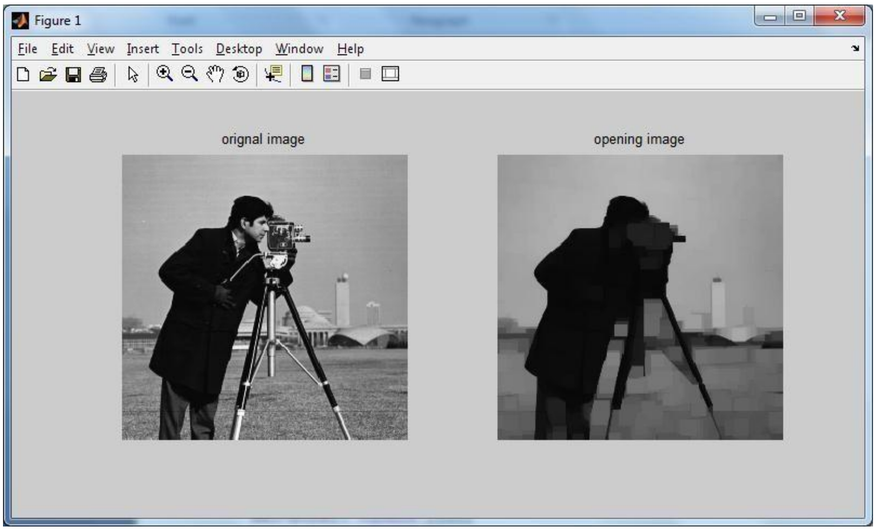
PRACTICAL NO: 6

Aim: Write a program to apply following morphological operations on the image.

A. Opening Code :

```
img=imread('cameraman.tif');
se1 = strel('square',11);
im2 = imerode(img,se1);
im3 = imdilate(im2,se1);
subplot(1,2,1),imshow(img),title('orignal image');
subplot(1,2,2),imshow(im3),title('opening image');
```

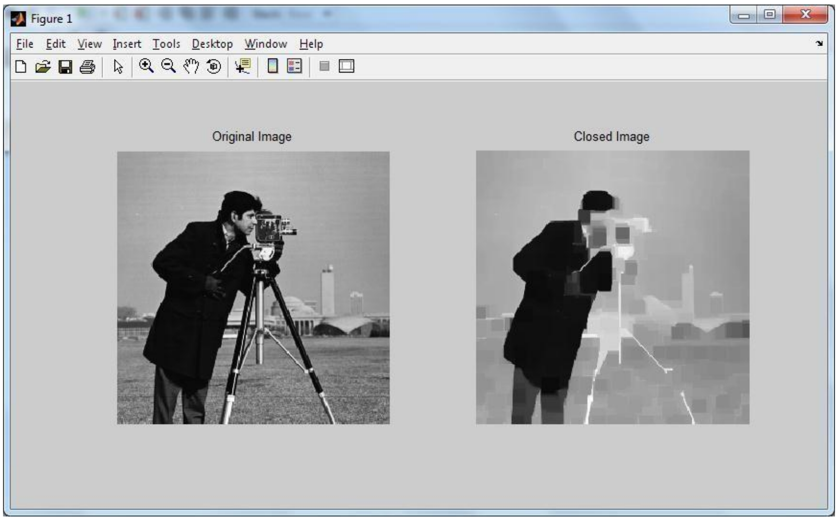
Output :



B. Closing Code :

```
aa=imread('cameraman.tif');
se1=strel('square',11);
IM2=imdilate(aa,se1);
IM3=imerode(IM2,se1);
subplot(1,2,1),imshow(aa),title('Original Image');
subplot(1,2,2),imshow(IM3),title('Closed Image');
```

Output :

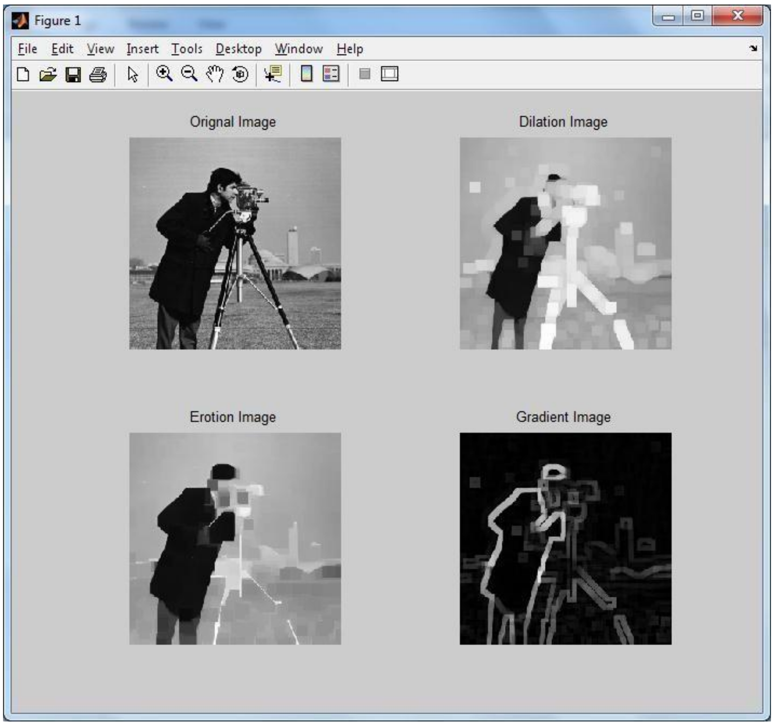


C. Morphological Gradient

Code :

```
img=imread('cameraman.tif');
se1=strel('square',12);
im1=imdilate(img,se1);
im2=imerode(im1,se1);
g=im1-im2;
subplot(2,2,1),imshow(img),title('Orignal  Image');
subplot(2,2,2),imshow(im1),title('Dilation  Image');
subplot(2,2,3),imshow(im2),title('Erotion  Image');
subplot(2,2,4),imshow(g),title('Gradient Image');
```

Output :



D. Top-hat transformation

Code :

```
i=imread('cameraman.tif');
se1=strel('square',22);
im1=imerode(i,se1);
im2=imdilate(im1,se1);
h=i-im2;
subplot(2,2,1),imshow(i),title('Orignal Image');
subplot(2,2,2),imshow(im1),title('Erotion Image');
subplot(2,2,3),imshow(im2),title('Dilation Image');
subplot(2,2,4),imshow(h),title('Top Hat Transformation Image');
```

Output :

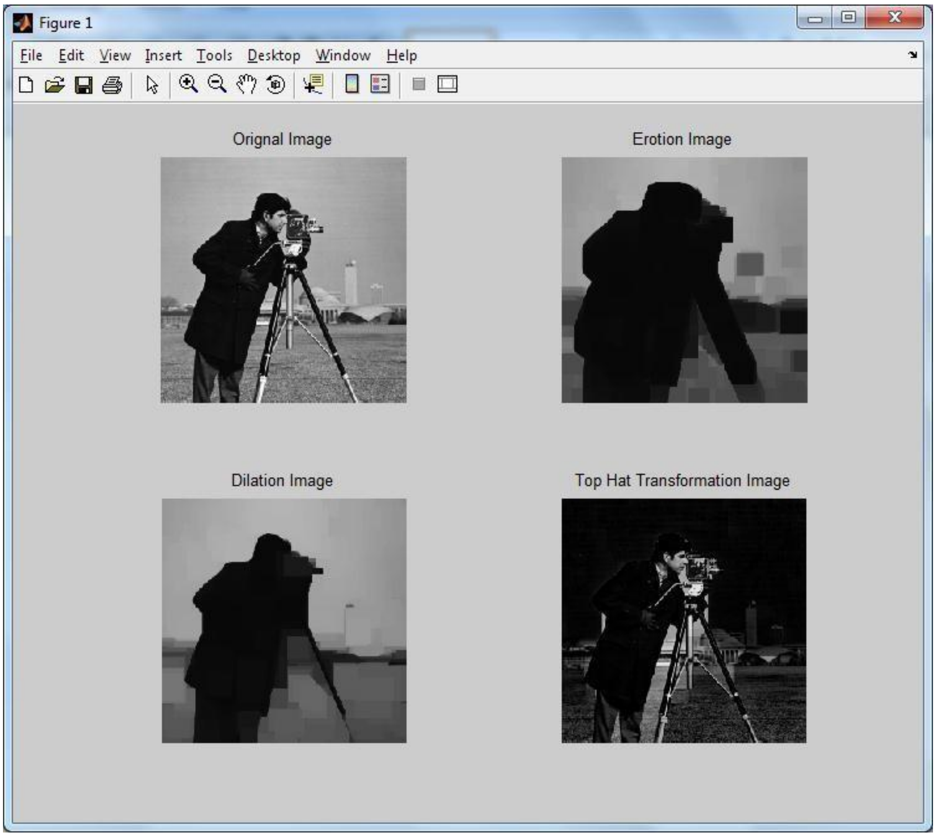


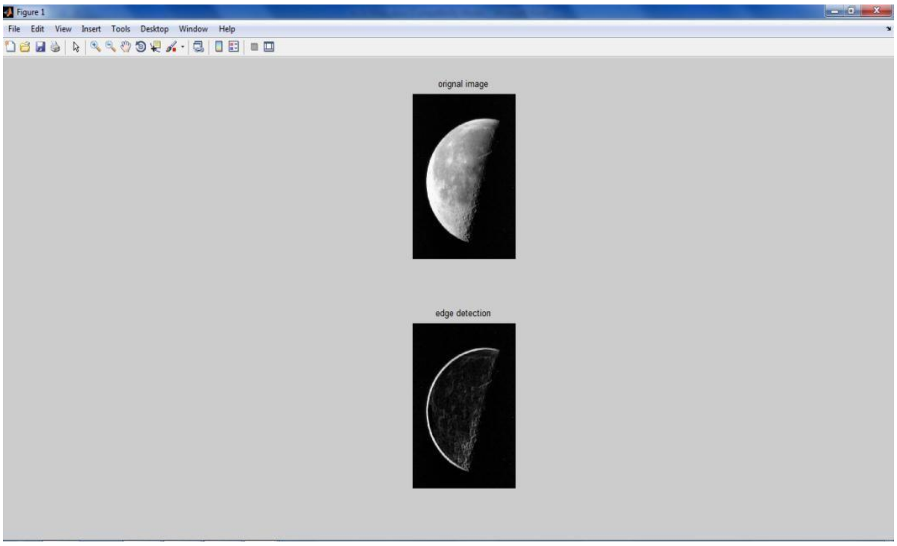
Figure 1
File Edit View Insert Tools Desktop Window Help
Orignal Image
Erotion Image
Dilation Image
Top Hat Transformation Image

Aim: Write a program for boundary detection.

Code:

```
clearall;
clc;
aa=imread('moon.tif');
se1=strel('square',11);
m1=imerode(aa,se1);
m2=aa-m1;
subplot(2,1,1),imshow(aa);
title('orignal image');
subplot(2,1,2),imshow(m2);
title('edge detection');
```

Output:



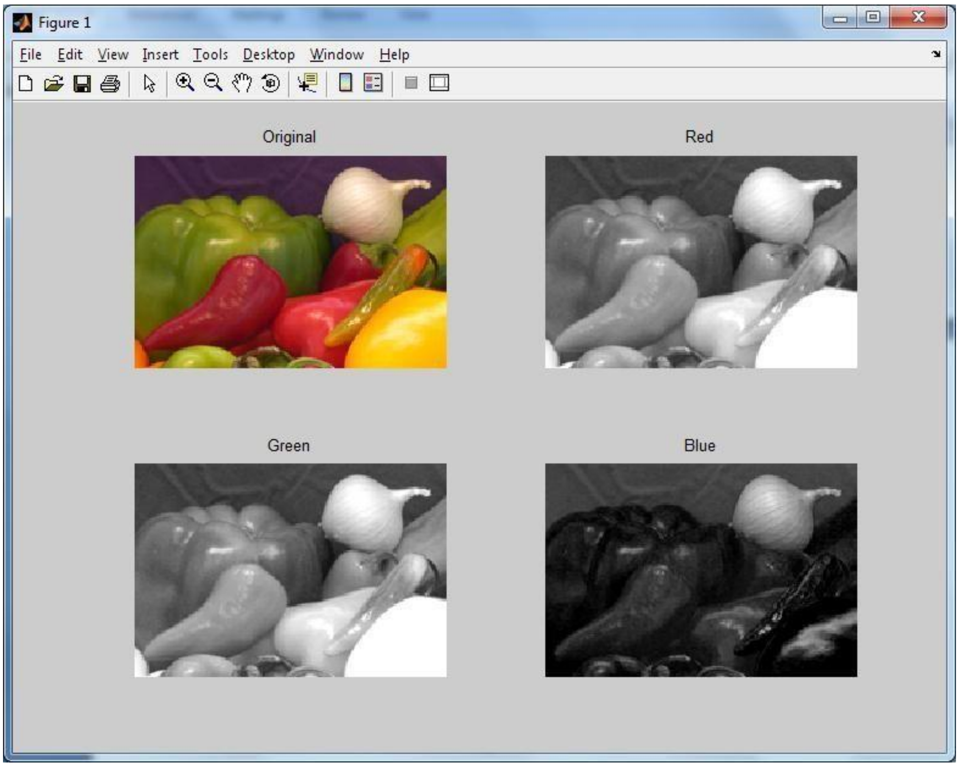
PRACTICAL NO: 7

Aim: Write a program to show RGB planes

Code :

```
original=imread('onion.png');
im_red=original(:,:,1);
im_green=original(:,:,1);
im_blue=original(:,:,3);
subplot(2,2,1),imshow(original),title('Original');
subplot(2,2,2),imshow(im_red),title('Red');
subplot(2,2,3),imshow(im_green),title('Green');
subplot(2,2,4),imshow(im_blue),title('Blue');
```

Output:



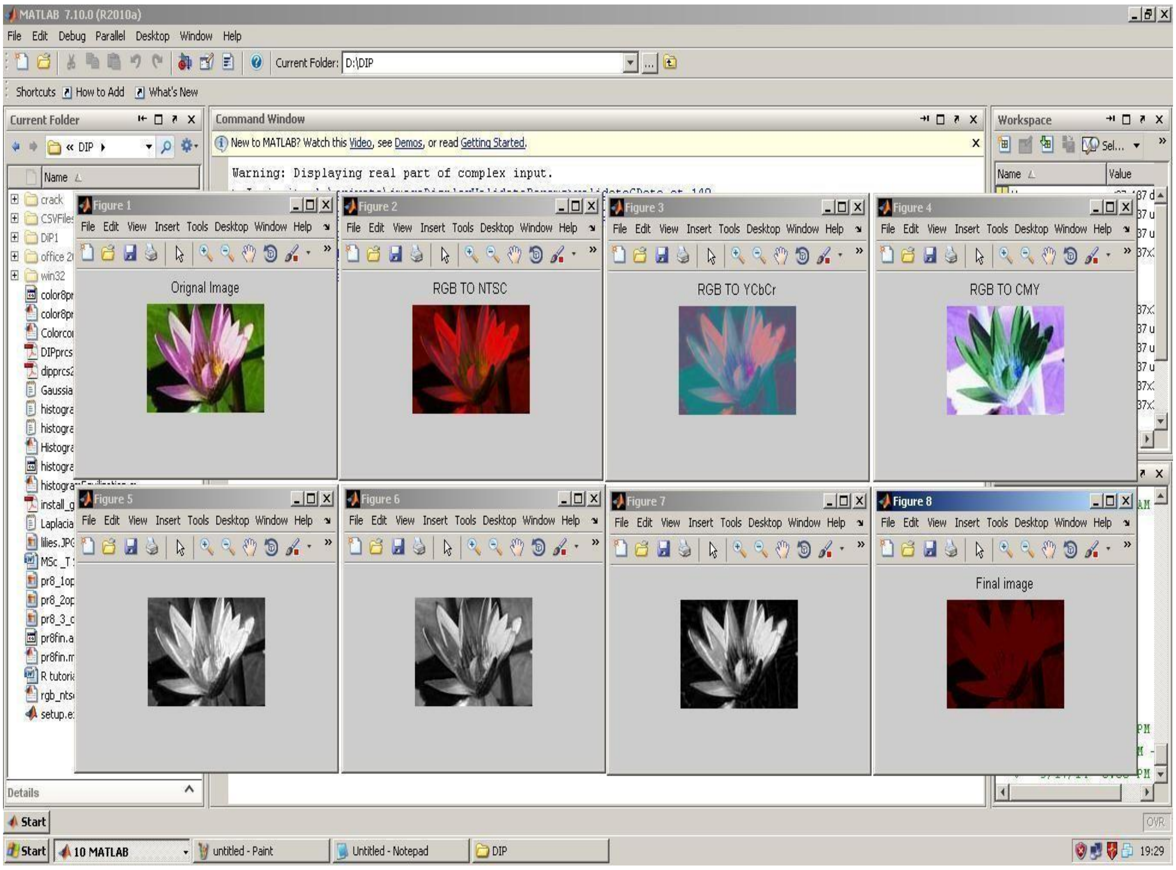
Aim:WAP to convert
RGB to NTSC
RGB to YCbCr
RGB to CMY

Code :

```
clc;
clearall;
closeall;
a = imread('lilies.jpg');
figure(1),imshow(a);
title('Orignal Image');
k=rgb2ntsc(a);
figure(2),imshow(k);
title('RGB TO NTSC');
l=rgb2ycbcr(a);
figure(3),imshow(l);
title('RGB TO YCbCr');
m=imcomplement(a);
figure(4),imshow(m);
title('RGB TO CMY');
imr=a(:,:,1);
img=a(:,:,2);
imb=a(:,:,3);
figure(5),imshow(imr);
figure(6),imshow(img);
figure(7),imshow(imb);
I=(imr+img+imb)/3;
[m,n]=size(imr);
for c=1:m
for d=1:n
min1=min(imr(c,d),img(c,d));
min2=min(min1,imb(c,d));
S(c,d) = 1-(3/(imr(c,d)+img(c,d)+imb(c,d)))*min2;
end
end
for c=1:m
for d=1:n
temp= (0.5*(imr(c,d)-img(c,d))+(imr(c,d)-
imb(c,d)))/sqrt(double(imr(c,d)*imr(c,d)+(imr(c,d)-imb(c,d))*(img(c,d)-imb(c,d))));
H(c,d)=acos(double(temp));
end
end
for c=1:m
for d=1:n
finali(c,d,1)=I(c,d);
finali(c,d,2)=S(c,d);
finali(c,d,3)=H(c,d);
```

```
end
end
figure(8),imshow(finali);

title('Final image');
```

Output:



```
Warning: Displaying real part of complex input.
```

PRACTICAL NO: 8

Aim: Write a program to achieve Pseudo coloring.

Code :

```
a=imread('cameraman.tif');
[l,m,n]=size(a);
for i=1:l
for j=1:m
for k=1:n
if a(i,j)>=0 & a(i,j) < 50
b(i,j,1)=a(i,j,1)+50;
b(i,j,2)=a(i,j,1)+100;
b(i,j,3)=a(i,j,1)+10;
end
if a(i,j)>=50 & a(i,j) < 100
b(i,j,1)=a(i,j,1)+35;
b(i,j,2)=a(i,j,1)+128;
b(i,j,3)=a(i,j,1)+10;
end
if a(i,j)>=100 & a(i,j) < 150
b(i,j,1)=a(i,j,1)+152;
b(i,j,2)=a(i,j,1)+130;
b(i,j,3)=a(i,j,1)+15;
end
if a(i,j)>=150 & a(i,j) < 200
b(i,j,1)=a(i,j,1)+50;
b(i,j,2)=a(i,j,1)+140;
b(i,j,3)=a(i,j,1)+25;
end
if a(i,j)>=200 & a(i,j) < 256
b(i,j,1)=a(i,j,1)+120;
b(i,j,2)=a(i,j,1)+160;
b(i,j,3)=a(i,j,1)+45;
end
end
end
end
subplot(1,2,1),imshow(a),title('Original');
subplot(1,2,2),imshow(b),title('Pseudo Image');
```

Output :

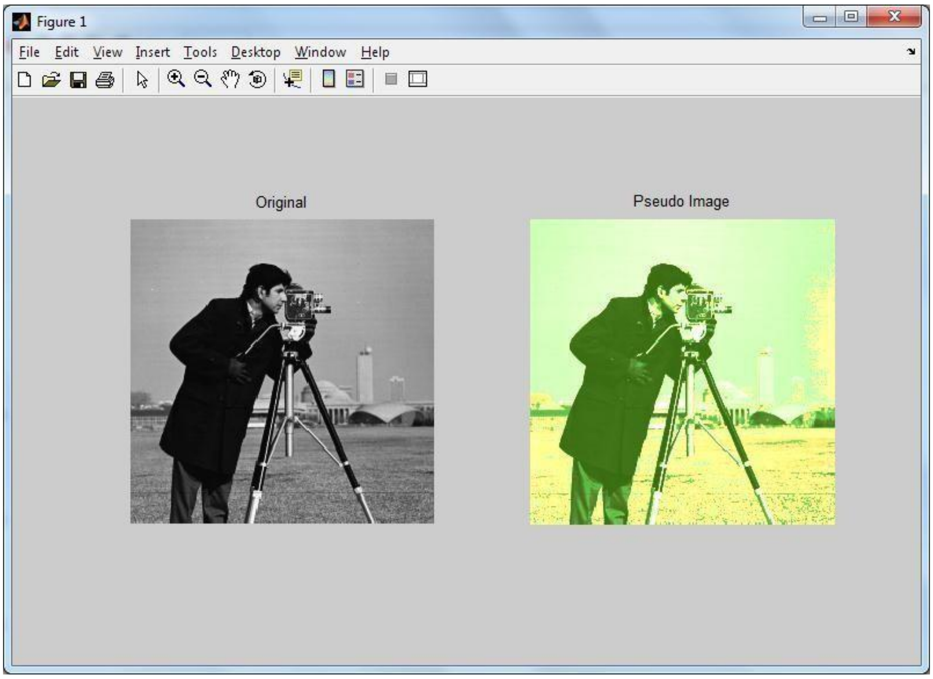


Figure 1
File Edit View Insert Tools Desktop Window Help
Original
Pseudo Image