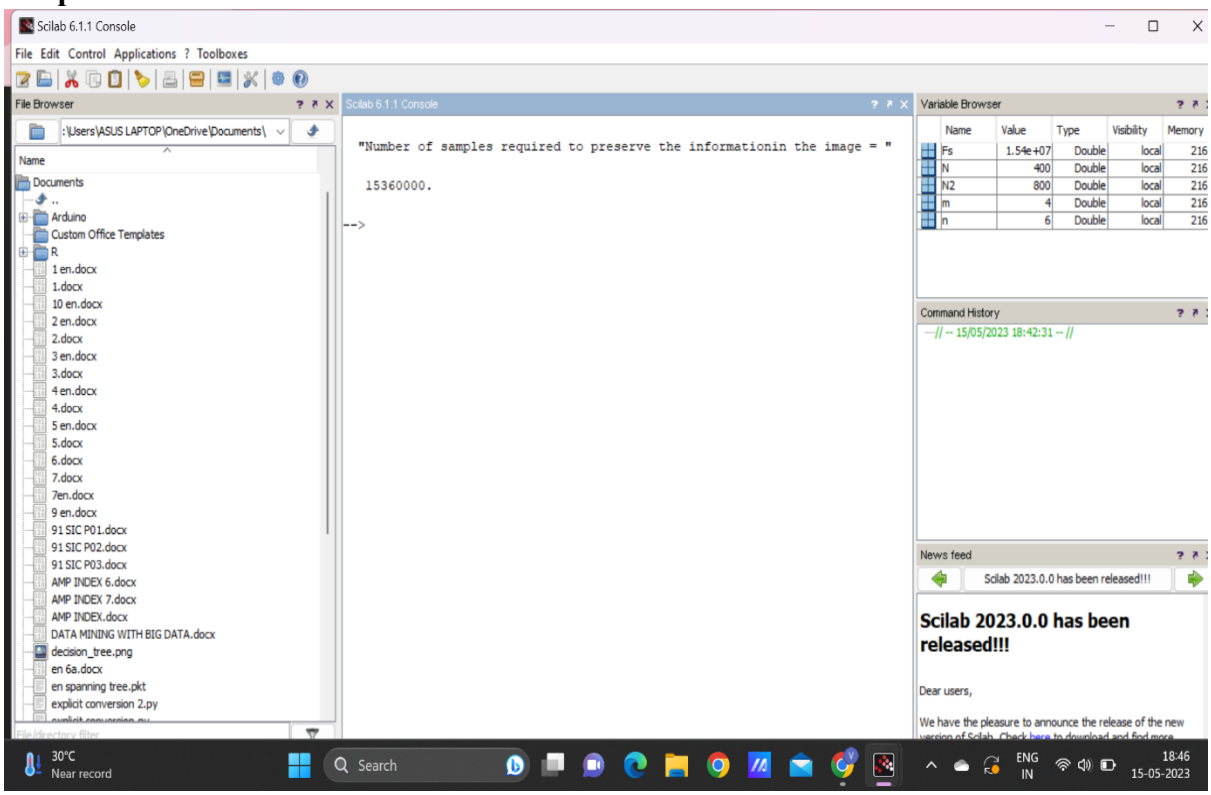
Practical No. 01

Aim: A) Program to calculate a number of samples required for the 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:

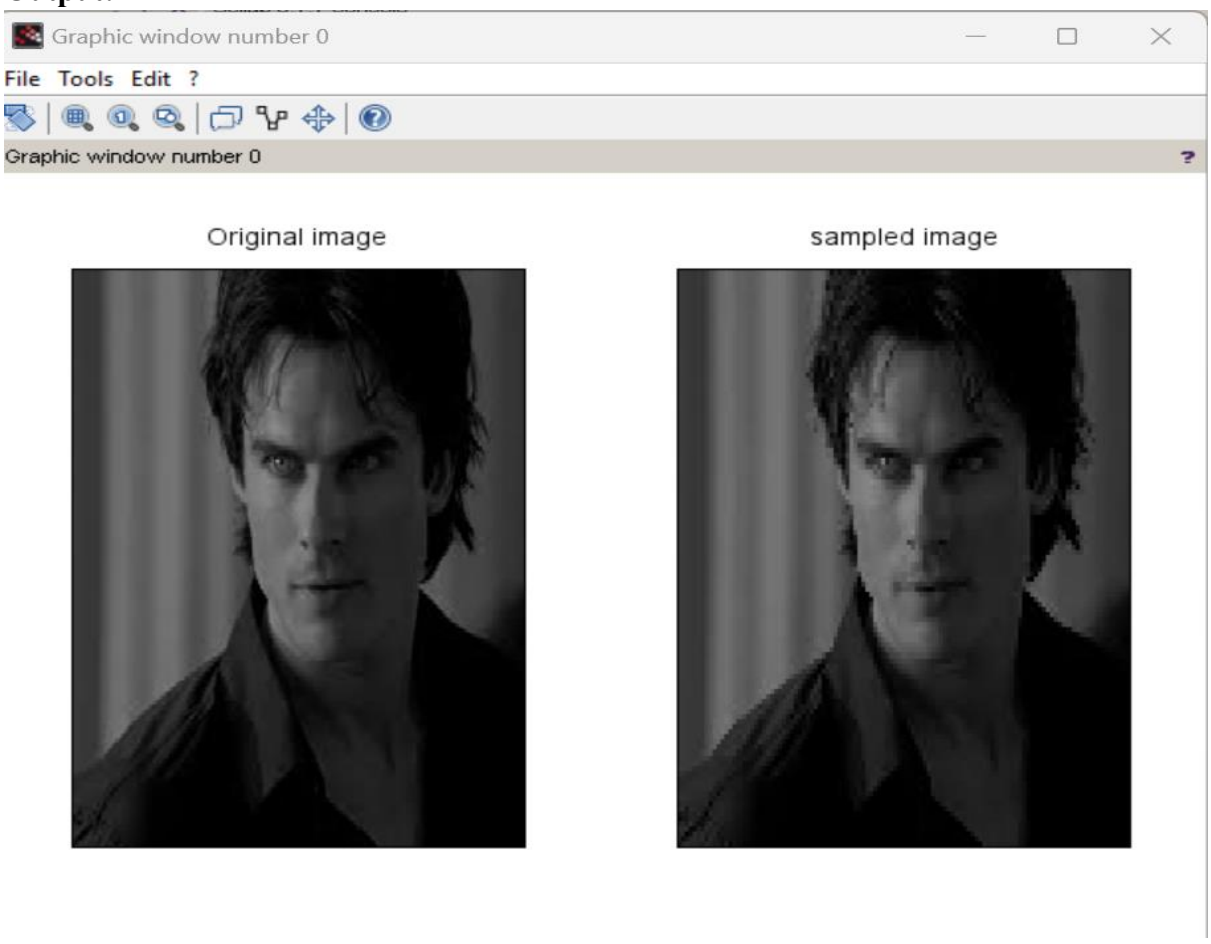


Aim: B) Program to study the effects of reducing the spatial resolution of a digital image.

Code:

```
n = input('Enter the input samples');
img=rgb2gray(imread('D:\damon.jpeg'));
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. 02

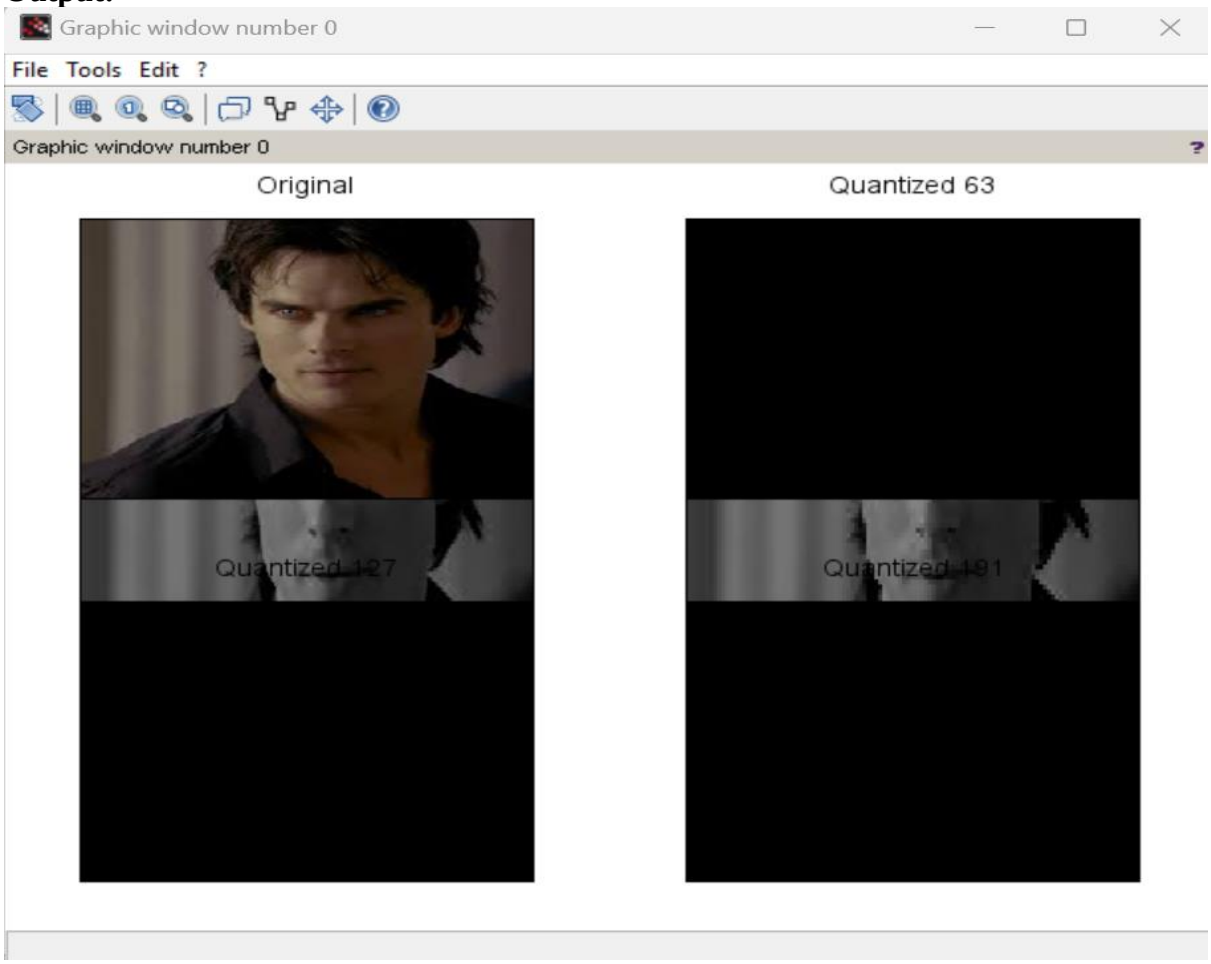
Aim: WAP to study the effect of reducing the quantization values and spatial resolution.

1) Quantization

Code:

```
a=imread('D:\damon.jpeg');
[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:

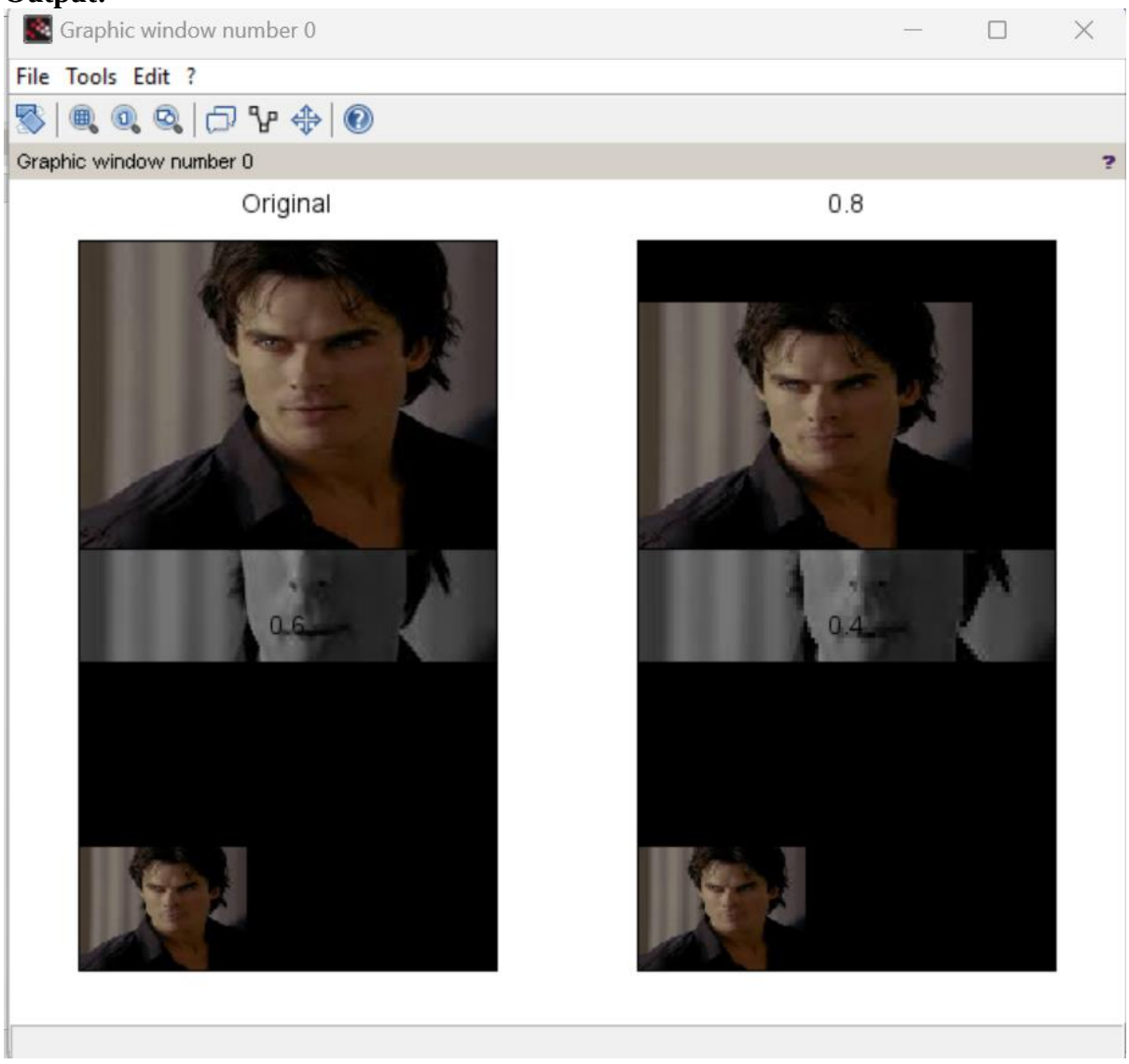


2) Spatial Resolution

Code:

```
i=imread('D:\damon.jpeg');
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. 03

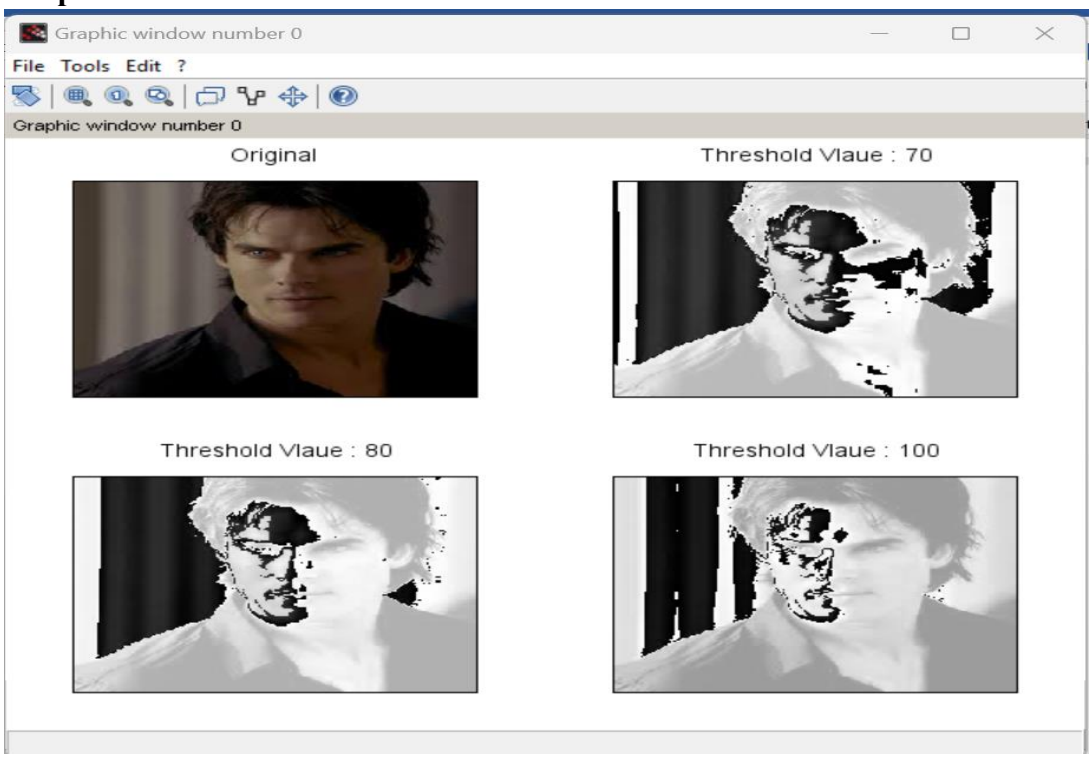
Aim: Image Enhancement

A) Thresholding

code:

```
a=imread('D:\damon.jpeg');
[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:

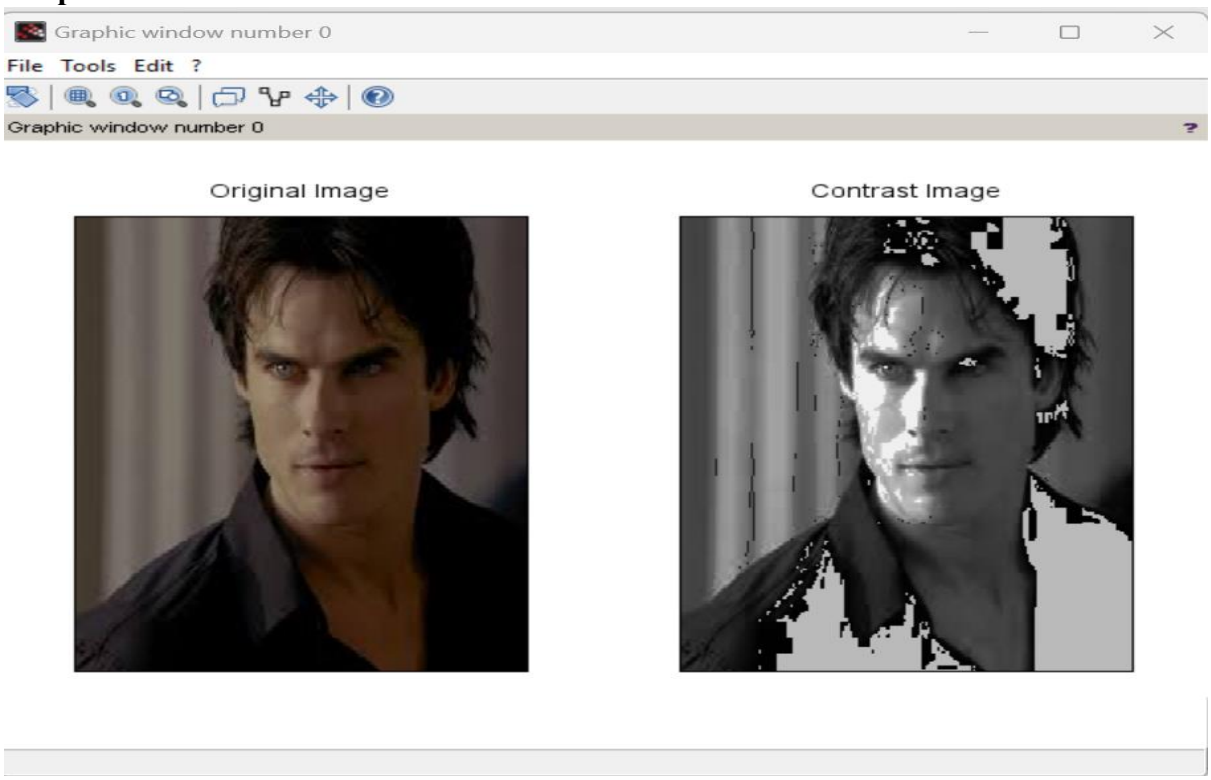


B) Contrast Adjustment:

Code:

```
a=imread('D:\damon.jpeg');
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:

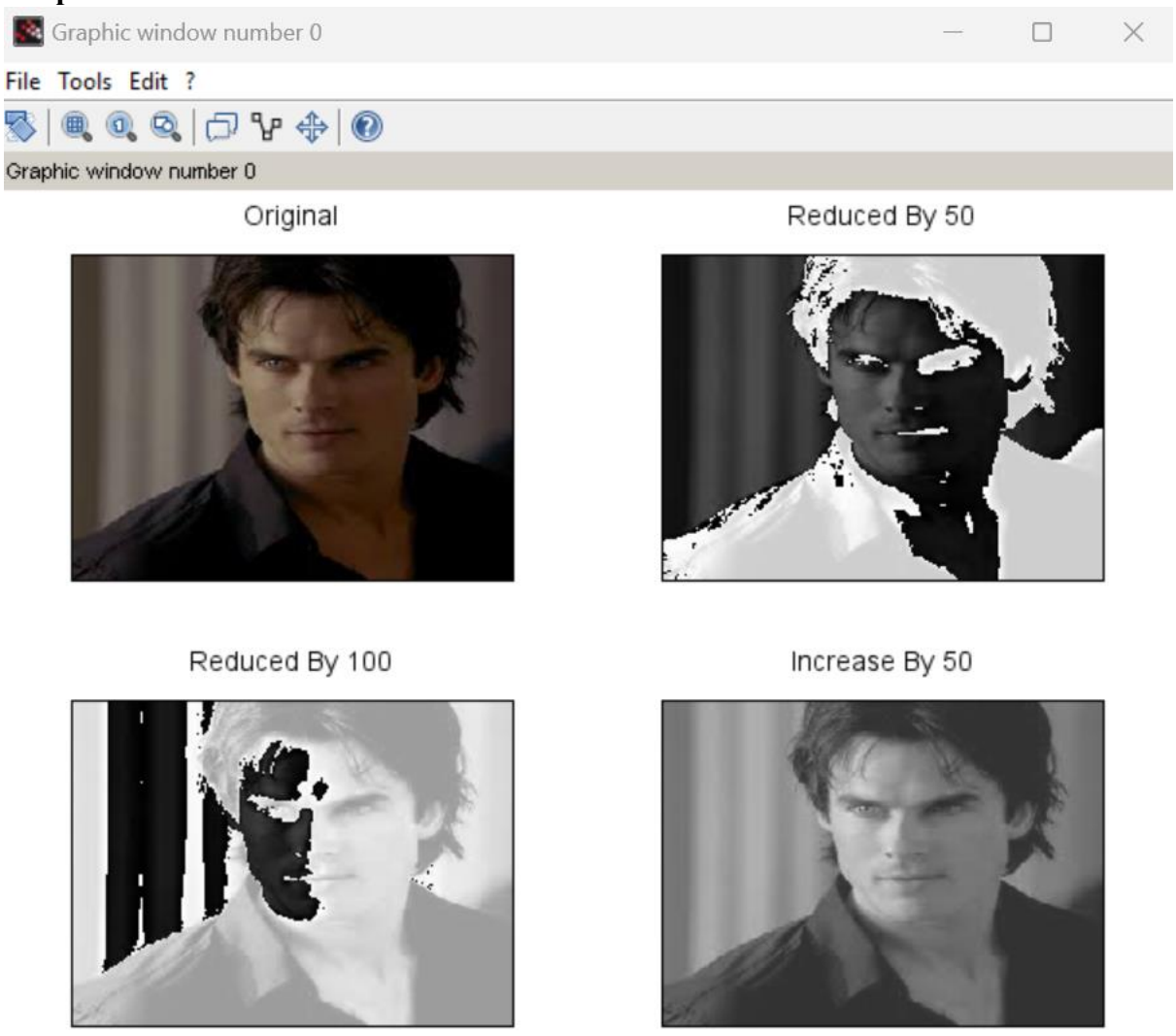


C) Brightness Adjustment:

Code:

```
a=imread('D:\damon.jpeg');
[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:

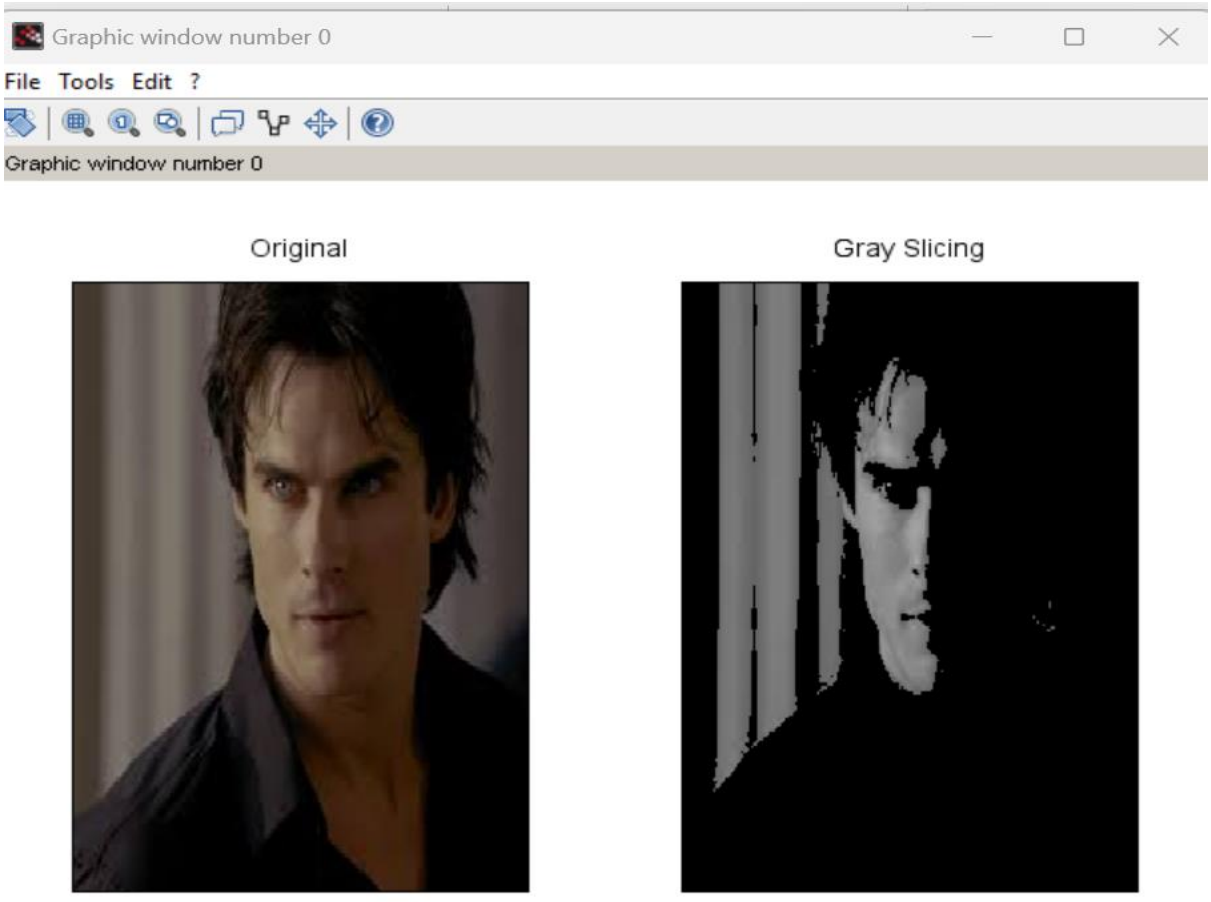


D) Gray Level Slicing:

code:

```
a=imread('D:\damon.jpeg');
[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
subplot(1,2,1),imshow(a),title('Original');
subplot(1,2,2),imshow(b),title('Gray Slicing');
```

Output:



Practical No. 04

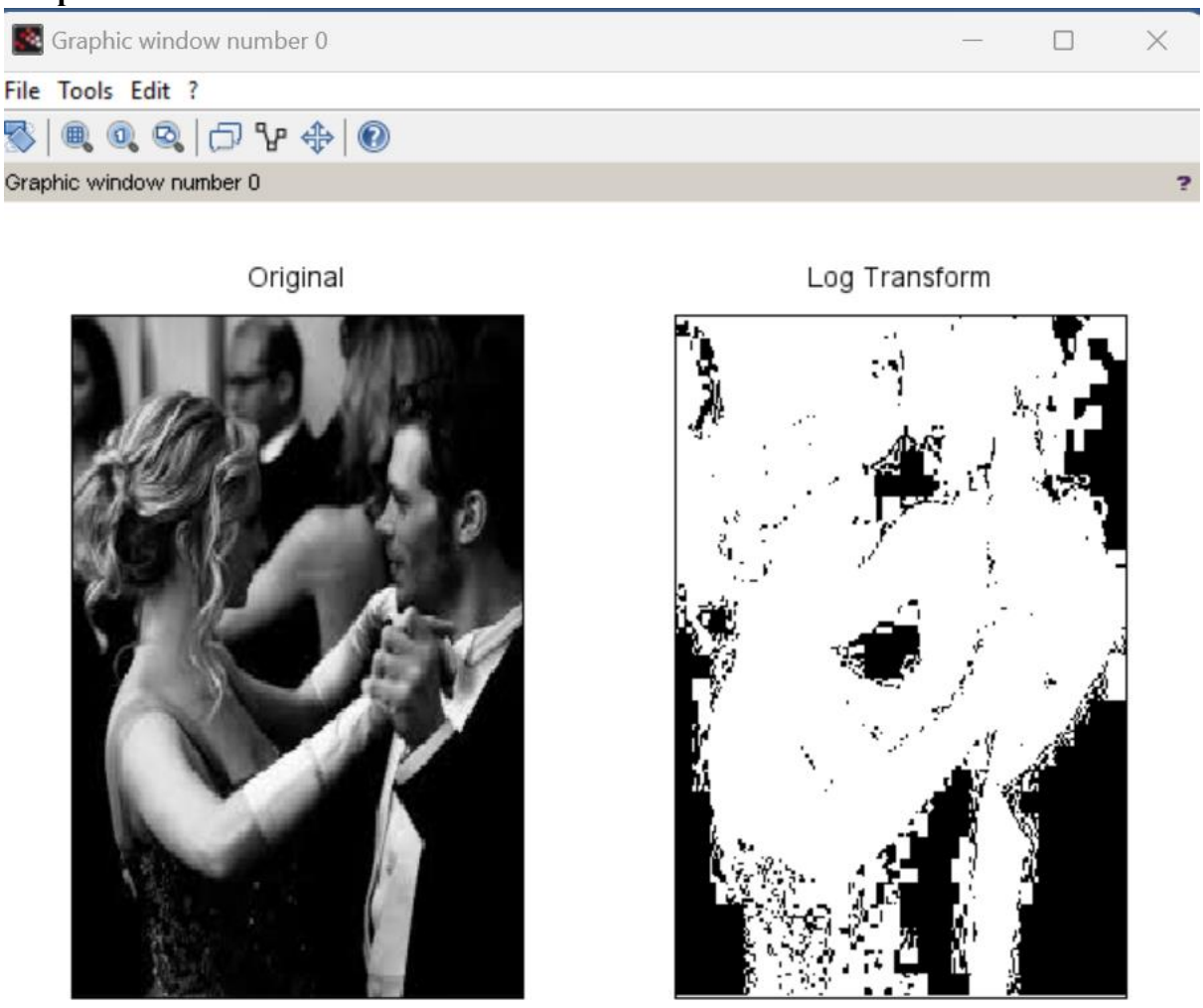
Aim: Basic Transformation

A) Log Transformation:

Code:

```
a=imread('D:\klaroline.jpeg');
[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:

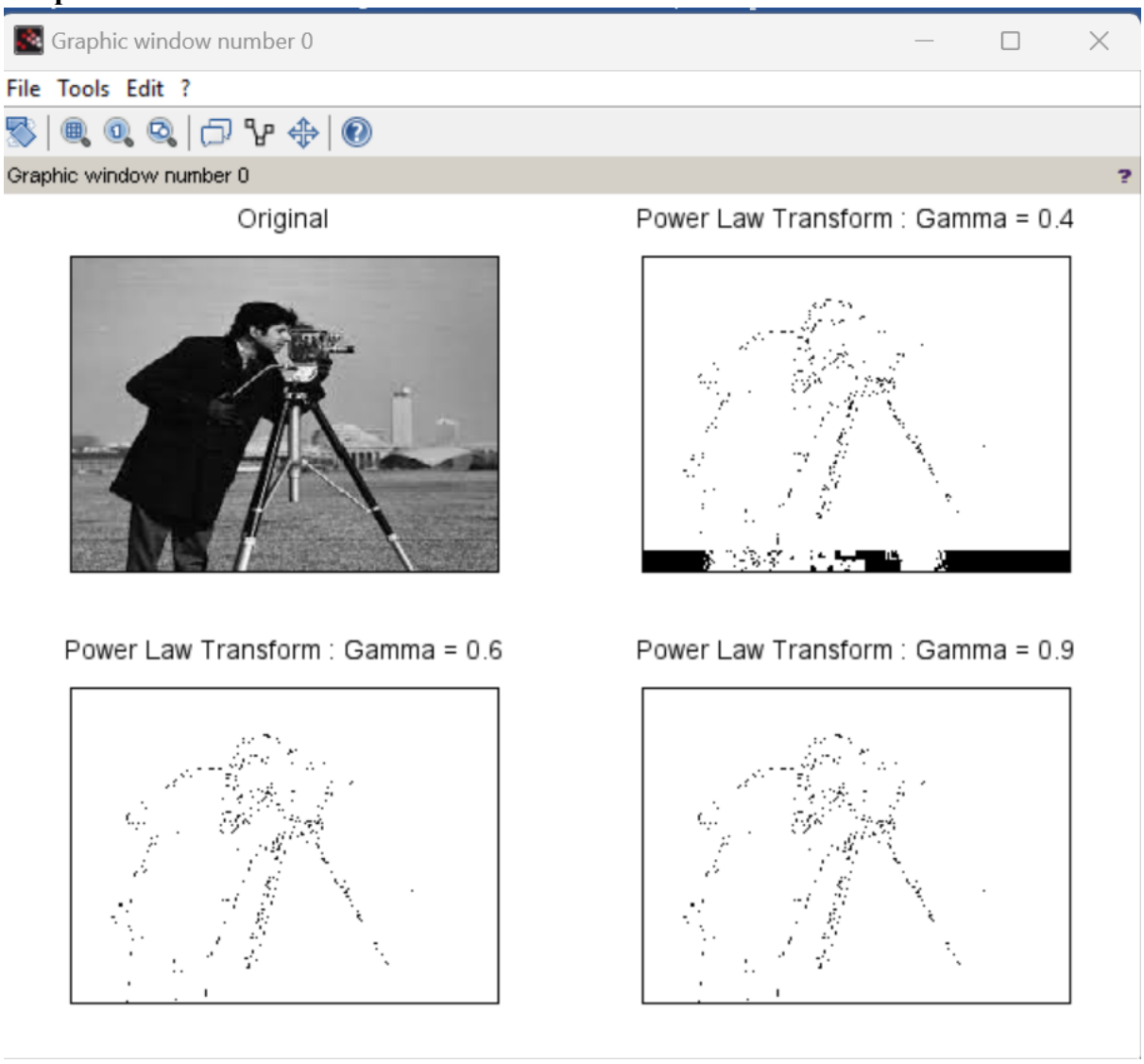


B) Power Law Transformation:

code:

```
a=imread('D:\cameraman.jpeg');
[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:

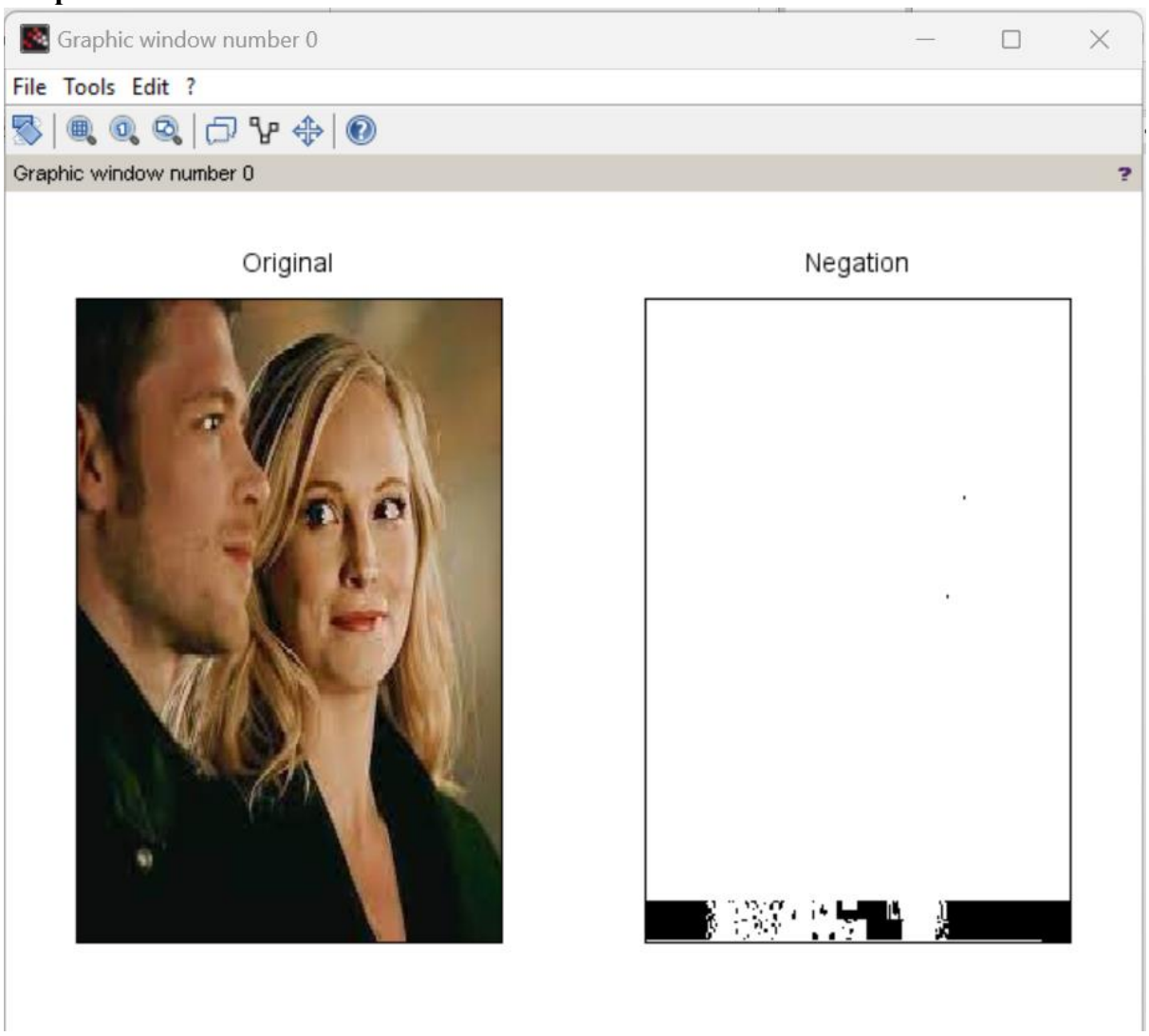


C) Negation code

code:

```
a=imread('D:\klaroline.jpeg');
[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:

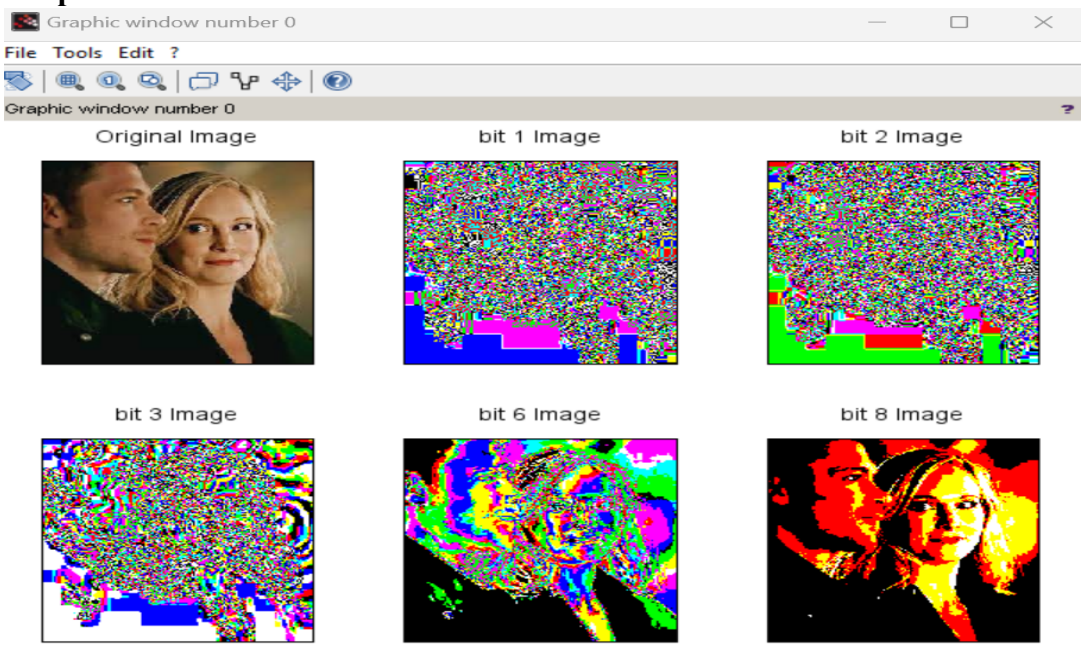


D) Piecewise linear transformations

code:

```
clc;
clear all;
a=imread('D:\klaroline.jpeg');
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:



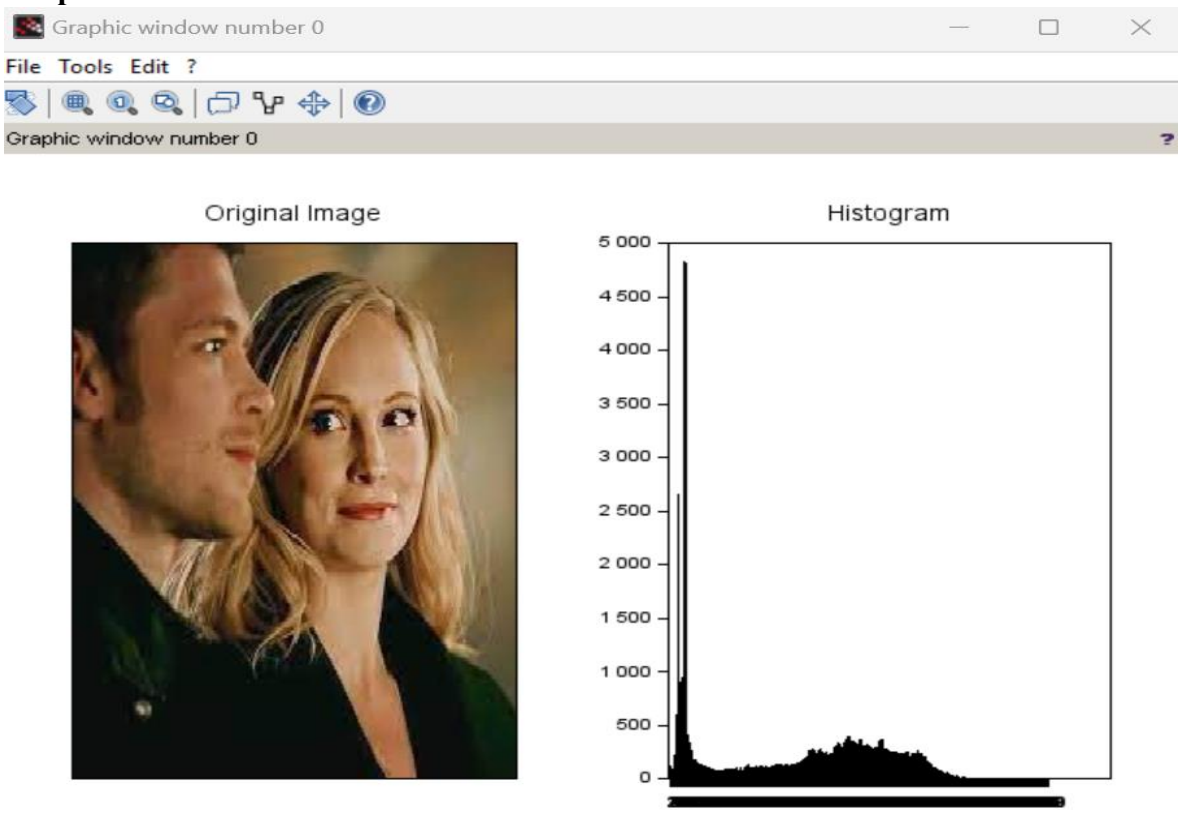
Practical No. 05

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

Code:

```
a = imread('D:\klaroline.jpeg');
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) = 1;
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:

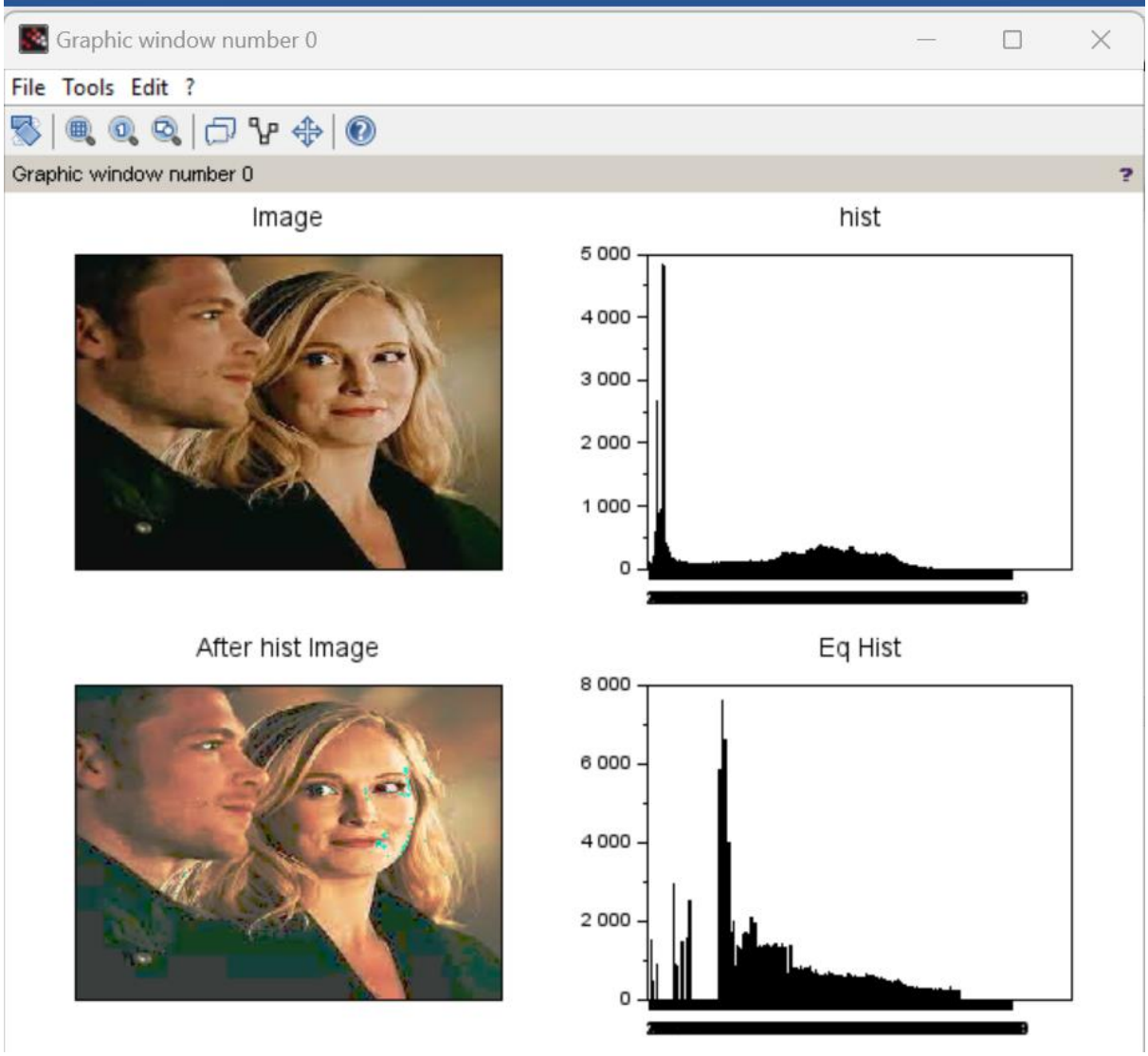


B) Write a program to apply histogram equalization.

Code:

```
a = imread('D:\klaroline.jpeg');
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:


Graphic window number 0
File Tools Edit ?
Graphic window number 0
Image
hist
5 000
4 000
3 000
2 000
1 000
0
After hist Image
Eq Hist
8 000
6 000
4 000
2 000
0

Practical No. 06

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('D:\cameraman.jpeg');
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
```

Practical No. 07

Aim: 1) 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');
```

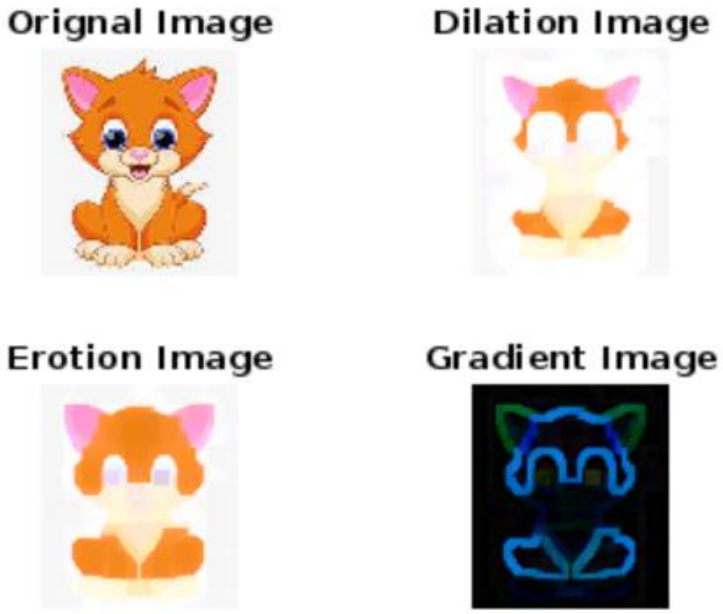
Output:

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:

Aim: 2) Write a program for boundary detection.

Code:

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

Output:

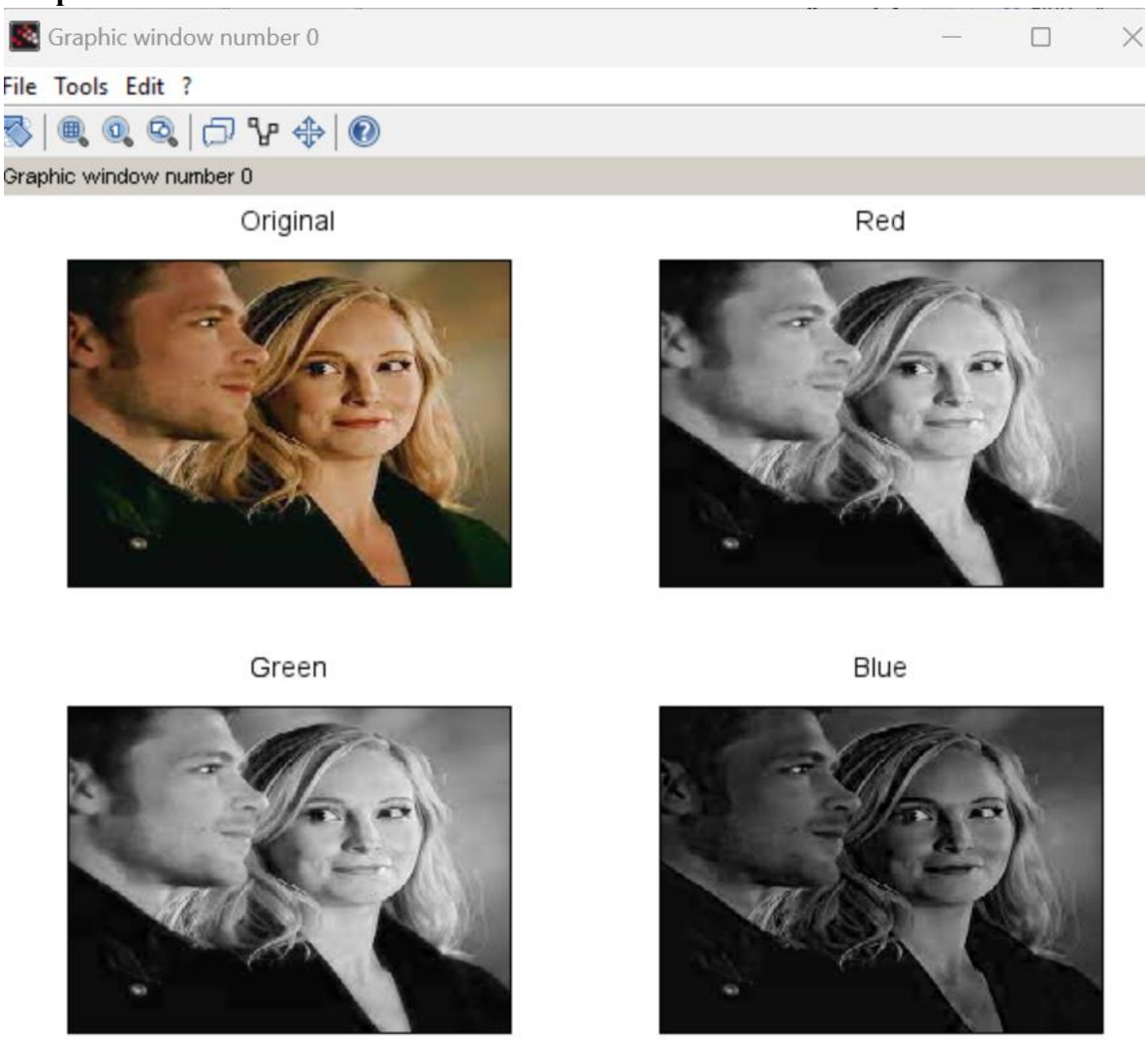
Practical No. 08

Aim: A) Write a program to show RGB planes

Code:

```
original=imread('D:\klaroline.jpeg');
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:

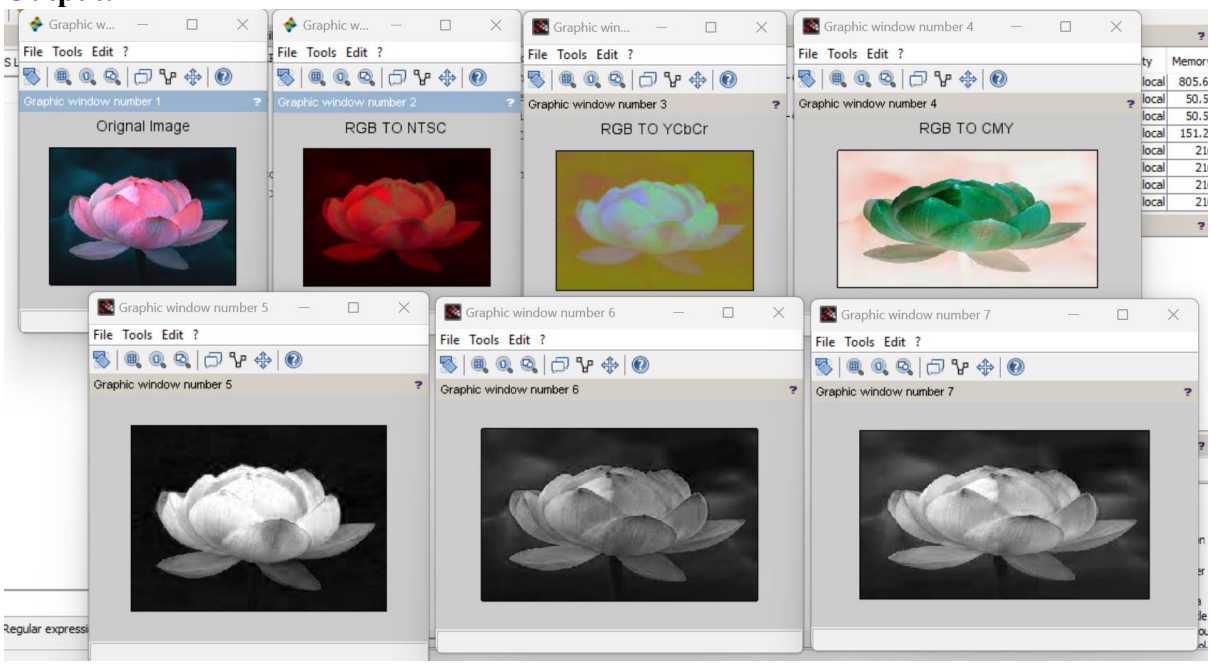


Aim: B) WAP to convert
RGB to NTSC
RGB to YCbCr
RGB to CMY
Code:

```
clc;
clear all;
close all;
a = imread('D:\lotus.jpeg');
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:



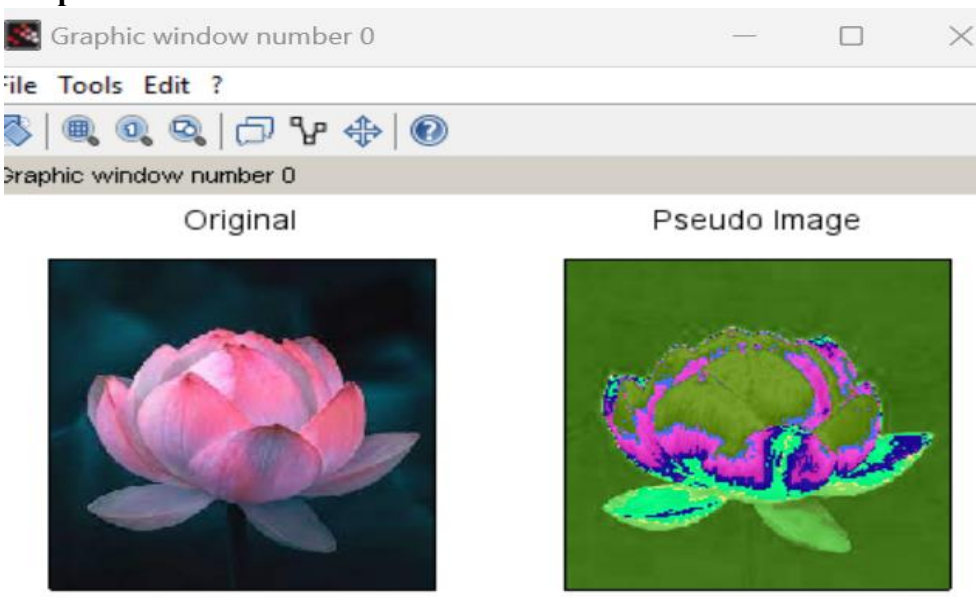
Practical No. 09

Aim: Write a program to achieve Pseudo coloring.

Code:

```
a=imread('D:\lotus.jpeg');
[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:


Graphic window number 0
File Tools Edit ?
Graphic window number 0
Original
Pseudo Image