



MALAD KANDIVLI EDUCATION SOCIETY'S

**NAGINDAS KHANDWALA COLLEGE OF COMMERCE,
ARTS & MANAGEMENT STUDIES & SHANTABEN NAGINDAS KHANDWALA
COLLEGE OF SCIENCE
MALAD [W], MUMBAI – 64
(AUTONOMOUS)**

**(Reaccredited 'A' Grade by NAAC)
(AFFILIATED TO UNIVERSITY OF MUMBAI)
(ISO 9001:2015)**

CERTIFICATE

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Roll No: 574

Programme: BSc CS

Semester: VI

This is certified to be a bonafide record of practical works done by the above student in the college laboratory for the course

DIGITAL IMAGE PROCESSING (Course Code: **1865UCSPR**) for the partial fulfillment of SIXTH Semester of BSc CS during the academic year 2020-2021. The journal work is the original study work that has been duly approved in the year 2020-2021 by the undersigned.

External Examiner

Mr. Ashish Modi
Subject-In-Charge

Date of Examination:

(College Stamp)

Subject: Digital Image Processing**Class: TY BSc CS****INDEX**

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Practical No. 1**A] linear convolution between two matrices****Code :**

```
disp('574_kuldeep patel');
x = [1,2 ; 3,4];
disp('x=');
disp(x);
h = [5,6;7,8];
disp('h=');
lenX = length(x)
lenH = length(h)
n = max(lenX , lenH)
a = x';
v1 = reshape(a,1,[]);
b = h';
v2 = reshape(b,1,[]);
y = cconv(v1,v2,n);
disp('Circular Convolved Vector Y=');
disp(y);
```

Output :

The screenshot shows the MATLAB 7.5.0 (R2007b) interface. The Command Window displays the following code and its output:

```
>> disp('574_kuldeep patel');
574_kuldeep patel
>> X = [7,8,9 ; 10,11,12];
>> H = [1;1;1];
>> Y = conv2(X,H);
>> disp(Y);
    7     8     9
   10    11    12

>> disp(H);
    1
    1
    1

>> disp(Y);
    7     8     9
   17    19    21
   17    19    21
   10    11    12

>> |
```

The Command History pane shows the same sequence of commands being run multiple times.

B] Circular convolution between two matrices .**Code :**

```
disp('circular convolution with 2 matrices')
disp('574_kuldeep patel');
x=[1,2,;3,4];
disp('x=');
disp(x);
h=[5,6;7,8];
disp('h=');
disp(h);
lenX = length(x)
lenH = length(h)
n = max(lenX , lenH)
a=x';
v1=reshape(a,1,[]);
b=h';
v2=reshape(b,1,[]);
y=cconv(v1,v2,n);
disp('Circular Convolved Vector Y=');
disp(y);
```

Output :

The screenshot shows the MATLAB 7.5.0 (R2007b) interface. The Command Window displays the following code and output:

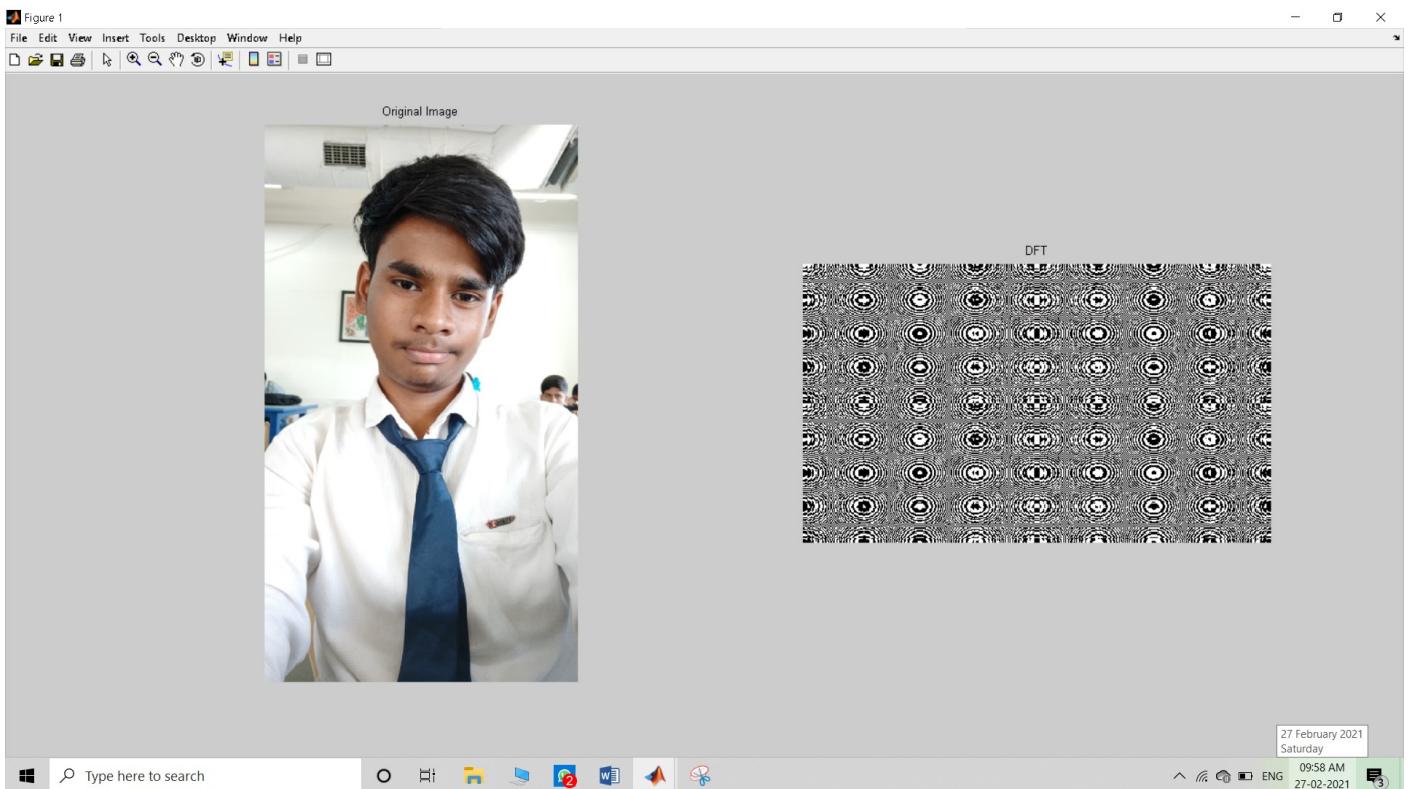
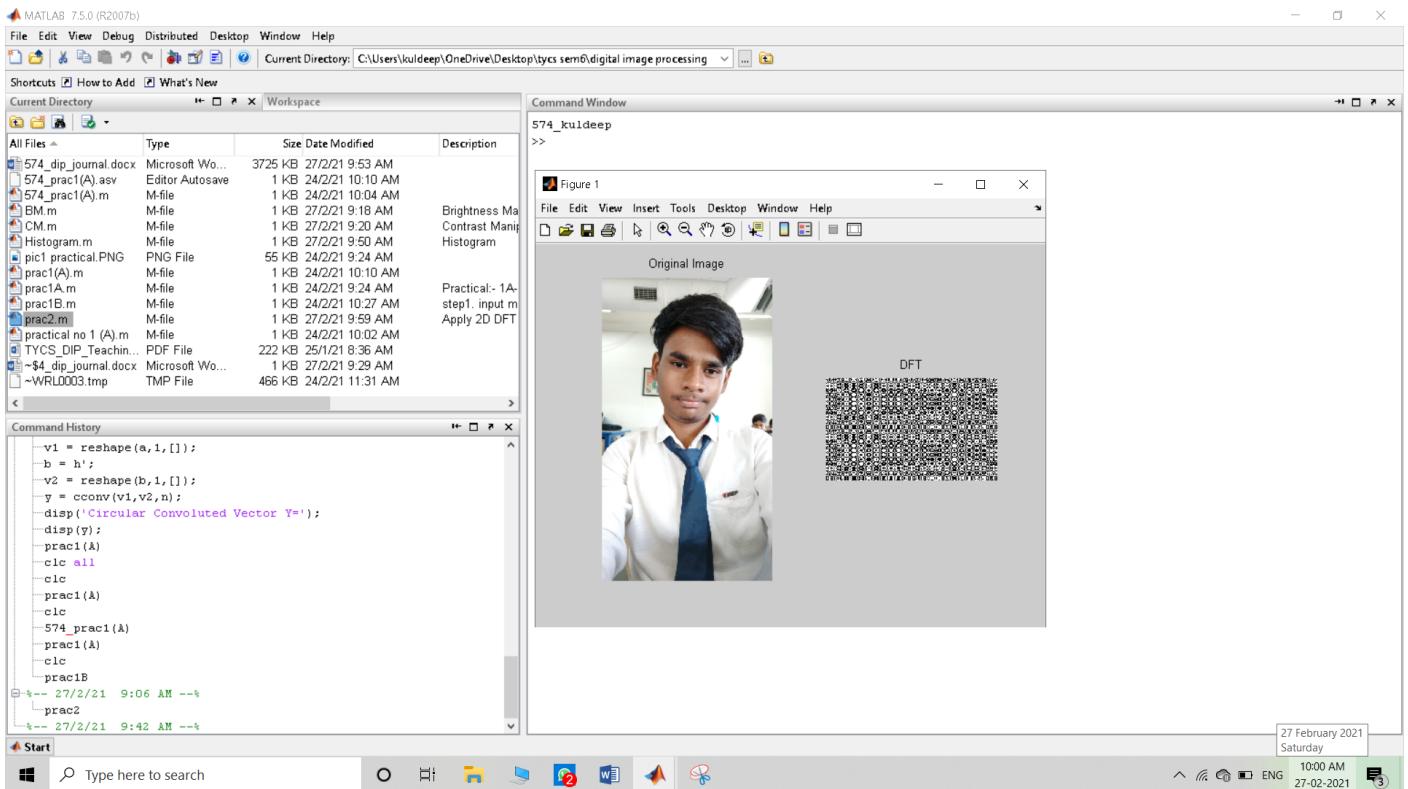
```
>> prac1B
circular convolution with 2 matrices
574_kuldeep Patel
x=
    1    2
    3    4
h=
    5    6
    7    8
lenX =
    2
lenH =
    2
n =
    2
Circular Convolved Vector Y=
    132    128
>>
```

The Current Directory browser shows the following file list:

All Files	Type	Size	Date Modified	Description
574_dip_journal.docx	Microsoft Word Document	235 KB	24/2/21 9:56 AM	
574_prac1(A).asv	Editor Autosave	1 KB	24/2/21 10:10 AM	
574_prac1(A).m	M-file	1 KB	24/2/21 10:04 AM	
BM.m	M-file	1 KB	24/2/21 9:24 AM	Brightness Ma...
CM.m	M-file	1 KB	24/2/21 9:24 AM	Contrast Mani...
Histogram.m	M-file	1 KB	24/2/21 9:24 AM	
pic1 practical.PNG	PNG File	55 KB	24/2/21 9:24 AM	
prac1(A).m	M-file	1 KB	24/2/21 10:10 AM	
prac1A.m	M-file	1 KB	24/2/21 9:24 AM	Practical- 1A...
prac1B.m	M-file	1 KB	24/2/21 10:27 AM	step1_input.m
prac2.m	M-file	1 KB	24/2/21 9:24 AM	Practical 2 - A...
practical no 1 (A).m	M-file	1 KB	24/2/21 10:02 AM	
TYCS_DIP_Teachin.pdf	PDF File	222 KB	25/1/21 8:36 AM	
~\$4_dip_journal.docx	Microsoft Word Document	1 KB	24/2/21 9:16 AM	
~WRL0005.tmp	TMP File	12 KB	24/2/21 8:39 AM	

Practical No. 2**AIM :** Apply DFT on an image**Code :**

```
%Apply 2D DFT on an image
clc;
clear all;
close all;
disp('574_kuldeep')
a=imread('C:\Users\kuldeep\OneDrive\Pictures\Saved Pictures\574kuldeep.jpeg');
img=double(a);
subplot(1,2,1);
imshow(a);
title('Original Image');
[row col]=size(a);
dft1=size(a);
for x=1:row %M
    for y=1:col %N
        b(x,y)=img(x,y)*((-1)^(x+y)); %f(x,y)intensity
    end
end
for x=1:row %M
    for y=1:col %N
        dft1(x,y)=b(x,y)*exp(-1*1i*2*pi*((x*x)/row)+((y*y)/col));
    end
end
subplot(1,2,2);
imshow(real(dft1));
title('DFT');
```

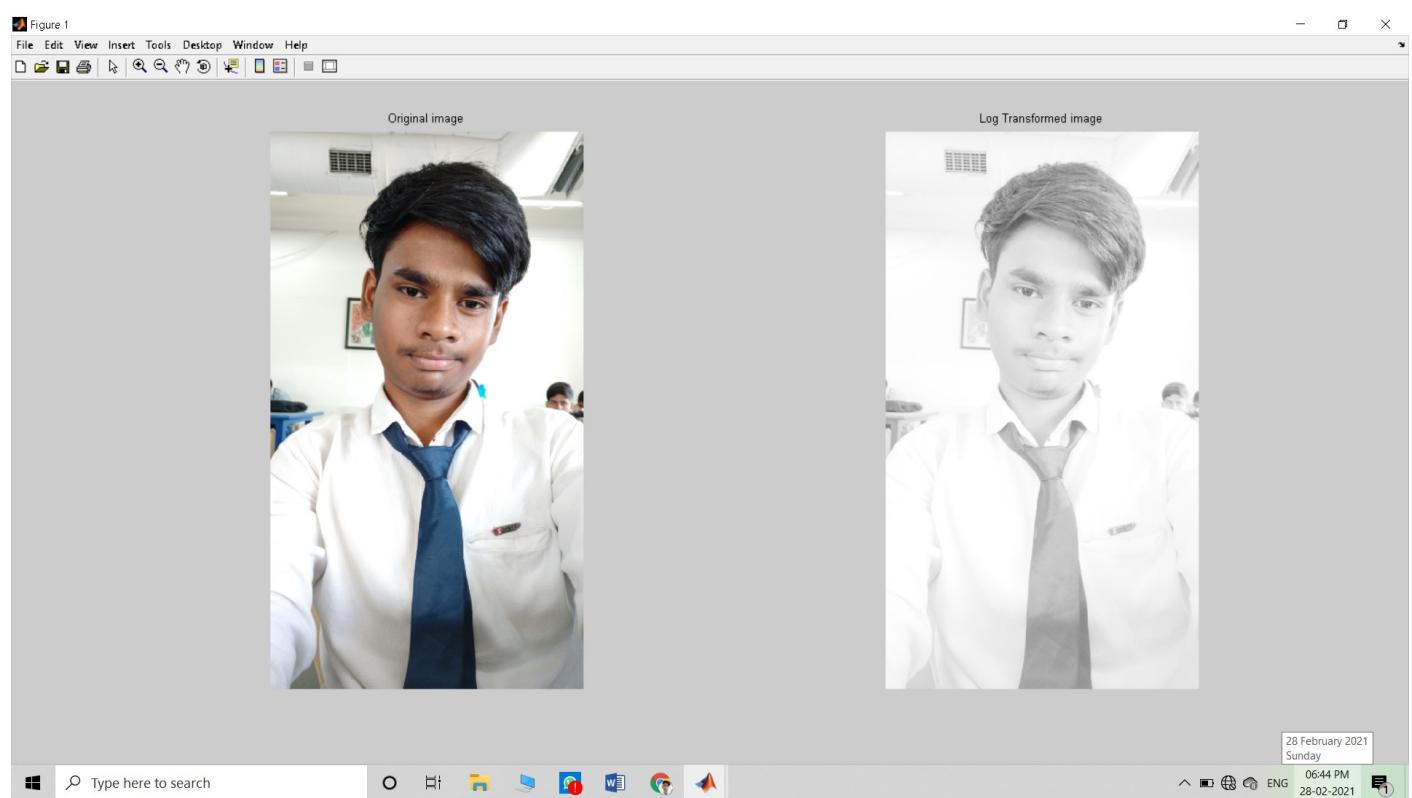
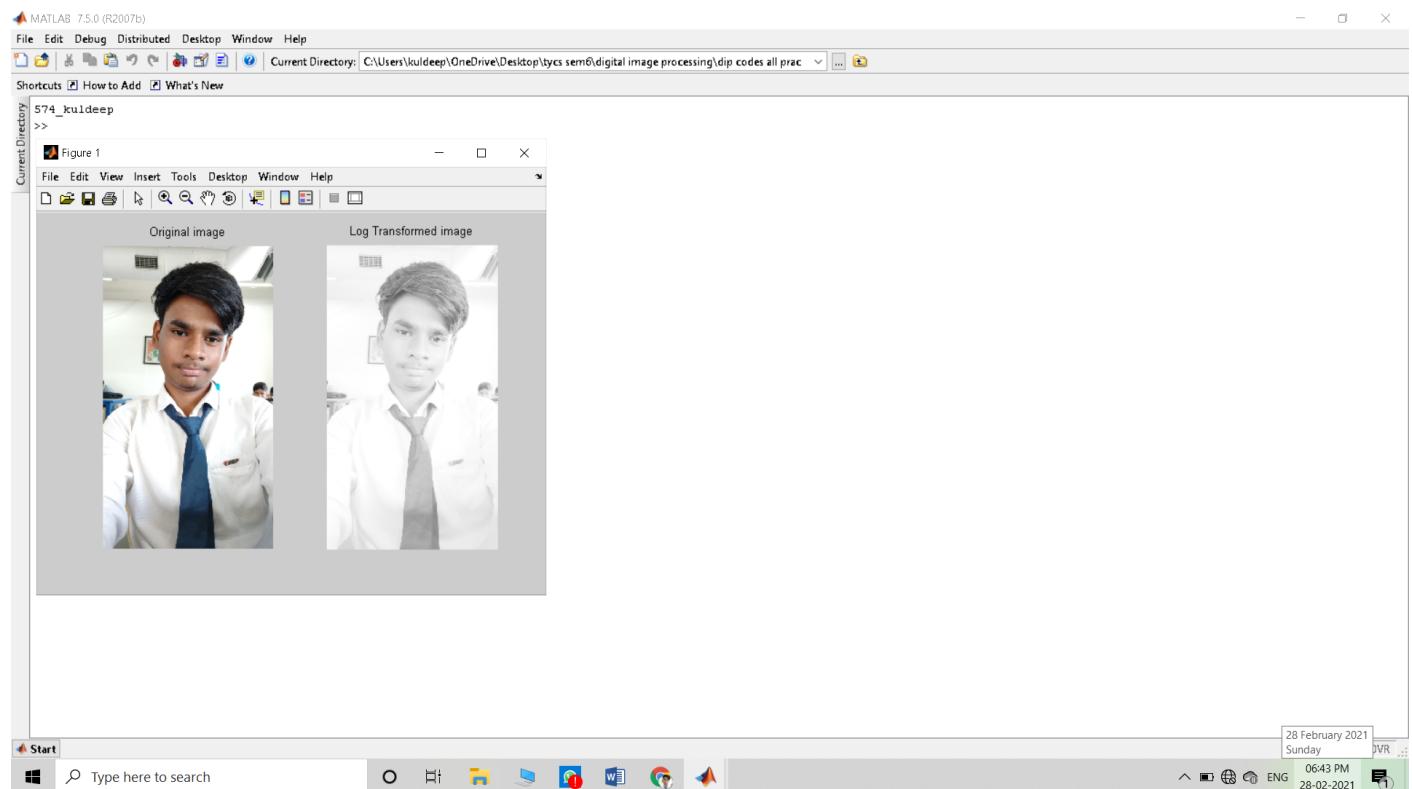
Output :

PRACTICAL NO : 3

AIM : Apply the following Pre-Processing Techniques on an image .

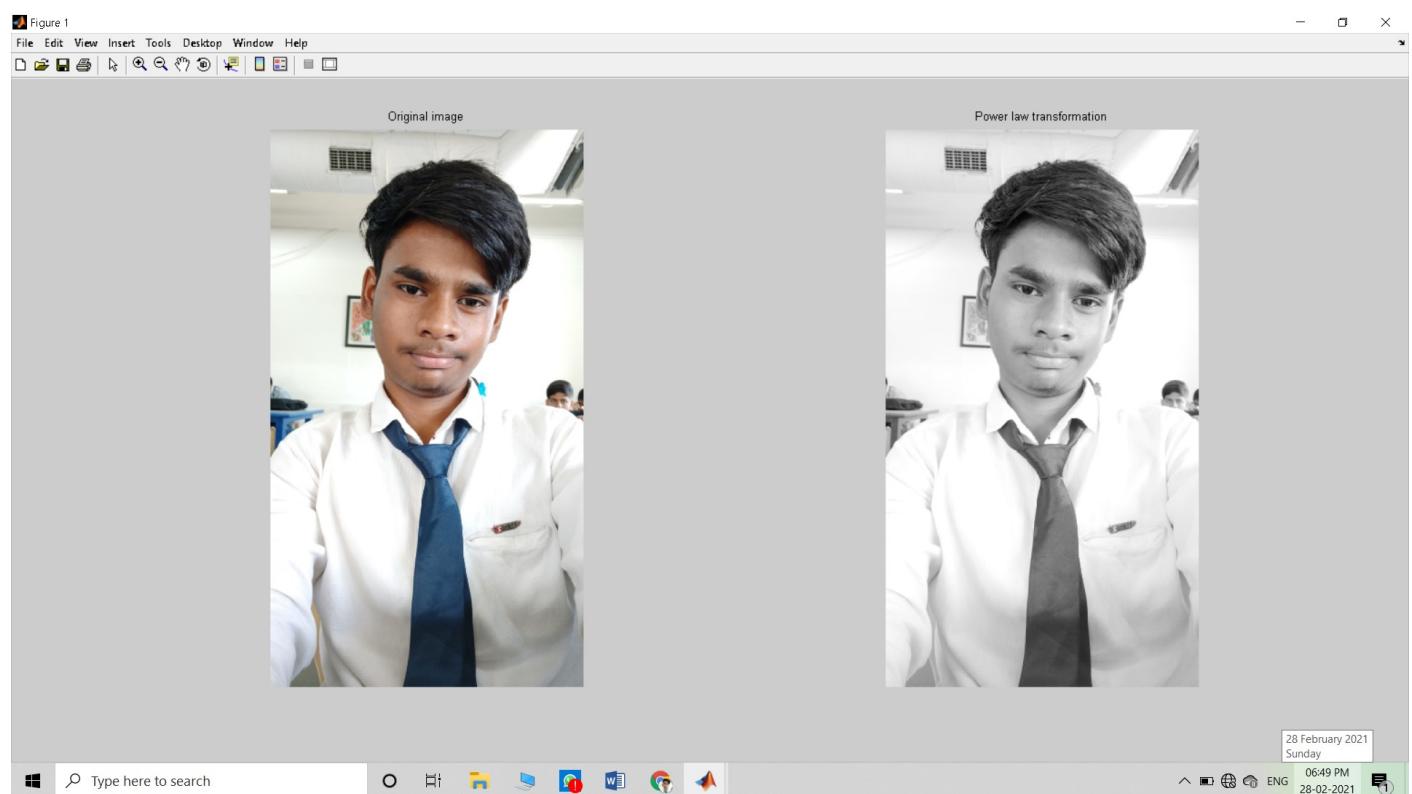
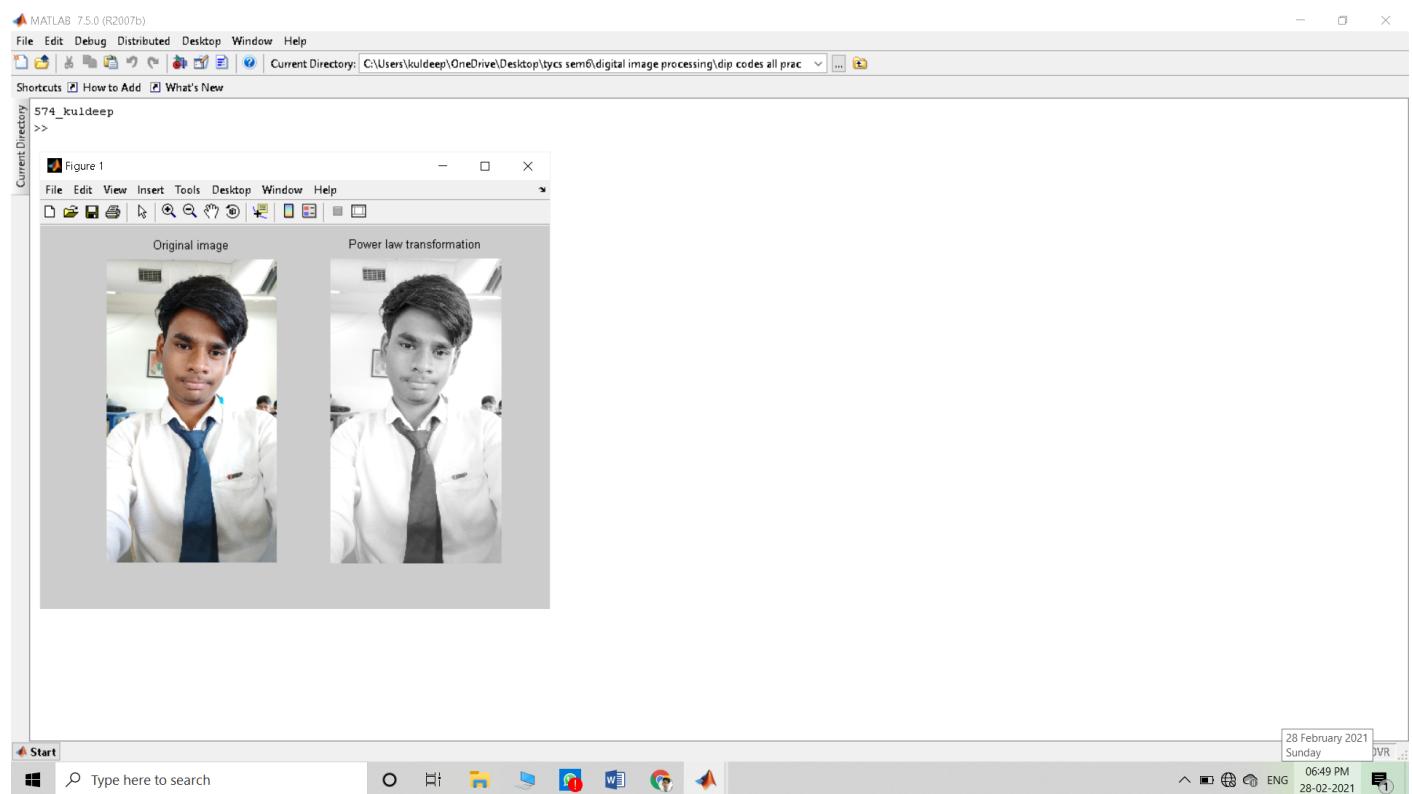
A] Log Transform**CODE :**

```
%practical 3(a) Log Transformend image
close all;
clear all;
clc;
disp('574_kuldeep');
img1=imread('C:\Users\kuldeep\OneDrive\Pictures\Saved Pictures\574kuldeep.jpeg');
img=rgb2gray(img1); %for black and white
subplot(1,2,1);
imshow(img1);
title('Original image');
L=255;
c = L/log10(1+L);
d = c*(log10(1+double(img)));
a = uint8(d);
subplot(1,2,2)
imshow(uint8(a));
title('Log Transformed image');
```

output :

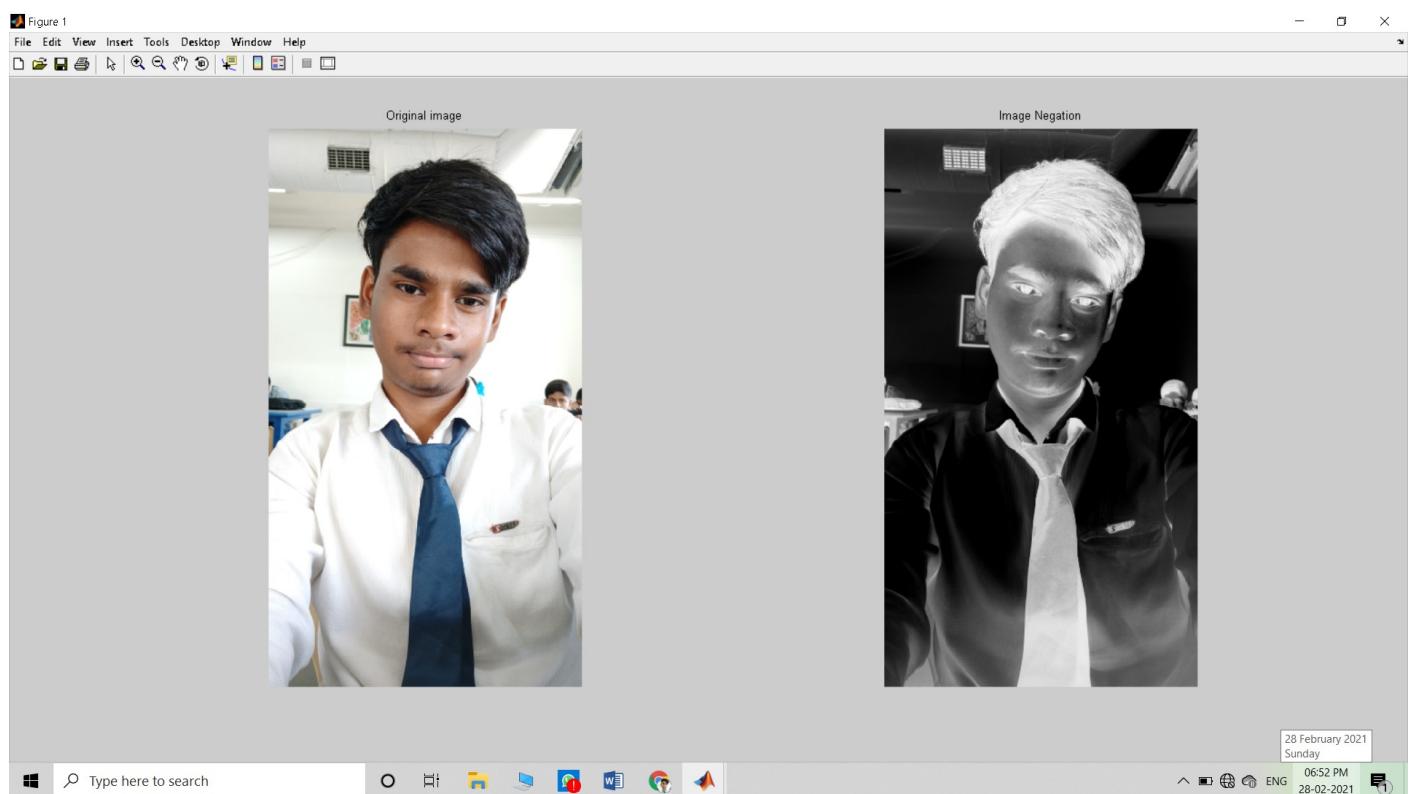
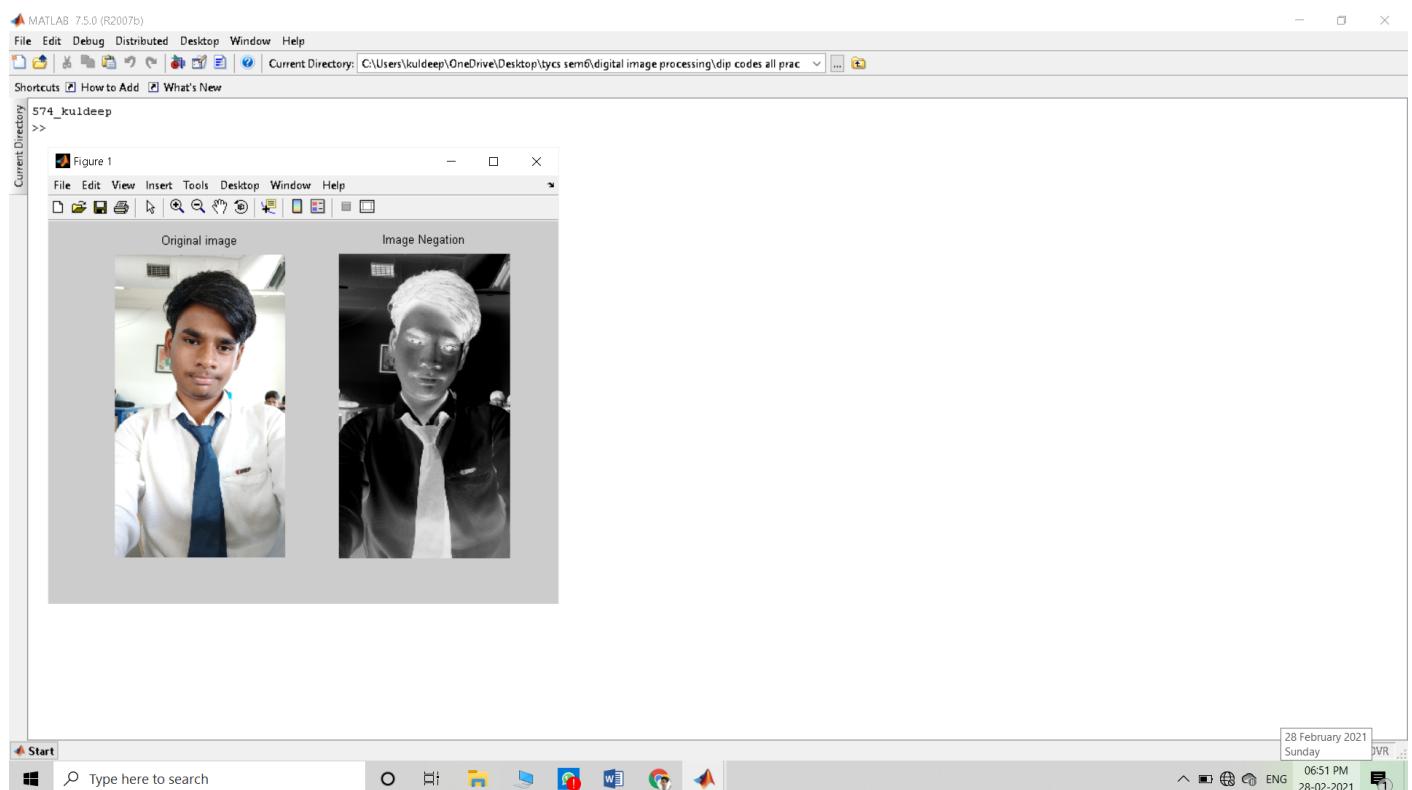
B] Power Law Transform**CODE :**

```
%practical 3(b) power low transformation
close all;
clear all;
clc;
disp('574_kuldeep');
title('kuldeep');
img1=imread('C:\Users\kuldeep\OneDrive\Pictures\Saved Pictures\574kuldeep.jpeg');
img=rgb2gray(img1); %for black an white
subplot(1,2,1);
imshow(img1);
title('Original image');
s=size(img);
c=1;
img=double(img);
gamma=0.5;
for x=1:s(1) %row
for y=1:s(2) %column
j(x,y)=c*(img(x,y)^gamma);
end
end
subplot(1,2,2);
imshow(j,[])
title('Power law transformation')
```

output :

C] image negation**Code:**

```
%practical 3(c) image negation
close all;
clear all;
clc;
disp('574_kuldeep');
img1=imread('C:\Users\kuldeep\OneDrive\Pictures\Saved Pictures\574kuldeep.jpeg');
img=rgb2gray(img1); %for black an white
subplot(1,2,1);
imshow(img1);
title('Original image');
s=size(img);
for x=1:s(1) %row
for y=1:s(2) %column
img_neg(x,y)=255-img(x,y);
end
end
img_ne=uint8(img_neg);
subplot(1,2,2);
imshow(img_ne);
title('Image Negation')
```

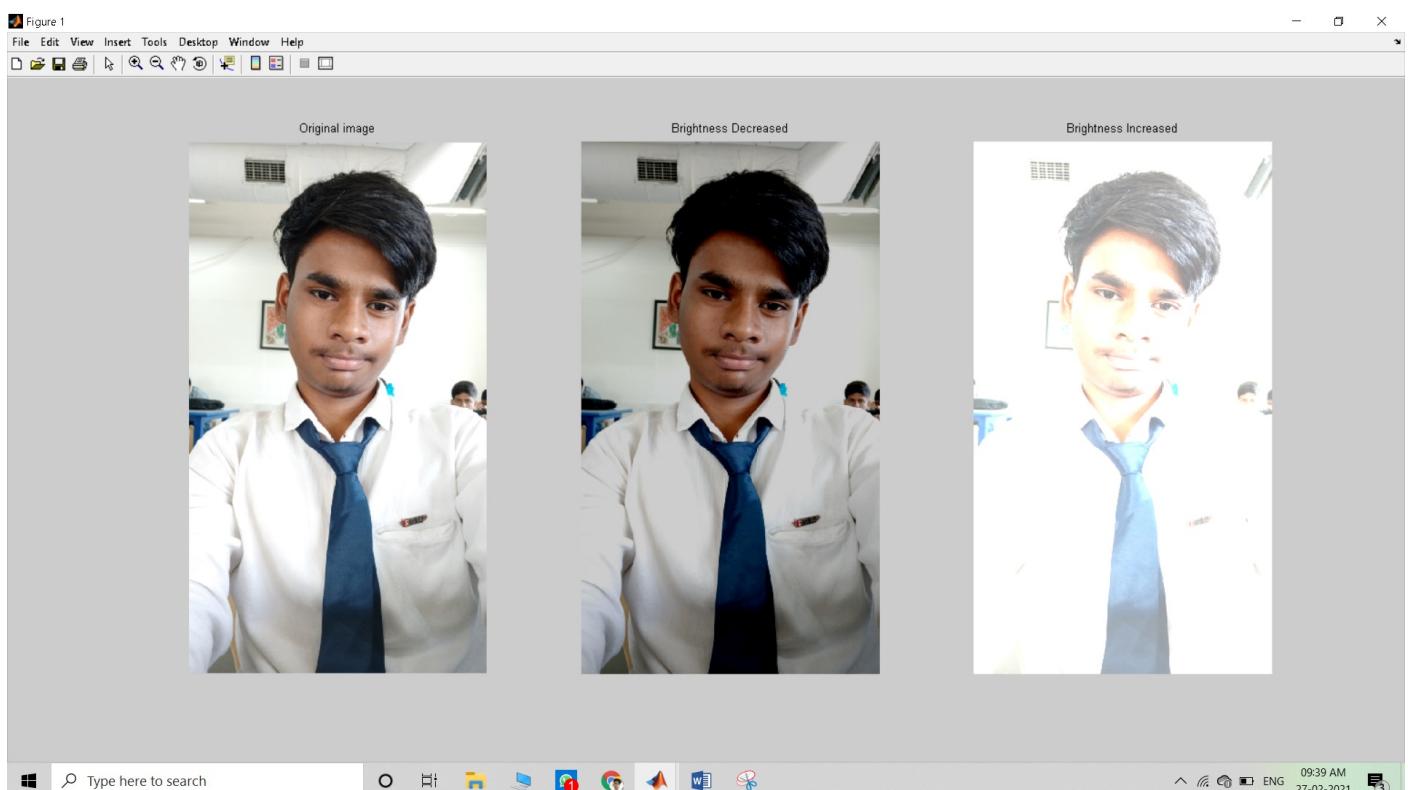
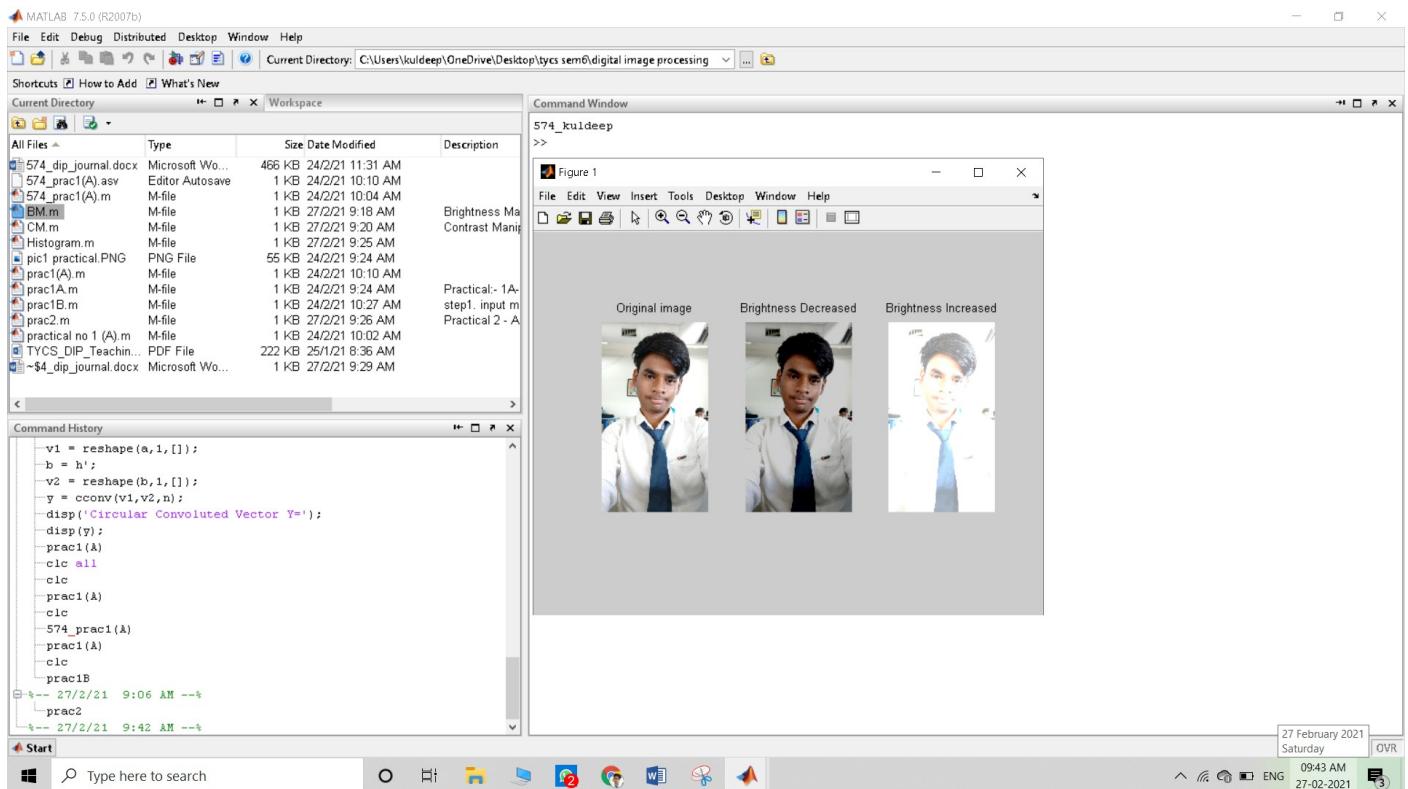
Output :

PRACTICAL NO : 4

AIM : Apply the following Image Enhancement Techniques on an Image .

A] Brightness manipulation**Code :**

```
%practical 4(a) Brightness Increased
close all;
clear all;
clc;
disp('574_kuldeep');
img1=imread('C:\Users\kuldeep\OneDrive\Pictures\Saved Pictures\574kuldeep.jpeg');
%img = rgb2gray(img1);
subplot(1,3,1);
imshow(img1);
title('Original Image');
B=double(img1)-140;
subplot(1,3,2);
imshow(uint8(B))
title('Brightness Decreased');
B=double(img1)+140;
subplot(1,3,3);
imshow(uint8(B))
title('Brightness Increased');
```

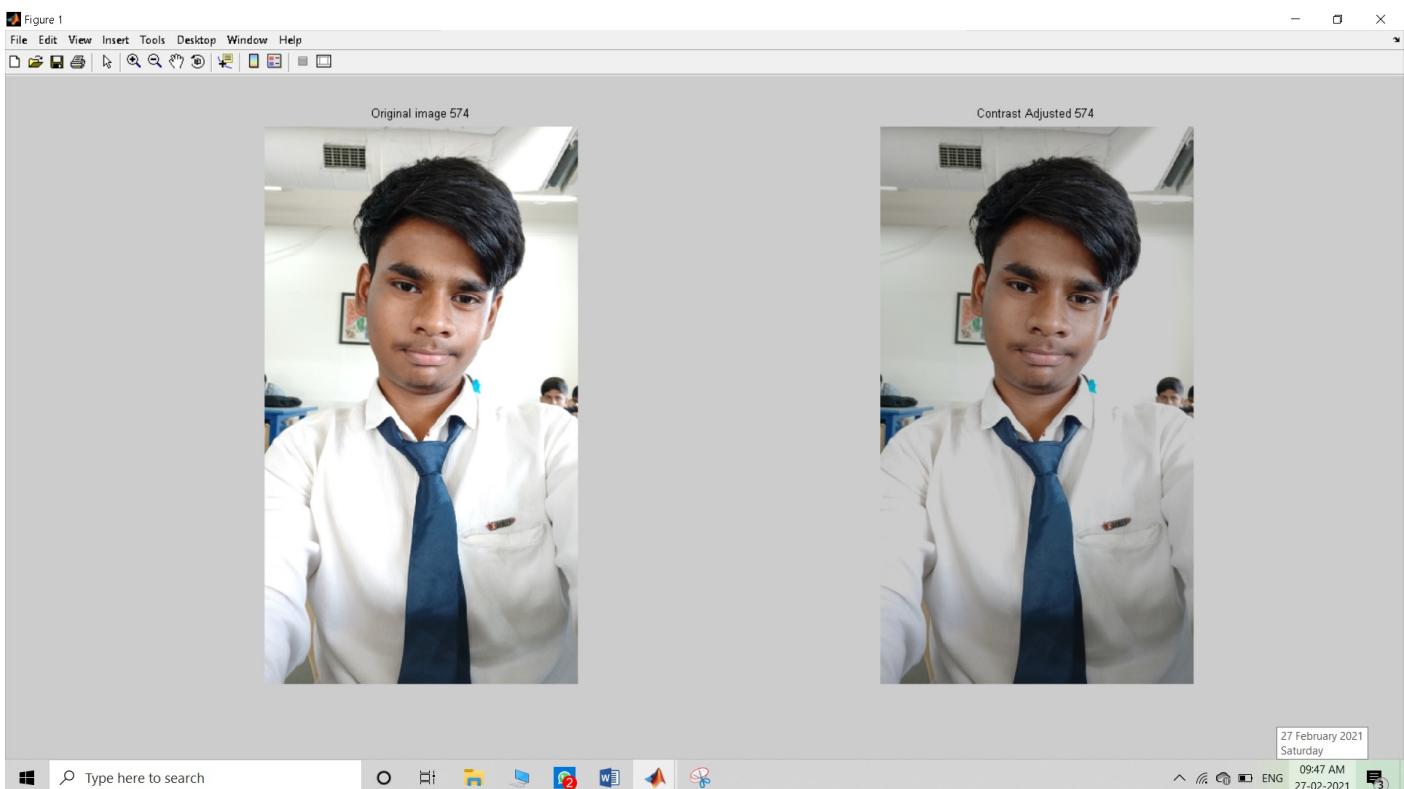
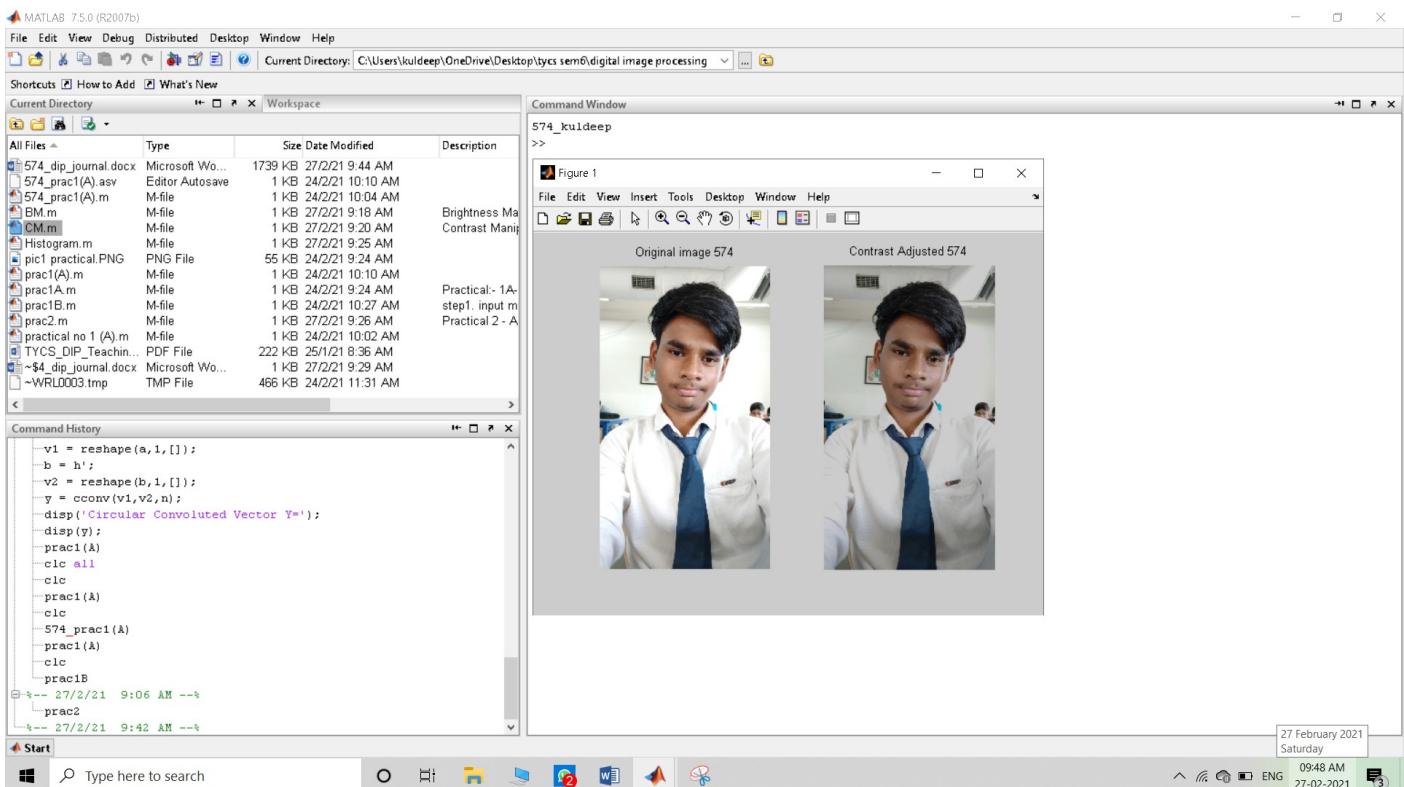
Output :

B] Contrast Stretching

Code :

```
%practical 4(b) contrast adjusted
close all;
clear all;
clc;
disp('574_kuldeep');
img1=imread('C:\Users\kuldeep\OneDrive\Pictures\Saved Pictures\574kuldeep.jpeg');
%img = rgb2gray(img1);
subplot(1,2,1);
imshow(img1);
title('Original Image');
B=double(img1)*(4);
subplot(1,2,2)
imshow(uint8(B))
title('Contrast Adjusted')
```

Output :

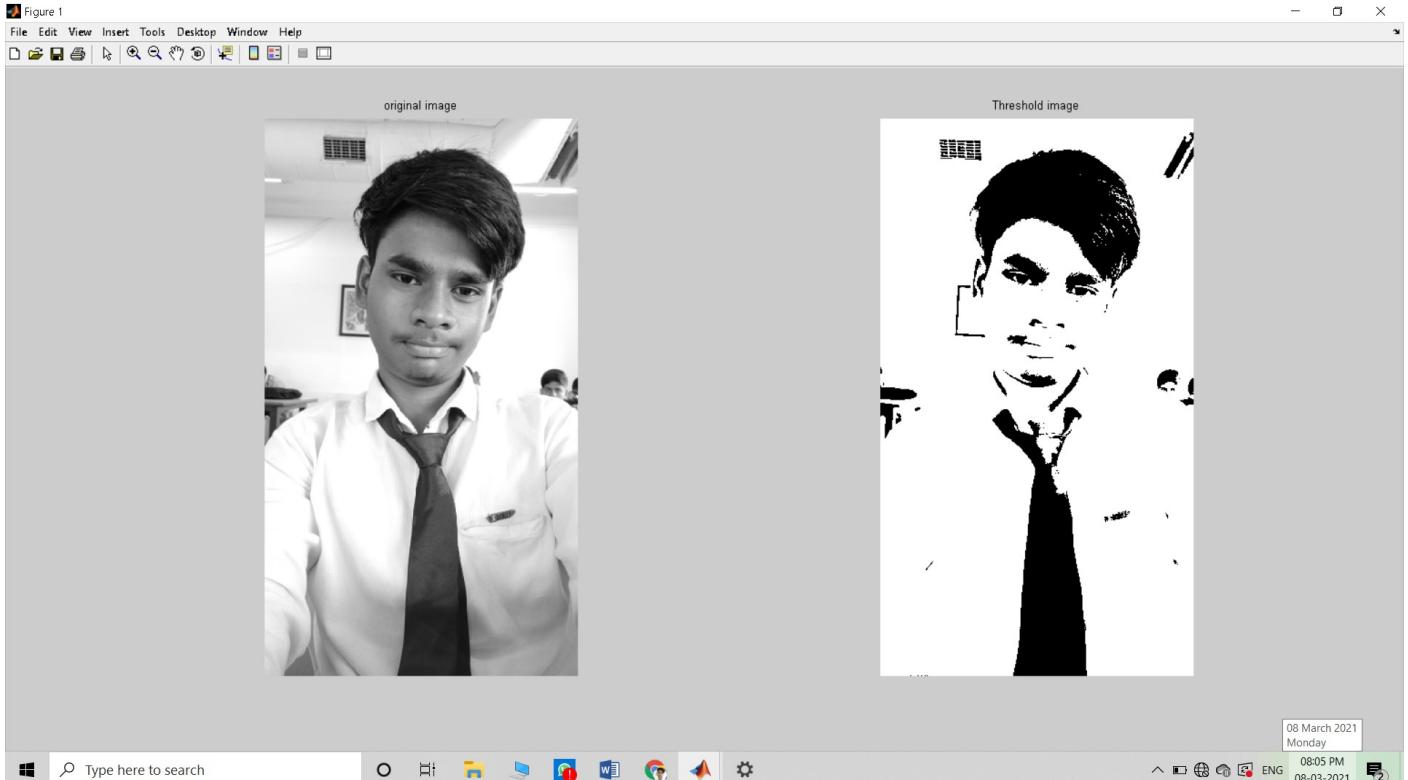
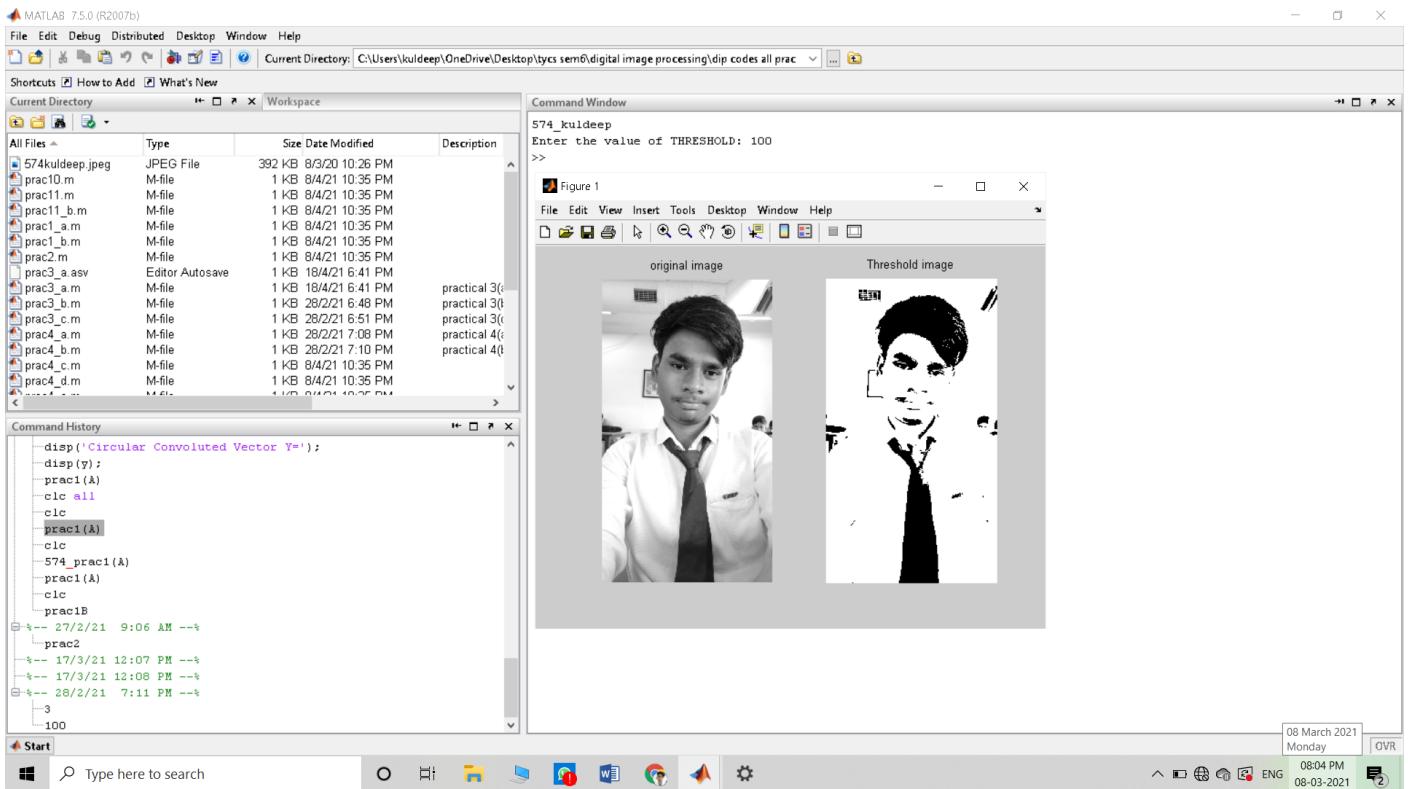


C] Thresholding

Code :

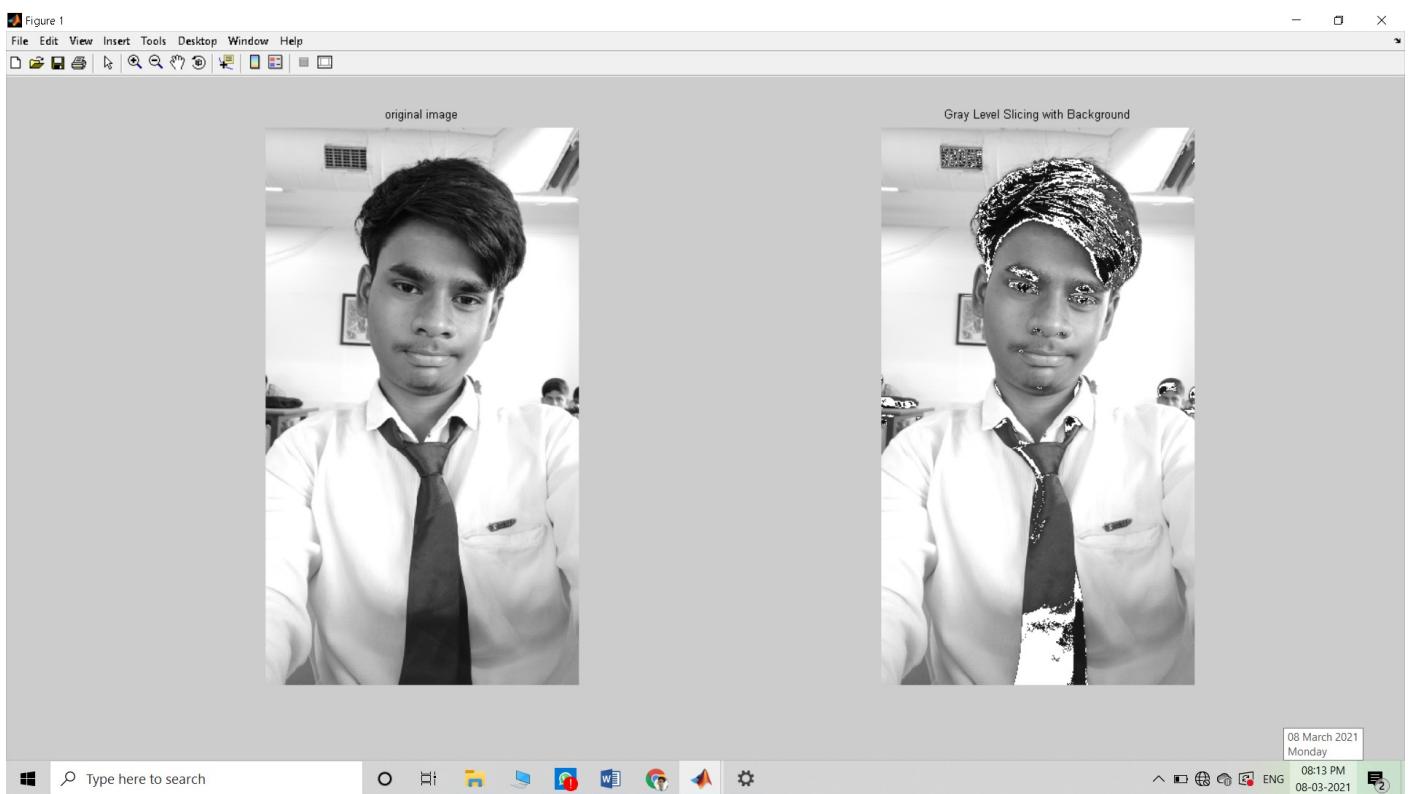
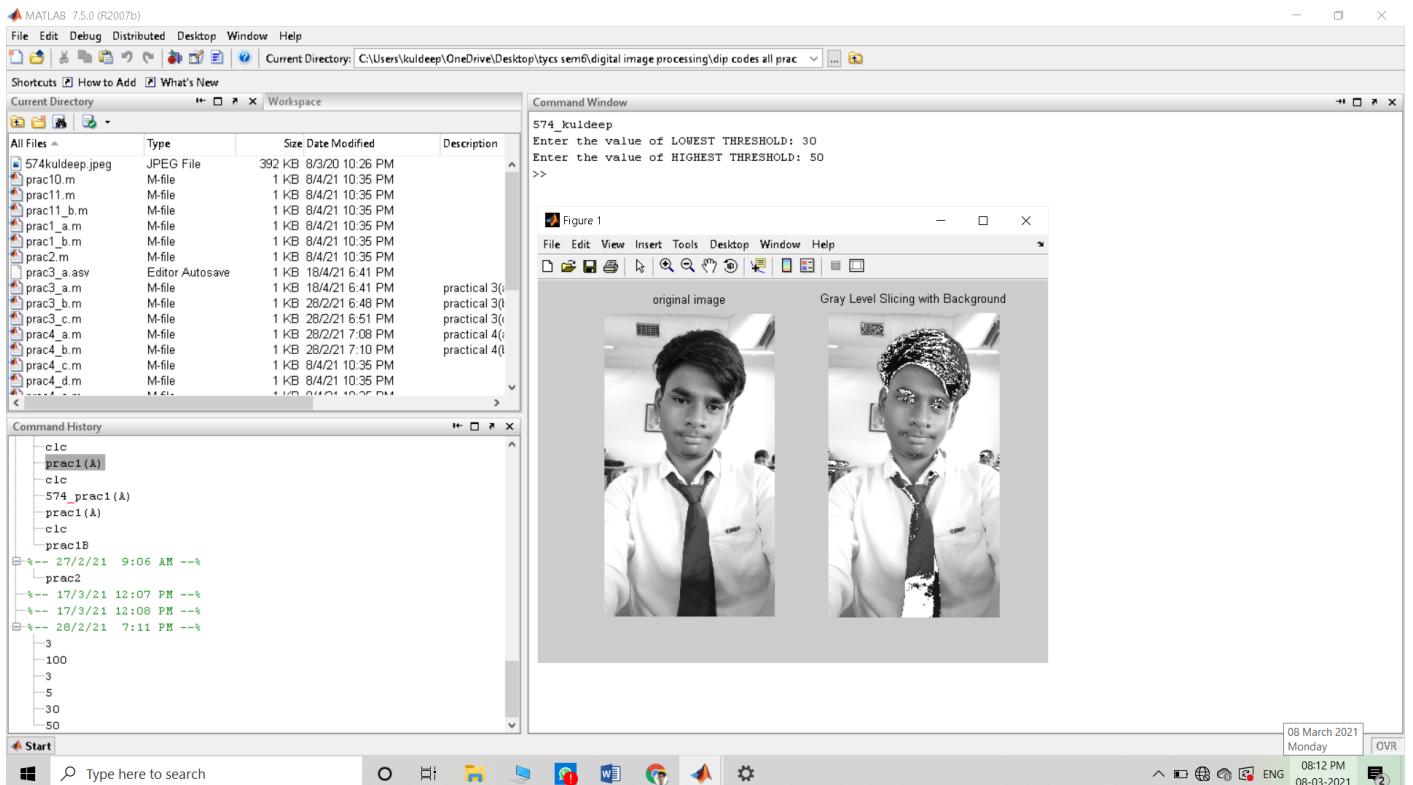
```
%practical 3(c) thresholding
clc;
close all;
clear all;
disp('574_kuldeep');
p=imread('C:\Users\kuldeep\OneDrive\Pictures\Saved Pictures\574kuldeep.jpeg');
p1=rgb2gray(p);
subplot(1,2,1)
imshow(p1);
title('original image')
T=input('Enter the value of THRESHOLD: '); % range - 0 to 255 %
[row col]=size(p1);
for x=1:row
    for y=1:col
        if((p1(x,y)<T)) %if((p1(x,y)<50))
            p1(x,y)=0;
        else
            p1(x,y)=255;
        end;
    end;
end;
subplot(1,2,2)
imshow(p1);
title('Threshold image')
```

Output :



D] Gray Level Slicing (With Background)**Code :**

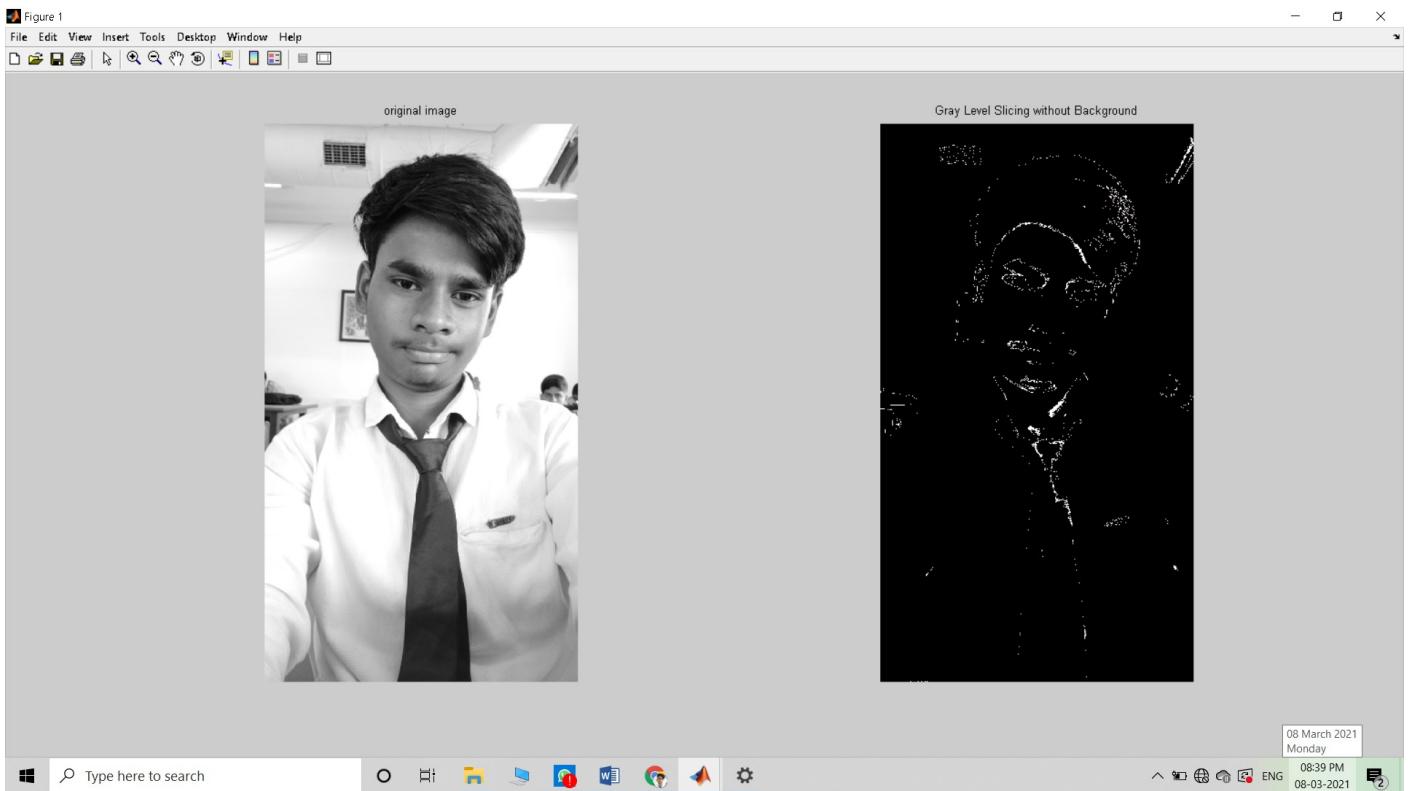
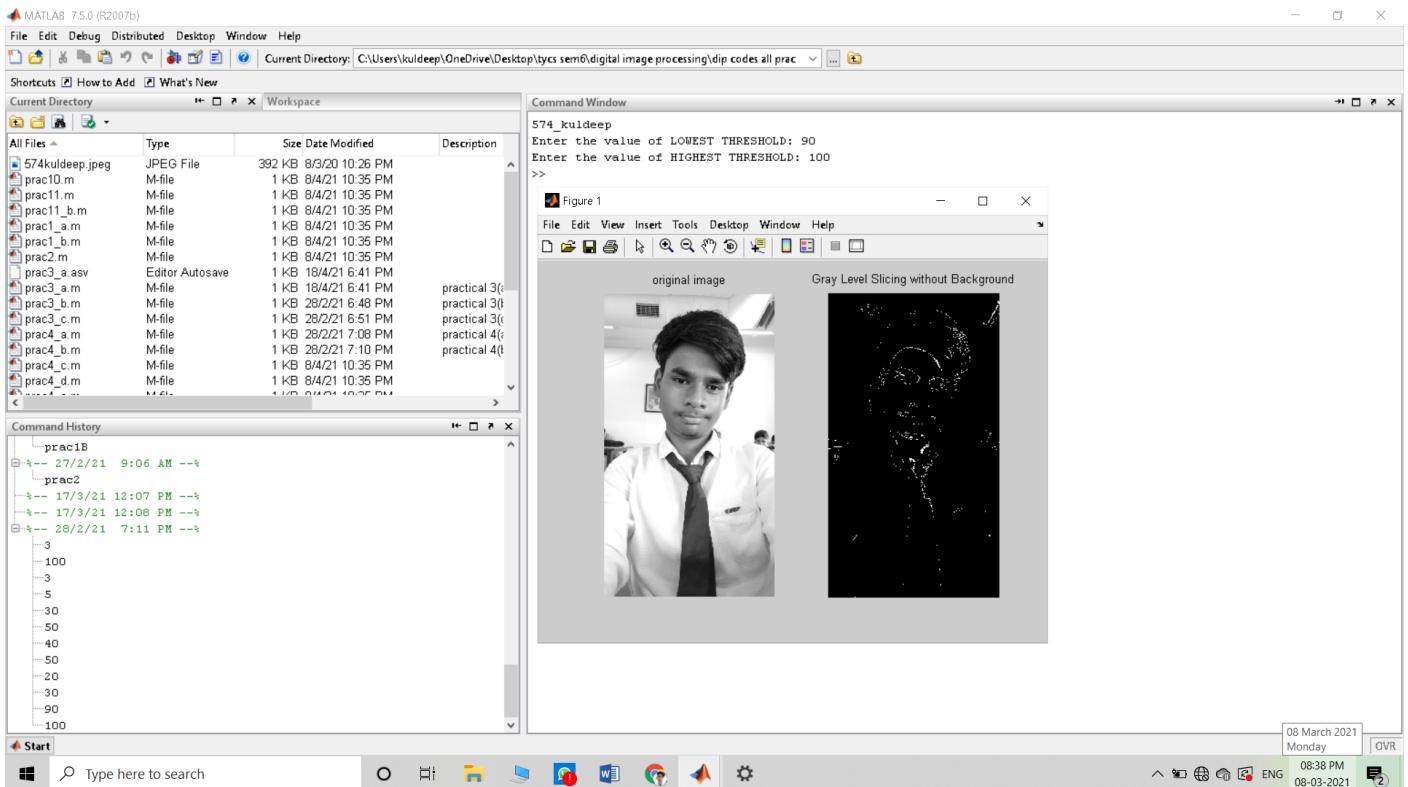
```
%practical 4(d) gray level slicing(with backgroung)
clc;
close all;
clear all;
disp('574_kuldeep');
i=imread('C:\Users\kuldeep\OneDrive\Pictures\Saved Pictures\574kuldeep.jpeg');
img=rgb2gray(i);
subplot(1,2,1)
imshow(img);
j=double(img);
[row col]=size(j);
title('original image')
T1=input('Enter the value of LOWEST THRESHOLD: ');
T2=input('Enter the value of HIGHEST THRESHOLD: ');
for x=1:1:row
    for y=1:1:col
        if(j(x,y)>T1 && (j(x,y)<T2))
            j(x,y)=255;
        else
            j(x,y)=img(x,y);
        end
    end
end
subplot(1,2,2)
imshow(uint8(j));
title('Gray Level Slicing with Background')
```

Output :

E] Gray Level Slicing (without background)**Code :**

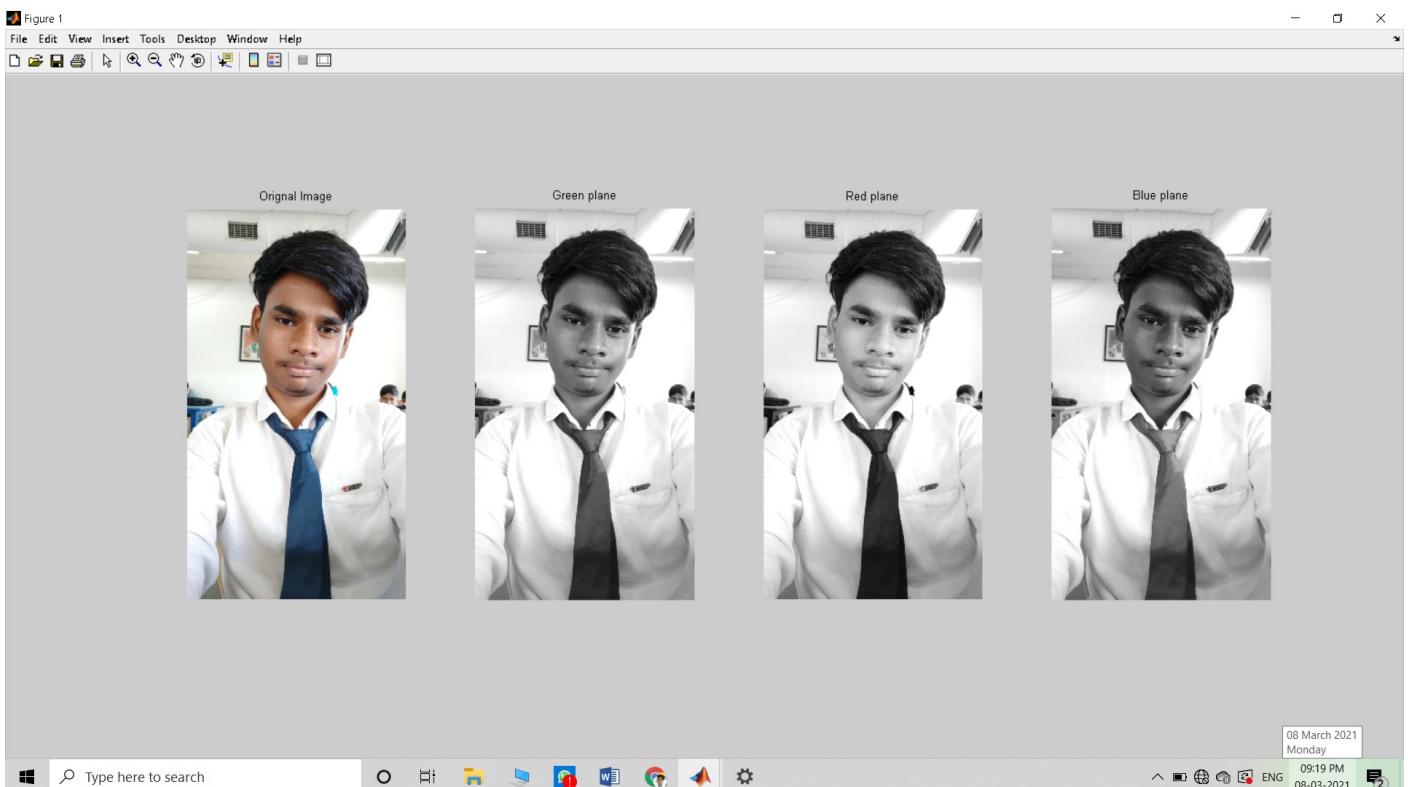
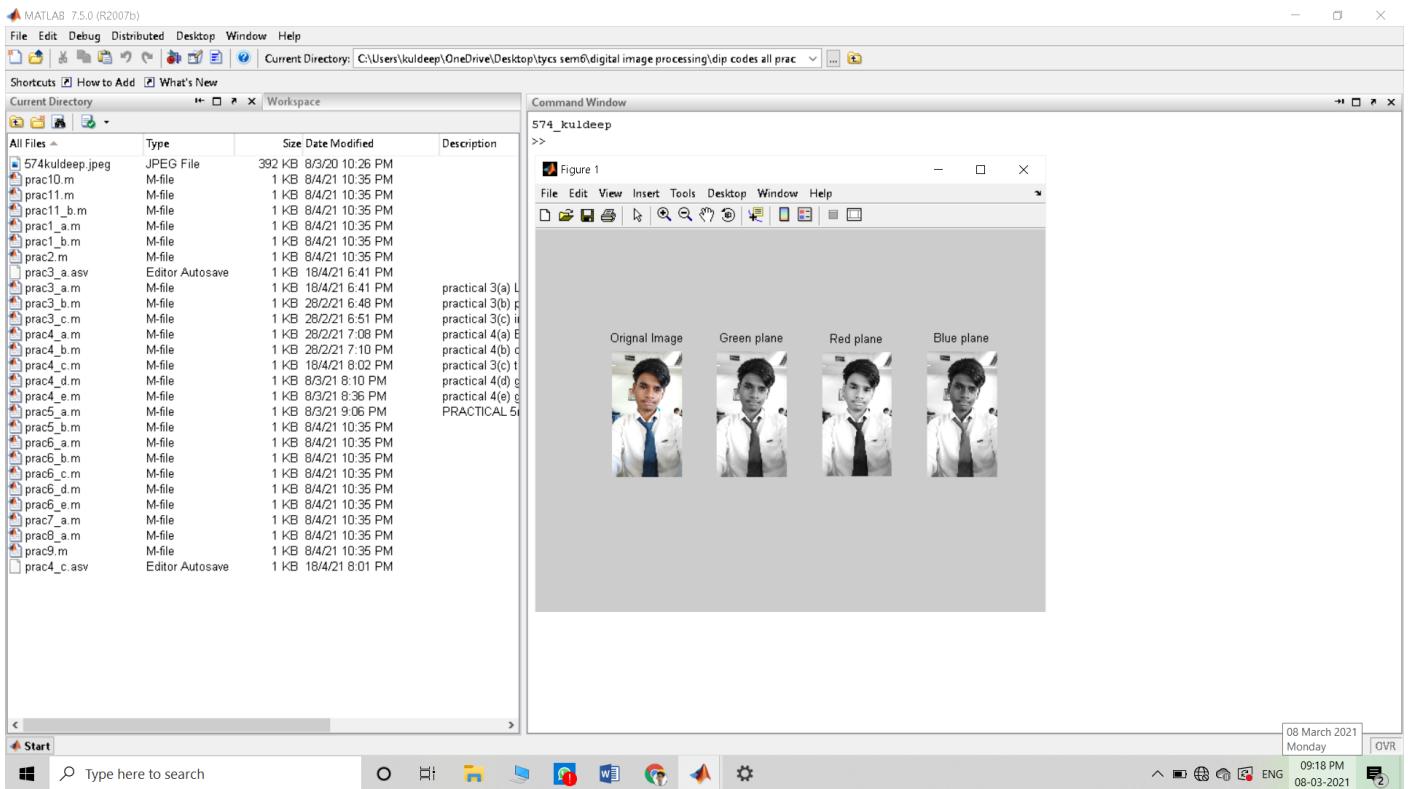
```
%practical 4(e) gray level slicing (without background)
clc;
close all;
clear all;
disp('574_kuldeep');
i=imread('C:\Users\kuldeep\OneDrive\Pictures\Saved Pictures\574kuldeep.jpeg');
img=rgb2gray(i);
subplot(1,2,1);
imshow(img);
j=double(img);
[row col]=size(j);
title('original image')
T1=input('Enter the value of LOWEST THRESHOLD: ');
T2=input('Enter the value of HIGHEST THRESHOLD: ');
for x=1:1:row
    for y=1:1:col
        if(j(x,y)>T1 && (j(x,y)<T2))
            j(x,y)=255;
        else
            j(x,y)=0;
        end
    end
end
subplot(1,2,2)
imshow(uint8(j));
title('Gray Level Slicing without Background')
```

Output :



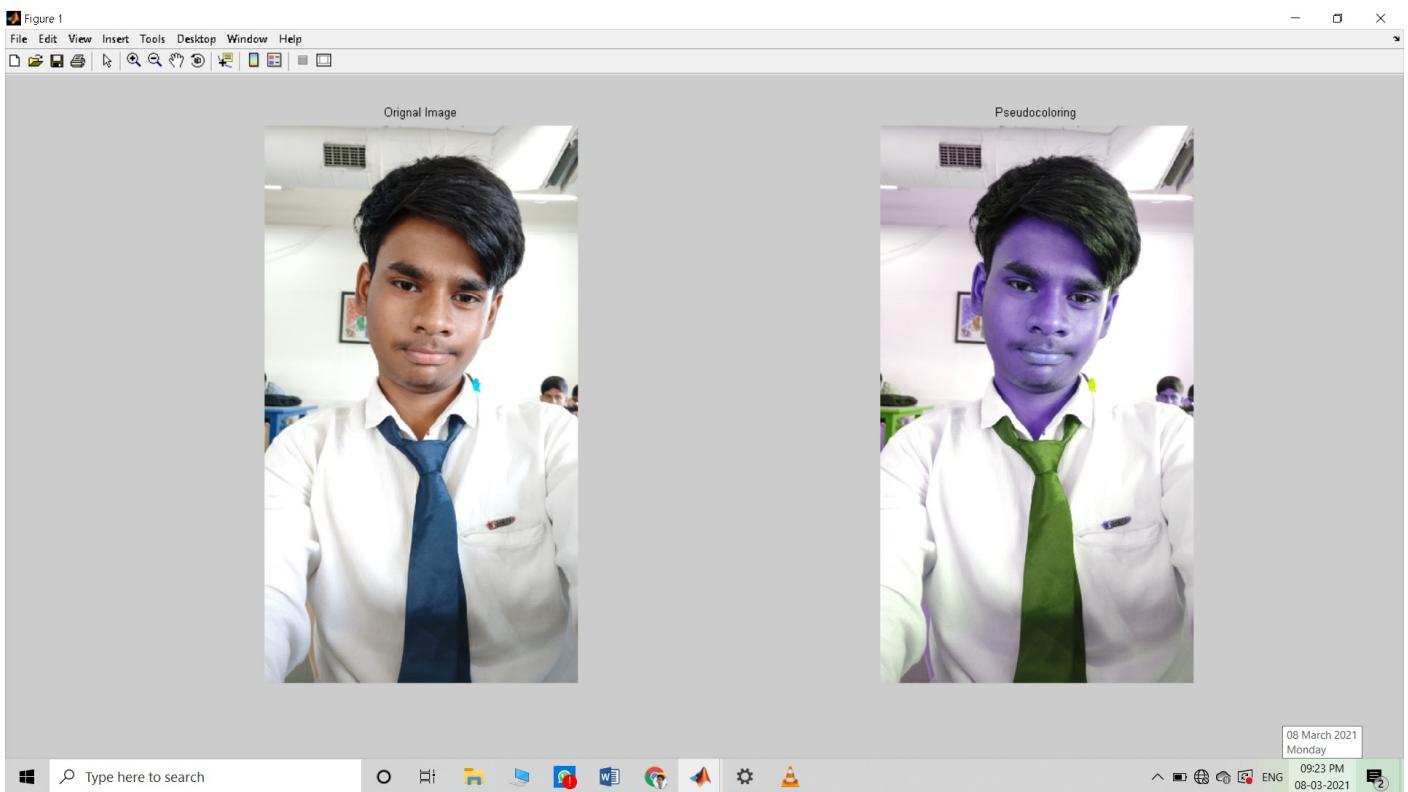
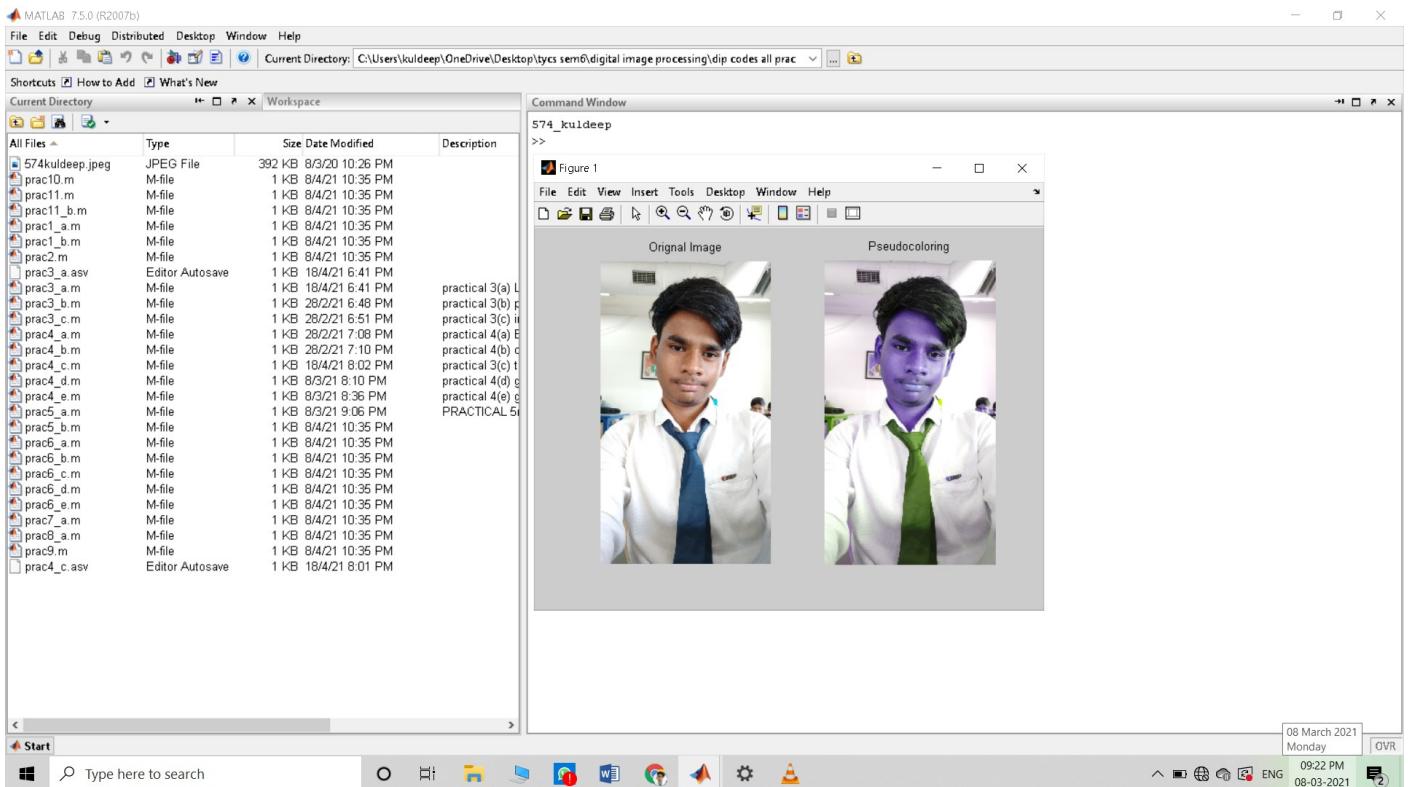
PRACTICAL NO : 5**AIM :** Color Image Processing – 1**A] Splitting RGB Planes****CODE :**

```
%PRACTICAL 5(A) splitting RGB planes
close all;
clear all;
clc;
disp ('574_kuldeep');
img=imread('C:\Users\kuldeep\OneDrive\Pictures\Saved Pictures\574kuldeep.jpeg');
subplot(1,4,1);
imshow(img);
title('Orignal Image')
s=size(img);
redp=img(:,:,1);
greenp=img(:,:,2);
bluep=img(:,:,3);
subplot(1,4,2);
imshow(greenp);
title('Green plane');
subplot(1,4,3);
imshow(redp);
title('Red plane');
subplot(1,4,4);
imshow(bluep);
title('Blue plane');
```

OUTPUT :

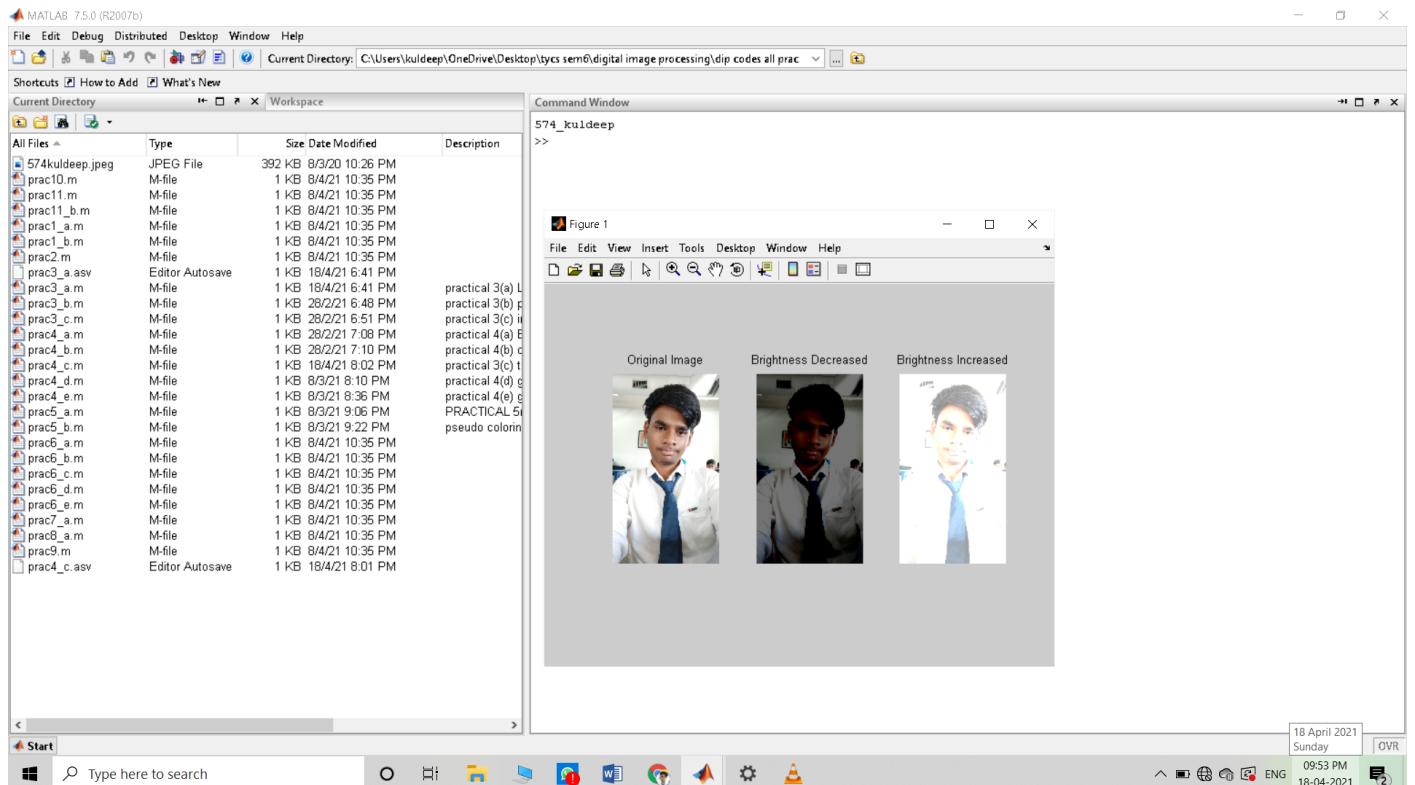
B] Pseudo Coloring**Code :**

```
%pseudo coloring
close all;
clear all;
clc;
disp ('574_kuldeep');
img=imread('C:\Users\kuldeep\OneDrive\Pictures\Saved Pictures\574kuldeep.jpeg');
subplot(1,2,1);
imshow(img);
title('Original Image')
s=size(img);
redp=img(:,:,1);
greenp=img(:,:,2);
bluep=img(:,:,3);
OP(:,:,1)=greenp;
OP(:,:,2)=bluep;
OP(:,:,3)=redp;
subplot(1,2,2);
imshow(OP);
title('Pseudocoloring')
```

Output :

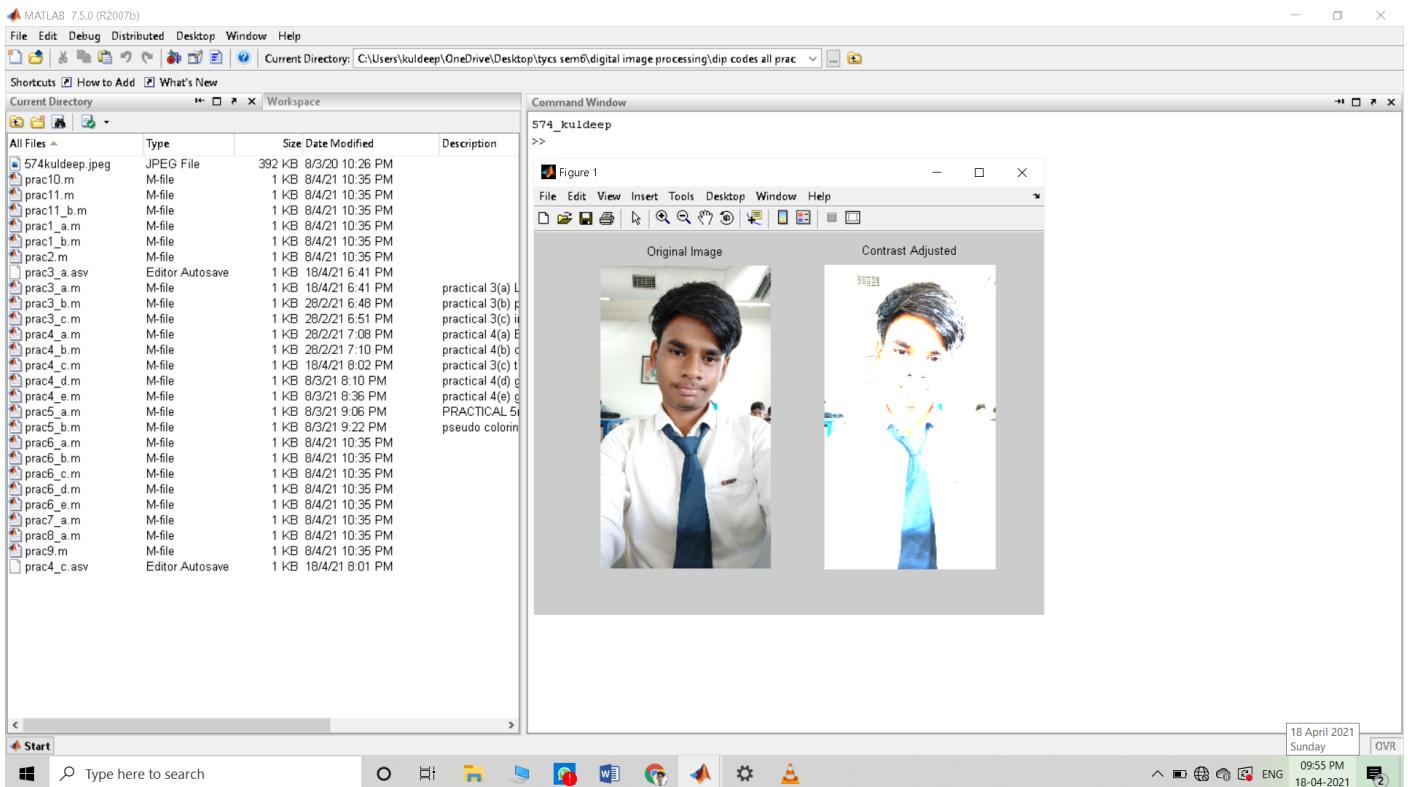
PRACTICAL NO : 6**AIM : COLOR IMAGE PROCESSING – 2****A] Brightness Adjustment****CODE :**

```
%prctical 6(a) Brightness Adjustment
close all;
clear all;
clc;
disp('574_kuldeep');
img1=imread('C:\Users\kuldeep\OneDrive\Pictures\Saved Pictures\574kuldeep.jpeg');
subplot(1,3,1); imshow(img1); title('Original Image');
B=double(img1)-140; subplot(1,3,2); imshow(uint8(B))
title('Brightness Decreased');
B=double(img1)+140; subplot(1,3,3); imshow(uint8(B))
title('Brightness Increased');
```

OUTPUT :

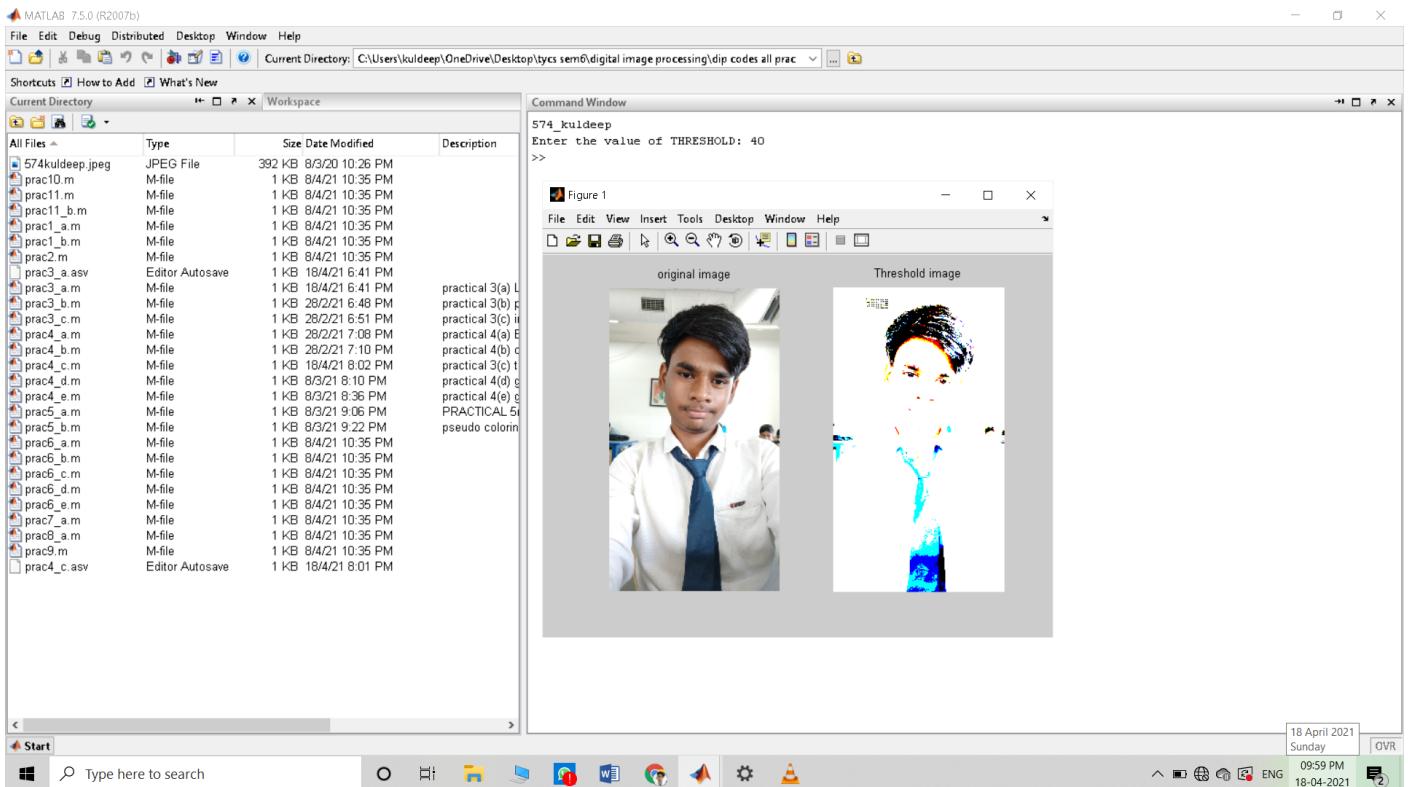
B] CONTRAST STRETCHING**CODE :**

```
%practical 6(b)CONTRAST STRETCHING
close all;
clear all;
clc;
disp('574_kuldeep');
img1=imread('C:\Users\kuldeep\OneDrive\Pictures\Saved Pictures\574kuldeep.jpeg');
subplot(1,2,1);
imshow(img1);
title('Original Image');
B=double(img1)*(4);
subplot(1,2,2)
imshow(uint8(B))
title('Contrast Adjusted')
```

OUTPUT :

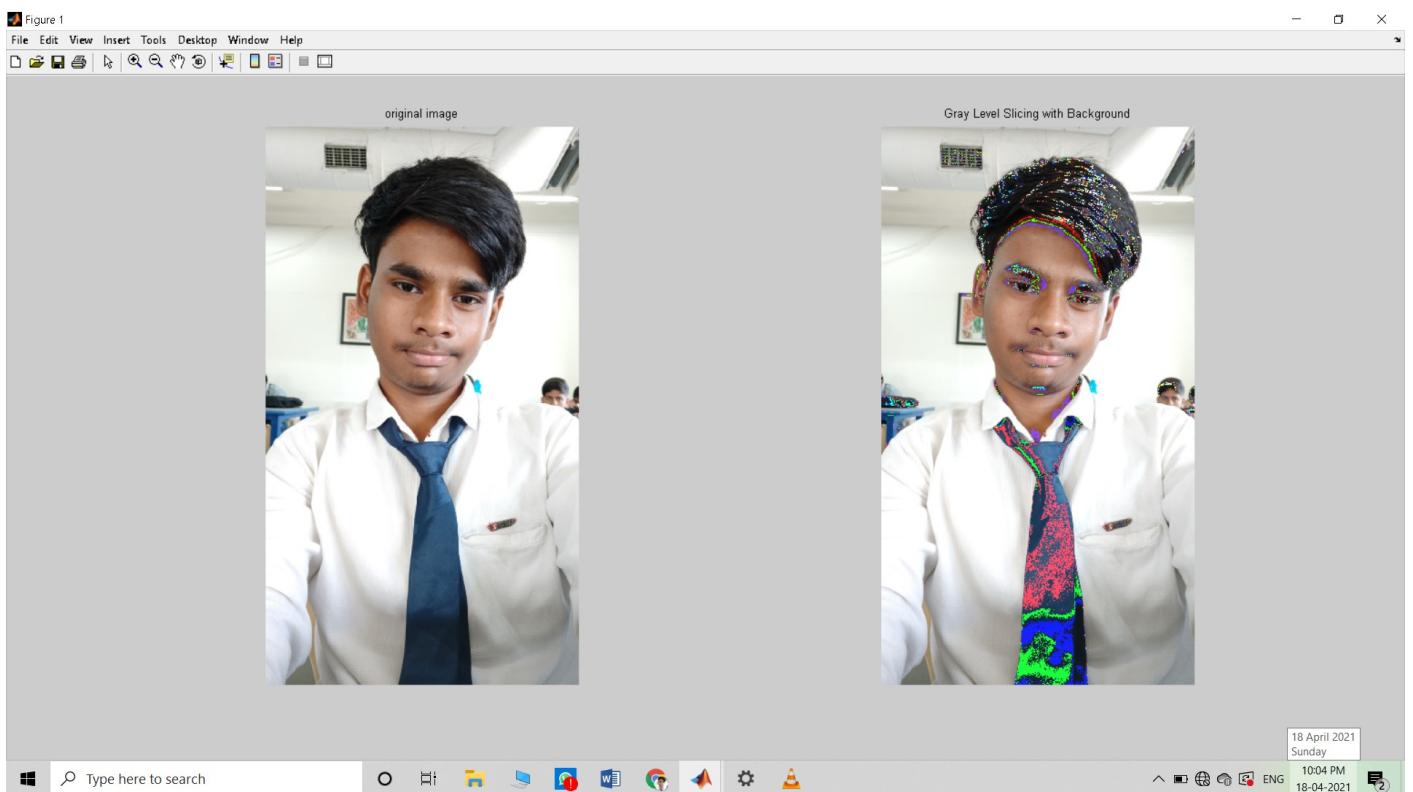
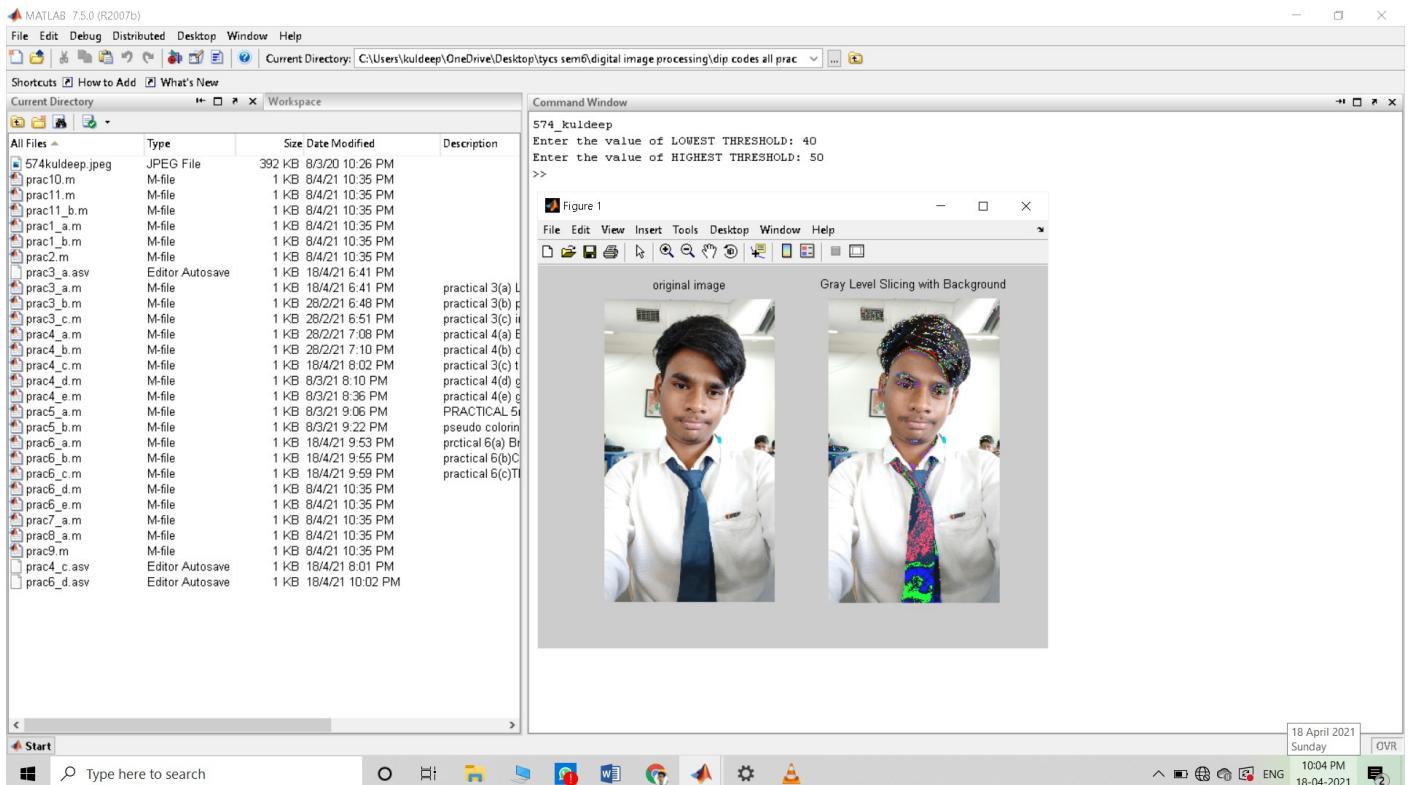
C] THRESHOLDING**CODE :**

```
%practical 6(c)THRESHOLDING
clc;
close all;
clear all;
disp('574_kuldeep');
p=imread('C:\Users\kuldeep\OneDrive\Pictures\Saved Pictures\574kuldeep.jpeg');
subplot(1,2,1)
imshow(p);
title('original image')
T=input('Enter the value of THRESHOLD: '); % range - 0 to 255 %
[row col]=size(p);
for x=1:row
for y=1:col
if((p(x,y)<T)) %if((p1(x,y)<50))
p(x,y)=0;
else
p(x,y)=255;
end;
end;
end;
subplot(1,2,2)
imshow(p);
title('Threshold image')
```

OUTPUT :

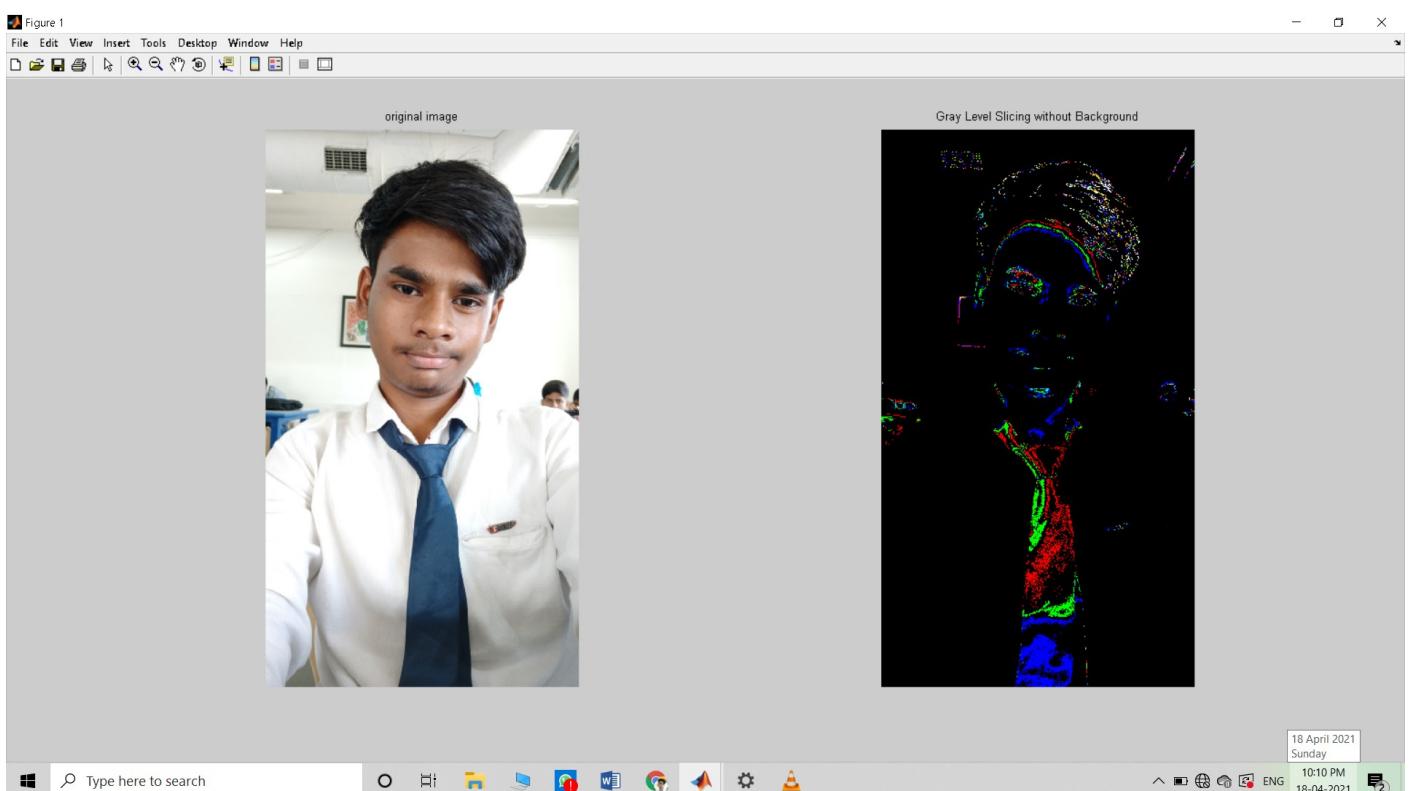
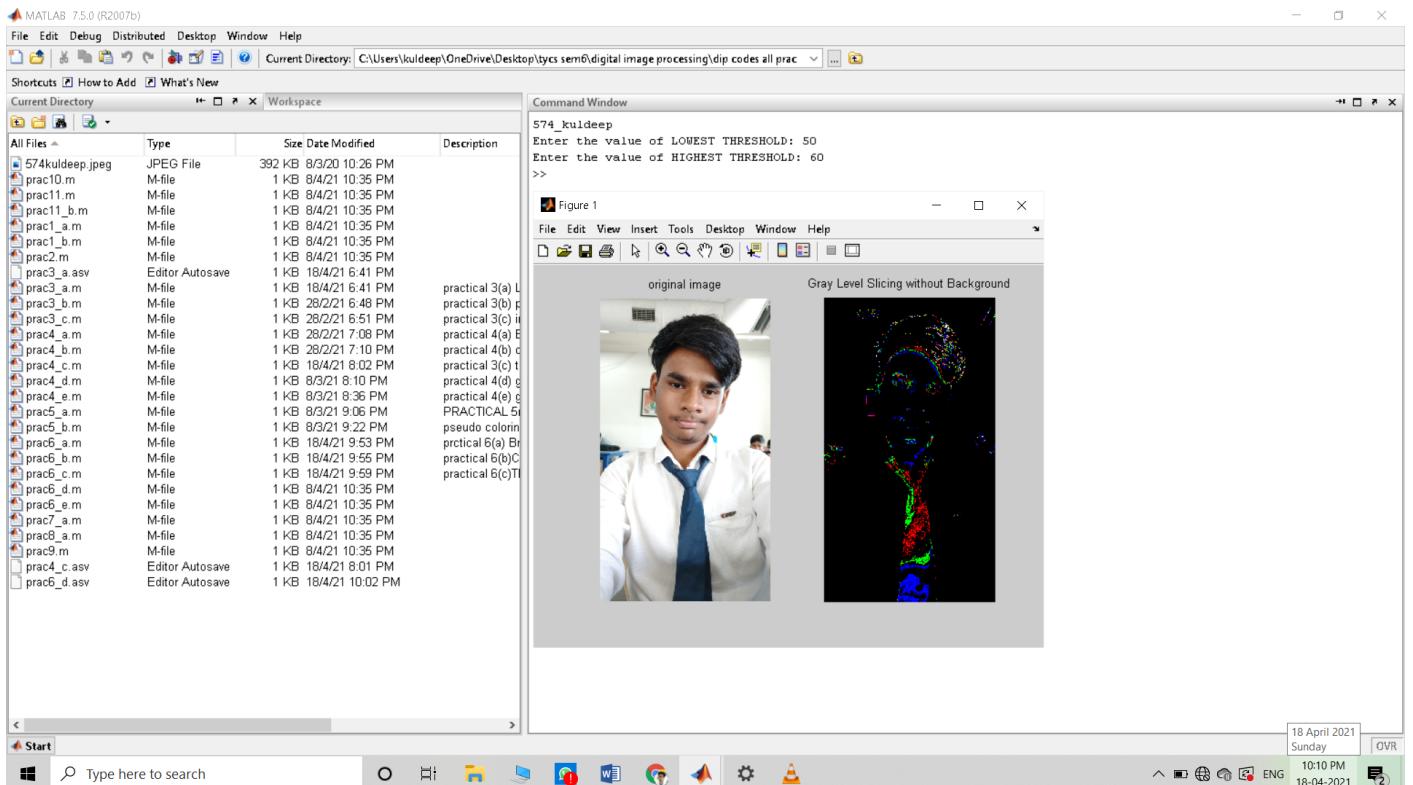
D] Gray Level Slicing (with background)**CODE :**

```
%practical 6(d)Gray Level Slicing(with background)
clc;
close all;
clear all;
disp('574_kuldeep');
i=imread('C:\Users\kuldeep\OneDrive\Pictures\Saved Pictures\574kuldeep.jpeg');
subplot(1,2,1)
imshow(i);
j=double(i);
[row col]=size(j);
title('original image')
T1=input('Enter the value of LOWEST THRESHOLD: ');
T2=input('Enter the value of HIGHEST THRESHOLD: ');
for x=1:1:row
    for y=1:1:col
        if(j(x,y)>T1 && (j(x,y)<T2))
            j(x,y)=255;
        else
            j(x,y)=i(x,y);
        end
    end
end
subplot(1,2,2)
imshow(uint8(j));
title('Gray Level Slicing with Background')
```

OUTPUT :

E] Gray Level Slicing (without background)**Code :**

```
%Gray Level Slicing (without background)
clc;
close all;
clear all;
disp('574_kuldeep');
i=imread('C:\Users\kuldeep\OneDrive\Pictures\Saved Pictures\574kuldeep.jpeg');
subplot(1,2,1);
imshow(i);
j=double(i);
[row col]=size(j);
title('original image')
T1=input('Enter the value of LOWEST THRESHOLD: ');
T2=input('Enter the value of HIGHEST THRESHOLD: ');
for x=1:1:row
    for y=1:1:col
        if(j(x,y)>T1 && (j(x,y)<T2))
            j(x,y)=255;
        else
            j(x,y)=0;
        end
    end
end
subplot(1,2,2)
imshow(uint8(j));
title('Gray Level Slicing without Background')
```

Output :

Practical no 7

Aim : Write a program to plot Histogram of an image.

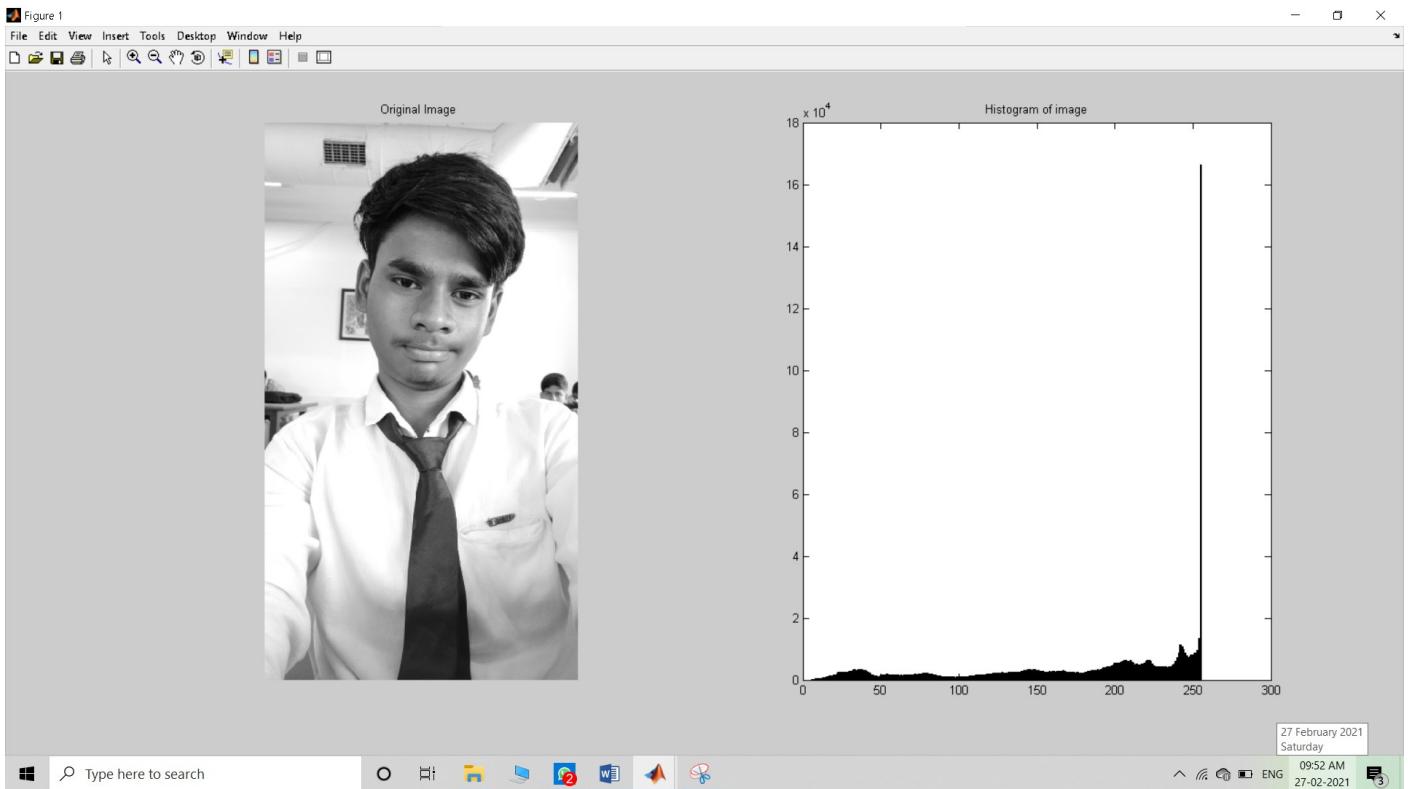
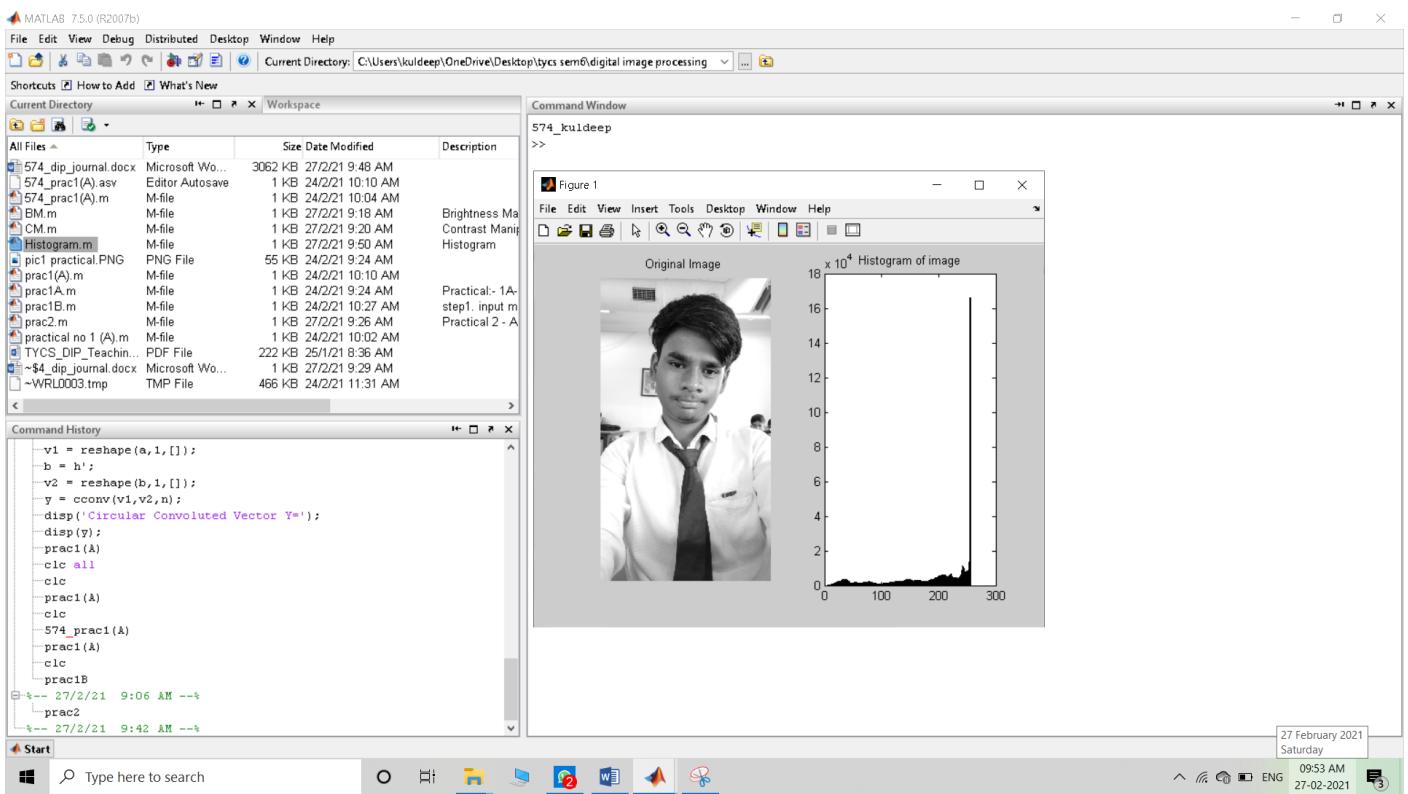
Code :

```
%practical 7 Histogram
close all;
clear all;
clc;

disp('574_kuldeep');

a=imread ('C:\Users\kuldeep\OneDrive\Pictures\Saved Pictures\574kuldeep.jpeg');
a1=double (a);
a2=rgb2gray(uint8(a1));
subplot(1,2,1)
imshow(uint8(a2))
title ('Original Image ');

[row col]=size(a2);
h=zeros(1,256);
for m=1:1:row
    for n=1:1:col
        t=a2(m,n);
        h(t+1)= h(t+1)+1;
    end
end
subplot(1,2,2)
bar(h)
title ('Histogram of image');
```

Output :

PRACTICAL NO : 8**AIM :** Write a program to perform Histogram Equalization of an image.**CODE :**

```
%PRACTICAL 8 Histogram Equalization of an image.  
close all;  
clear all;  
clc;  
disp('574_kuldeep');  
a=imread('C:\Users\kuldeep\OneDrive\Pictures\Saved Pictures\574kuldeep.jpeg');  
a1=double(a);  
a2=rgb2gray(uint8(a1));  
[row col]=size(a2);  
c=row*col;  
h=zeros(1,300);  
z=zeros(1,300);  
for m = 1:1:row  
for n = 1:1:col  
t = a2(m,n);  
h(t+1) = h(t+1)+1;  
end  
end  
pdf=h/c;  
cdf(1)=pdf(1);  
for x=2:1:256  
cdf(x)=pdf(x)+cdf(x-1);  
end  
new=round(cdf*256);  
new=new+1;  
for p=1:1:row  
for q=1:1:col  
temp = a2(p,q)+1;  
b(p,q)=new(temp);  
t=b(p,q);  
z(t+1)=z(t+1)+1;  
end  
end  
b=b-1;  
subplot(2,2,1)  
imshow(uint8(a2))  
title ('Original Image');
```

Kuldeep patel

TYCS

Roll No: 574

subplot(2,2,2)

bar(h)

title ('Histogram of Original Image');

subplot(2,2,3)

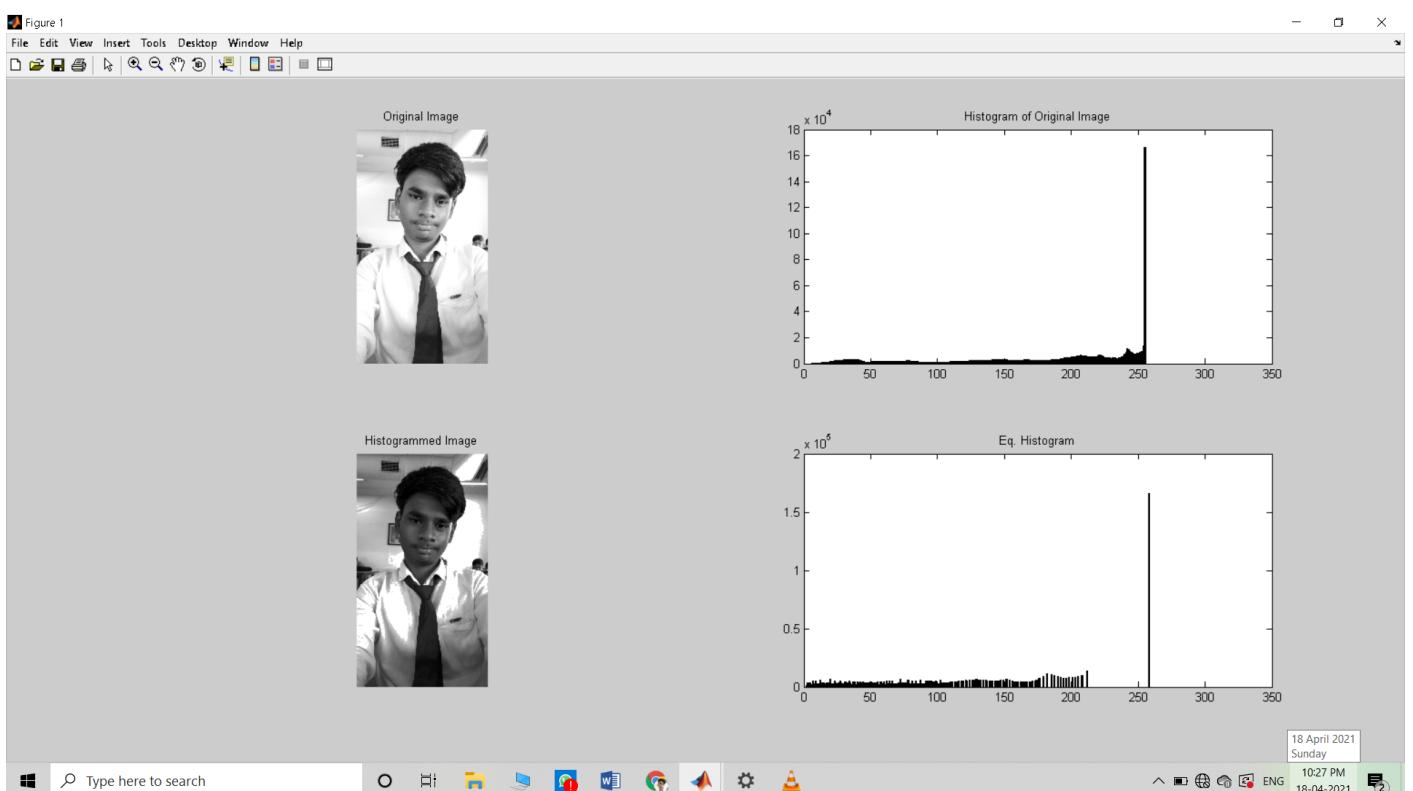
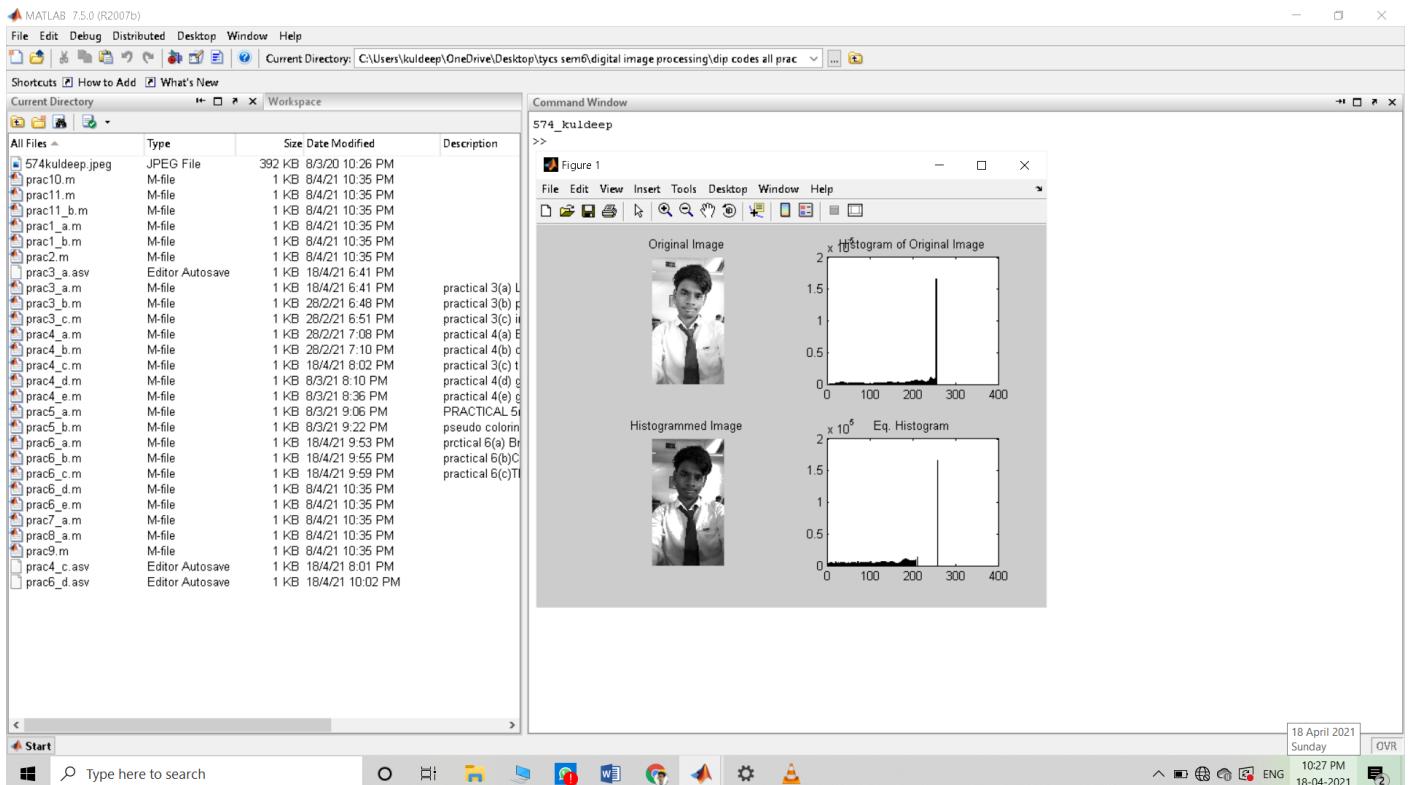
imshow(uint8(b))

title ('Histogrammed Image');

subplot(2,2,4)

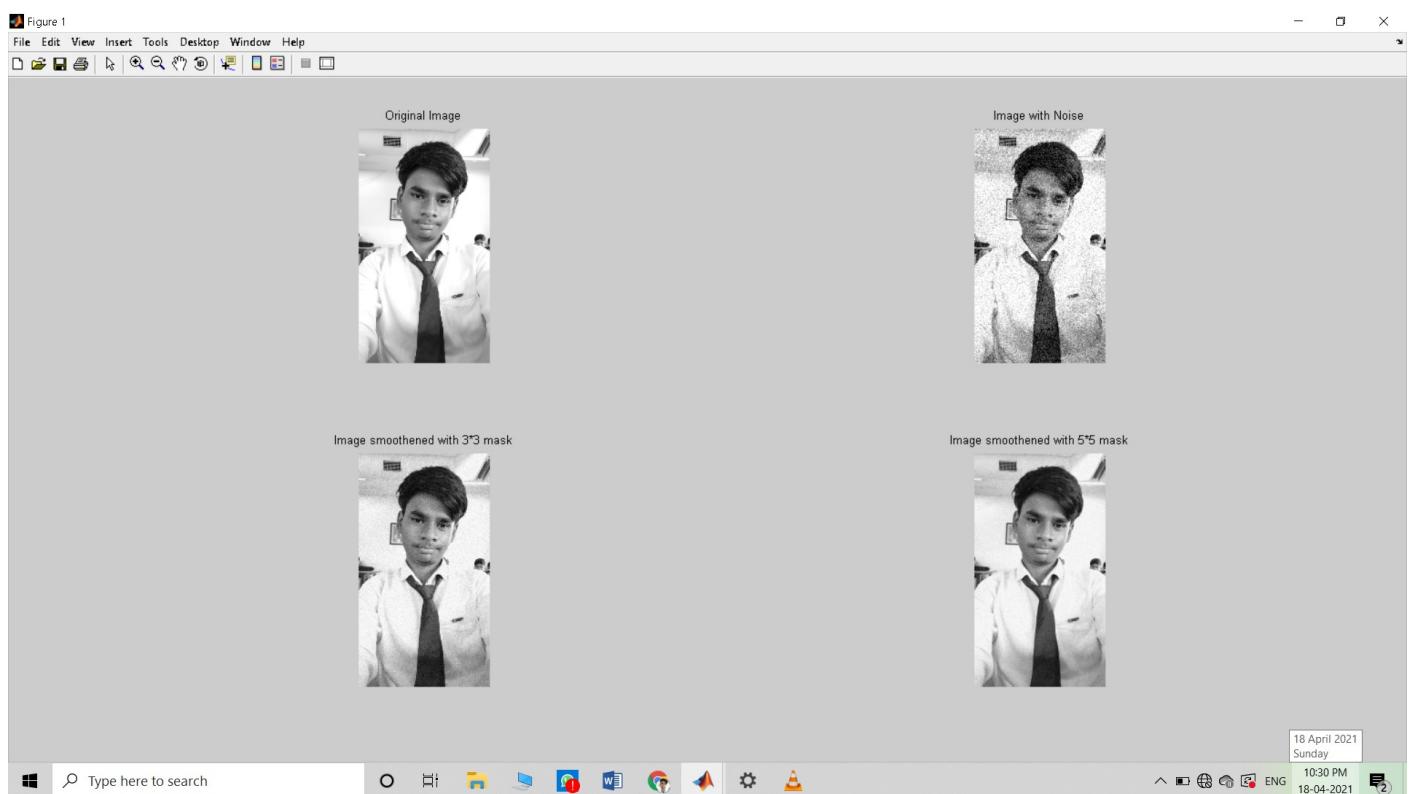
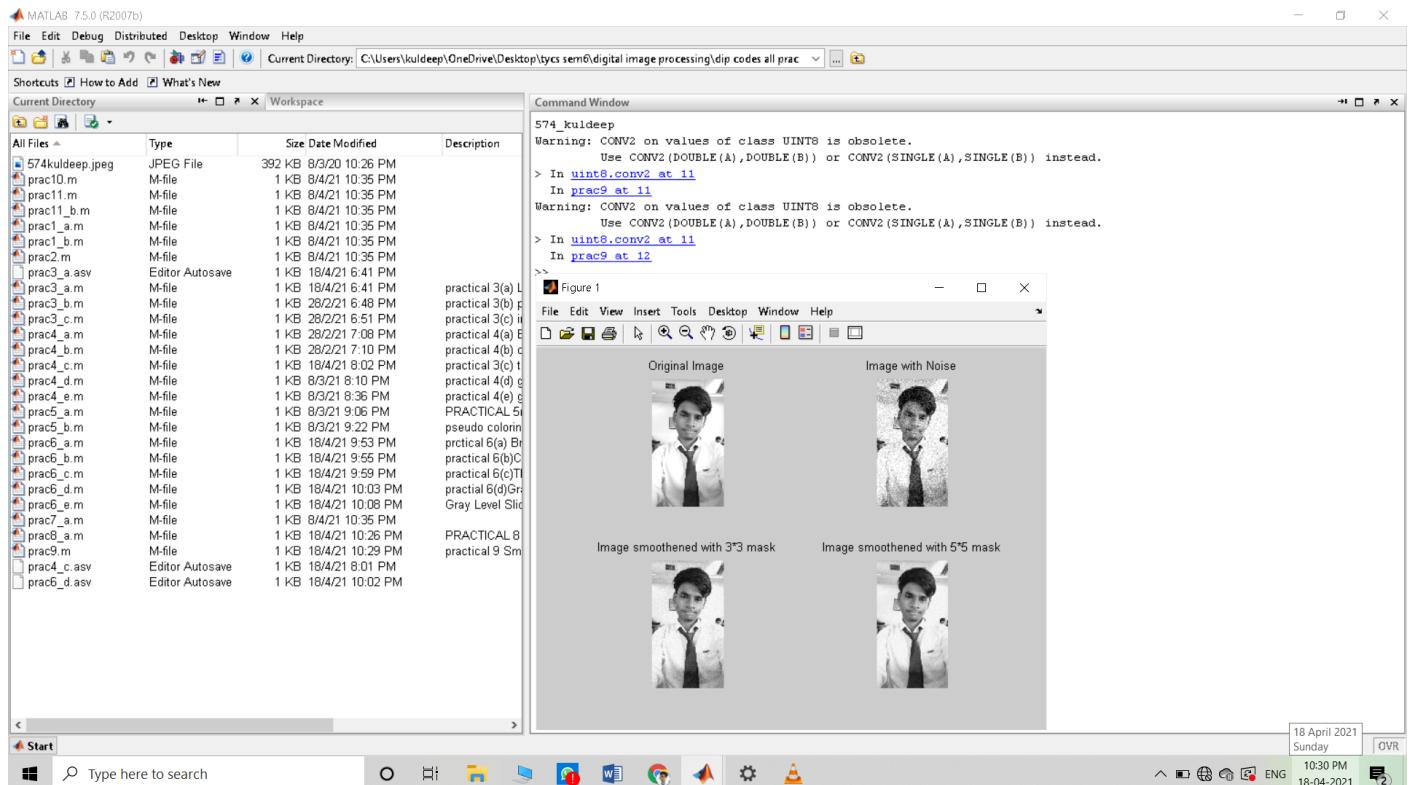
bar(z)

title ('Eq. Histogram');

OUTPUT :

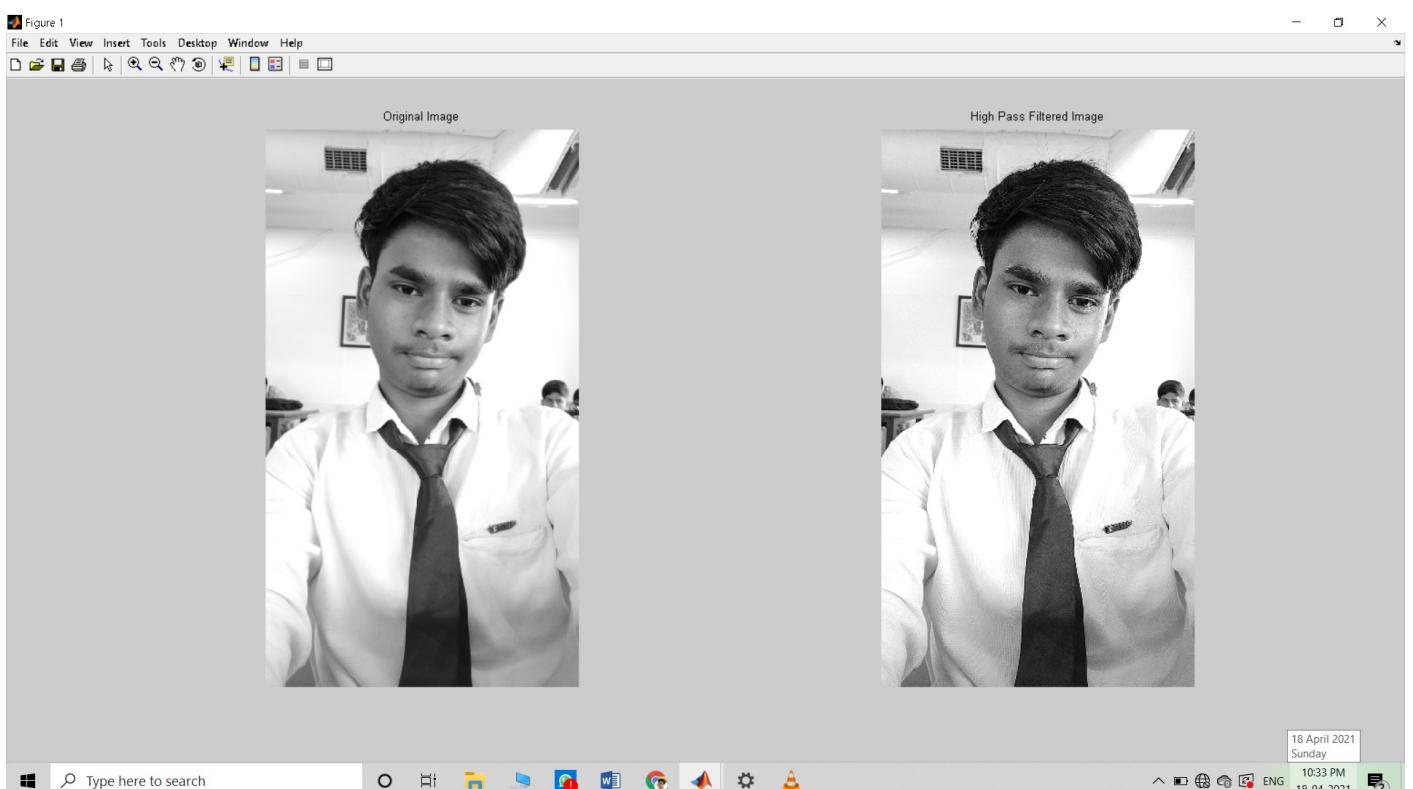
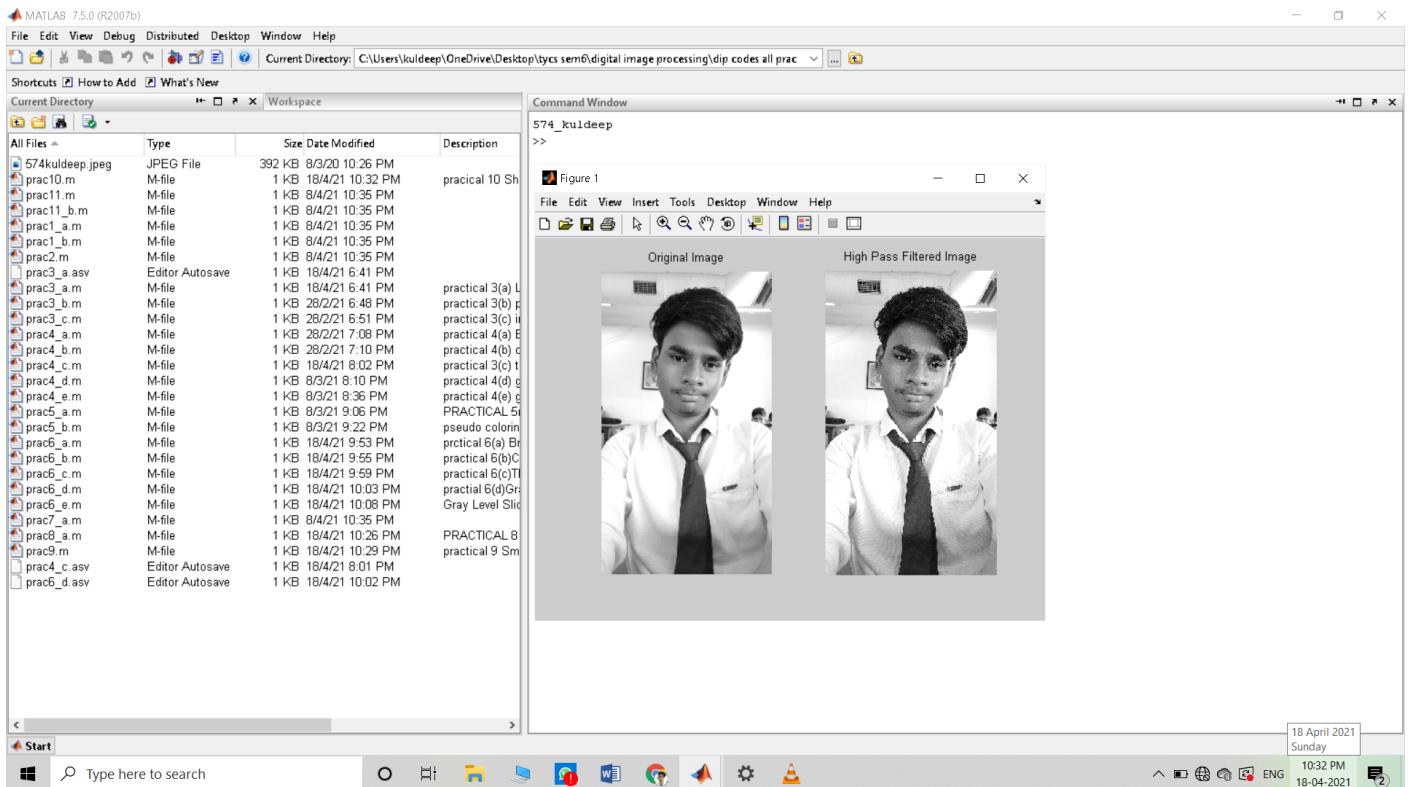
PRACTICAL NO : 9**AIM :** Write a program to perform Smoothing on an image.**CODE :**

```
%practical 9 Smoothing on an image.  
close all;  
clear all;  
clc;  
disp('574_kuldeep');  
a=imread('C:\Users\kuldeep\OneDrive\Pictures\Saved Pictures\574kuldeep.jpeg');  
i=rgb2gray(a);  
b=imnoise(i, 'gaussian');  
h1 = 1/9*ones(3,3);  
h2 = 1/25*ones(5,5);  
output1 = conv2(b,h1, 'same');  
output2 = conv2(b,h2, 'same');  
subplot(2,2,1);  
imshow(i);  
title('Original Image');  
subplot(2,2,2);  
imshow(b);  
title('Image with Noise');  
subplot(2,2,3);  
imshow(uint8(output1));  
title('Image smoothed with 3*3 mask');  
subplot(2,2,4);  
imshow(uint8(output2));  
title('Image smoothed with 5*5 mask');
```

OUTPUT :

PRACTICAL NO : 10**AIM :** Write a program to perform Sharpening on an image.**CODE :**

```
%practical 10 Sharpening on an image.  
close all;  
clear all;  
clc;  
disp('574_kuldeep');  
a=imread('C:\Users\kuldeep\OneDrive\Pictures\Saved Pictures\574kuldeep.jpeg');  
i=rgb2gray(a);  
h=fspecial('unsharp');  
b=imfilter(i,h);  
subplot(1,2,1);  
imshow(i);  
title('Original Image');  
subplot(1,2,2);  
imshow(b);  
title('High Pass Filtered Image');
```

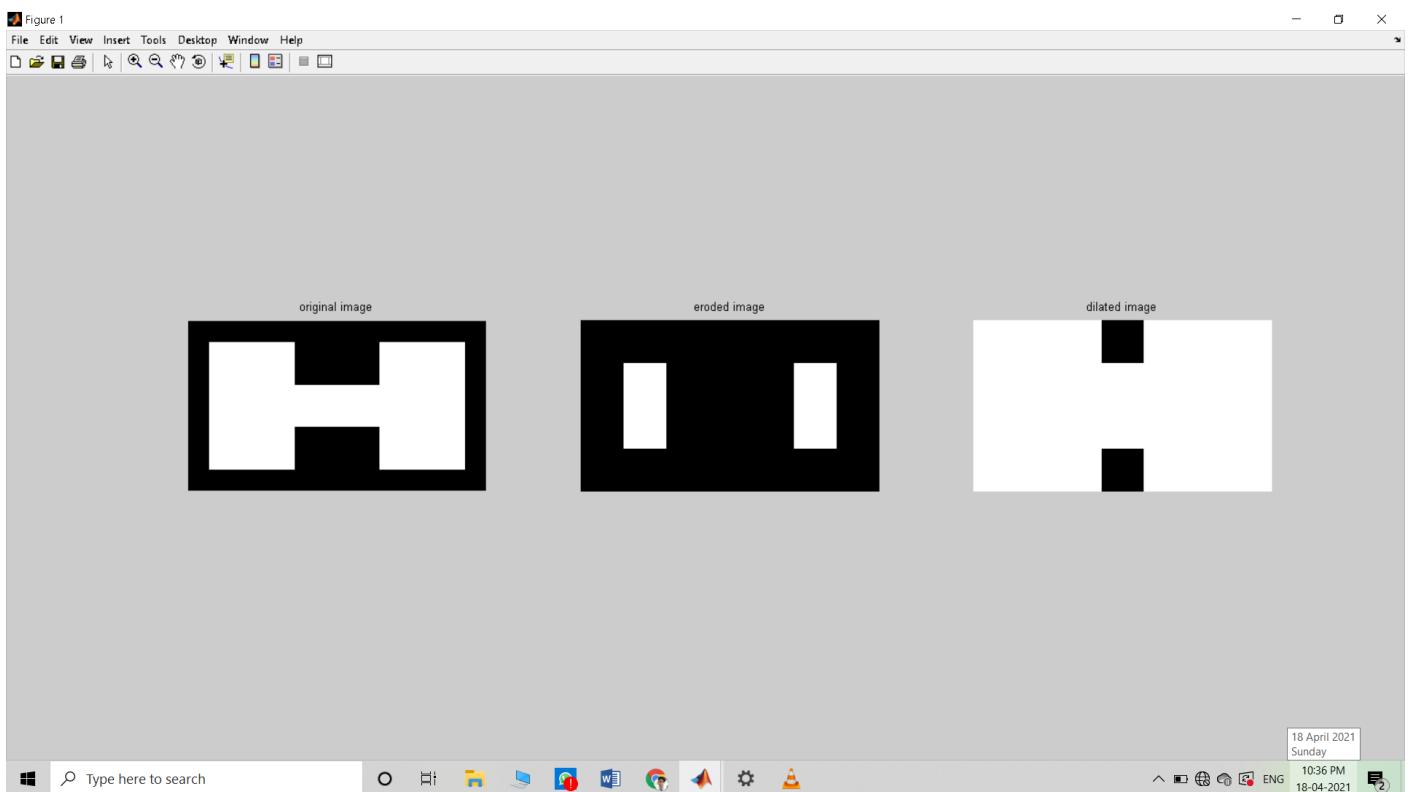
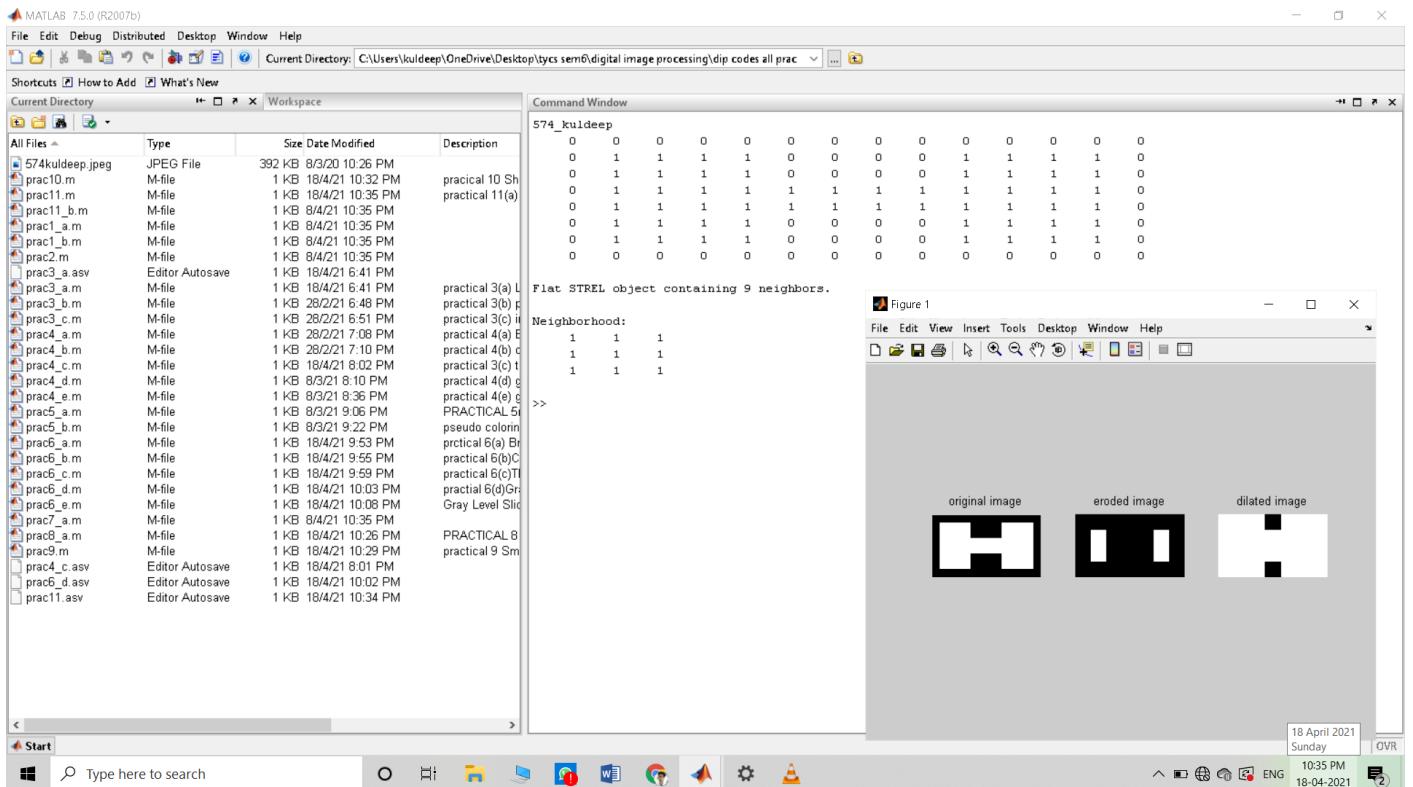
OUTPUT :

PRACTICAL NO : 11

AIM : Write a program to perform Dilation and Erosion on an image.

A] EROSION AND DILATION**CODE :**

```
%practical 11(a) Dilation and Erosion on an image.  
close all;  
clear all;  
clc;  
w = [0 0 0 0 0 0 0 0 0 0 0 0;0 1 1 1 1 0 0 0 1 1 1 0;0 1 1 1 1 0 0 0 1 1 1 0;0 1 1 1 1 1  
1 1 1 1 1 1 0;0 1 1 1 1 1 1 1 1 1 0;0 1 1 1 1 0 0 0 1 1 1 0;0 1 1 1 1 0 0 0 1 1 1 0;0  
0 0 0 0 0 0 0 0 0 0];  
disp('574_kuldeep');  
disp(w);  
se1= strel('square',3);  
disp(se1);  
IM1 = imerode(w,se1);  
IM2 = imdilate(w,se1);  
subplot(1,3,1);  
imshow(w);  
title('original image');  
subplot(1,3,2);  
imshow(IM1);  
title('eroded image');  
subplot(1,3,3);  
imshow(IM2);  
title('dilated image');
```

OUTPUT :

B] OPENING AND CLOSING**CODE :**

```
%practical 11(b) OPENING AND CLOSING
close all;
clear all;
clc;
w = [0 0 0 0 0 0 0 0 0 0 0 0;0 1 1 1 1 0 0 0 0 1 1 1 0;0 1 1 1 1 0 0 0 0 1 1 1 0;0 1 1 1 1 1
1 1 1 1 1 1 0;0 1 1 1 1 1 1 1 1 1 1 0;0 1 1 1 1 0 0 0 0 1 1 1 0;0 1 1 1 1 0 0 0 0 1 1 1 0;0
0 0 0 0 0 0 0 0 0 0 0];
disp('574_kuldeep');
disp(w);
se1= strel('square',3);
disp(se1);
O1 = imerode(w,se1);
O2 = imdilate(O1,se1);
C1 = imdilate(w,se1);
C2 = imerode(C1,se1);
subplot(1,3,1);
imshow(w);
title('original image');
subplot(1,3,2);
imshow(O2);
title('OPENING - Erosion followed by Dilation');

subplot(1,3,3);
imshow(C2);
title('CLOSING - Dilation performed by Erosion');
```

OUTPUT :