MANARAT INTERNATIONAL UNIVERSITY

Department of Computer Science & Engineering (CSE)

Lab Report

Digital Signal and Image Processing

Course code: CSE434

DSP Lab

1st Experiment –Page 01
2nd Experiment –Page 02
3rd Experiment –Page 03
4th & 5th Experiment –Page 04
6th Experiment – Page 05-06
7th Experiment –Page 07
8th Experiment –Page 08

Image Processing Lab

Experiment 1: Add image to another image – Page 09-11
Experiment 2: Edge Detection Algorithm— Page 11-14
Experiment 3: Sharpen Image Using Gradient Mask—Page 14-16
Experiment 4: Finding Image – Page 16-22
Experiment-5: Image Filtering – Page 23-33
Experiment 6: Erosion and Dilation – Page 34-36

Submitted by-

Md. Shamimul islam shamim
ID:1538CSE00435
Dept. of CSE
Manarat International University

Submitted to-

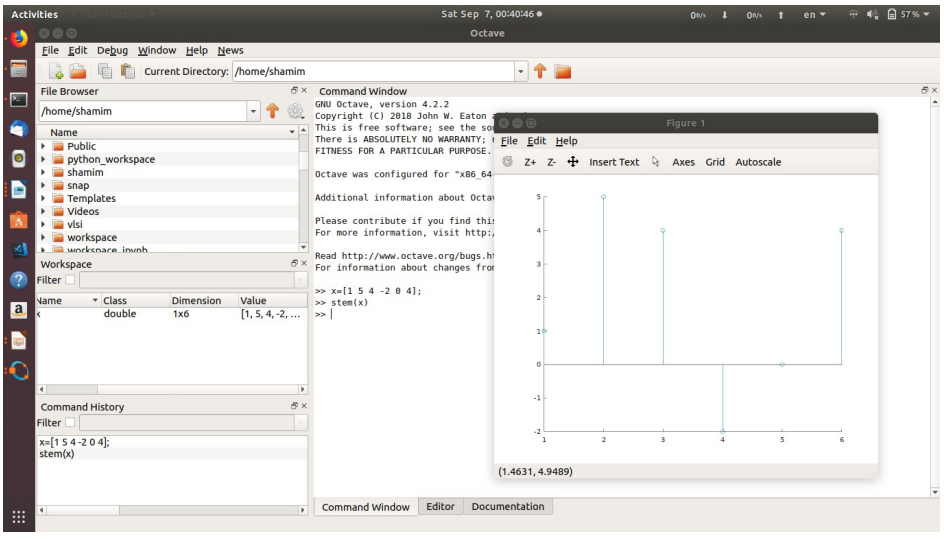
Md. Jahurul Haque
Senior lecturer
Dept. of CSE
Manarat International University

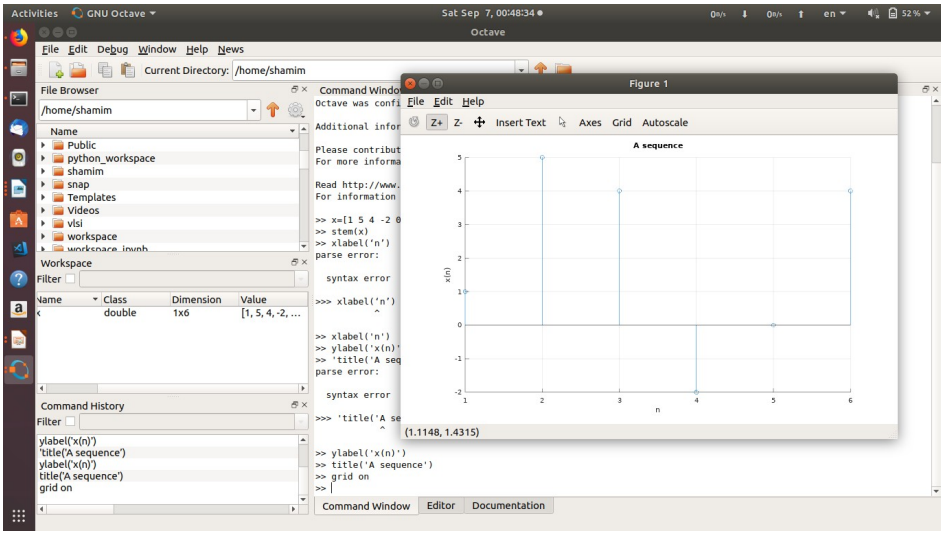
DSP Lab

Experiment-1:

```
>> x=[1 5 4 -2 0 4];
        stem(x)
        xlabel('n')
        ylabel('x(n)')
        title('A sequence')
        grid on
```

Output:

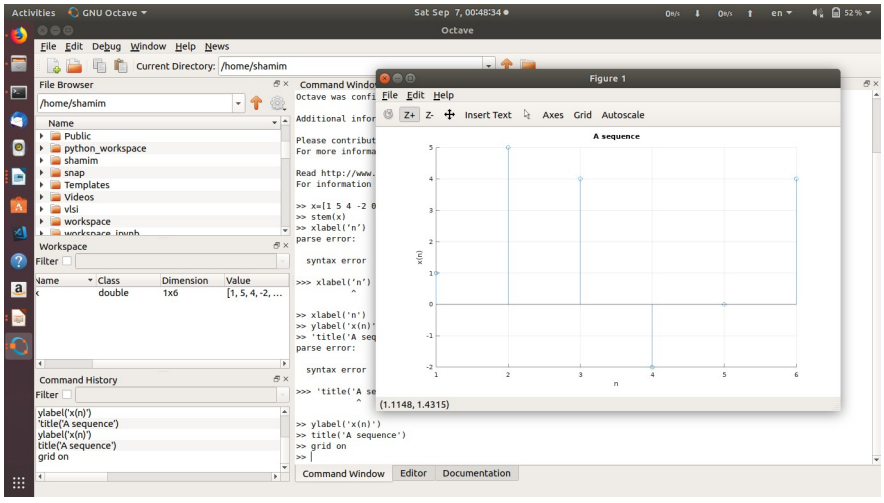


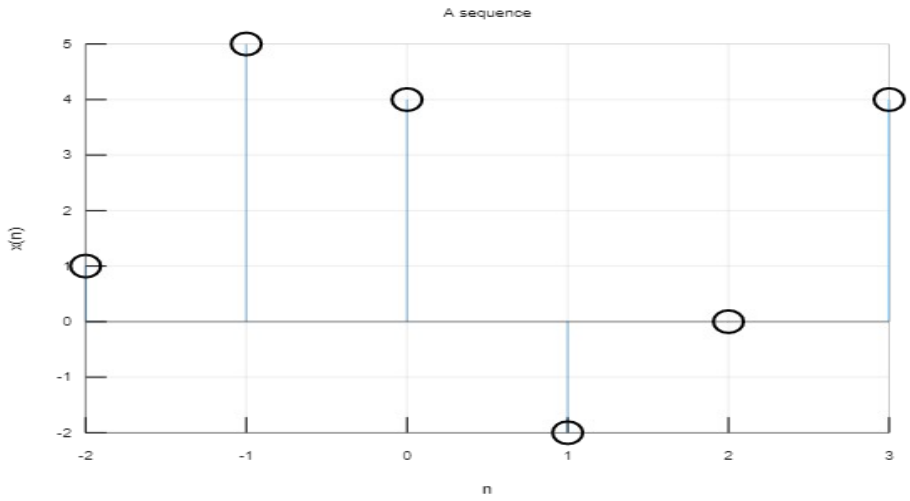


Experiment-2:

```
>> x=[1 5 4 -2 0 4];
     n=-2:1:3;
   stem(n,x)
   xlabel('n')
   ylabel('x(n)')
   title('A sequence')
   grid on
```

Output:

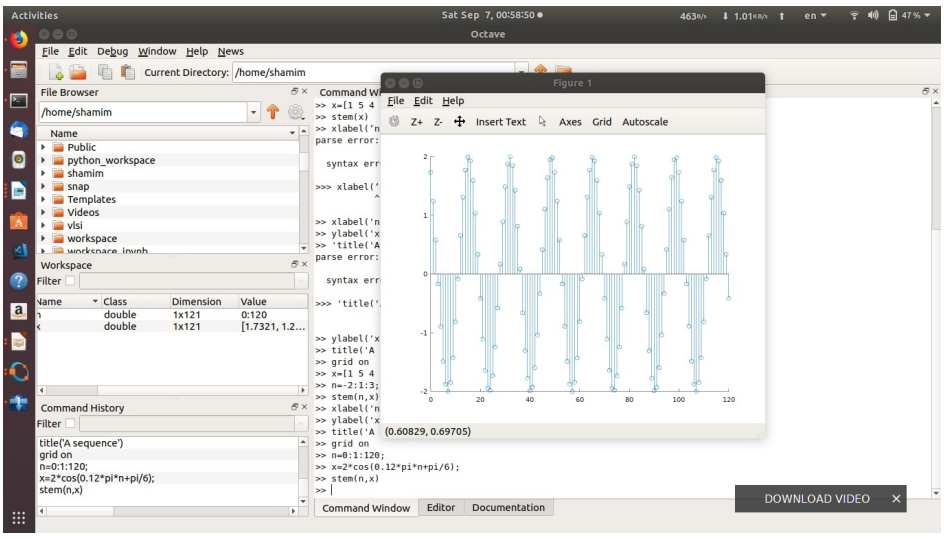




Experiment-3:

```
>> n=0:1:120;

   x=2*cos(0.12*pi*n+pi/6);

   stem(n,x)
```

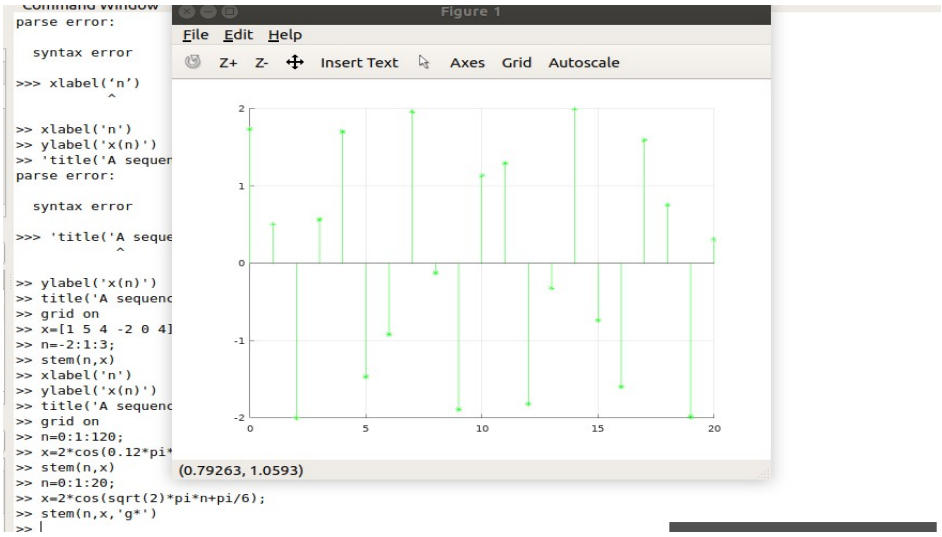
output:



Experiment-4:

```
>>n=0:1:20;
    x=2*cos(sqrt(2)*pi*n+pi/6);
    stem(n,x,'g*')
```

Output:



Experiment-5:

>>x=[2 4 6 3 8]

x(1)

for i=1:6

E=E+abs(x(i))^2;

End

Output:

ans = 2

Experiment-6:

x=[2 4 6 3 8]

E=0;

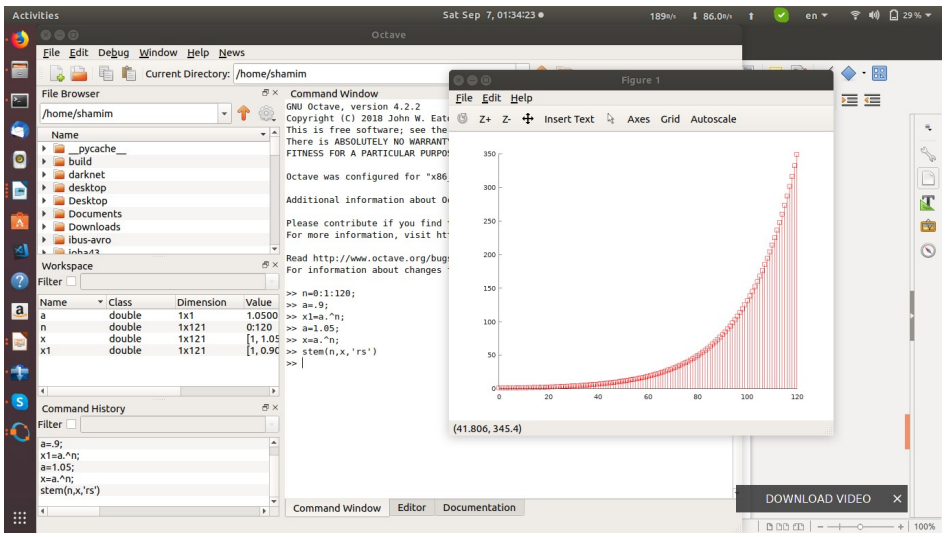
```
for i=1:6
E=E+abs(x(i))^2;
End
E
```

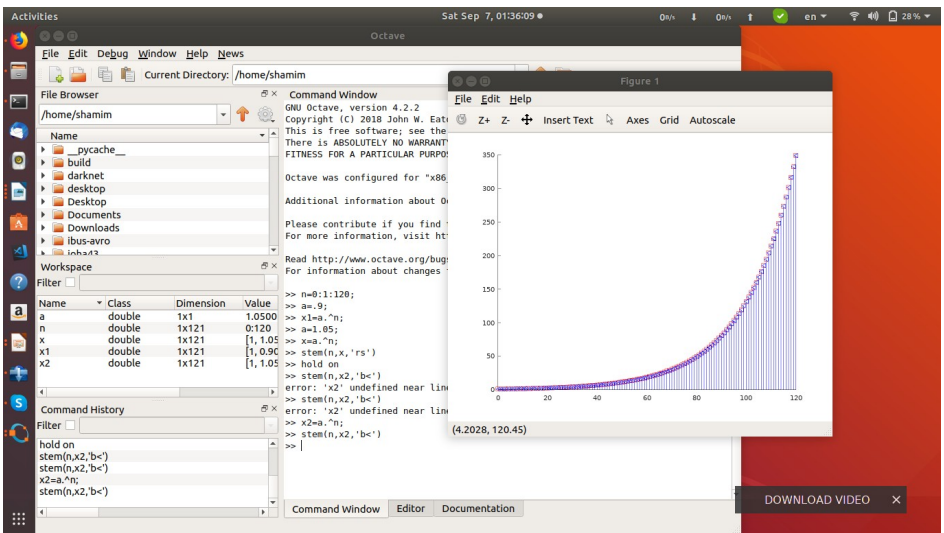
Output: E = 129

Experiment-7:

```
>>n=0:1:120;
        a=.9;
        x1=a.^n;
        a=1.05;
        x=a.^n;
        stem(n,x,'rs')
        hold on
        stem(n,x2,'b<')
```

Output:





Experiment-8:

```
>>n=0:1:120;
        x=2*cos(sqrt(2)*pi*n+pi/6);
        stem(n,x)
        E=0;
        for i=1:120;
        E=E+abs(x(i))^2;
        end;
```

Output:

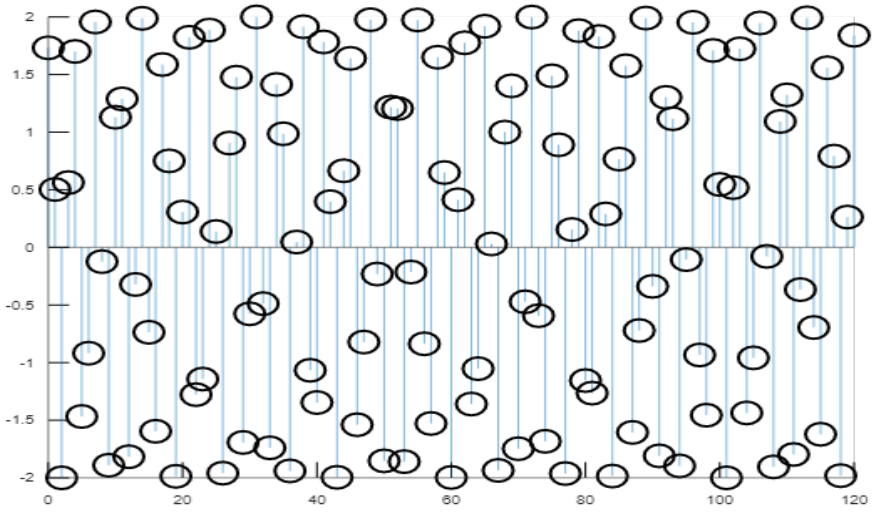


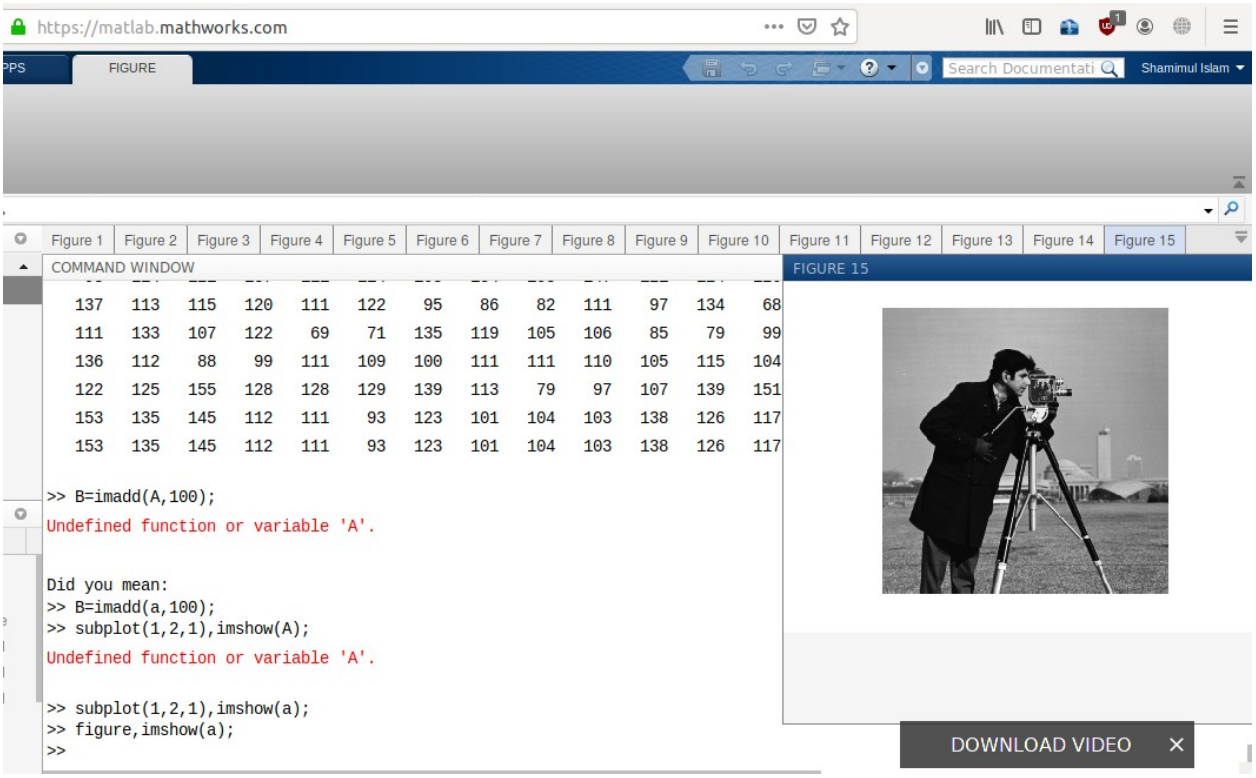
Image Procssing Lab

Experiment 1: Add image to another image

```
A=imread('cameraman.tif');
```

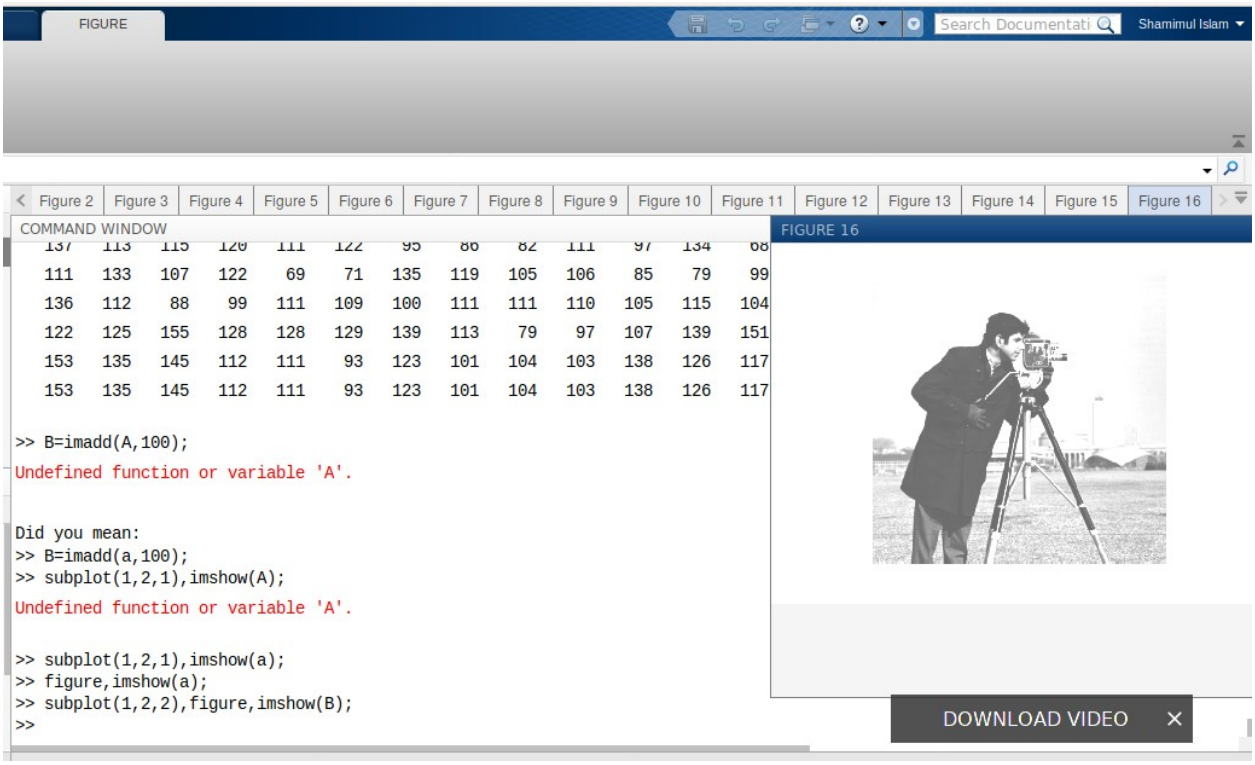
B=imadd(A,100);

subplot(1,2,1),figure,imshow(A);



>> subplot(1,2,2),figure,imshow(B);

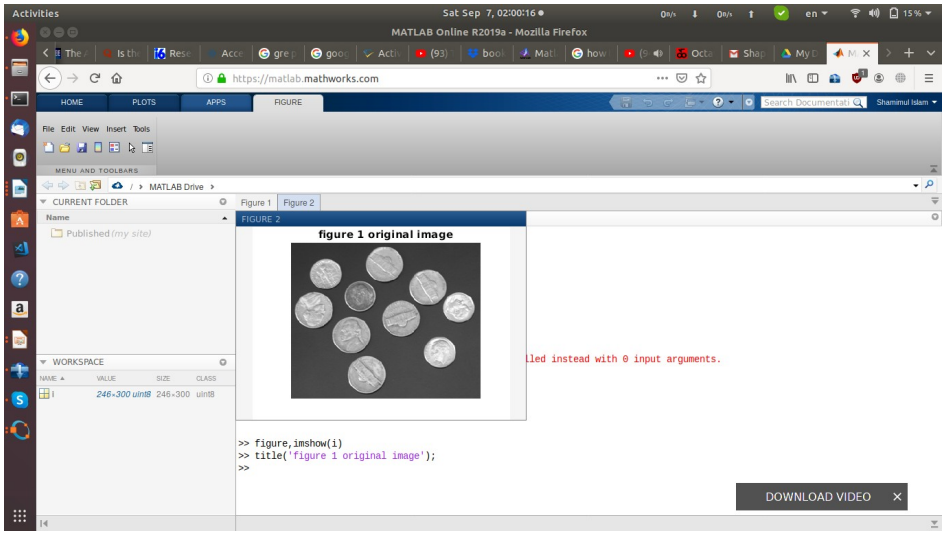
Output:



Experiment 2: Edge Detection Algorithm

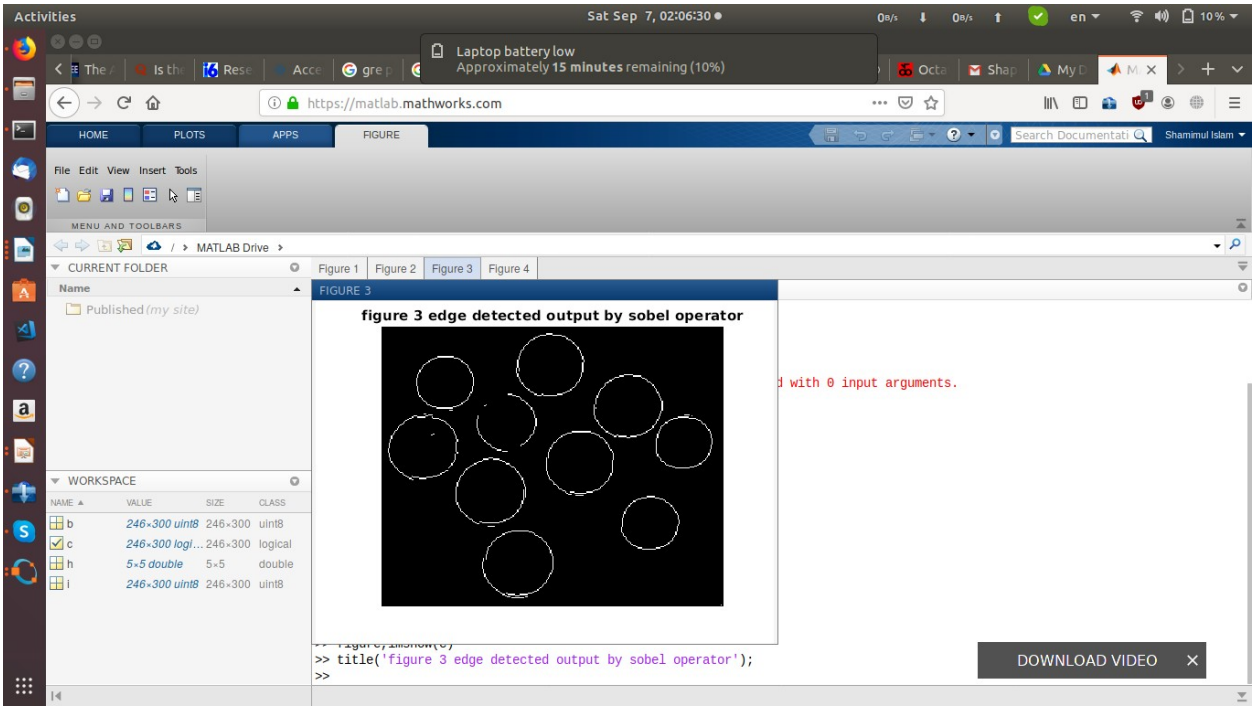
```
i=imread('coins.png');

figure,imshow(i)

title('figure 1 original image');
h=ones(5,5)/25;
b=imfilter(i,h);
title('figure 2 original image');
```

output:



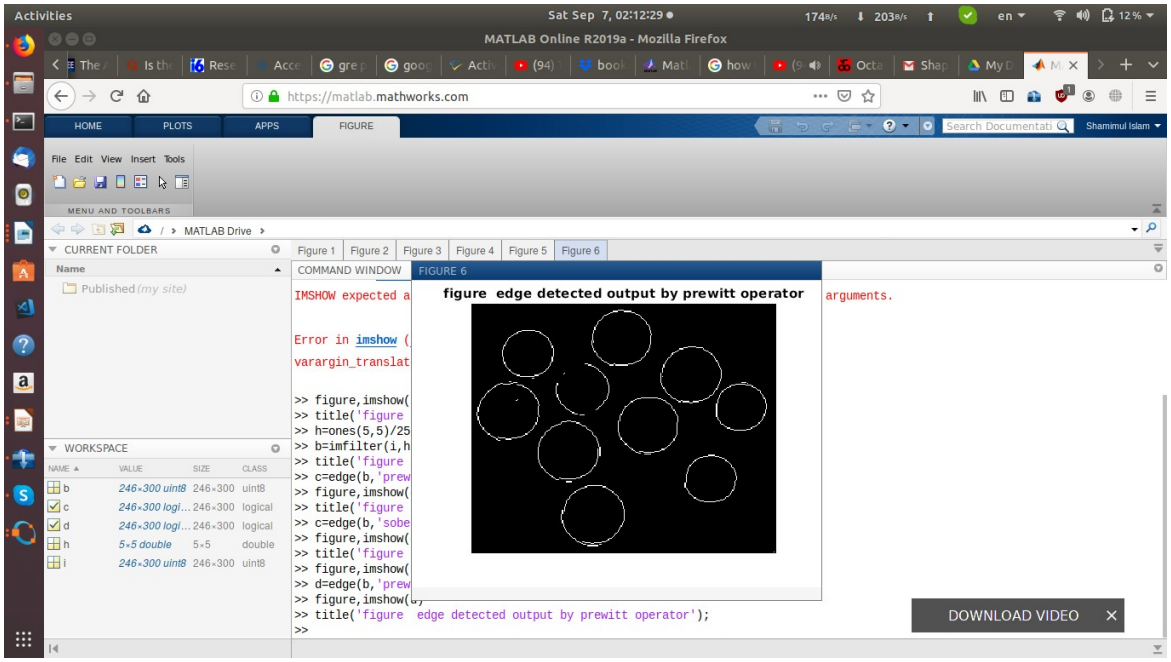

```
h=ones(5,5)/25;

b=imfilter(i,h);
title('figure 2 original image');
c=edge(b,'prewitt');
figure,imshow(c)
title('figure 3 edge detected output by sobel operator');
```

output:



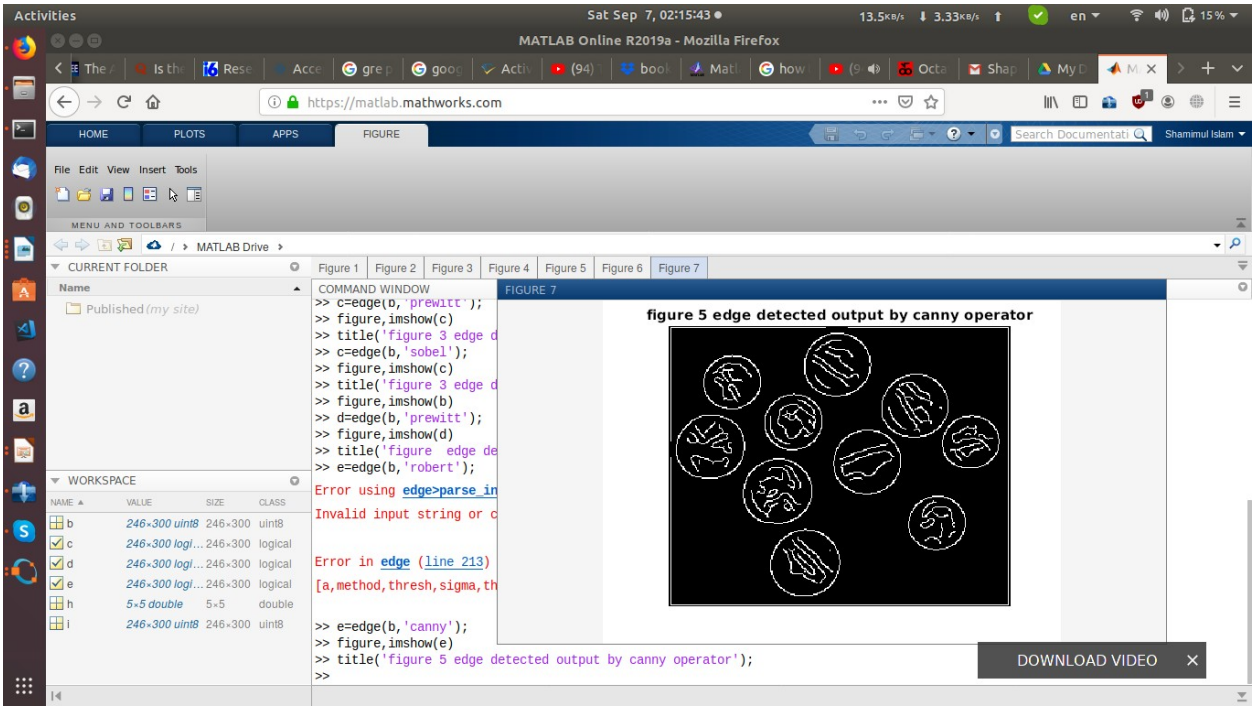
d=edge(b,'prewitt');

figure,imshow(d)
title('figure edge detected output by prewitt operator');
output:



e=edge(b,'canny');

figure,imshow(e)
title('figure 5 edge detected output by canny operator');
output:



Experiment 3: Sharpen Image Using Gradient Mask

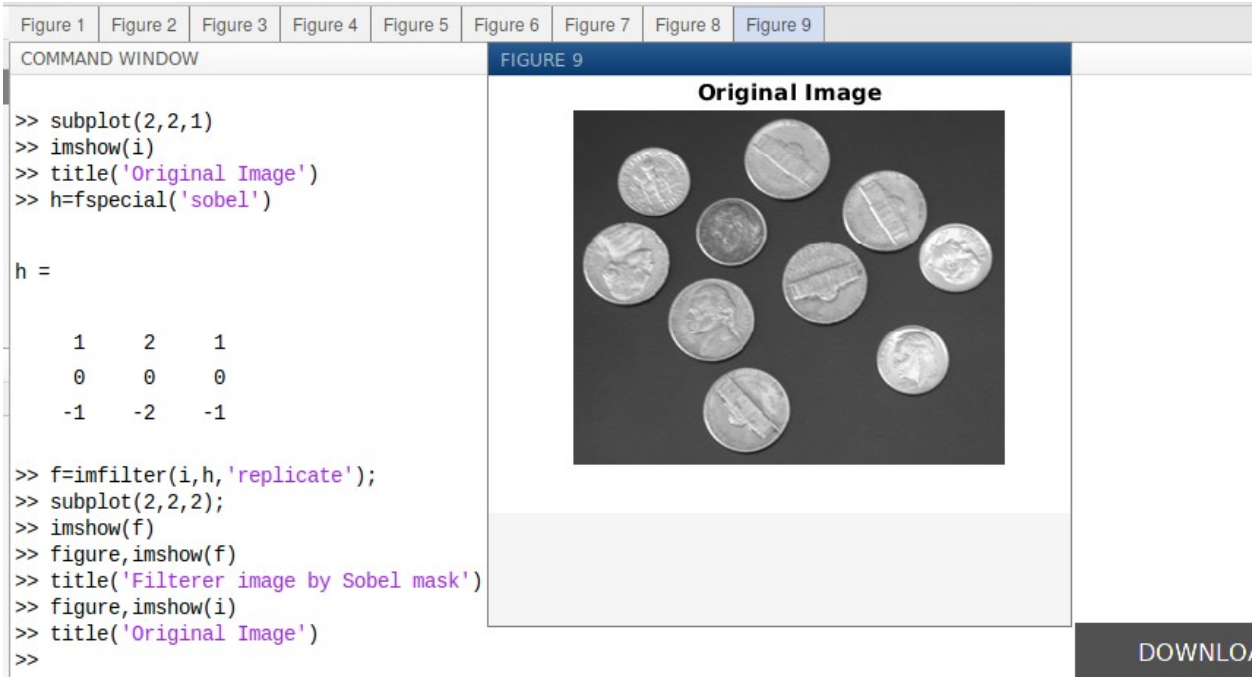
i=imread(‘coins.png’);

subplot(2,2,1);

imshow(i)

title(‘Original Image’)

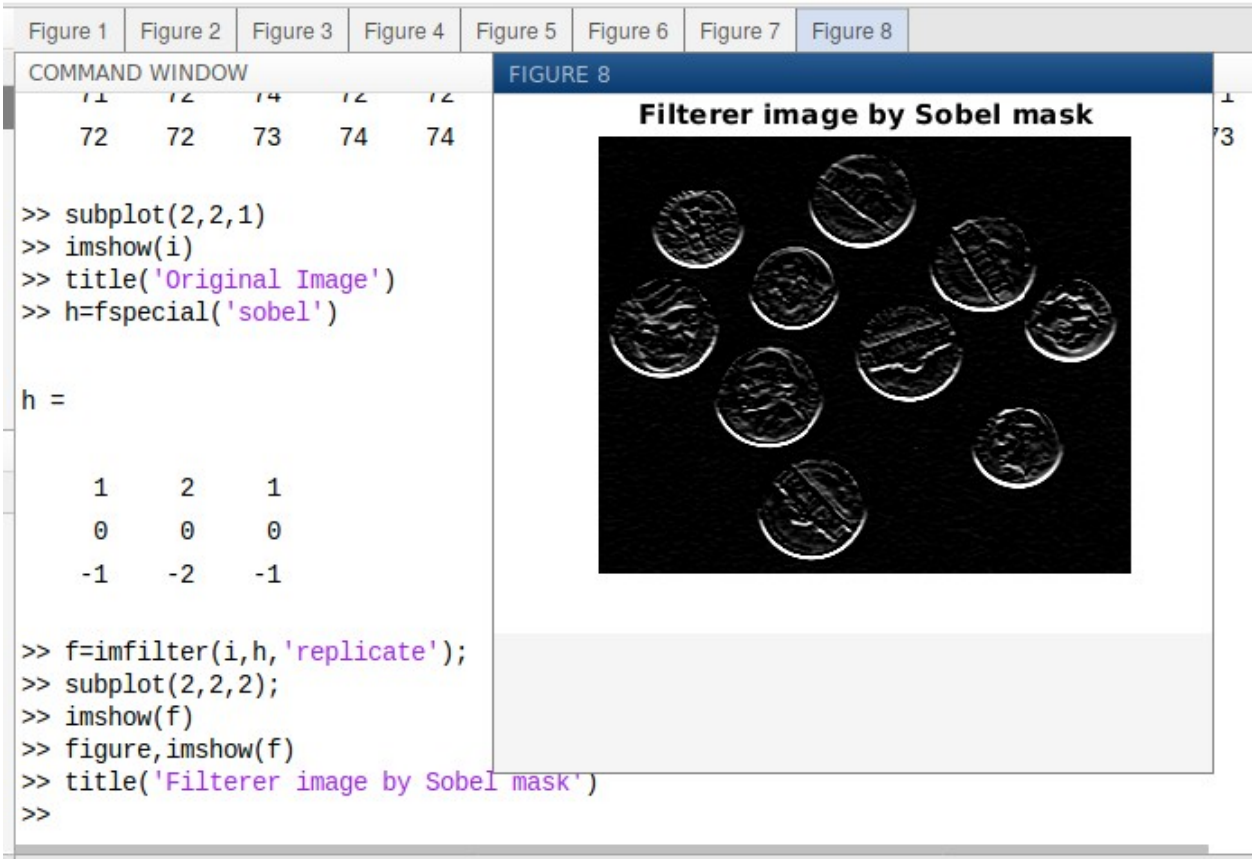
output:



h=fspecial('sobel')

f=imfilter(i,h,'replicate');
subplot(2,2,2);
imshow(f)
figure,imshow(f)
title('Filterer image by Sobel mask')

output:



Experiment 4: Finding Image

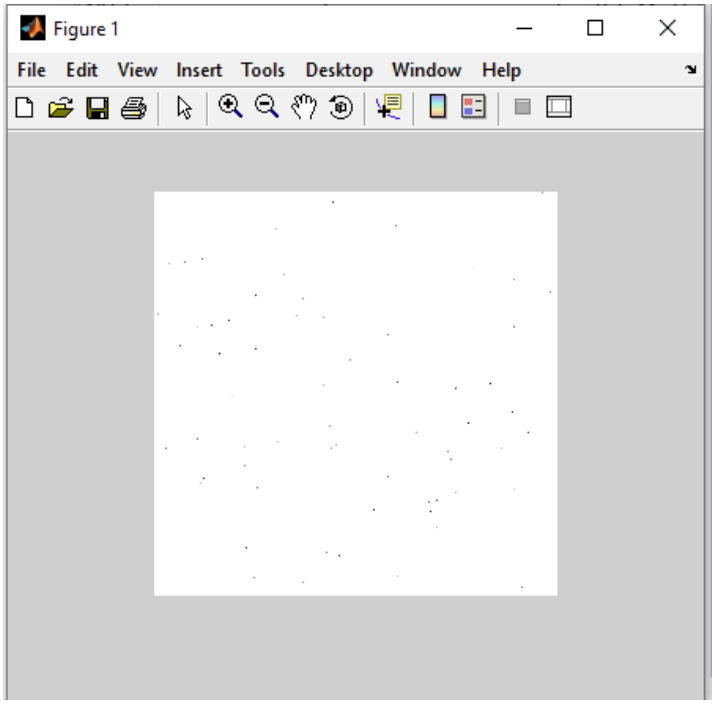
```
>> a=rand(1)a =

    0.8147
>> a=rand(2)
a =
  0.9058    0.9134
  0.1270    0.6324
>> rand(1,2)
ans =
0.0975    0.2785
>> rand(2,2)
ans =
0.5469    0.9649
 0.9575    0.1576
>> rand(3,2)
ans =
0.9706    0.8003
0.9572    0.1419
0.4854    0.4218
```

for creating new image:

```
>> A=rand(2)
A =
0.9157    0.9595
0.7922    0.6557
>> A*10
ans =
   9.1574    9.5949
```

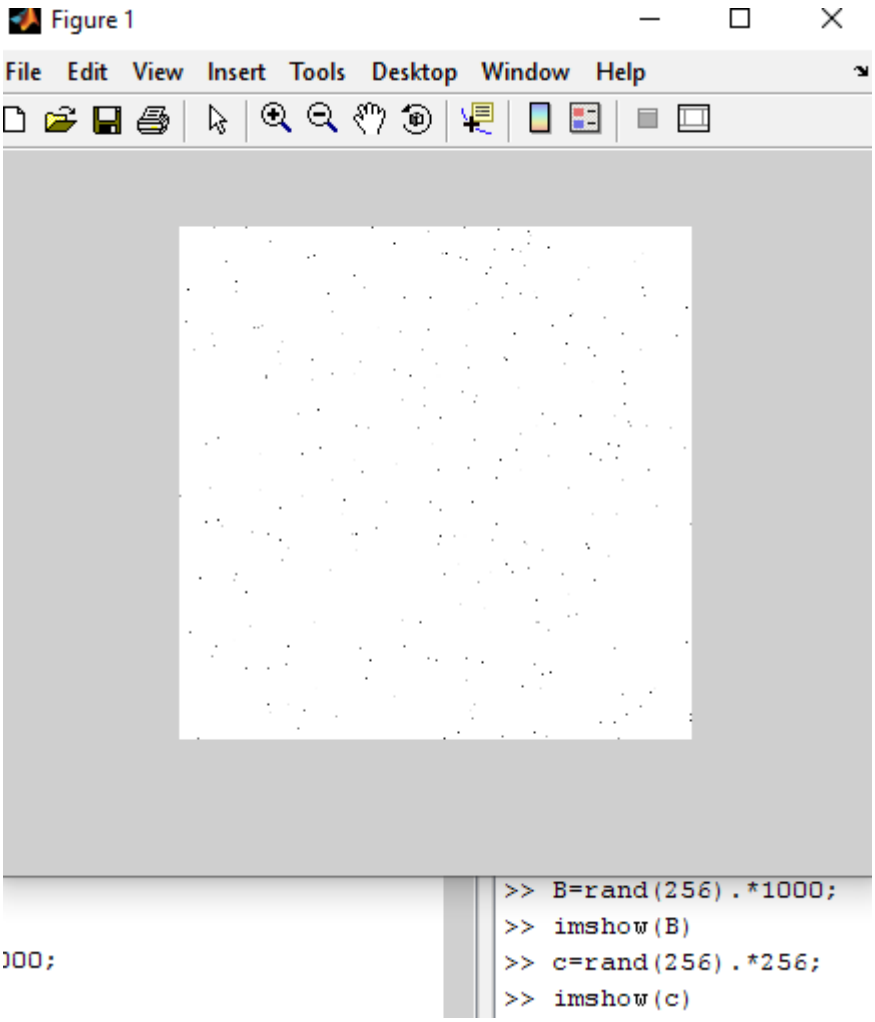
7.9221 6.5574

```
>> B=rand(256).*1000;

>> imshow(B)
```

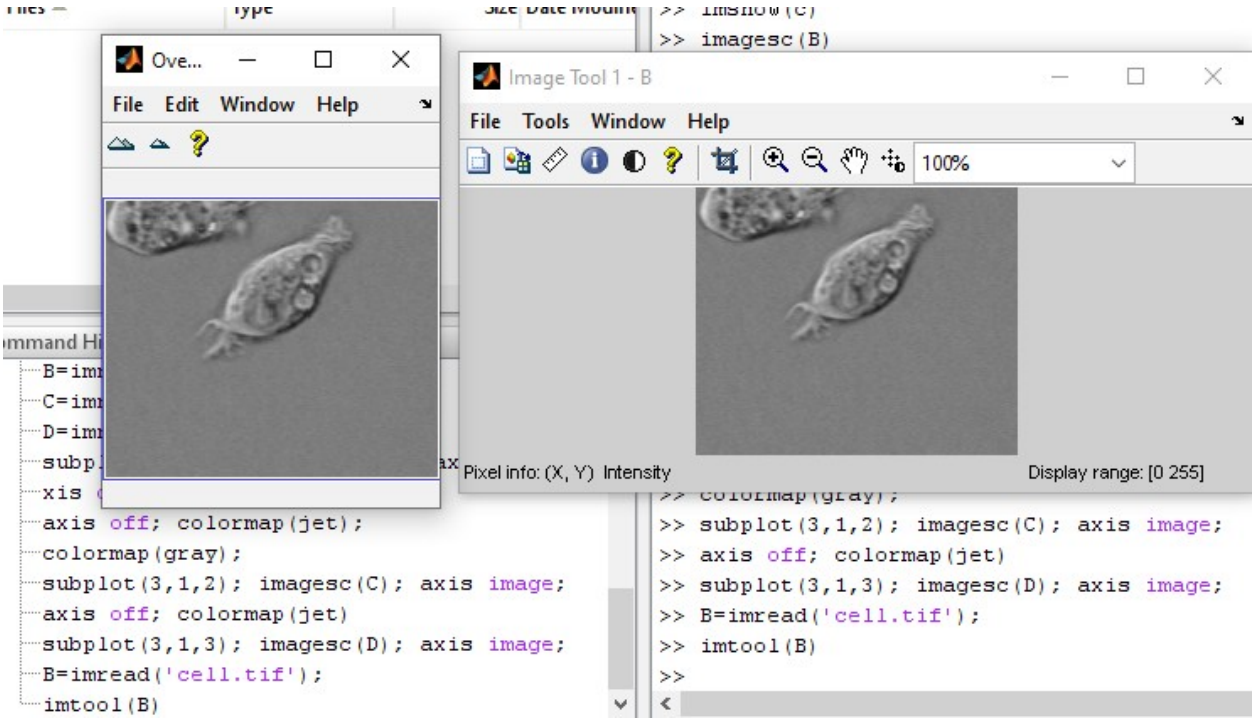



```
ans =

    0.9649    0.9572
    0.1576    0.4854
    0.9706    0.8003

>> A=rand(2)

A =

    0.1419    0.9157
    0.4218    0.7922

>> A*10

ans =

    1.4189    9.1574
    4.2176    7.9221

>> B=rand(256).*1000;
>> imshow(B)
>>
```

```
>> c=rand(256).*256;

>> imshow(c)
```




```
>> imagesc(B)
>> axis off;
>> colormap(gray)
>> colorbar;
>> C=imread('spine.tif');
>> D=imread('onion.png');
>> subplot(3,1,1);  imagesc(B); axis image;
>> axis off; colormap(jet);
```

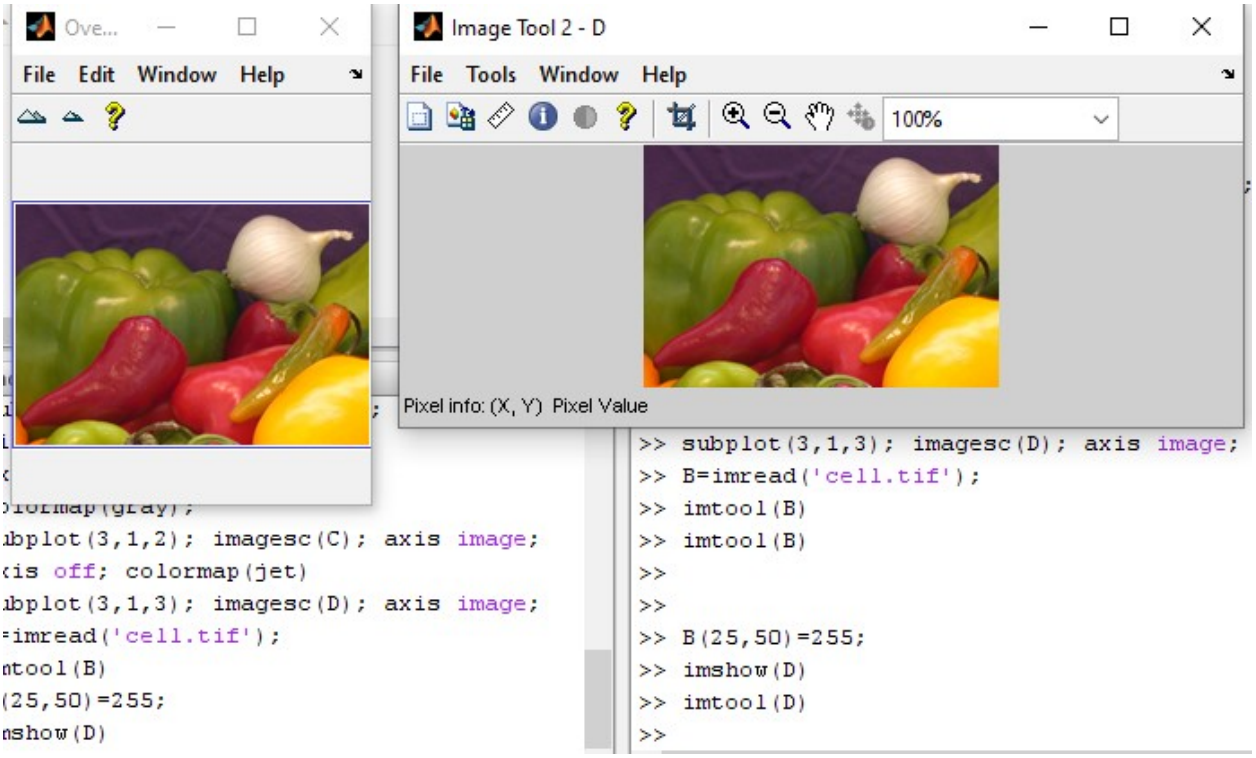


>> colormap(gray);

>> subplot(3,1,2); imagesc(C); axis image;

>> axis off; colormap(jet)

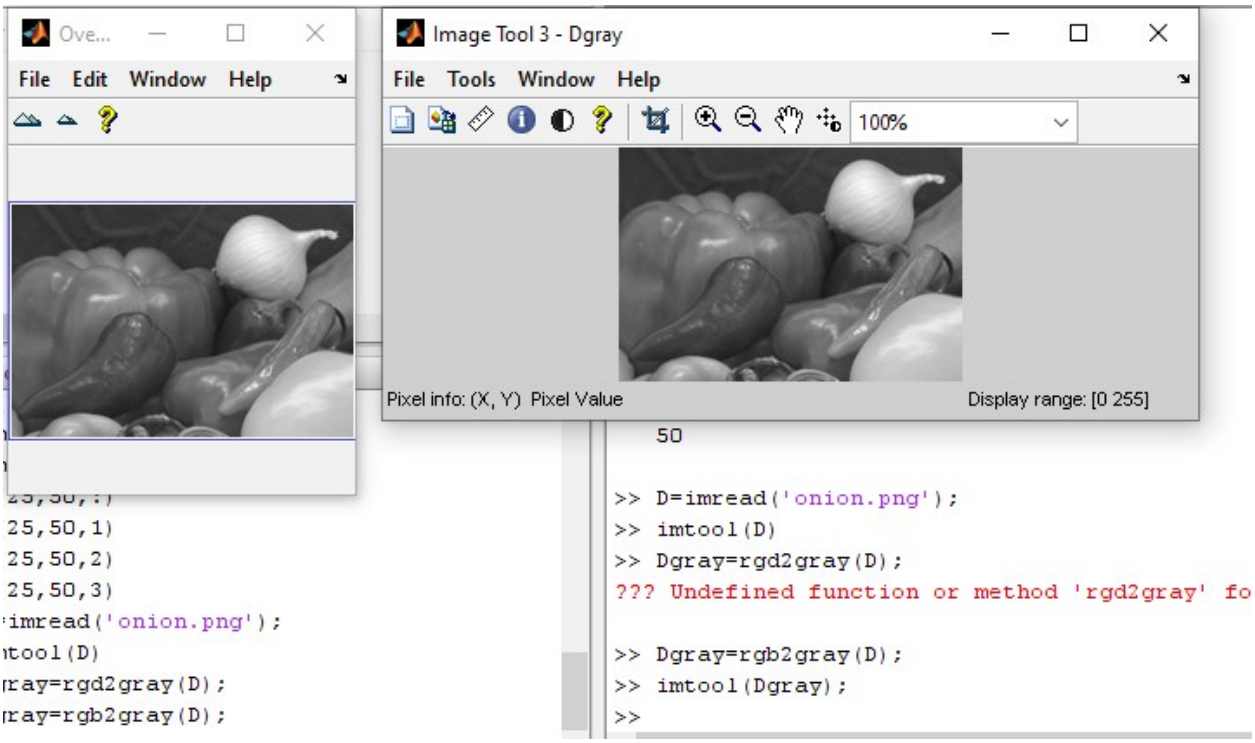
>> subplot(3,1,3); imagesc(D); axis image;



```
>> B=imread('cell.tif');
>> imtool(B)
>> B(25,50)=255;
>> imshow(D)
>> imtool(D)
>> D(25,50,:)
Ans (:, :,1) =46
ans(:,:,2) =29
ans(:,:,3) =50
>> D(25,50,1)
ans =46
>> D(25,50,2)
ans =29
>> D(25,50,3)
ans = 50
```

for finding another image:

```
>> D=imread('onion.png');
>> imtool(D)
>> Dgray=rgb2gray(D);
>> imtool(Dgray);
>> p=imread('A.jpg');
>> imtool(p)
```


Ove...
File Edit Window Help
Image Tool 3 - Dgray
File Tools Window Help
100%
Pixel info: (X, Y) Pixel Value
Display range: [0 255]
25,50,:)
25,50,1)
25,50,2)
25,50,3)
imread('onion.png');
tool(D)
ray=rgd2gray(D);
ray=rgb2gray(D);
50
>> D=imread('onion.png');
>> imtool(D)
>> Dgray=rgd2gray(D);
??? Undefined function or method 'rgd2gray' fo
>> Dgray=rgb2gray(D);
>> imtool(Dgray);
>>

Experiment-5: Image Filtering

```
>> ones(2)
ans =
1    1
1    1
>> ones(2,2)
ans =
1    1
1    1
```

low pass filter=average filter/mask filter>> (1/9.0)*ones(3)

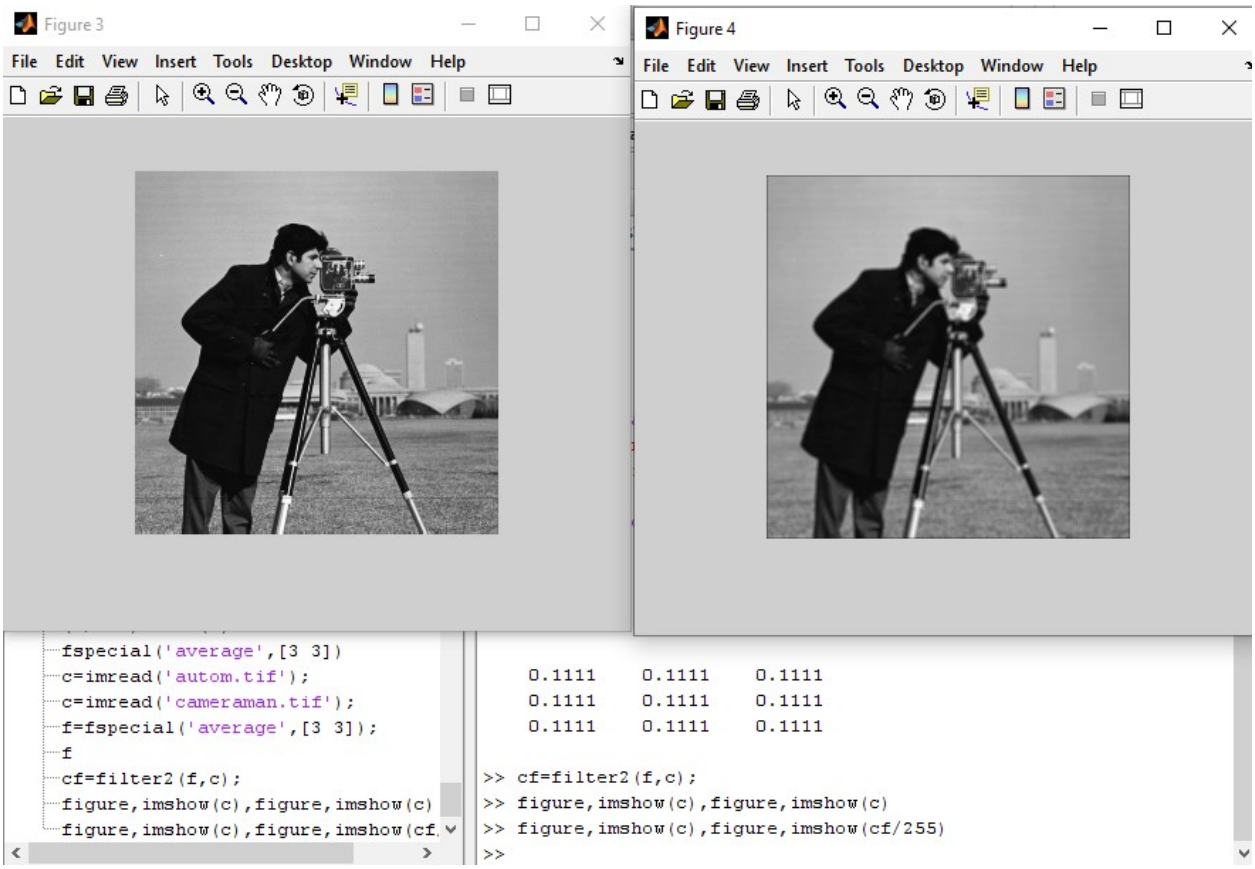
```
ans =

   0.1111   0.1111   0.1111
   0.1111   0.1111   0.1111
   0.1111   0.1111   0.1111

>> fspecial('average',[3 3])

ans =

   0.1111   0.1111   0.1111
   0.1111   0.1111   0.1111
   0.1111   0.1111   0.1111
```

for colour image :

Low pass filter:

code :

```
>> (1/9.0)*ones(3)
ans =

   0.1111    0.1111    0.1111
   0.1111    0.1111    0.1111
   0.1111    0.1111    0.1111
>> fspecial('average',[3 3])
ans =

   0.1111    0.1111    0.1111
   0.1111    0.1111    0.1111
   0.1111    0.1111    0.1111
>> c=imread('autom.tif');
Error using imread (line 350)
File "autom.tif" does not exist.
>> c=imread('cameraman.tif');
>> f=fspecial('average',[3 3]);
>> f
f =

   0.1111    0.1111    0.1111
   0.1111    0.1111    0.1111
   0.1111    0.1111    0.1111

>> cf=filter2(f,c);
>> figure,imshow(c),figure,imshow(c)
>> figure,imshow(c),figure,imshow(cf/255)
```

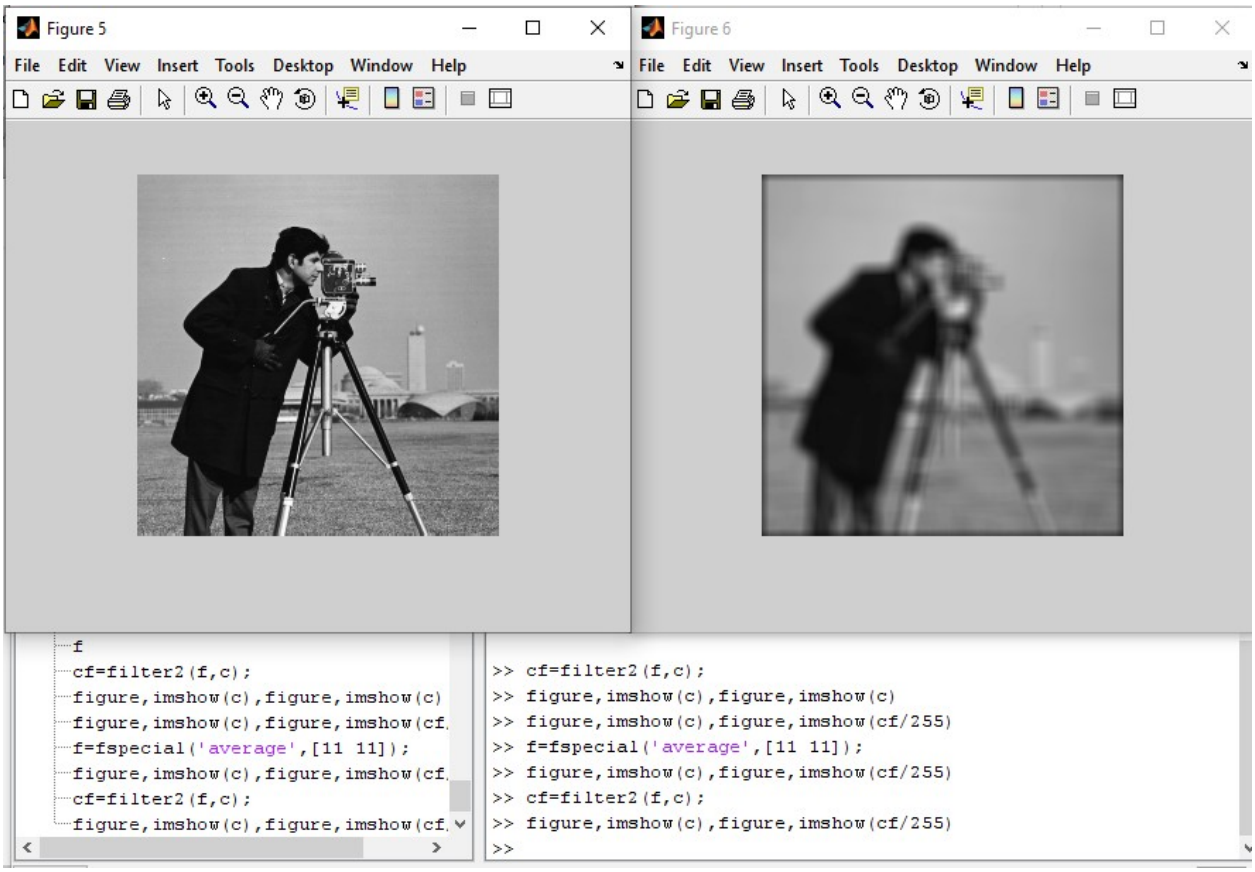


>> f=fspecial('average',[11 11]);

>> figure,imshow(c),figure,imshow(cf/255)

>> cf=filter2(f,c);

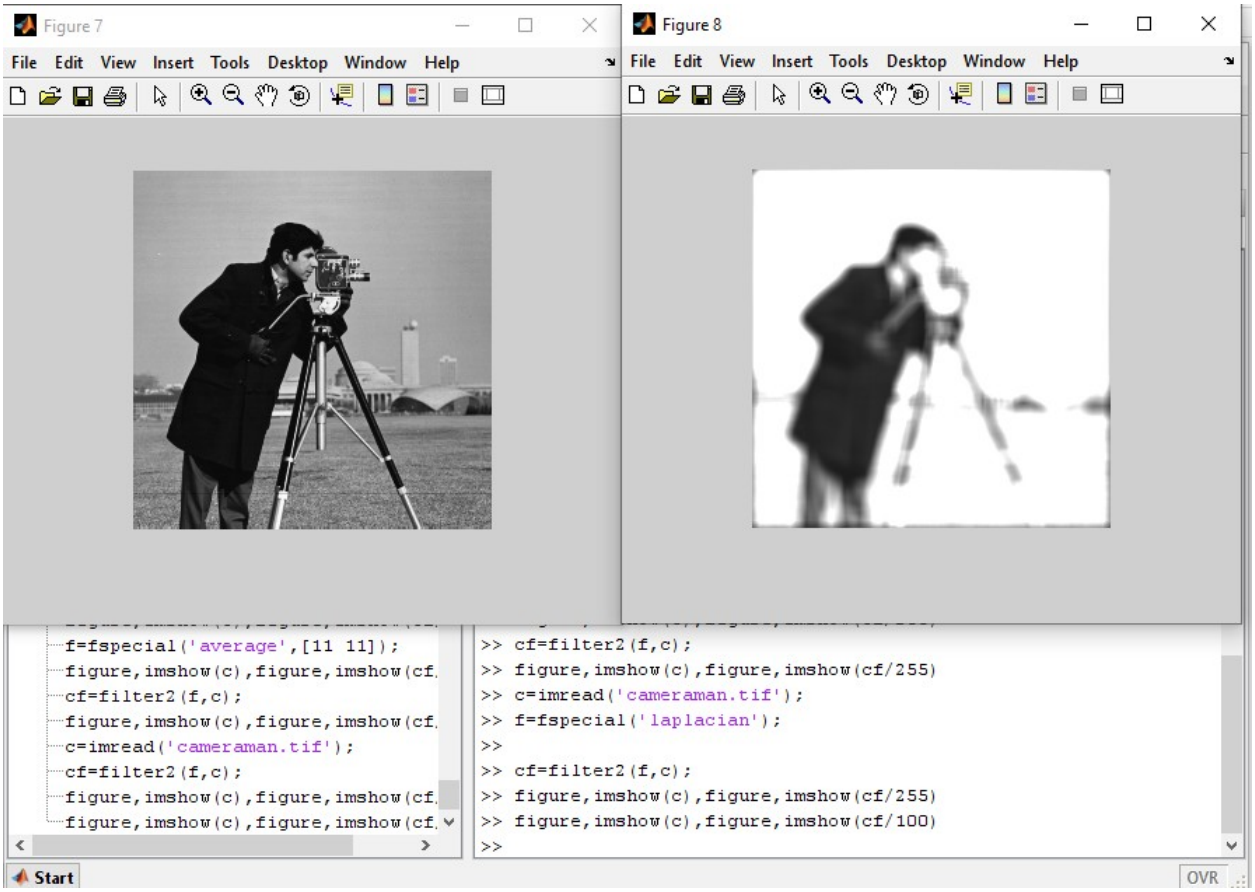
>> figure,imshow(c),figure,imshow(cf/255)



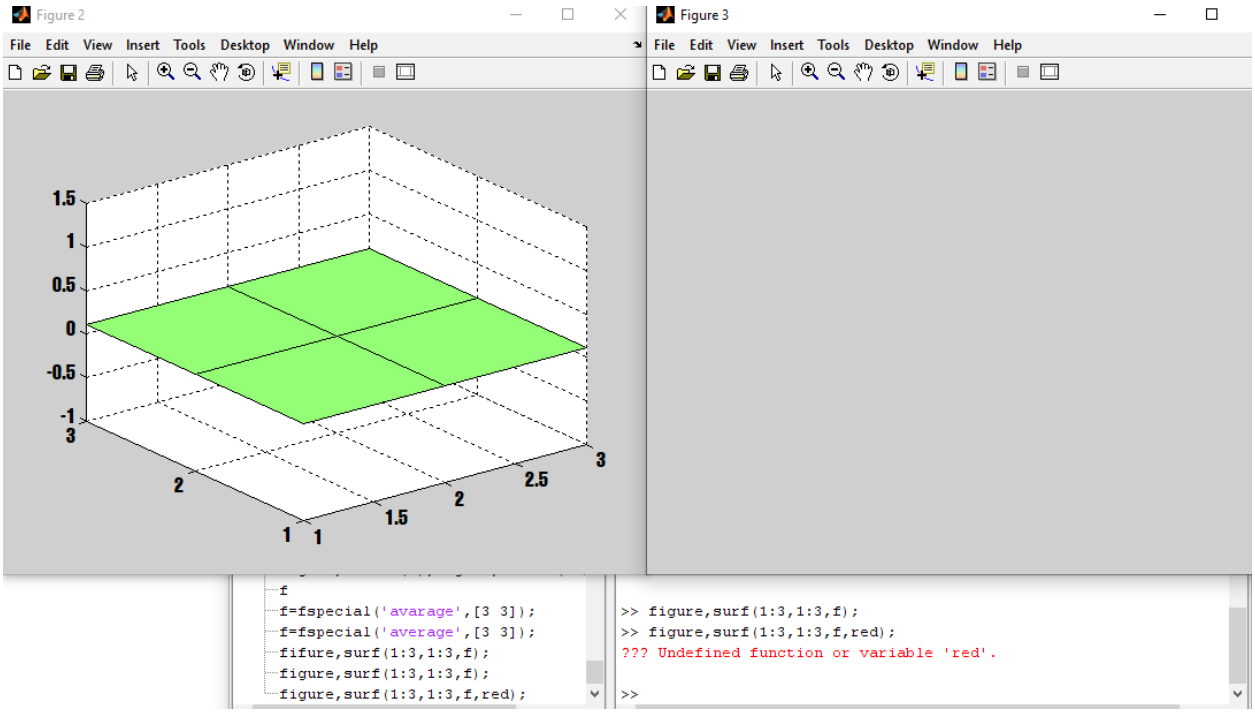
High pass filter:

laplas transform = High pass filter :

```
>> c=imread('cameraman.tif');
>> f=fspecial('laplacian');
>> cf=filter2(f,c);
>> figure,imshow(c),figure,imshow(cf/255)
>> figure,imshow(c),figure,imshow(cf/100)
```



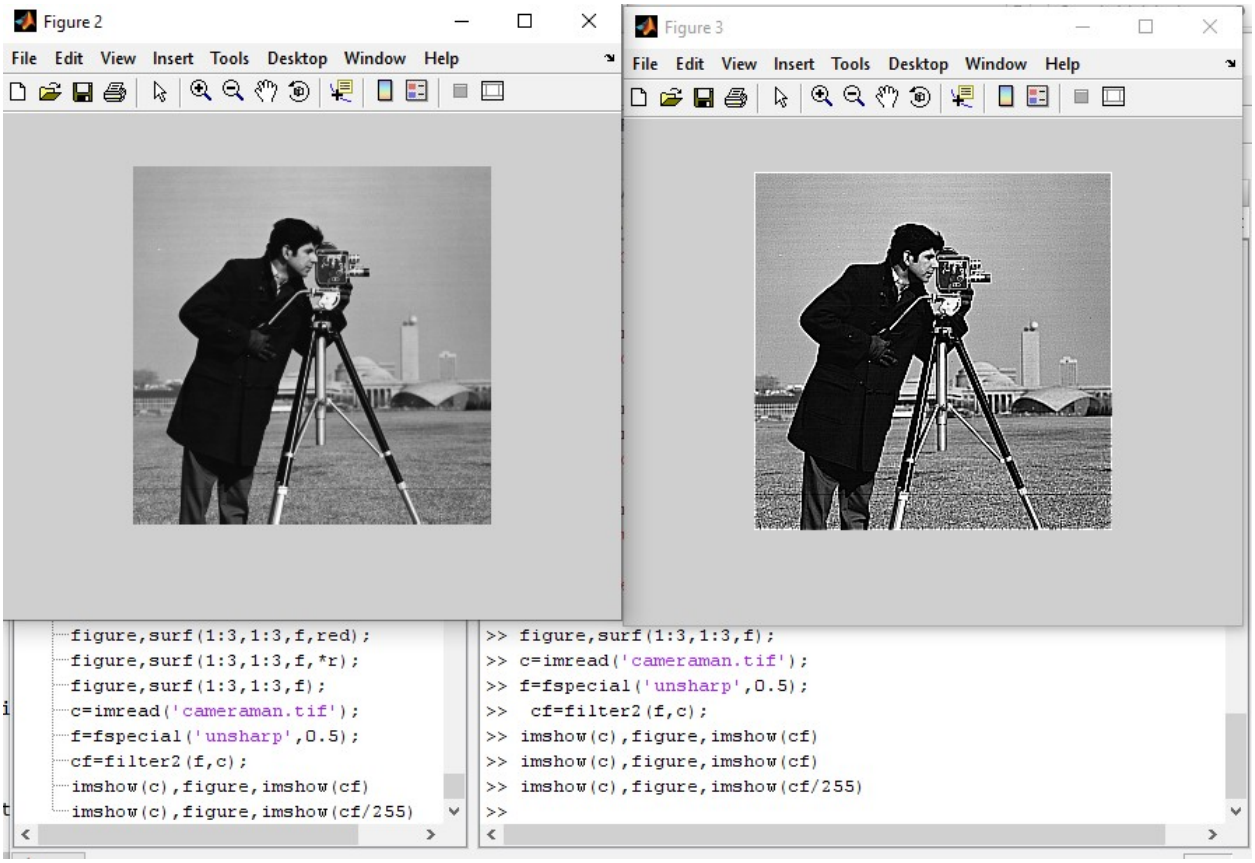

```
>> f

f =

    0.1667    0.6667    0.1667
    0.6667   -3.3333    0.6667
    0.1667    0.6667    0.1667

>> f=fspecial('avarage',[3 3]);
[type, p2, p3] = ParseInputs(varargin{:})
>> f=fspecial('average',[3 3]);
>> fifure,surf(1:3,1:3,f);
Undefined function or variable 'fifure'.
 >> figure,surf(1:3,1:3,f);
>> figure,surf(1:3,1:3,f,red);
```




```
>> figure,surf(1:3,1:3,f,*r);
 figure,surf(1:3,1:3,f,*r);
>> figure,surf(1:3,1:3,f);
>> f=fspecial('log');
>> f
f =
0.0448    0.0468    0.0564    0.0468    0.0448
0.0468    0.3167    0.7146    0.3167    0.0468
0.0564    0.7146   -4.9048    0.7146    0.0564
0.0468    0.3167    0.7146    0.3167    0.0468
0.0448    0.0468    0.0564    0.0468    0.0448
>> size(f)
ans =
5     5
>> figure, surf(1:5,1:5,f)
```

Unsharp Masking:

```
>> c=imread('cameraman.tif');
>> f=fspecial('unsharp',0.5);
>> cf=filter2(f,c);
>> imshow(c),figure,imshow(cf)
>> imshow(c),figure,imshow(cf/255)
```



for creating Linear Filter , we have to first vreate a identity ,atrix;

Linear filter is a all pass filter

Code:

```
>> id=[0 0 0 ; 0 1 1; 0 0 0];
>> id
```

```
id =

    0     0     0
    0     1     1
    0     0     0

>>
>>
>> f=fspecial('average');
>> hb1=3*id-2*f;
>> hb2=1.25*id-o.25*f;
 hb2=1.25*id-o.25*f;
            |
Error: Unexpected MATLAB expression.

>> hb2=1.25*id-0.25*f;
>> hb1

hb1 =

   -0.2222   -0.2222   -0.2222
   -0.2222    2.7778    2.7778
   -0.2222   -0.2222   -0.2222

>> (hb= high boss filter)
>> hb2 =

   -0.0278   -0.0278   -0.0278
   -0.0278    1.2222    1.2222
   -0.0278   -0.0278   -0.0278
```

```
>> id=[0 0 0 ; 0 1 1; 0 0 0];
>> id

id =

     0     0     0
     0     1     1
     0     0     0

>>
>>
>> f=fspecial('average');
>> hb1=3*id-2*f;
>> hb2=1.25*id-o.25*f;
 hb2=1.25*id-o.25*f;
             |
Error: Unexpected MATLAB expression.

>> hb2=1.25*id-0.25*f;
>> hb1

hb1 =

   -0.2222   -0.2222   -0.2222
   -0.2222    2.7778    2.7778
   -0.2222   -0.2222   -0.2222

>> hb2

hb2 =
```

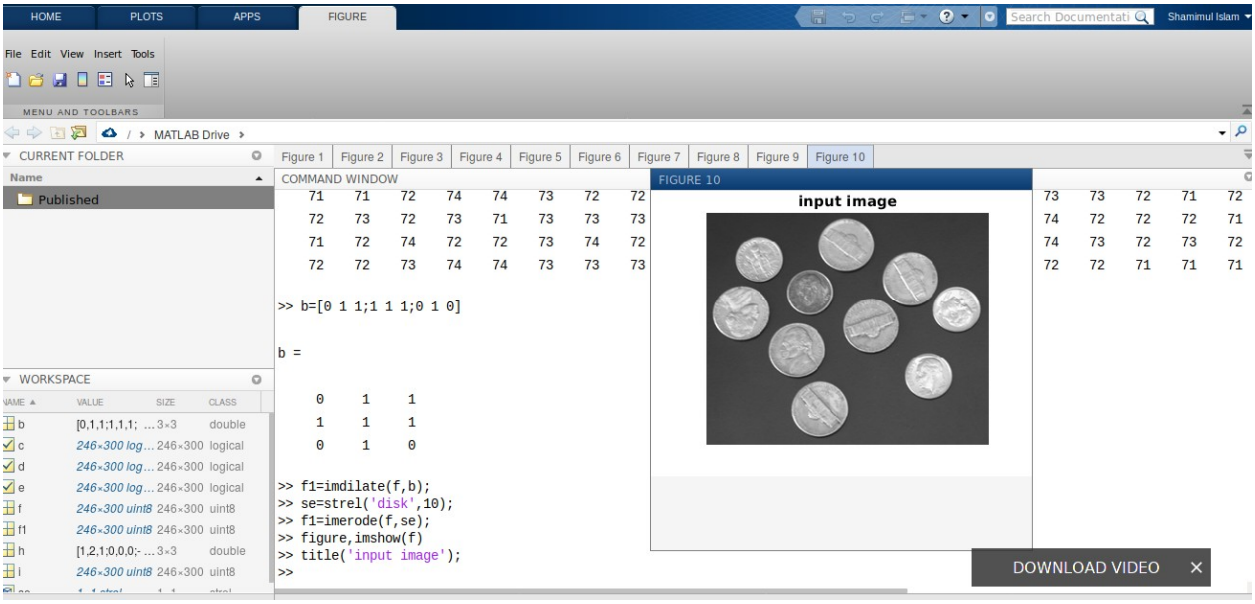
```
  -0.0278   -0.0278   -0.0278
  -0.0278    1.2222    1.2222
  -0.0278   -0.0278   -0.0278

>> hb2 =

  -0.0278   -0.0278   -0.0278
  -0.0278    1.2222    1.2222
  -0.0278   -0.0278   -0.0278
 hb2 =
     |
Error: Expression or statement is incomplete or incorrect.
>> figure,surf(1:3,1:3,hb1)
>> figure,surf(1:3,1:3,hb2)
>> figure,surf(1:5,1:5,hb1)
Error using surf (line 75)
Data dimensions must agree.

>> figure,surf(1:3,1:3,hb1)
>> figure,surf(1:3,1:3,hb2)
ROI= Resion of Interest
Code:
>> c=imread('cameraman.tif');
>> imtool(c)
>> c=imread('cameraman.tif');
>> roi=roipoly(c,[175 230 230 175],[100 100 185 185]);
>> imshow(roi)

>> f=fspecial('unsharp');
```

```
>> cf=roifilter2(f,c,roi);
Undefined function 'roifilter2' for input arguments of type 'uint8'.

>> cf=roifilt2(f,c,roi);
>> imshow(c),figure,imshow(cf)
```

Experiment 6: Erosion and Dilation

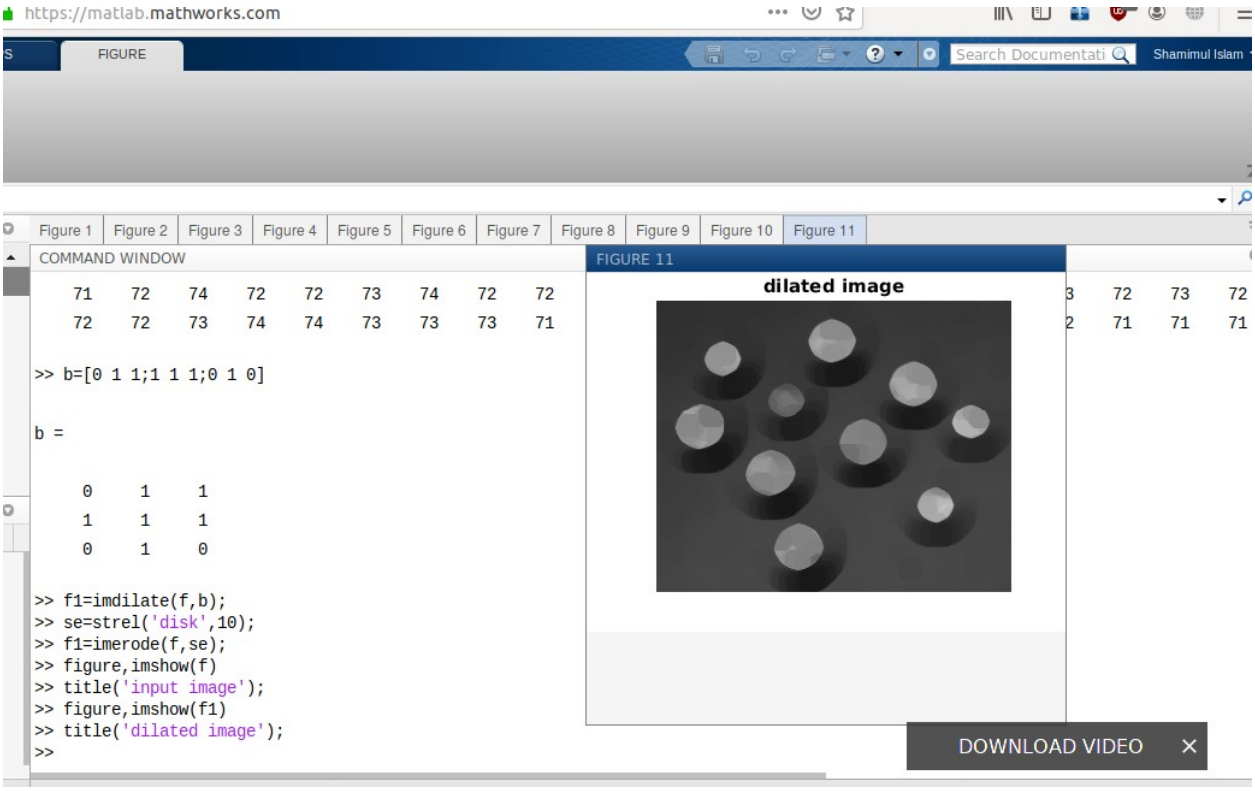
```
f=imread('coins.png')

b=[0 1 1;1 1 1;0 1 0]

f1=imdilate(f,b);

se=strel('disk',10);
f1=imerode(f,se);
figure,imshow(f)
title('input image');
```

output:




```
figure,imshow(f1)

title('dilated image');
```

output:



f2=imerode(f,se);

figure,imshow(f2)
title('Erroded image');
output:


https://matlab.mathworks.com
FIGURE
Search Documentati
Shamimul Islam
Figure 1
Figure 2
Figure 3
Figure 4
Figure 5
Figure 6
Figure 7
Figure 8
Figure 9
Figure 10
Figure 11
Figure 12
Figure 13
Figure 14
COMMAND WINDOW
0 1 1
1 1 1
0 1 0
>> f1=imdilate(f,b);
>> se=strel('disk',10);
>> f1=imerode(f,se);
>> figure,imshow(f)
>> title('input image');
>> figure,imshow(f1)
>> title('dilated image');
>> figure,imshow(f2)
Undefined function or variable 'f2'.
>> f2=imerode(f,se);
>> figure,imshow(f2)
>> title('Erroded image');
>> figure,imshow(f1)
>> title('dilated image');
>>
FIGURE 13
Erroded image
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