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Lab : signals

Assignment 1

Problem 1:

```
s=[150 150 150 160];
s=(s+10)+(s+10)*0.10
```

output

s =

176 176 176 187

Comment: Another answer is

```
s=(s+10)*1.1
```

Problem 2:

```
v=[2 8 7 3 1 0 8 9];
v2=[1 1 1 1 1 1 1 1];
v2(mod(v,2)==0)=-1
```

comment : we also can use for and if loop

output :

v2 =

-1 -1 1 1 1 -1 -1 1

Problem 3:

A:

```
v=[1;2;3;4;5;6;7;8;9;10];
v([end-2 : end ],:)=[v(end-2)+2 v(end-1)+2 v(end)+2]
```

output :

v =

1

2

3

4

5

6

7

10

11

12

B:

```
v=[1;2;3;4;5;6;7;8;9;10];
v(end-3 : end)=v([end end-1 end-2 end-3])
```

output :

1

2

3

4

5

6

10

9

8

7

C:

```
%problem C
v = [1; 2; 3; 4; 5; 6; 7; 8; 9; 10];
v(2:2:end) = v(2:2:end) + v(1:2:end-1)
```

output:

v =

1

3

3

7

5

11

7

15

9

19

Problem 4:

```
z=[(1:8).^2 ,(7:-1:1).^2]
```

output :

z =

1 4 9 16 25 36 49 64 49 36 25 16 9 4 1

Problem 5:

A:

```
%problem A
m=[1 2 3 4;-1 -2 -3 -4;1 2 3 4;-1 -2 -3 -4];
%we can use m2= fliplr(m)
m2(:,4)=m(:,1);
m2(:,1)=m(:,4);
m2(:,2)=m(:,3);
m2(:,3)=m(:,2);
m2
```

output :

m2 =

4	3	2	1
-4	-3	-2	-1
4	3	2	1
-4	-3	-2	-1

B:

```
%problem B
m=[1 2 3 4;-1 -2 -3 -4;1 2 3 4;-1 -2 -3 -4];
%we can use m3= flipud(m)
m3(1,:)=m(4,:);
m3(2,:)=m(3,:);
m3(3,:)=m(2,:);
m3(4,:)=m(1,:);
m3
```

output :

m3 =

-1	-2	-3	-4
1	2	3	4
-1	-2	-3	-4

1 2 3 4

C:

```
%problem c
m=[1 2 3 4;-1 -2 -3 -4;1 2 3 4;-1 -2 -3 -4];
m(:,[1 2 3 4])=m(:,[1 3 2 4])
```

output :

m =

1 3 2 4

-1 -3 -2 -4

1 3 2 4

-1 -3 -2 -4

D:

```
%problem D :
m=[1 2 3 4;-1 -2 -3 -4;1 2 3 4;-1 -2 -3 -4];
m([1 2 3 4],:)=m([4 2 3 1],:)
```

Output :

m =

-1	-2	-3	-4
-1	-2	-3	-4
1	2	3	4
1	2	3	4

E:

```
%problem e
m=[1 2 3 4;-1 -2 -3 -4;1 2 3 4;-1 -2 -3 -4];
m([1 2 3 4],[1 2 3 4])=m([1 3 4 2],[3 2 4 1])
```

output :

m =

3	2	4	1
3	2	4	1
-3	-2	-4	-1
-3	-2	-4	-1

Problem 6:

a):

```
m=[1 0 0 0 -1;2 0 0 0 -2;3 0 0 0 -3;4 0 0 0 -4;5 0 0 0 -5]
y=m'
```

output :

y =

1	2	3	4	5
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
-1	-2	-3	-4	-5

b):

```
z=y;
z([1 5],[4 5])=[2 1; -2 -1]
```

output :

z =

1	2	3	2	1

0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
-1	-2	-3	-2	-1

c):

```
%c
w=m;
w([1: end],[2:4])=100;
w([1: end],1)=w([1:end],1)*2;
 w([1: end],5)=w([1: end],5)*-1/10;
w
```

output :

w =

2.0000	100.0000	100.0000	100.0000	0.1000
4.0000	100.0000	100.0000	100.0000	0.2000
6.0000	100.0000	100.0000	100.0000	0.3000
8.0000	100.0000	100.0000	100.0000	0.4000
10.0000	100.0000	100.0000	100.0000	0.5000

Problem 7:

A):

```
%A
A=zeros(5);
B=zeros(5,1);
```

B)

```
%B
A(1,:)=[2 3 5 6 21];
 A(2,:)=[5 0 2 2 0];
 A(3,:)=[6 7 8 9 11];
 A(4,:)=[0 13 17 5 6];
 A(5,:)=[1 4 0 3 9]
```

C) :

```
 %C
B(:,1)=[152 ;19 ;135; 127; 66]
```

E) :

```
%e
if rank(A)==size(A)
    s=1
else
    s=0
end
```

F) :

```
%f
y=inv(A)*B
```

D):

If the rank is equal to number of unknowns then it is unique solution

Otherwise, they are independent

OUTPUT:

A =

2	3	5	6	21
5	0	2	2	0
6	7	8	9	11
0	13	17	5	6
1	4	0	3	9

B =

152
19
135
127
66

s =

1

y =

1.0000

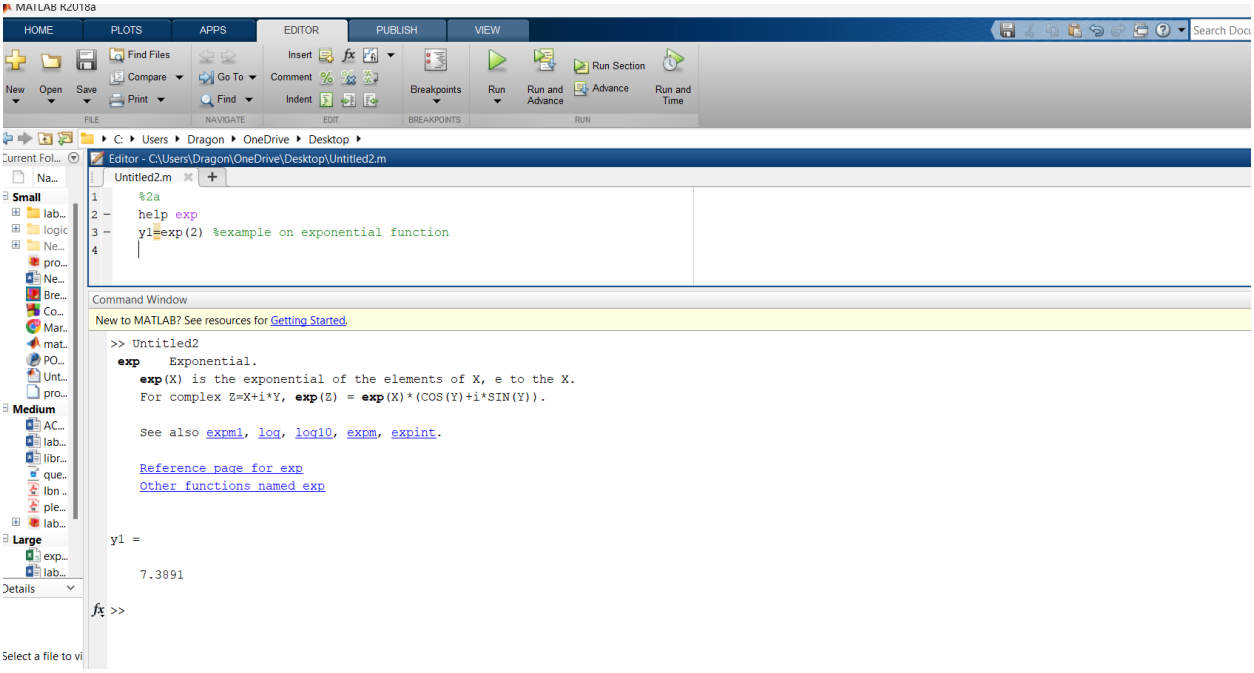
2.0000

3.0000

4.0000

5.0000

```
7 :2 A:
```



Example on exponential :

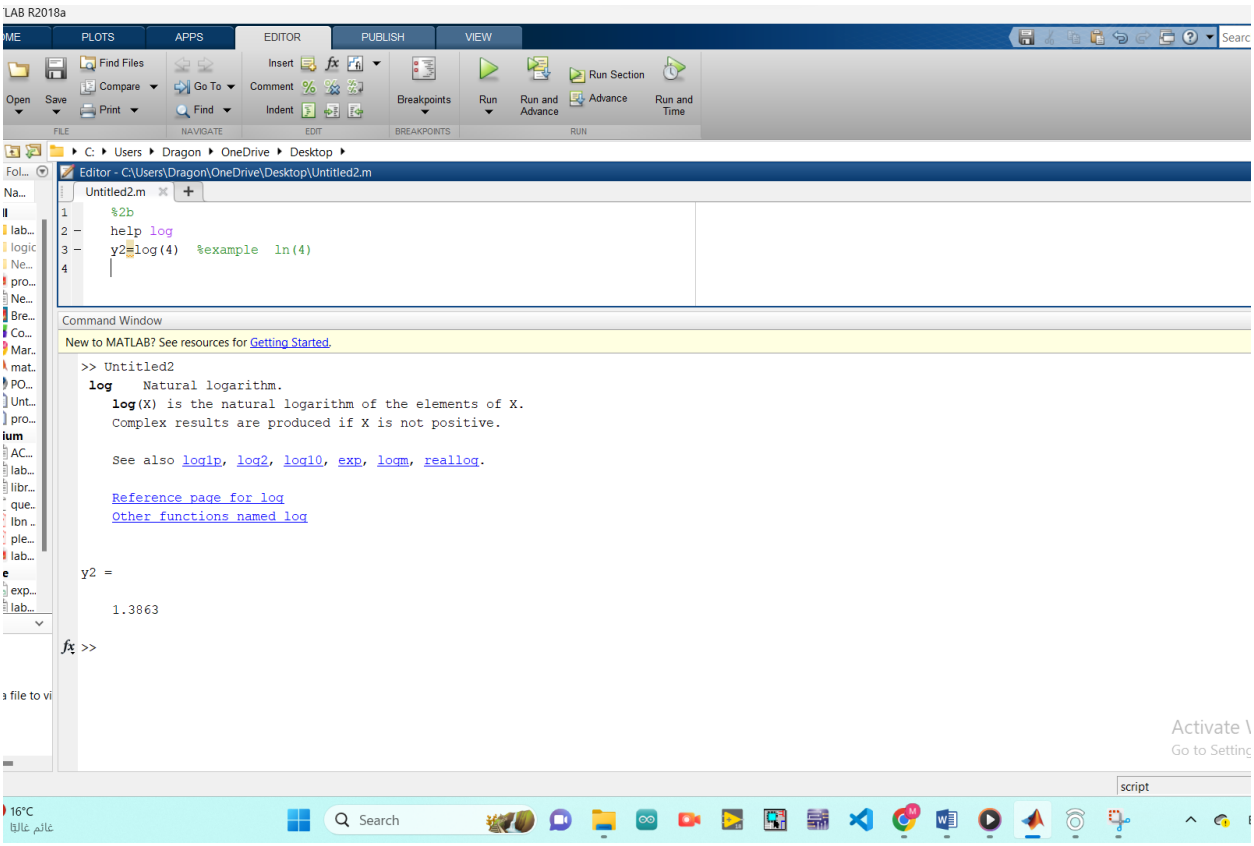
y=exp(2)

output :

y =

7.3891

7:2B:



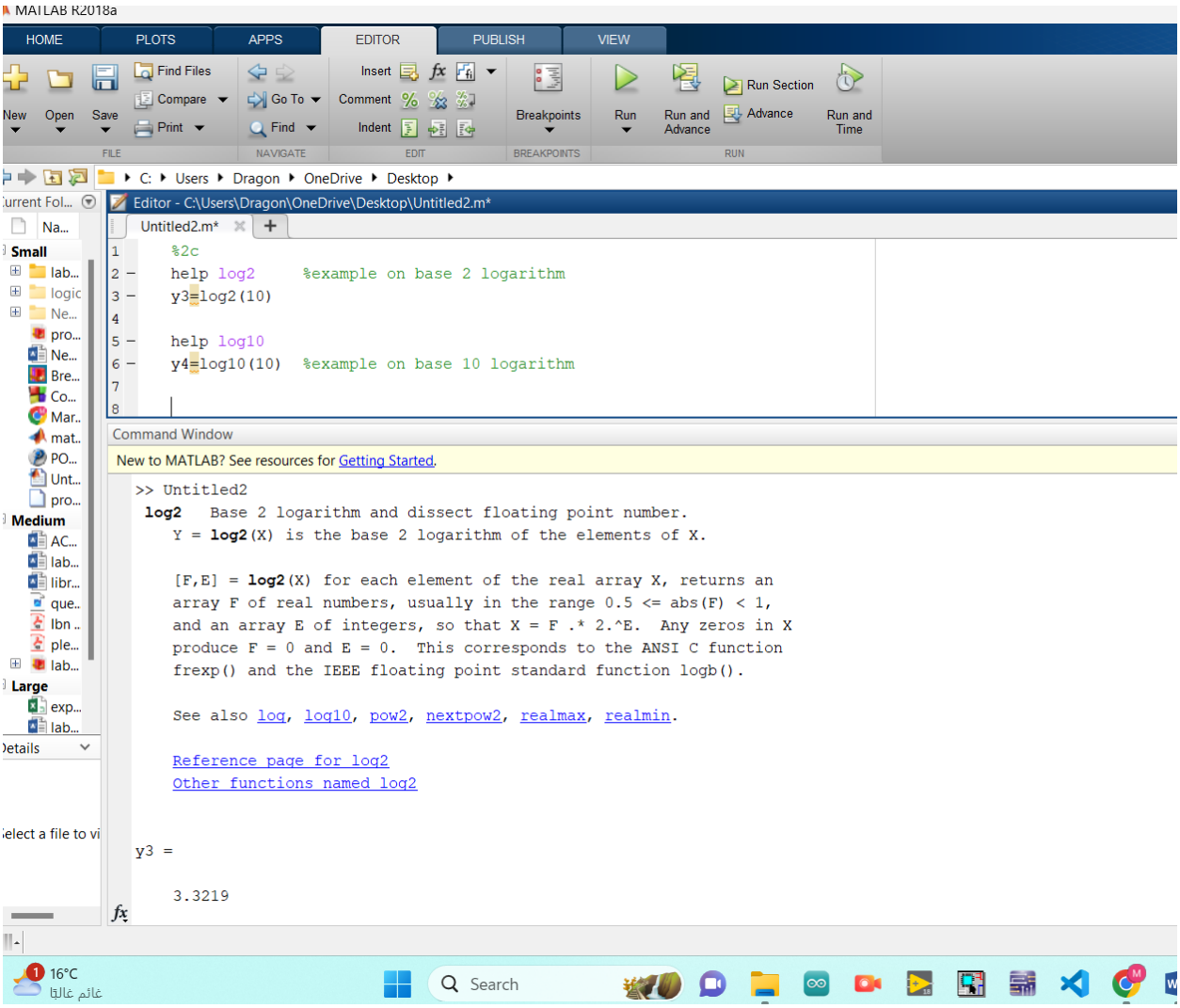
Example on ln on matlab :
y2=log(4)

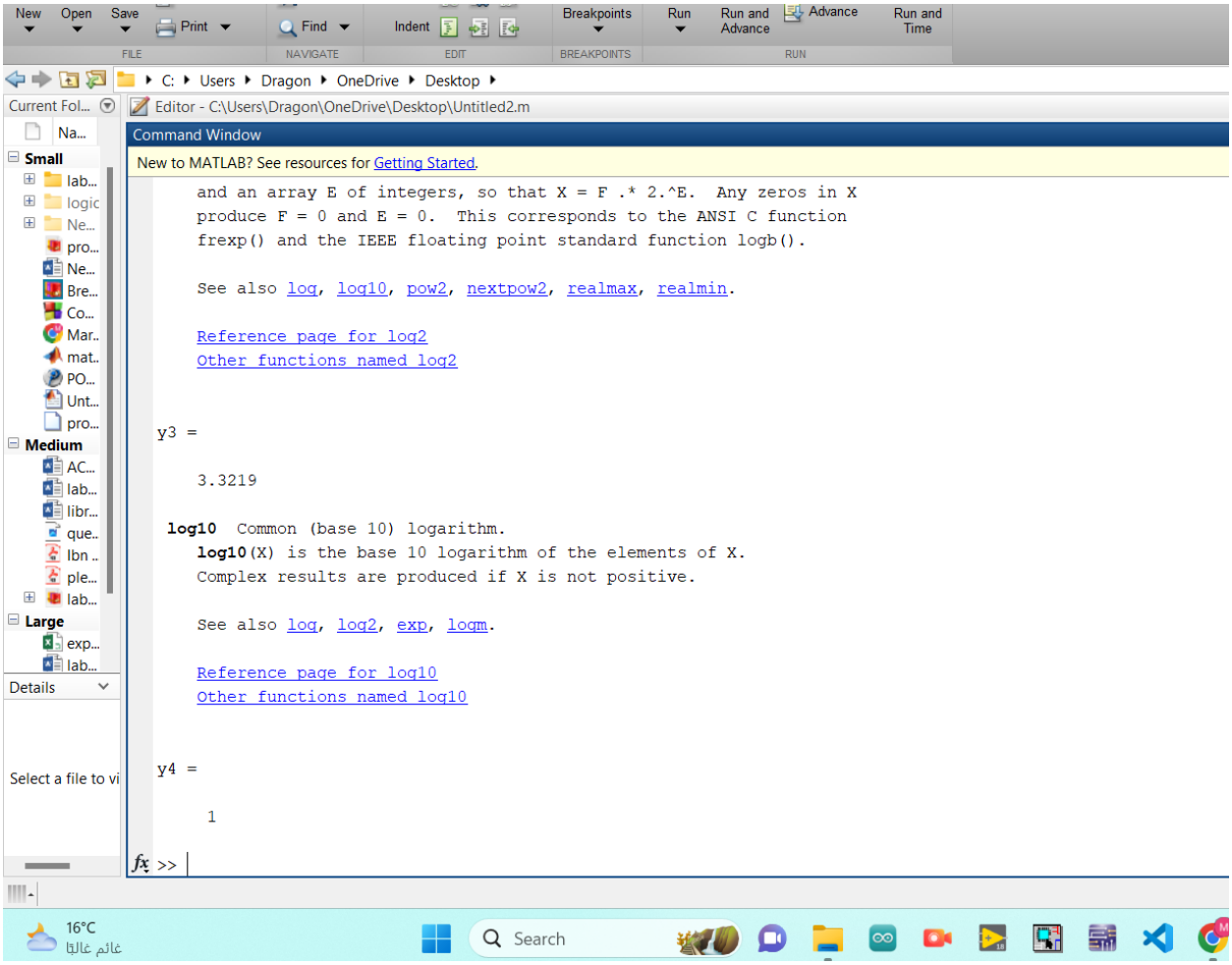
output :

y2 =

1.3863

7 2C:


MATLAB R2018a
HOME
PLOTS
APPS
EDITOR
PUBLISH
VIEW
New
Open
Save
Find Files
Compare
Print
Go To
Find
Insert
Comment
Indent
Breakpoints
Run
Run and Advance
Run Section
Advance
Run and Time
FILE
NAVIGATE
EDIT
BREAKPOINTS
RUN
C: ▸ Users ▸ Dragon ▸ OneDrive ▸ Desktop ▸
Editor - C:\Users\Dragon\OneDrive\Desktop\Untitled2.m*
Untitled2.m*
1 %2c
2 help log2 %example on base 2 logarithm
3 y3=log2(10)
4
5 help log10
6 y4=log10(10) %example on base 10 logarithm
7
8
Command Window
New to MATLAB? See resources for Getting Started.
>> Untitled2
log2 Base 2 logarithm and dissect floating point number.
Y = log2(X) is the base 2 logarithm of the elements of X.
[F,E] = log2(X) for each element of the real array X, returns an
array F of real numbers, usually in the range 0.5 <= abs(F) < 1,
and an array E of integers, so that X = F .* 2.^E. Any zeros in X
produce F = 0 and E = 0. This corresponds to the ANSI C function
frexp() and the IEEE floating point standard function logb().
See also log, log10, pow2, nextpow2, realmax, realmin.
Reference page for log2
Other functions named log2
y3 =
3.3219
Small
Medium
Large
Search
16°C



Example on base 2 logarithm :

```
y3=log2(10)
```

output :

y3 =

3.3219

Example on base 10 :

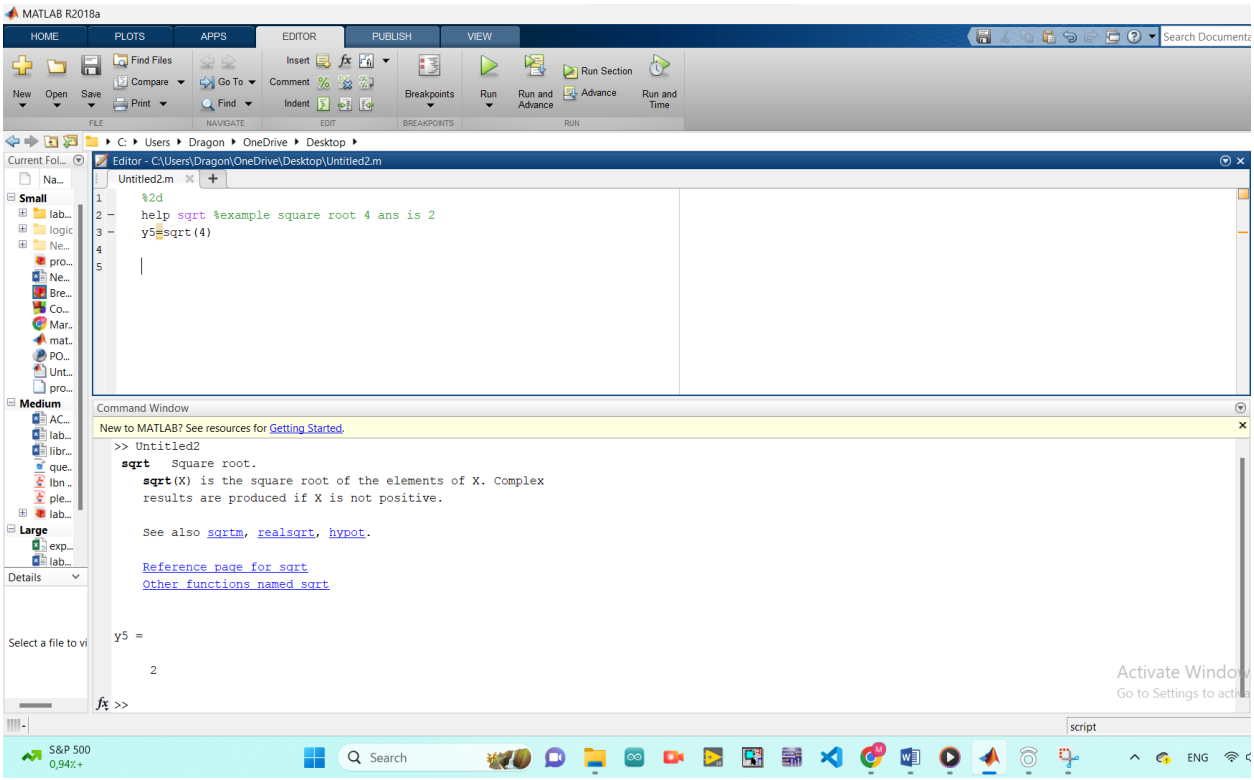
```
y4=log10(10)
```

output :

y4 =

1

7 2 D:



Example on square root :

```
y5=sqrt(4)
```

output :

y5 =

2

7 2E:

Sound function :

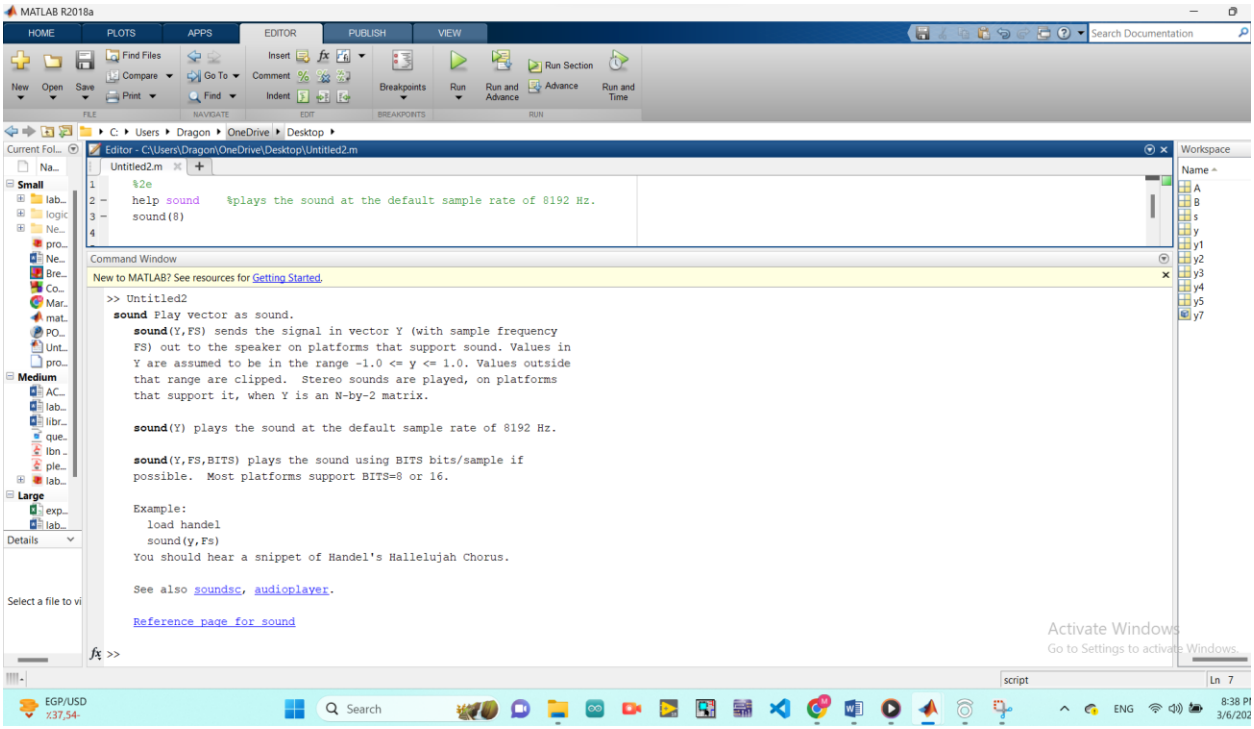
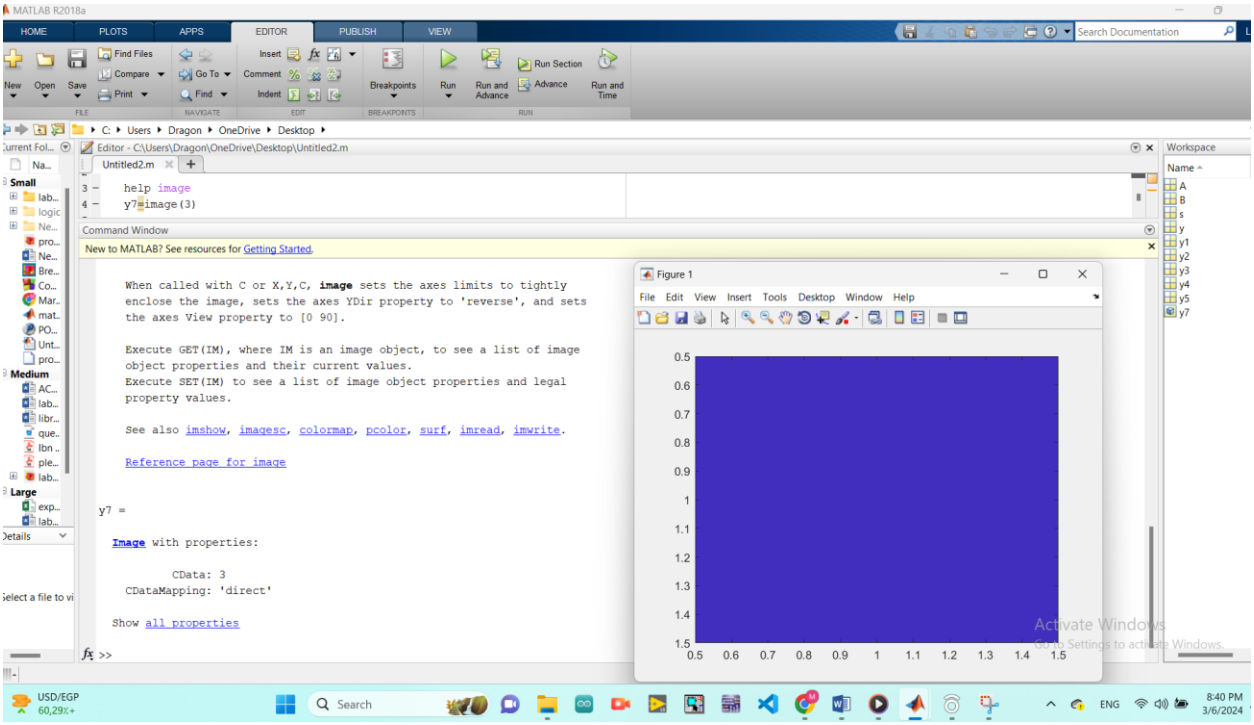


Image function:


MATLAB R2018a
HOME
PLOTS
APPS
EDITOR
PUBLISH
VIEW
Search Documentation
New
Open
Save
Find Files
Compare
Print
Go To
Find
Insert
Comment
Indent
Breakpoints
Run
Run and Advance
Run Section
Advance
Run and Time
C: ▸ Users ▸ Dragon ▸ OneDrive ▸ Desktop ▸
Editor - C:\Users\Dragon\OneDrive\Desktop\Untitled2.m
Untitled2.m
3 — help image
4 — y7=image(3)
Command Window
New to MATLAB? See resources for Getting Started.
When called with C or X,Y,C, image sets the axes limits to tightly enclose the image, sets the axes YDir property to 'reverse', and sets the axes View property to [0 90].
Execute GET(IM), where IM is an image object, to see a list of image object properties and their current values.
Execute SET(IM) to see a list of image object properties and legal property values.
See also imshow, imagesc, colormap, pcolor, surf, imread, imwrite.
Reference page for image
y7 =
Image with properties:
CData: 3
CDataMapping: 'direct'
Show all properties
fx >>
Figure 1
File Edit View Insert Tools Desktop Window Help
0.5 0.6 0.7 0.8 0.9 1 1.1 1.2 1.3 1.4 1.5
Workspace
Name
A
B
s
y
y1
y2
y3
y4
y5
y7
Activate Windows
Go to Settings to activate Windows.
USD/EGP
60,29
Search
ENG
8:40 PM
3/6/2024