

Lab Sheet 1 – ANSWER SHEET

Introduction to Matlab

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Ex.1: Declaring variables

Complete the following table:

	Output Obtained	Type of Output		Output Obtained	Type of Output
a	a = 1	scalar	d	d = 1 2 3	column vector
b	b = 1 2 3	row vector	e	e = 1 2 3	column vector
c	c = 1 2 3	row vector	f	f = 1 2 3 4 5 6 7 8 9	matrix

Which variables are exactly the same?

The same: b&c d&e

What is the purpose of the ans variable in Matlab?

When you run code that returns output without specifying an output parameter, MATLAB creates the ANS variable and stores the output in it.

What is the purpose of the semi-colon at the end of a command in Matlab?

Line feed.

Ex.2: Manipulating variables

Complete the following table:

	Output Obtained		Output Obtained
b1	b1 = 1	f1	f1 = 1 2 3
b2	b2 = 1 2	f2	f2 = 1 2 3 4 5 6
b3	b3 = 2 3	f3	f3 = 2 3 5 6 8 9
b4	b4 = 1 2 1 3	f4	f4 = 1 2 4 5

What does the command `f(:,:)` return?

ans =

1 2 3

```
4 5 6
7 8 9
```

What command would generate the matrix $\begin{bmatrix} 5 & 8 \\ 6 & 9 \end{bmatrix}$ from the existing matrix f?

```
f(2:3,2:3)'
```

Ex.3: Generating sequences

Give the output for each of the following sequences:

```
seq1:
```

```
seq1 =
```

```
1 3 5 7 9
```

```
seq2:
```

```
seq2 =
```

```
Columns 1 through 5
```

```
1.0000 1.1000 1.2000 1.3000 1.4000
```

```
Column 6
```

```
1.5000
```

```
seq3:
```

```
seq3 =
```

```
8 7 6 5 4 3 2
```

```
seq4:
```

```
seq4 =
```

```
0 1 2 3 4 5
```

What command would generate the sequence -3, 0, 3, 6, 9, 12?

>> -3:3:12

Ex.4: Performing calculations

Complete the following table:

	Output Obtained		Output Obtained
a_new	a_new = 3	sum_f1	sum_f1 = 2 4 6 8 10 12 14 16 18
bc1	bc1 = 2 4 6	sum_f2	sum_f2 = 2 4 6 8 10 12 14 16 18
bc2	bc2 = 4 8 12	prod_f1	prod_f1 = 30 36 42 66 81 96 102 126 150

Complete the following table:

	Output Obtained (if applicable)	Explain in words (briefly), what has actually occurred
c1	inapplicable	Incorrect use of * Internal matrix dimensions must be consistent

c2	c2 = 1 4 9	normal operation The dot makes that multiply the corresponding positions in two matrices
c3	inapplicable	Incorrect use of ^ input must be scalar and square To POWER by element, use POWER (.^) instead
c4	c4 = 1 4 9	normal operation The dot makes that multiply the corresponding positions in two matrices
c5	c5 = 1 4 27	normal operation The numbers in the latter matrix are powers of the corresponding numbers in the previous matrix

Ex.5: Useful commands - who, whos, clear all and clc:

In your own words, explain the difference between the who and whos commands:

who: Use to list all variable names in the current workspace

whos: Use to list all variables in the current workspace, as well as their name size (such as the column dimension of a matrix or array) in bytes, and other attributes

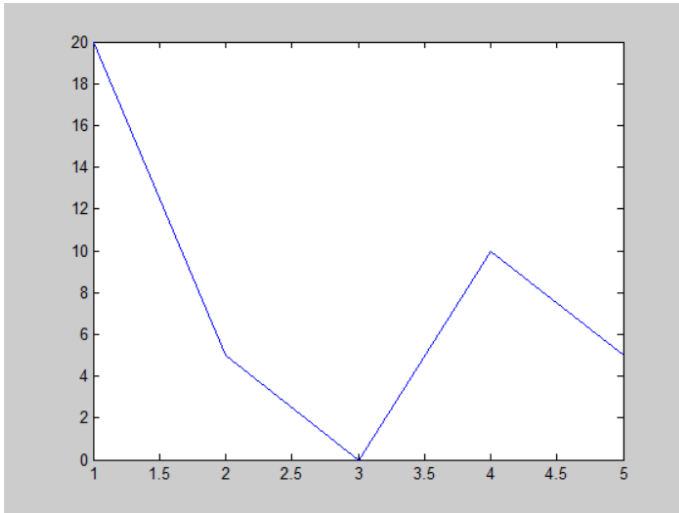
What exactly does the clear all command do?

close all the Figure windows

What exactly does the clc command do?

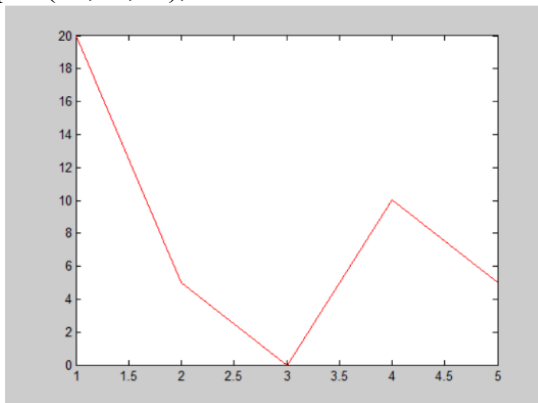
Clear the data from the command line window

Ex.6: Simple plots

Plot of x_1 v x_2 attached? Yes / No

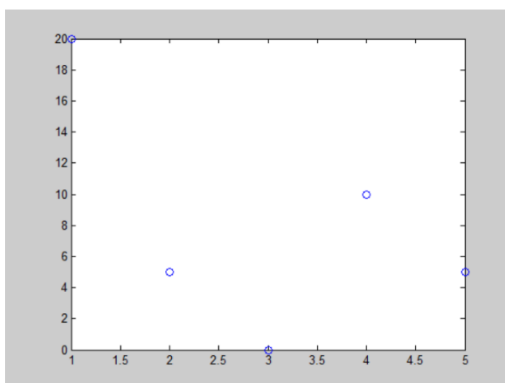
Comment on the effect of each of the following commands on your plot (you do NOT need to provide a new plot in each case):

`plot(x1,x2,'r');` -



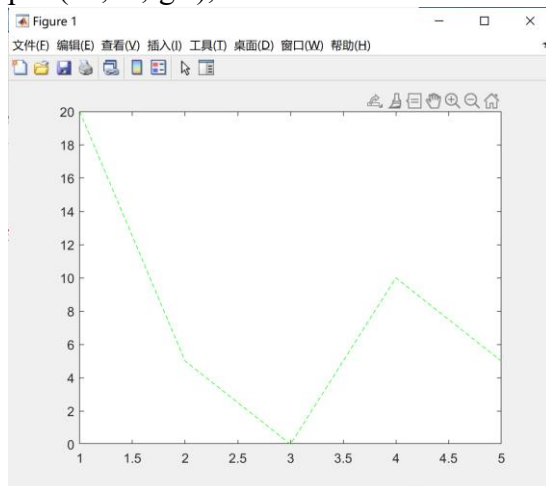
make no difference

`plot(x1,x2,'o');` -



Form a mark at each inflection point

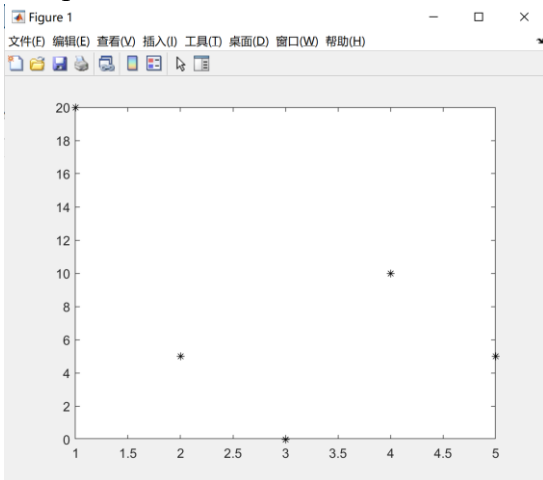
```
plot(x1,x2,'g-'); -
```



The graph becomes a green line

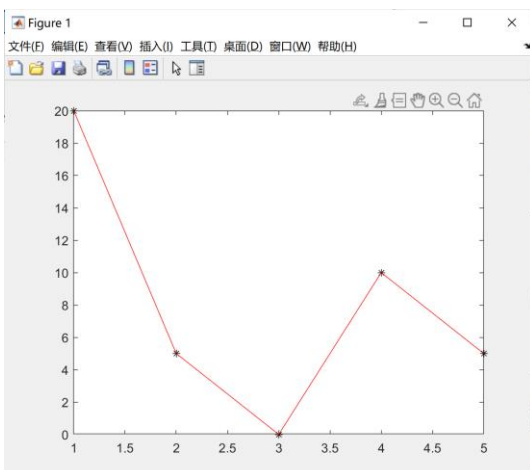
New plot of x1 v x2 attached?

Yes



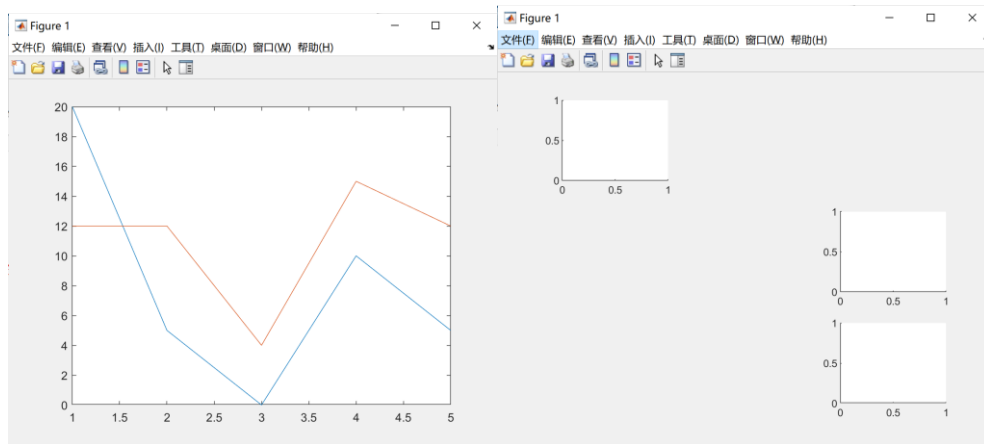
Plot of x1 v x2 and x3 attached?

Yes



Plot of subplots attached?

Yes



What does m, n and x represent in the command subplot(mnx)?

M is the row

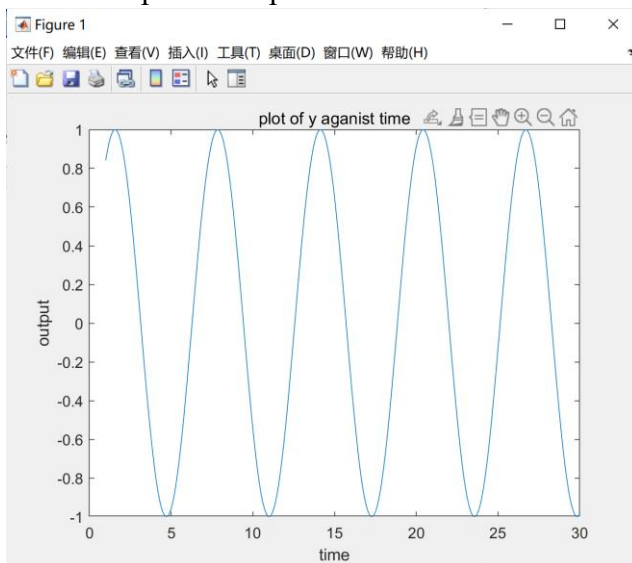
n is the column

X is its location

Ex.7: m-files as scripts

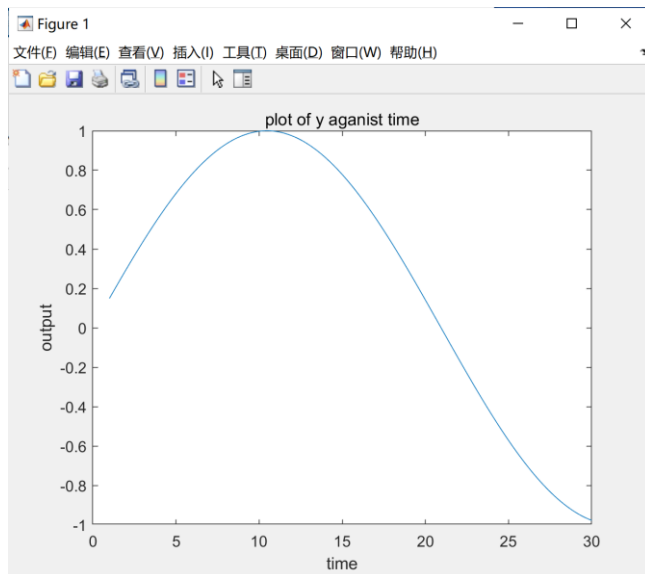
Plot of output of testplot.m attached?

Yes



Plot of output of modified testplot.m attached?

Yes



Explain, in your own words, the benefit of using m-files:

M file is equivalent to programming space, it is written in the contents of the saved can be run directly. The M file makes it easy to call a function multiple times.

Ex.8: m-file function

Complete the following table:

	Output Obtained		Output Obtained
z1	-1	z3	-1 11 31
z2	31	z4	11 -1 -5 -1 11

Summarise in your own words the significance of the comments immediately after the function declaration in an m-file function:

When we have finished the function declaration in an m-file function, we will gain much more time, and reduce the possibility of mistaking about our code.

Ex.9: Saving and loading data

What command with you use to save the variables z1 and z4 only to the file lab_data.mat?

save('lab_data.mat', 'z1', 'z');

What command with you use to load this data back into Matlab when needed?

Load ('lab_data.mat');