MATLAB Onramp

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Summary of MATLAB Onramp

Basic Syntax

Example	Description
x = pi	Create variables and assign values with the equal sign (`=`). The left side (`x`) is the variable name, and the right side (`pi`) is its value.
y = sin(-5)	Provide inputs to a function using parentheses.

Desktop Management

Function	Example	Description
save	save data.mat	Save your current workspace to a MAT-file.
load	load data.mat	Load the variables in a MAT-file to the workspace.
clear	clear	Clear all variables from the workspace.
clc	clc	Clear all text from the Command Window.
format	format long	Change how numeric output appears in the Command Window.

Array Types

Example	Description
4	scalar
[3 5]	row vector
[1;3]	column vector
[3 4 5; 6 7 8]	matrix

Evenly Spaced Vectors

Example	Description
1:4	Create a vector from `1` to `4`, spaced by `1`, using the colon operator (`:`).
1:0.5:4	Create a vector from `1` to `4`, spaced by `0.5`.
linspace(1,10,5)	Create a vector with `5` elements. The values are evenly spaced from `1` to `10`.

Matrix Creation

Example	Description
rand(2)	Create a square matrix with `2` rows and `2` columns.
zeros(2,3)	Create a rectangular matrix with `2` rows and `3` columns of `0`s.
ones(2,3)	Create a rectangular matrix with `2` rows and `3` columns of `1`s.

Array Indexing

Example	Description
A(end,2)	Access the element in the second column of the last row.
A(2,:)	Access the entire second row.
A(1:3,:)	Access all columns of the first three rows.

| A(2) = 11 | Change the value of the second element of an array to 11. |

Array Operations

Example	Description

`[1 2; 3 4] + 1`
 	
`ans =`
 	
　　2　　3
　　4　　5
	Perform [array addition]().

`[1 1; 1 1]*[2 2; 2 2]`
 	
`ans =`
 	
　　4　　4
　　4　　4
	Perform [matrix multiplication]().

`[1 1; 1 1].*[2 2; 2 2]`
 	
`ans =`
 	
　　2　　2
　　2　　2
	Perform [element-wise multiplication]().

Multiple Outputs

Example	Description
`[xrow,xcol] = size(x)`	Save the number of rows and columns in x to two different variables.
`[xMax,idx] = max(x)`	Calculate the maximum value of x and its corresponding index value.

Documentation

Example	Description
`doc randi`	Open the documentation page for the randi function.

Plots

Example	Description
`plot(x,y,"ro--","LineWidth",5)`	Plot a red (r) dashed (--) line with a circle (o) marker, with a heavy line width.
`hold on`	Add the next line to the existing plot.
`hold off`	Create new axes for the next plotted line.
`title("My Title")`	Add a title to a plot.
`xlabel("x")` `ylabel("y")`	Add labels to axes.
`legend("a","b","c")`	Add a legend to a plot.

Tables

Example	Description
`data.HeightYards`	Extract the variable HeightYards from the table data.

`data.HeightMeters = data.HeightYards*0.9144`	Derive a table variable from existing data.

Logical Indexing

Example	Description
`[5 10 15] > 12`	Compare the elements of a vector to the value `12`.
`v1(v1 > 6)`	Extract all elements of `v1` that are greater than `6`.
`x(x==999) = 1`	Replace all values in `x` that are equal to `999` with the value `1`.

Programming

Example	Description

```if x > 0.5```
```   y = 3```
```else```
```   y = 4```
```end```
	If `x` is greater than `0.5`, set `y` to `3`.
	
	Otherwise, set `y` to `4`.

```for c = 1:3```
```   disp(c)```
```end```
	The loop counter (`c`) progresses through the values `1:3` (`1`, `2`, and `3`).
	
	The loop body displays each value of `c`.