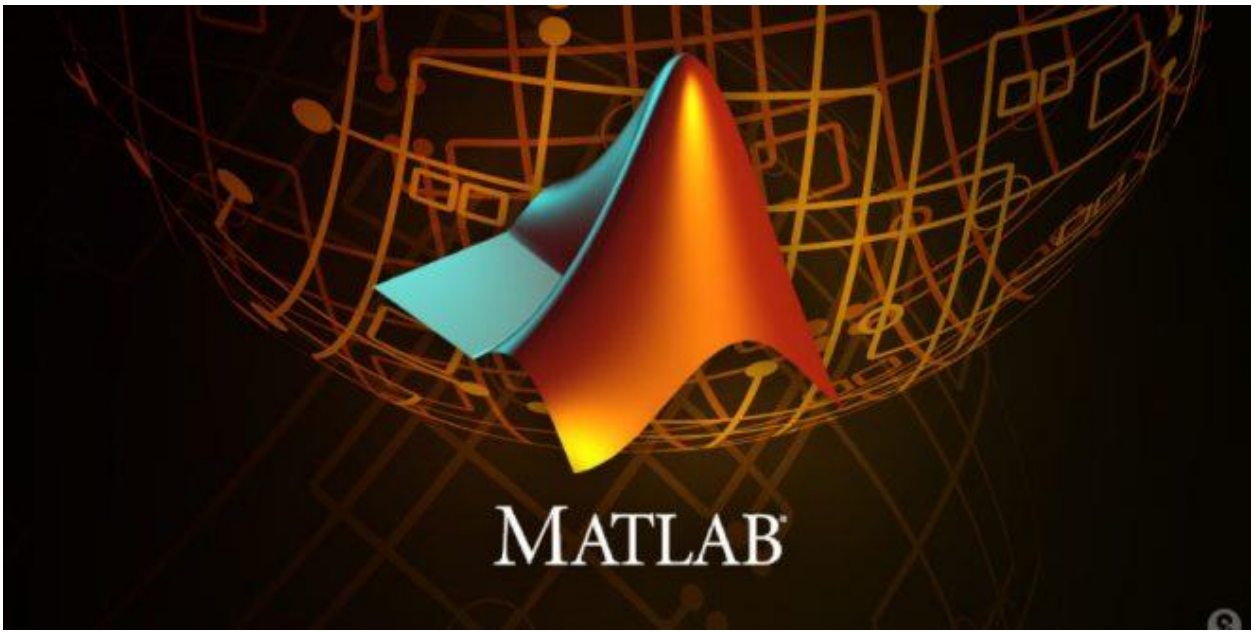
Course N°03

Matrix in

MATLAB

Cont. and end



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1.Operations with matrices

One of the advantages of MATLAB is the ability to directly use pre-defined mathematical operations $(+,-,/,\times)$ for matrices. To illustrate this special feature, consider two matrices, a and b, of 3 by 3 elements.

1.1.Addition of matrices

You can add two matrices direct. Both matrices must have the same dimension or number of elements which mean both number of row and columns should be equal in the two matrices (pay attention to dimensions which should be similar or the same).

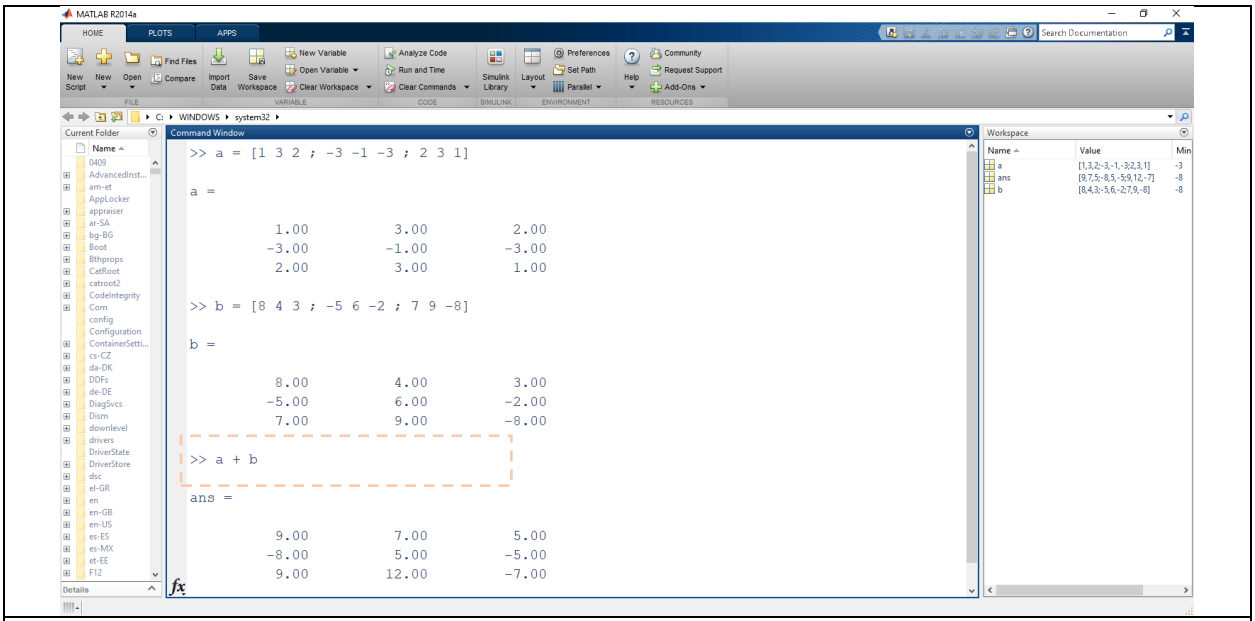

Fig 1. The sum of two matrices a and b

1.2.Subtraction of matrices

Is the difference between two matrices or more, whose defined in MATLAB by the following way.

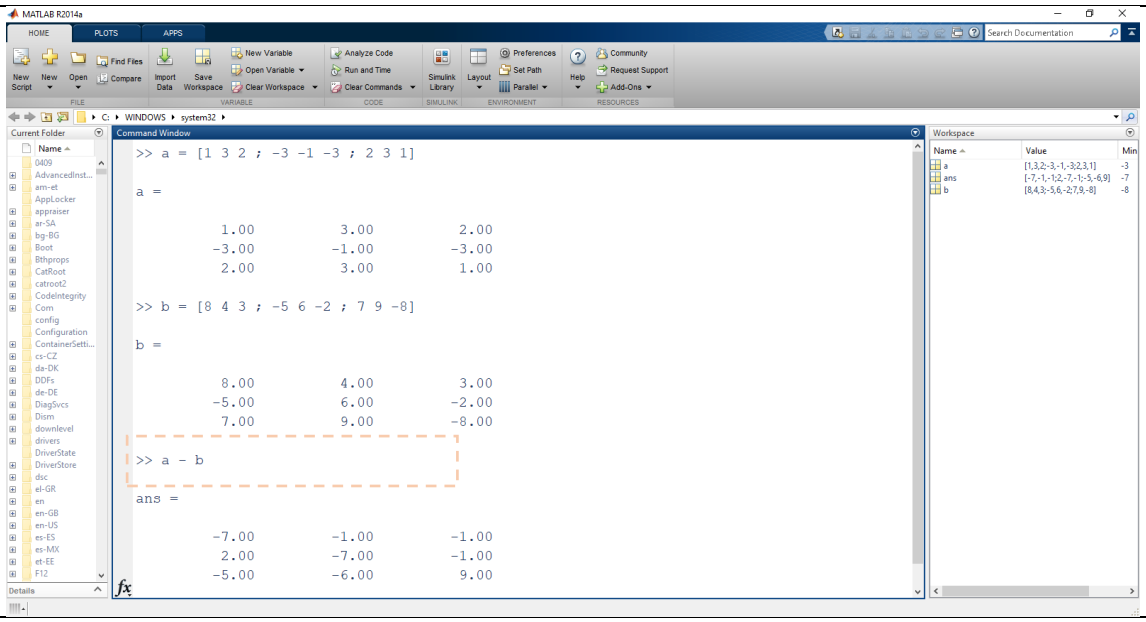

Fig 2. The difference of the two matrices a and b

1.3.Multiplication of matrices

A matrix product or multiplication is noted * and is defined if the number of columns in the first matrix is equal to number of rows in the second matrix; for example, we have the matrix product

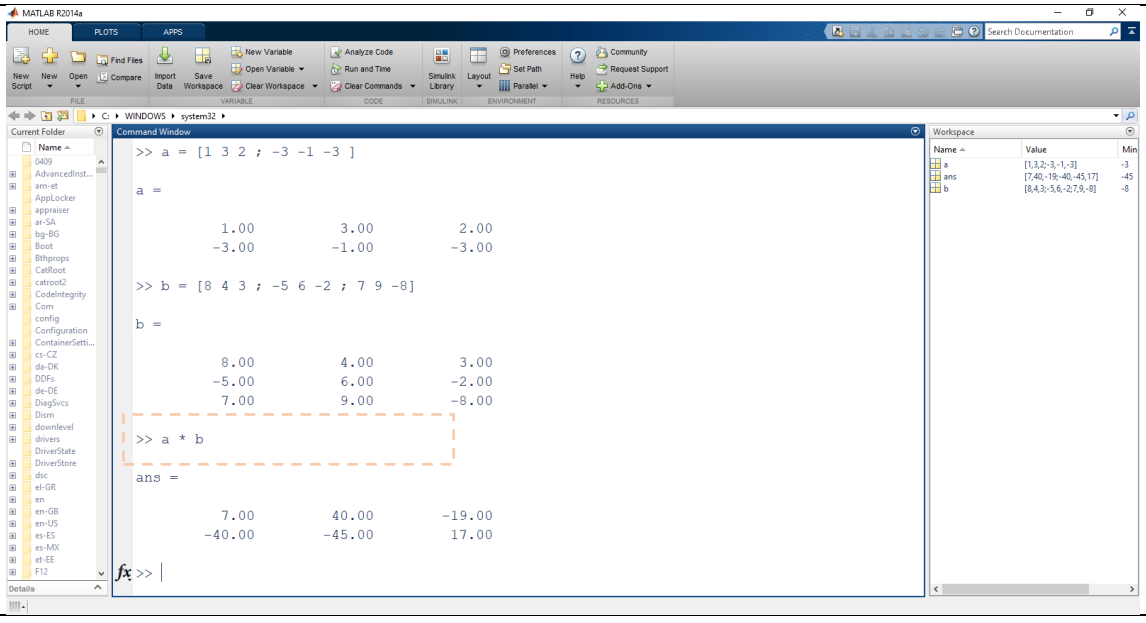

Fig 3. The multiplication of two matrices a and b

1.4.Multiplication a matrices element by element

In case the multiplication of two matrices (.*) element by element (attention with the dimension of the matrices which should be the same), the result will be a matrix with the same dimension.

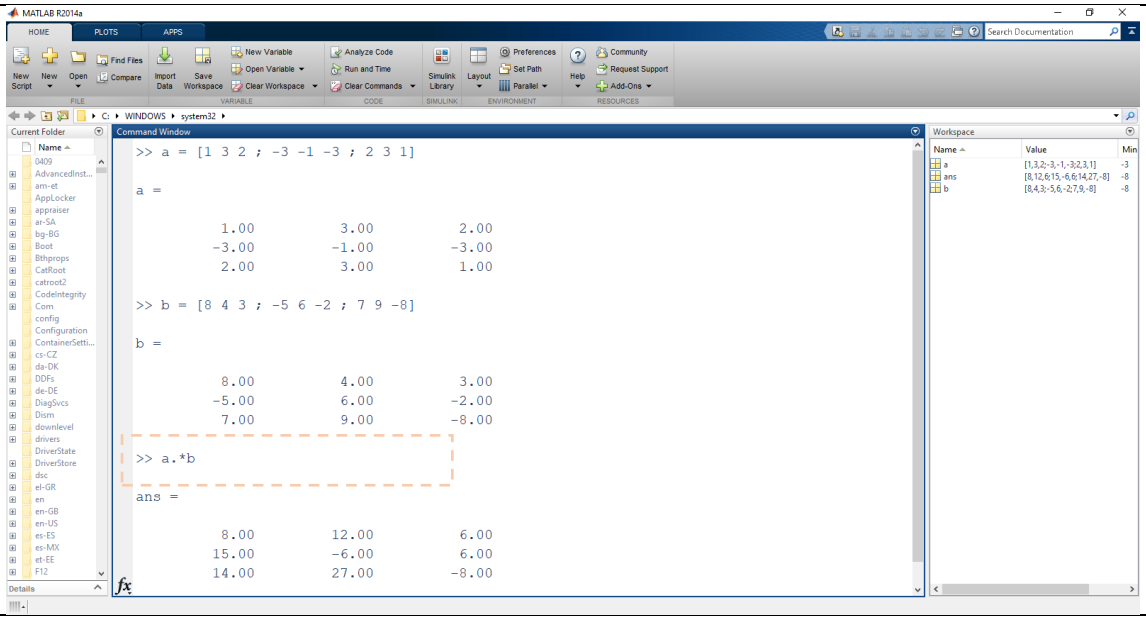

Fig 4. The multiplication of two matrices element by element

1.5.Division of matrices

For division, the usual operators (/) are defined for matrix division. Whereas the number of columns in the first matrix should be equal to number of rows in the second matrix

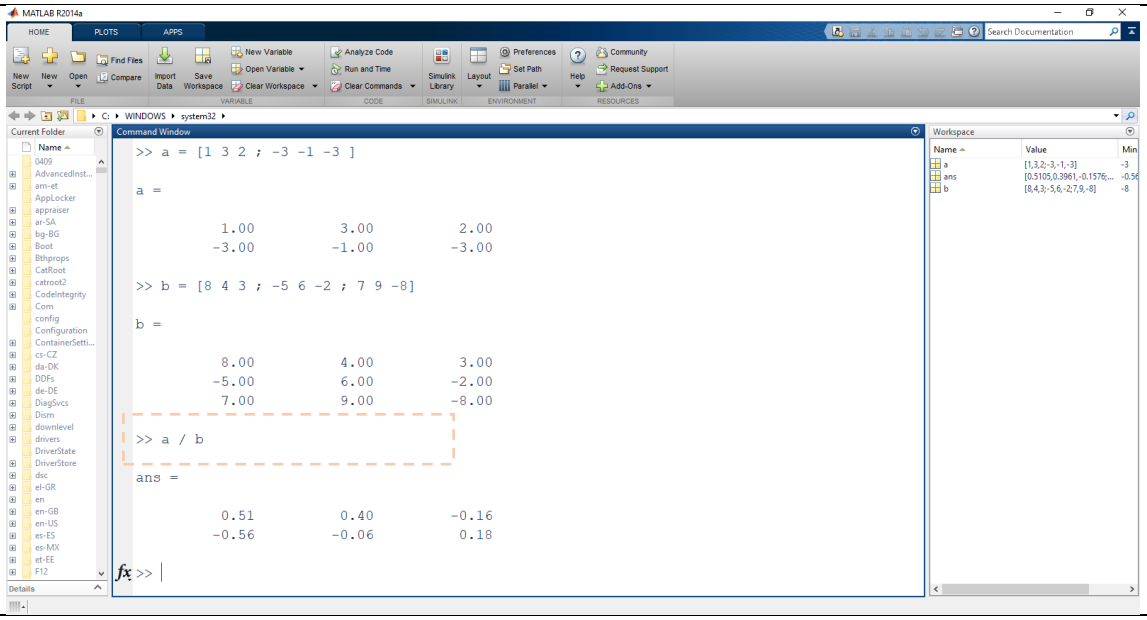

Fig 5. The division of two matrices a and b

Or we can calculate as follows

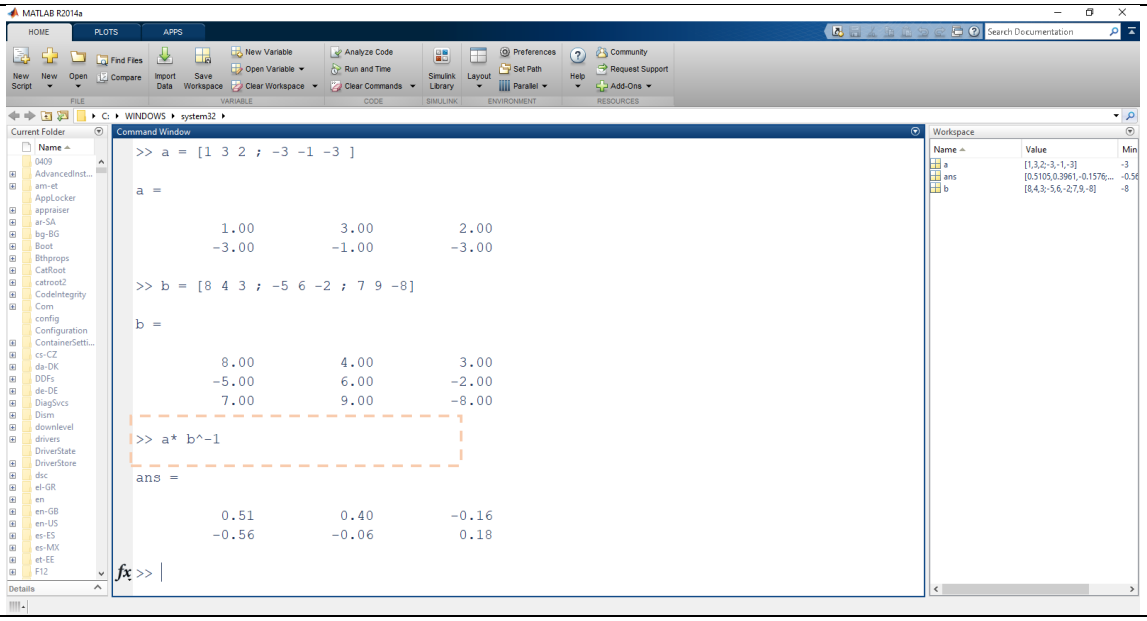

Fig 6. The division of two matrices a and b «another method»

1.6.Division a matrices element by element

In case the division of two matrices (./) element by element (attention with the dimension of the matrices which should be the same), the result will be a matrix with the same dimension.

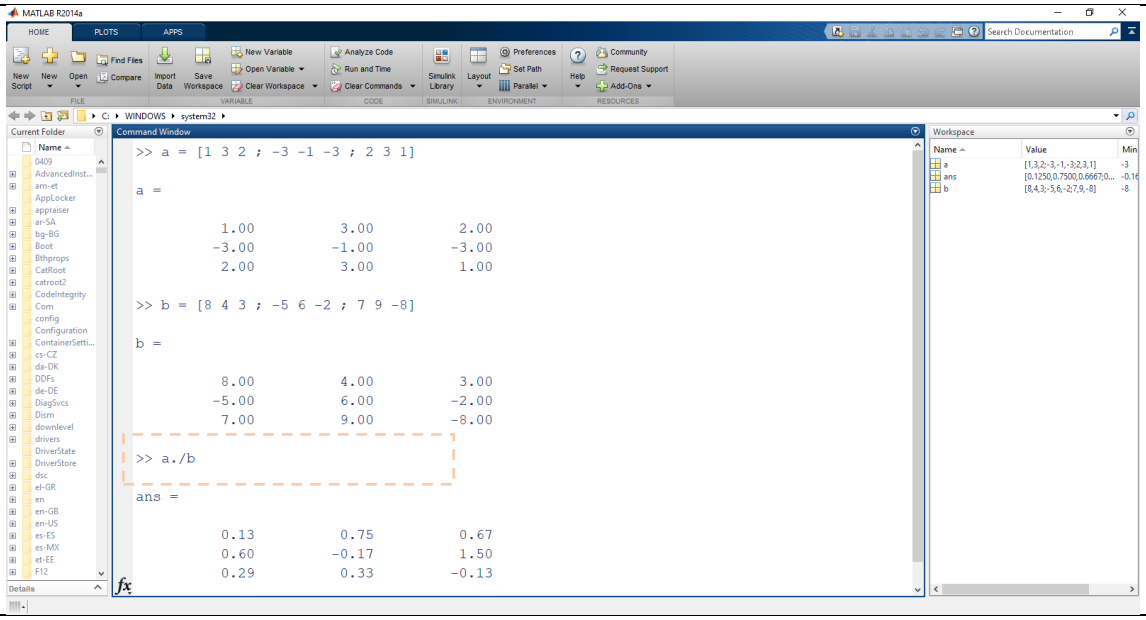

Fig 7. The division of two matrices element by element

2.Special or particular matrices

In MATLAB, there are functions that automatically generate specific matrices for example containing all ones, zero elements, ones in the diagonal only, arbitrary number.

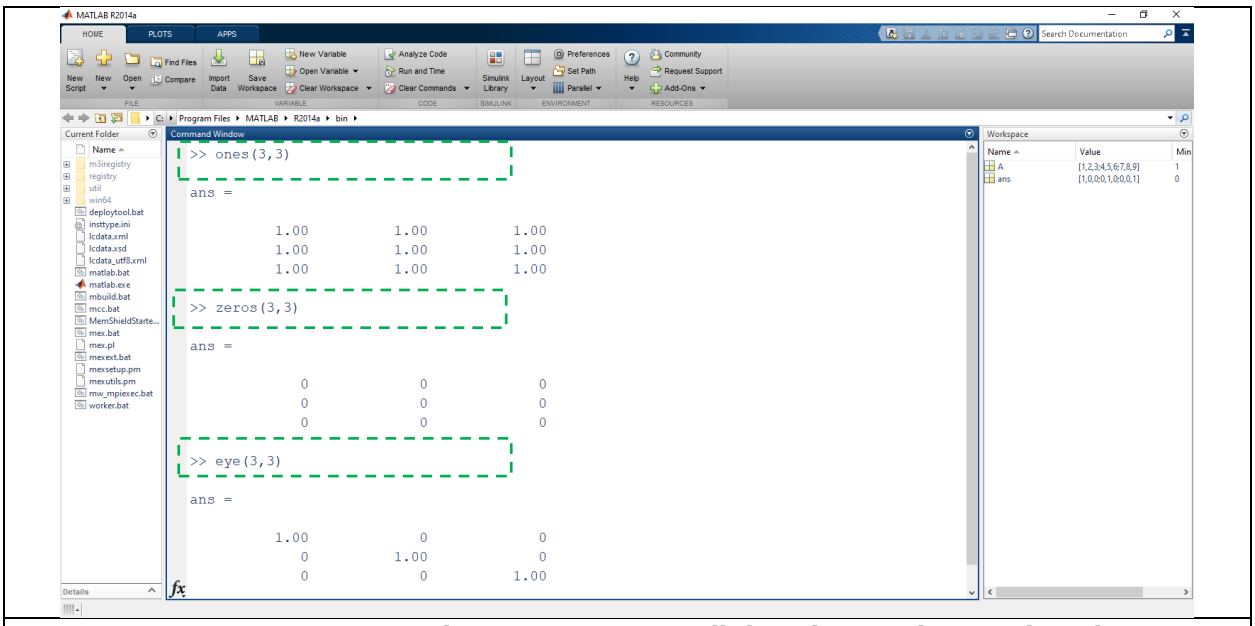

Fig 8. Create a matrix contain number « 1 » or « 0 » in all the column and row and number « 1 » in diagonal only

And

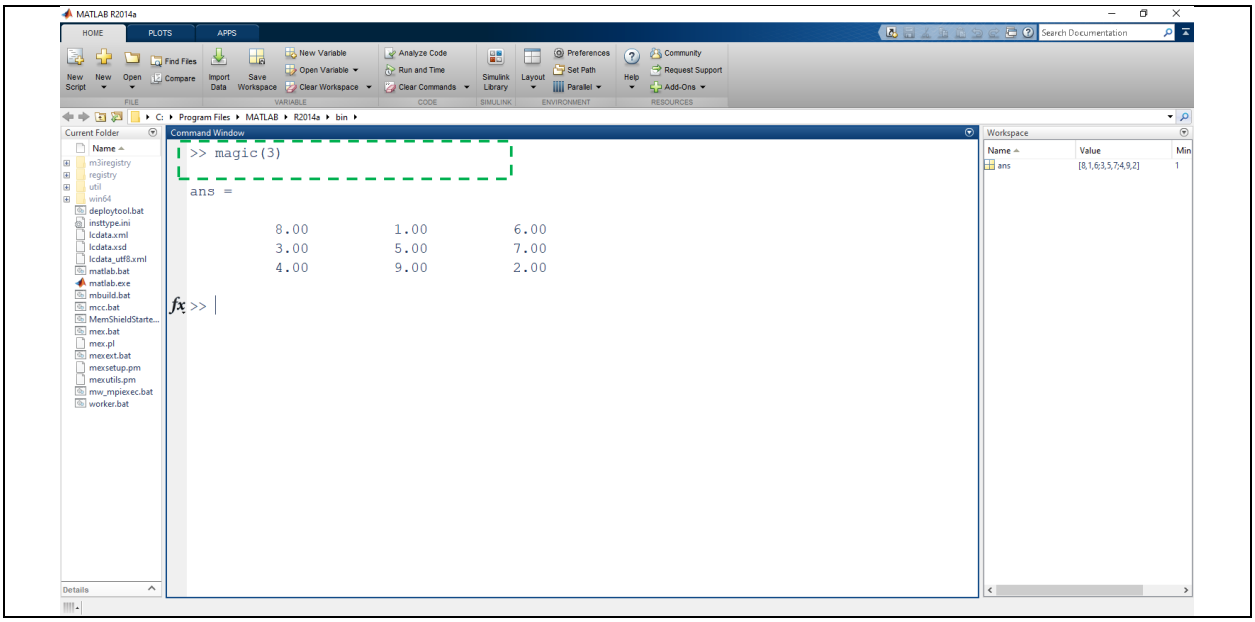

Fig 9. Create a random matrix

Note:

It is interesting to note that in case the matrix square (r=c), one argument will be sufficient; ones(3) , eye(3) , and zeros(3)

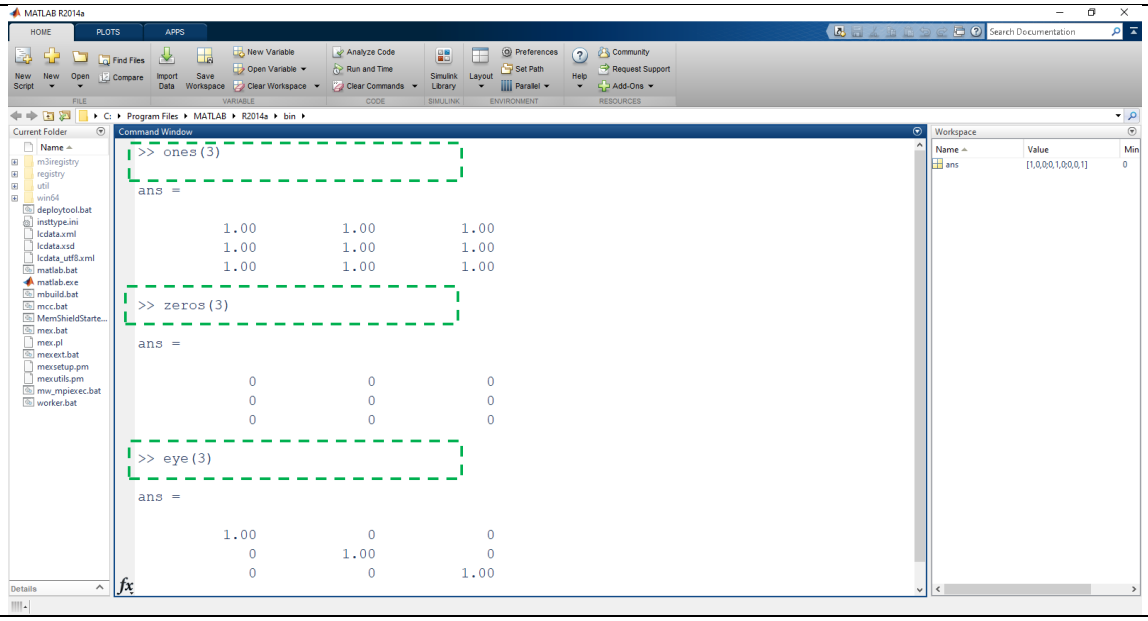

Fig 10. Create a matrix contain number « 1 » or « 0 » in all the column and row and number « 1 » in diagonal only another method

3.Matrix and submatrix manipulations

3.1.Pick and/or replace command

To show or peak or extract only one value from matrix already written by MATLAB, we need to know

- ✓ The name of the matrix first,
- ✓ Second, the position of that element in row and column of the matrix

Similarly, to replace one value from matrix, we need to know

- ✓ The name of the matrix
- ✓ Second, specify the position of the element by number of row and column in the matrix
- ✓ Third, give the new number or value

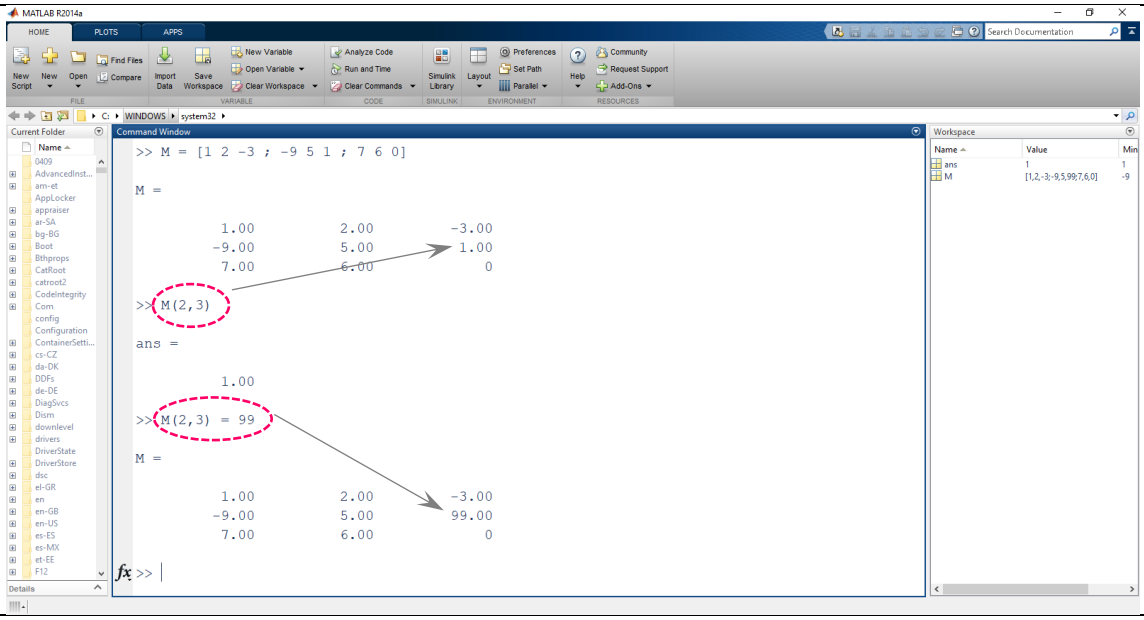

Fig 11. Display or replace such element from a matrix

3.2.Remove row and/or column command

To remove a row or column from a matrix already written by MATLAB, we need to know the position or the order of these columns and rows in that matrix

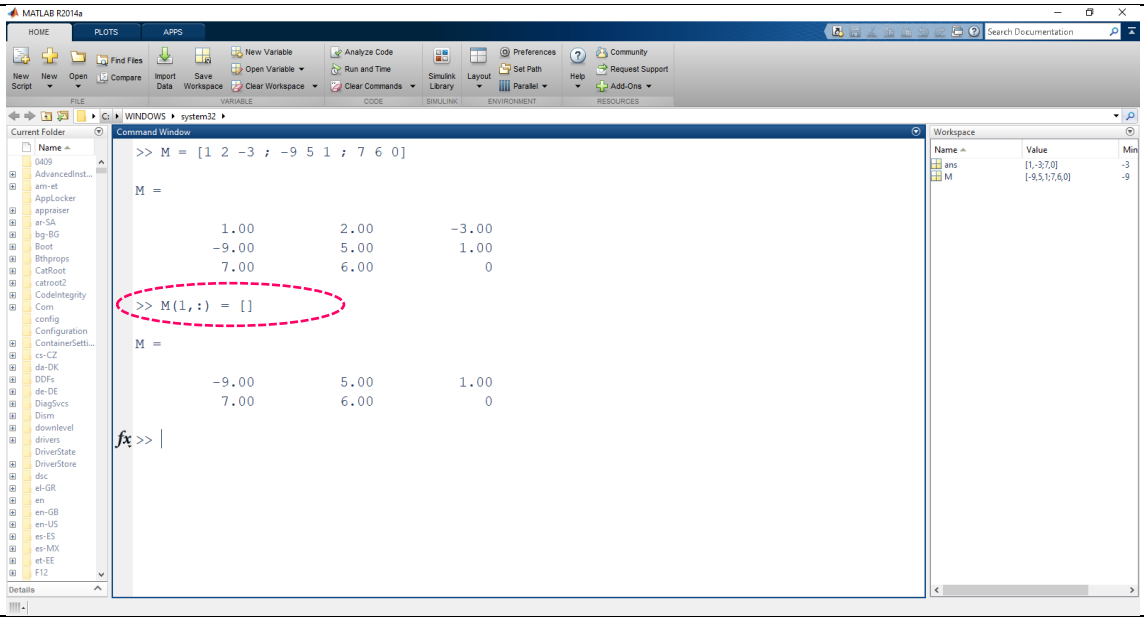

Fig 12. Display how to remove a row from a matrix

And

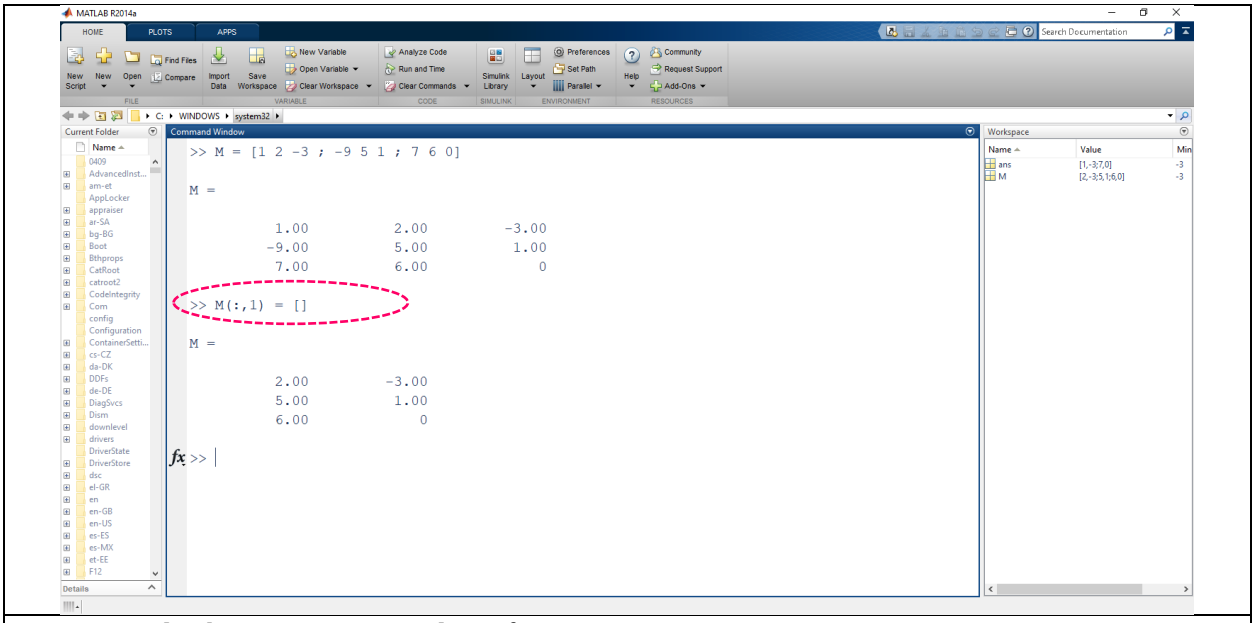

Fig 13. Display how to remove a column from a matrix

7.List of References

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