Adamson University
College of Engineering
Computer Engineering Department

Linear Algebra

Laboratory Activity No. 7

Matrix Operations

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I. Objectives

This laboratory activity aims to implement the principles and techniques of the fundamental matrix operations. Apply the operations to solve intemrediate equations. And Apply matrix algebra in engineering solutions.

II. Methods

There is a Specific Array/Matrix that is declaired for the whole Activity, It will be use in all aspect of solving. It is a paired activity that delivers a framework from two grids. For grid increase, the quantity of sections in the primary lattice should be equivalent to the quantity of columns in the subsequent network. The subsequent lattice, known as the network item, has the quantity of lines of the first and the quantity of segments of the subsequent framework.

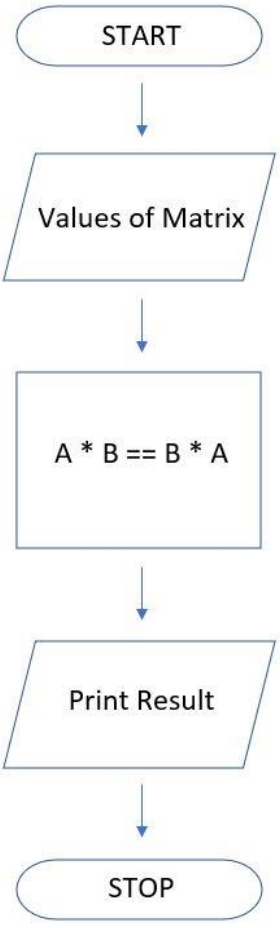

FIGURE 1: Flow chart of Equation no. 1 of Dot Product

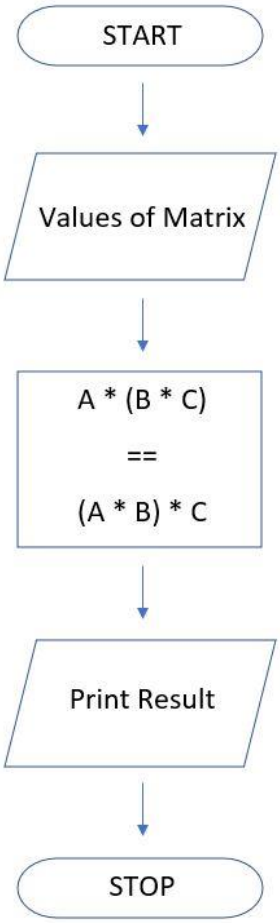

FIGURE 2: Flow chart of Equation no. 2 of Dot Product

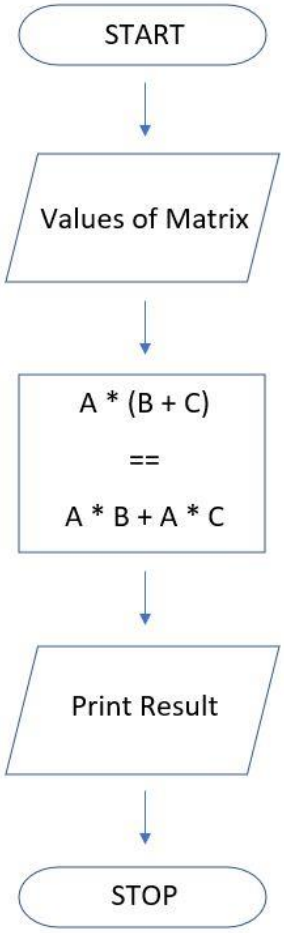

FIGURE 3: Flow chart of Equation no. 3 of Dot Product

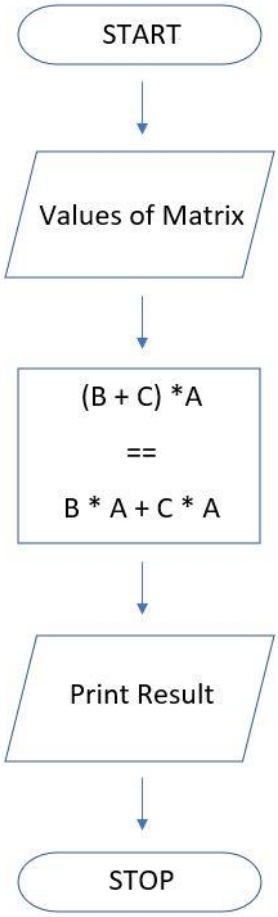

FIGURE 4: Flow chart of Equation no. 4 of Dot Product

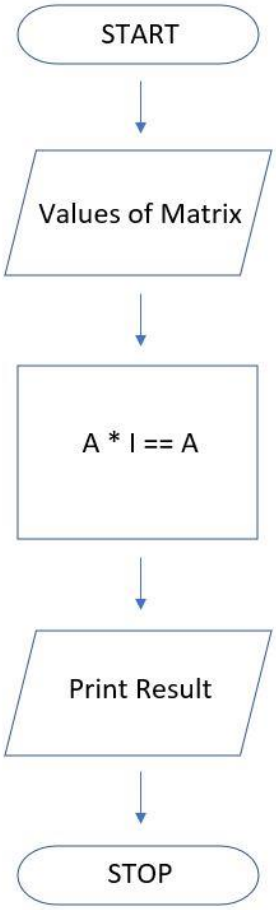

FIGURE 5: Flow chart of Equation no. 5 of Dot Product

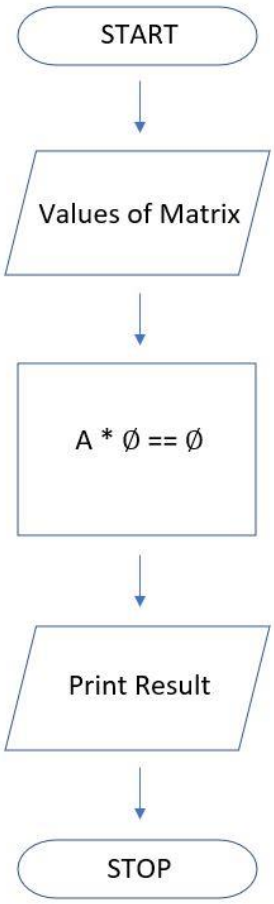

FIGURE 6: Flow chart of Equation no. 6 of Dot Product

III. Results

```
A = np.array ([
              [2,4,6],
              [8,10,12],
              [14,16,18],

])
B = np.array ([
              [1,2,3],
              [4,4,6],
              [7,8,9],

])
C = np.array ([
              [3,6,9,],
              [12,15,18],
              [21,24,27],

])
I = np.identity(3)
T = np.transpose(3)
```

FIGURE 7: List of Declaired matrix that will be used to solve the equations of Dot Product.

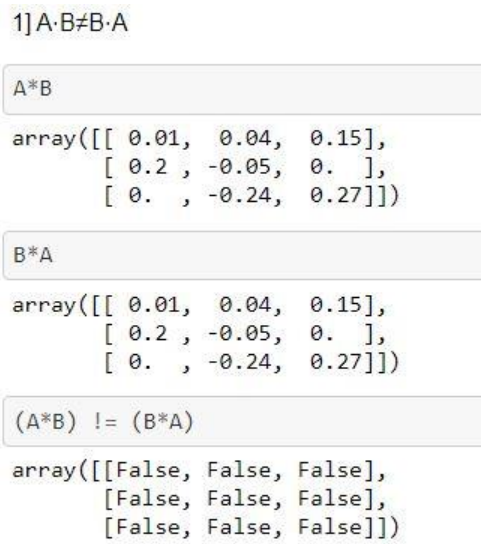

FIGURE 8: Step by Step Procedure on Solving the Eqaution no. 1 of the Dot Product

In figure 8, the equation in Mathimatical form is $A \times B \neq B \times A$ where in the asteris is use for multiplication in a programming language and exclamation point and equal sign is equivalent to not equal. This may also be solve in a manual or the way how we solve mathematical problems, where in the Values of A will be multiplied to the values of B and for the second equation B will be multiplied to the values in A and then you can compare the answers to justify wheter both answers will be equal or not.

2] A·(B·C)=(A·B)·C

```
B*C
```

```
array([[  3,  12,  27],
       [ 48,  60, 108],
       [147, 192, 243]])
```

```
A*(B*C)
```

```
array([[   6,   48,  162],
       [ 384,  600, 1296],
       [2058, 3072, 4374]])
```

```
(A*B)
```

```
array([[  2,   8,  18],
       [ 32,  40,  72],
       [ 98, 128, 162]])
```

```
(A*B)*C
```

```
array([[   6,   48,  162],
       [ 384,  600, 1296],
       [2058, 3072, 4374]])
```

```
A*(B*C) == (A*B)*C
```

```
array([[ True,  True,  True],
       [ True,  True,  True],
       [ True,  True,  True]])
```

FIGURE 9: Step by Step Procedure on Solving the Eqaution no. 2 of the Dot Product

In figure 9, the equation in Mathimatical form is A (B × C) = (A × B) C where in the asteris is use for multiplication in a programming language and the use of parenthesis is to give priority to the inside equation before appliying to the outer part of the equation. This may also be solve in a manual or the way how we solve mathematical problems, where in the Values inside the parenthesis will be multiplied to the outer equation and then after both equations are computed it will test whether the answers will be equal even if the arrangement of the variabls are different from each other.

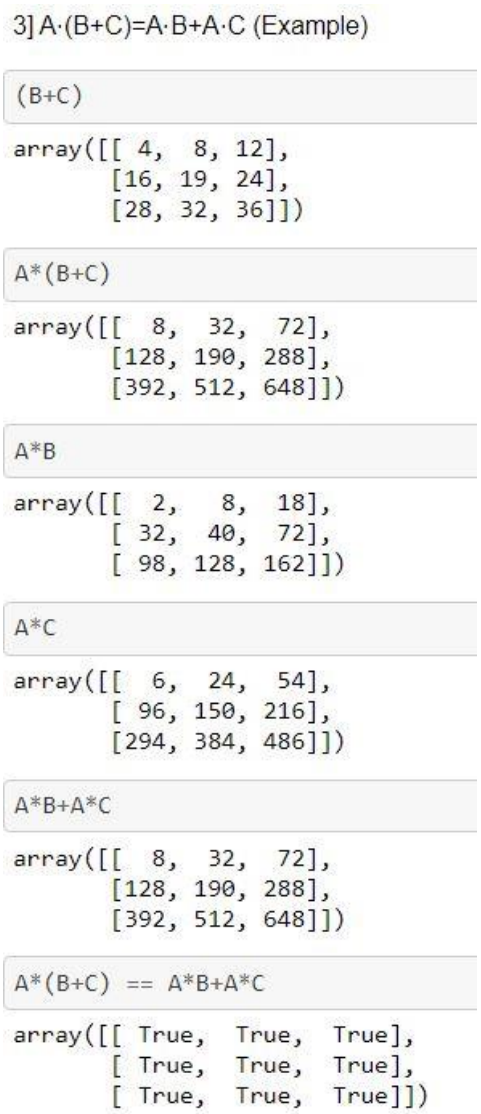

FIGURE 10: Step by Step Procedure on Solving the Eqaution no. 3 of the Dot Product

In figure 10, the equation in Mathimatical form is $A \times (B + C) = A \times B + A \times C$ where in the asteris is use for multiplication in a programming language and the use of parenthesis is to give priority to the inside equation before appliying to the outer part of the equation. This may also be solve in a manual or the way how we solve mathematical problems by following the MDAS, where in the Values inside the parenthesis will be multiplied to the outer equation and then after both equations are computed it will test whether the answers will be equal even if the arrangement of the variabls are different from each other.

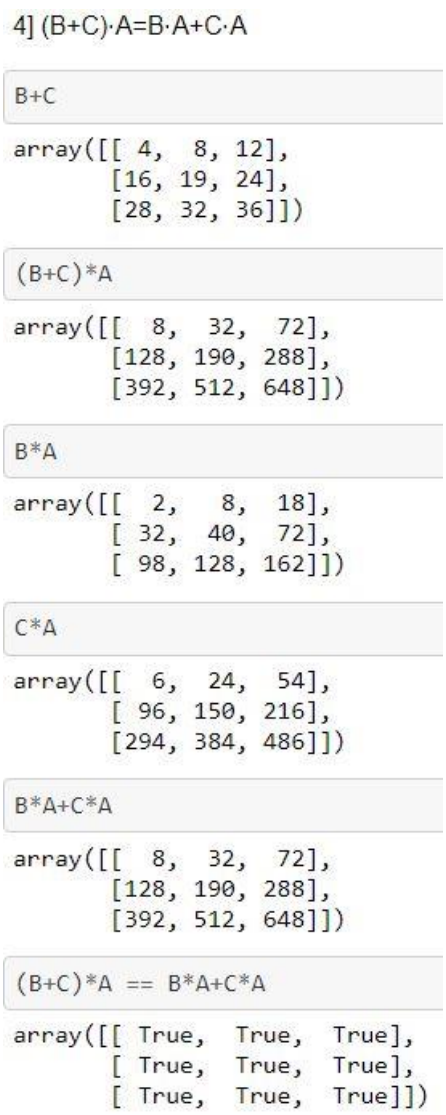

FIGURE 11: Step by Step Procedure on Solving the Eqaution no. 4 of the Dot Product

In figure 10, the equation in Mathimatical form is $(B + C) \times A = B \times A + C \times A$ where in the asteris is use for multiplication in a programming language and the use of parenthesis is to give priority to the inside equation before appliying to the outer part of the equation. This may also be solve in a manual or the way how we solve mathematical problems by following the MDAS, where in the Values inside the parenthesis will be multiplied to the outer equation and then after both equations are computed it will test whether the answers will be equal even if the arrangement of the variabls are different from each other.

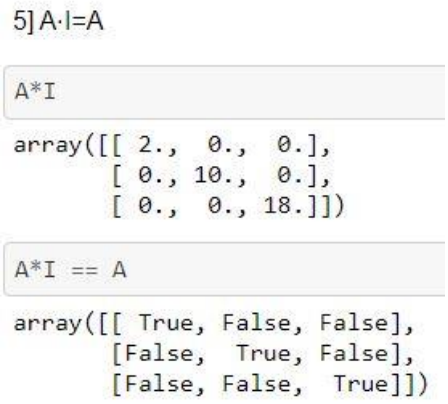

FIGURE 12: Step by Step Procedure on Solving the Eqaution no. 5 of the Dot Product

In figure 12, the equation in Mathimatical form is $A \times I = A$ This may also be solve in a manual or the way how we solve mathematical problems by following the MDAS, where in the Values inside the parenthesis will be multiplied to the outer equation and then after both equations are computed it will test whether the answers will be equal even if the arrangement of the variabls are different from each other. The I is a identity which is declaired in the set of variables and it is the object's memory address, and will be different for each time you run the program. (except for some object that has a constant unique id, like integers from -5 to 256

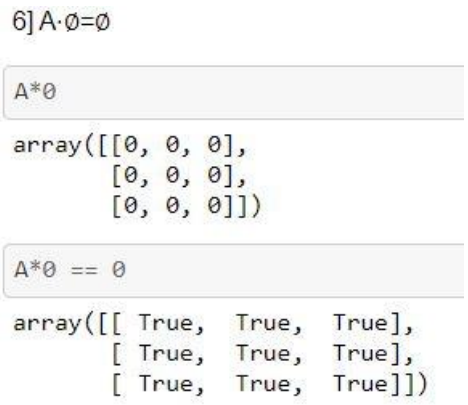

FIGURE 13: Step by Step Procedure on Solving the Eqaution no. 6 of the Dot Product

In figure 12, the equation in Mathimatical form is $A \times \emptyset = A$ This may also be solve in a manual or the way how we solve mathematical problems by following the MDAS, where in the Values inside the parenthesis will be multiplied to the outer equation and then after both equations are computed it will test whether the answers will be equal even if the arrangement of the variabls are different from each other. The null is a empty set that is being multiplied to the given set

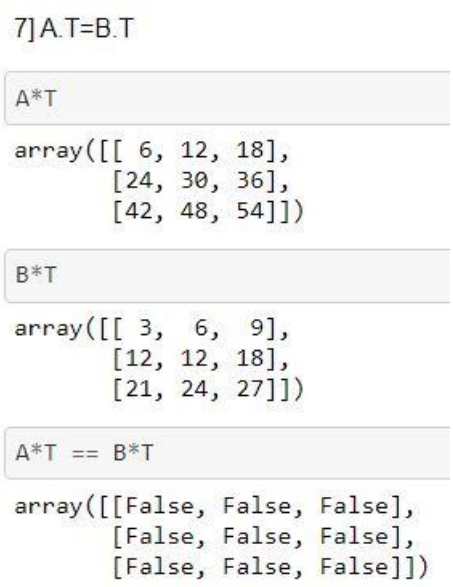

FIGURE 14: Step by Step Procedure on Solving the Eqaution no. 7 of the Dot Product

T corresponds to Transpose where in a network is acquired by moving the lines information to the section and segments information to the lines. In the event that we have a variety of shape (X, Y) at that point the render of the exhibit will have the shape (Y, X).

IV. Conclusion

There are a lot of different ways on solving mathematical equations and for programming it made out work easier and to be confident in answering different kind of mathematical problems that we encounter. This may also help each individual especially if the set of numbers are to big and they need to be exact or sure of the outcome this activity is such a big help.

References

[1] D.J.D. Lopez. “Adamson University Computer Engineering Department Honor Code,” AdU-CpE Departmental Policies, 2020.

[2]https://en.wikipedia.org/wiki/Matrix_multiplication

[3] W3Schools is Powered by W3.CSS.
https://www.w3schools.com/python/ref_func_id.asp#:~:text=The%20id()%20function%20returns,object%20when%20it%20is%20created.