Practical – 1

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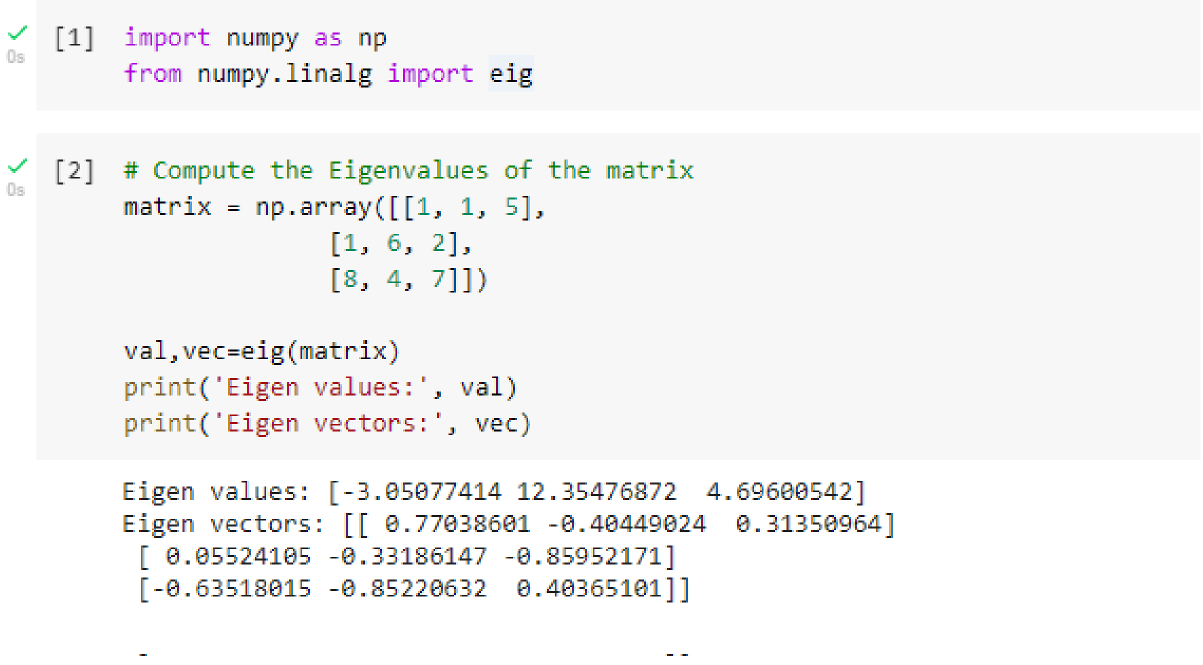
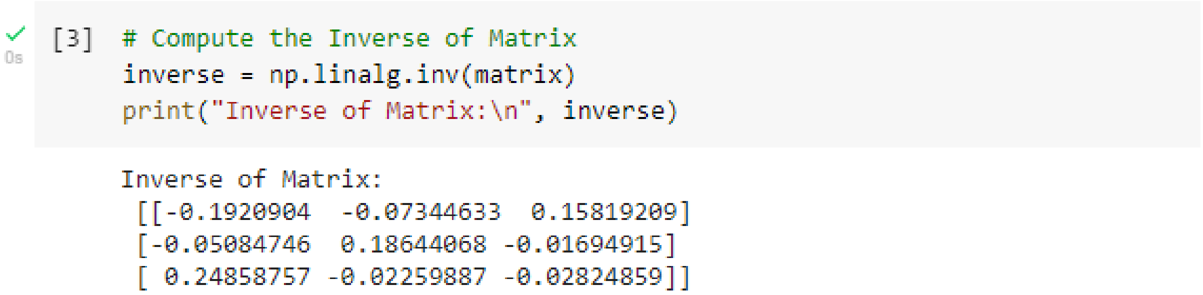


```
[1]  import numpy as np
     from numpy.linalg import eig
```

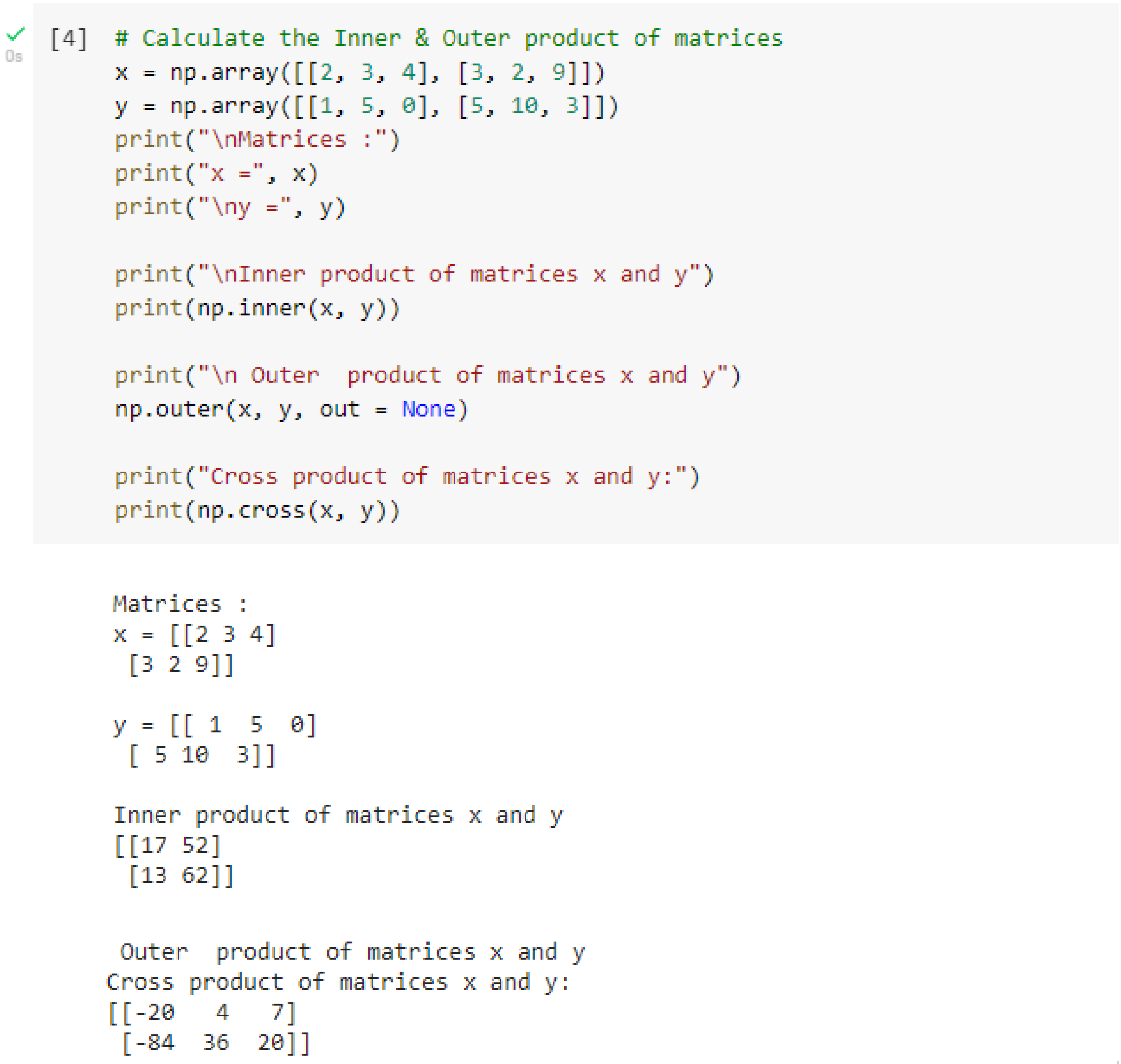
```
[2]  # Compute the Eigenvalues of the matrix
     matrix = np.array([[1, 1, 5],
                        [1, 6, 2],
                        [8, 4, 7]])

     val,vec=eig(matrix)
     print('Eigen values:', val)
     print('Eigen vectors:', vec)
```

```
Eigen values: [-3.05077414 12.35476872  4.69600542]
Eigen vectors: [[ 0.77038601 -0.40449024  0.31350964]
 [ 0.05524105 -0.33186147 -0.85952171]
 [-0.63518015 -0.85220632  0.40365101]]
```



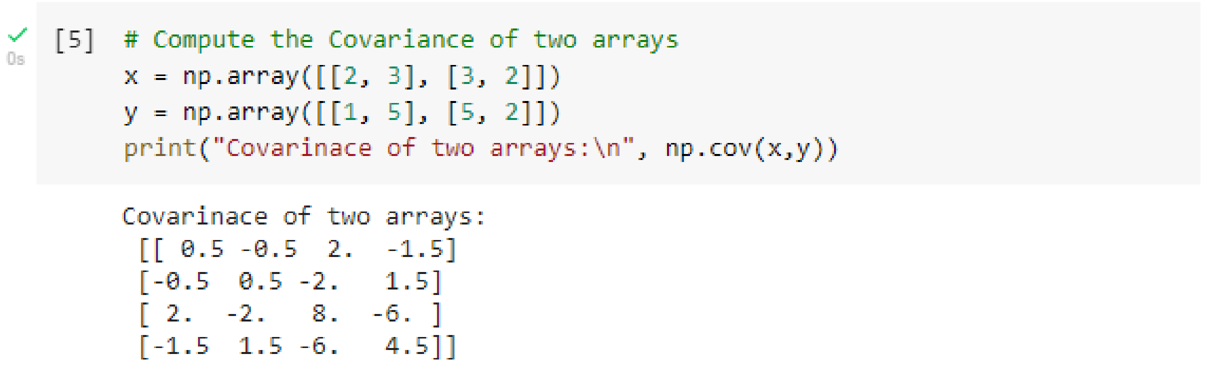
```
[3]  # Compute the Inverse of Matrix
     inverse = np.linalg.inv(matrix)
     print("Inverse of Matrix:\n", inverse)
```

```
Inverse of Matrix:
 [[-0.1920904  -0.07344633  0.15819209]
 [-0.05084746  0.18644068 -0.01694915]
 [ 0.24858757 -0.02259887 -0.02824859]]
```



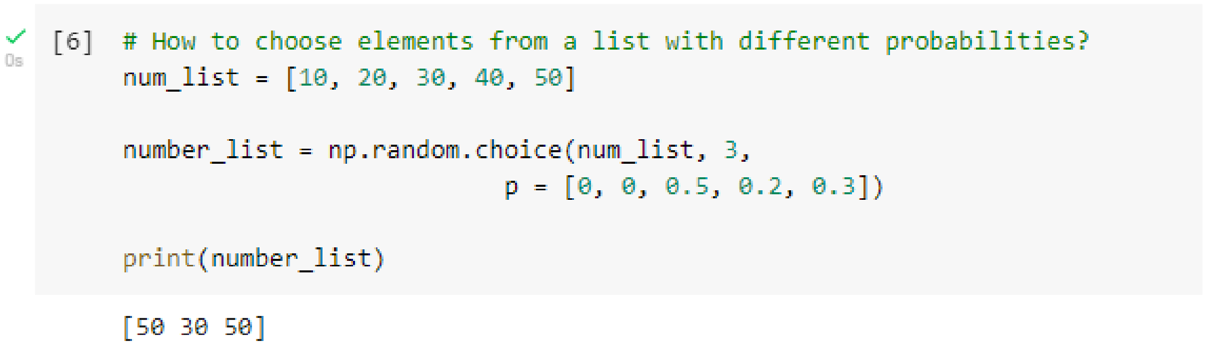
```
[4]  # Calculate the Inner & Outer product of matrices
     x = np.array([[2, 3, 4], [3, 2, 9]])
     y = np.array([[1, 5, 0], [5, 10, 3]])
     print("\nMatrices :")
     print("x =", x)
     print("\ny =", y)

     print("\nInner product of matrices x and y")
     print(np.inner(x, y))

     print("\n Outer  product of matrices x and y")
     np.outer(x, y, out = None)

     print("Cross product of matrices x and y:")
     print(np.cross(x, y))
```

```
Matrices :
x = [[2 3 4]
 [3 2 9]]

y = [[ 1  5  0]
 [ 5 10  3]]

Inner product of matrices x and y
[[17 52]
 [13 62]]


 Outer  product of matrices x and y
Cross product of matrices x and y:
[[-20   4   7]
 [-84  36  20]]
```



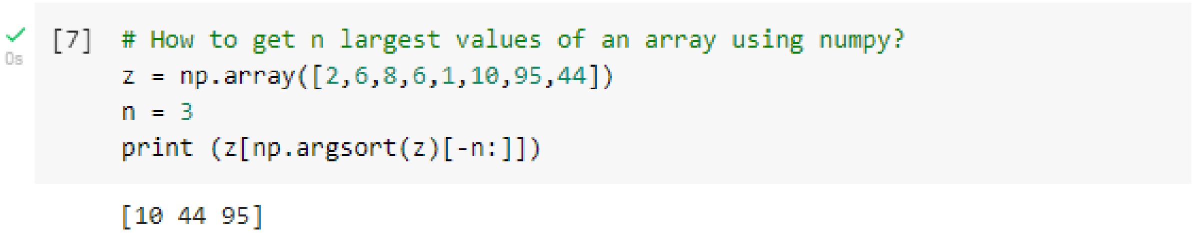
```
[5]  # Compute the Covariance of two arrays
     x = np.array([[2, 3], [3, 2]])
     y = np.array([[1, 5], [5, 2]])
     print("Covarinace of two arrays:\n", np.cov(x,y))
```

```
Covarinace of two arrays:
 [[ 0.5 -0.5  2.  -1.5]
 [-0.5  0.5 -2.   1.5]
 [ 2.  -2.   8.  -6. ]
 [-1.5  1.5 -6.   4.5]]
```



```
# How to choose elements from a list with different probabilities?
num_list = [10, 20, 30, 40, 50]

number_list = np.random.choice(num_list, 3,
                                p = [0, 0, 0.5, 0.2, 0.3])

print(number_list)
```

```
[50 30 50]
```



```
# How to get n largest values of an array using numpy?
z = np.array([2,6,8,6,1,10,95,44])
n = 3
print (z[np.argsort(z)[-n:]])
```

```
[10 44 95]
```