In [9]:
```
#LAB 2
#1

import numpy as np
matrix = np.array([[2,2,1],[4,2,3],[1,7,7]])
print(matrix)
print(f'The number of rows is {matrix.shape[0]}');
print(f'The number of columns is {matrix.shape[1]}');
```

```
[[2 2 1]
 [4 2 3]
 [1 7 7]]
The number of rows is 3
The number of columns is 3
```

In [11]:
```
#2
matrix = np.array([[2,2,1],[4,2,3],[1,7,7]])
print(matrix)
matrix.trace()
```

```
[[2 2 1]
 [4 2 3]
 [1 7 7]]
```

Out[11]:
```
11
```

In [15]:
```
#3
matrix1 = np.array([2,2,1])
matrix2 = np.array([3,1,3])

print(matrix1)
print(matrix2)
print(np.dot(matrix1,matrix2))
print(np.outer(matrix1,matrix2))
print(np.cross(matrix1,matrix2))
```

```
[2 2 1]
[3 1 3]
11
[[6 2 6]
 [6 2 6]
 [3 1 3]]
[ 5 -3 -4]
```

In [18]:
```
#4
matrix = np.array([2,2,1,2,2,71,50,3,50,50,71,99,1,2,71])
print(matrix)
u,c=np.unique(matrix,return_counts=True)
print(u,c)
```

```
[ 2  2  1  2  2 71 50  3 50 50 71 99  1  2 71]
[ 1  2  3 50 71 99] [2 5 1 3 3 1]
```

np.linalg.qr(matrix)

In [20]:
```
#6
matrix = np.array([[2,2,1],[4,2,3],[1,7,7]])
np.linalg.qr(matrix)
```

Out[20]:
```
(array([[-0.43643578,  0.03018889, -0.8992288 ],
        [-0.87287156, -0.2566056 ,  0.41502868],
        [-0.21821789,  0.96604461,  0.13834289]]),
 array([[-4.58257569, -4.14613991, -4.58257569],
        [ 0.        ,  6.30947889,  6.02268439],
        [ 0.        ,  0.        ,  1.31425748]]))
```

In [23]:
```
#5
matrix1 = np.array([[2,2,1],[4,6,1],[3,9,6]])
matrix2 = np.array([3,1,3])
np.kron(matrix1,matrix2)
```

Out[23]:
```
array([[ 6,  2,  6,  6,  2,  6,  3,  1,  3],
       [12,  4, 12, 18,  6, 18,  3,  1,  3],
       [ 9,  3,  9, 27,  9, 27, 18,  6, 18]])
```

In [25]:
```
#7
matrix = np.array([2,2,1,2,2,71,50,3,50,50,71,99,1,2,71])
np.random.choice(matrix)
```

Out[25]:
```
2
```

In [ ]: