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In [2]:
```
import numpy as np
#np.version
```

Out[2]:
```
<module 'numpy.version' from '/Library/Frameworks/Python.framework/Versions/3.8/lib/pyt
hon3.8/site-packages/numpy/version.py'>
```

Add vectors (4,6,7) and (3,4,5)

In [7]:
```
#Question 1
A = np.array([4,6,7])
B = np.array([3,4,5])
C = np.add(A,B)
C
```

Out[7]:
```
array([ 7, 10, 12])
```

Find the dimension (Question 2)

In [11]:
```
#Question 2

A = np.array([[2, 7, -1, 0, 3],[4, 6, -3, 1, 8]])

A.shape
```

Out[11]:
```
(2, 5)
```

Find the Transpose of A (Question 3)

In [13]:
```
#Question 3
Tranpose_of_A = A.T
Tranpose_of_A
```

Out[13]:
```
array([[ 2,  4],
       [ 7,  6],
       [-1, -3],
       [ 0,  1],
       [ 3,  8]])
```

Matrix Multiplication (Question 4)

In [16]:
```
#Question 4
A = np.array([[1, 2, 3], [4, 5, 6], [7, 8, 9]])
B = np.array([[9, 8, 7], [6, 5, 4], [3, 2, 1]])
product = np.dot(A,B)
product
```

Out[16]:
```
array([[ 30,  24,  18],
       [ 84,  69,  54],
       [138, 114,  90]])
```

Find the determinant and Inverse (Question 5)

In [28]:
```
B = np.array([[1, 2, 3], [4, 5, 6], [7, 8, 9]])

inverse = np.linalg.pinv(B)
#inverse
```

```
determinant = np.linalg.det(B)
#determinant

print(f"Determinant: {determinant}")
print(f"Pseudoinverse: \n{inverse}")
```

```
Determinant: 0.0
Pseudoinverse:
[[-6.38888889e-01 -1.66666667e-01  3.05555556e-01]
 [-5.55555556e-02  4.66439468e-17  5.55555556e-02]
 [ 5.27777778e-01  1.66666667e-01 -1.94444444e-01]]
```

Show that C (C-1) = I for C (Question 6)

In [34]:
```
#Question 6
C = np.array([[5,0], [0,5]])
inverse_C = np.linalg.inv(C)
product = np.dot(inverse_C, C)
product
```

Out[34]:
```
array([[1., 0.],
       [0., 1.]])
```

Solve the system of equations Interpret the solution spatially (Question 7)

In [45]:
```
#Question 7
A = np.array([[1,1,1],[1,-1,2],[0,1,1]])
B = np.array([3, 2, 2])
x = np.linalg.solve(A, B)
x
```

Out[45]:
```
array([1., 1., 1.])
```

What is the image of the vector (3,4) using the linear transformation in question 6 (Question 8)

In [48]:
```
#Question 8
C = np.array([[5,0], [0,5]])
v = np.array([3, 4])

image = np.dot(C, v)
image
```

Out[48]:
```
array([15, 20])
```

In [ ]: