In [1]:

```
import numpy as np
import pandas as pd
```

In [2]:

```
from numpy import linalg as la
```

1. Create 5 matrices with five different dimensions (1-D,2-D,...5-D)

In [8]:

```
a=np.array([4,5])
b=np.array([[5,6],[7,8]])
c=np.array([[23,45,67],[56,78,67],[5,7,8]])
d=np.array([[34,6,8,7],[34,67,89,67],[5,1,4,54],[45,98,45,87]])
e=np.array([[65,34,23,89],[53,45,67,98],[3,6,8,5],[34,67,45,67],[12,34,56,78]])
print("A:",(a))
print("B:",(b))
print("C:",(c))
print("D:",(d))
print("E:",(e))
```

```
A: [4 5]
B: [[5 6]
 [7 8]]
C: [[23 45 67]
 [56 78 67]
 [ 5  7  8]]
D: [[34  6  8  7]
 [34 67 89 67]
 [ 5  1  4 54]
 [45 98 45 87]]
E: [[65 34 23 89]
 [53 45 67 98]
 [ 3  6  8  5]
 [34 67 45 67]
 [12 34 56 78]]
```

2. Find determinants of 5 matrices and display your output

In [3]:

```
a=np.array([[1,2,3],[4,5,6],[3,5,6]])
b=np.array([[5,6,7],[7,8,9],[3,6,8]])
c=np.array([[23,45,67],[56,78,67],[5,7,8]])
d=np.array([[34,6,8],[34,67,89],[5,1,4]])
e=np.array([[65,34,23],[53,45,67],[3,6,8]])

print(la.det(a))
print(la.det(b))
print(la.det(c))
print(la.det(d))
print(la.det(e))
```

```
3.0000000000000004
1.9999999999999931
-1385.9999999999989
5532.000000000003
-6102.999999999999
```

3. Find inverse of the above 5 matrices and display your output

In [4]:

```
a=np.array([[1,2,3],[4,5,6],[3,5,6]])
b=np.array([[5,6,7],[7,8,9],[3,6,8]])
c=np.array([[23,45,67],[56,78,67],[5,7,8]])
d=np.array([[34,6,8],[34,67,89],[5,1,4]])
e=np.array([[65,34,23],[53,45,67],[3,6,8]])

print(la.inv(a))
print(la.inv(b))
print(la.inv(c))
print(la.inv(d))
print(la.inv(e))
```

```
[[ 0.          1.         -1.        ]
 [-2.         -1.          2.        ]
 [ 1.66666667  0.33333333 -1.        ]]
[[  5.   -3.   -1. ]
 [-14.5   9.5   2. ]
 [  9.   -6.   -1. ]]
[[-1.11832612e-01 -7.86435786e-02  1.59523810e+00]
 [ 8.15295815e-02  1.08946609e-01 -1.59523810e+00]
 [-1.44300144e-03 -4.61760462e-02  5.23809524e-01]]
[[ 3.23571945e-02 -2.89226320e-03 -3.61532899e-04]
 [ 5.58568330e-02  1.73535792e-02 -4.97830803e-01]
 [-5.44107014e-02 -7.23065799e-04  3.74909617e-01]]
[[ 0.00688186  0.02195641 -0.20367033]
 [ 0.03653941 -0.07389808  0.51384565]
 [-0.02998525  0.04718991 -0.18400786]]
```

4. Find the rank, diagonal and trace of the 5 matrices

In [5]:

```
print("A:")
print(la.matrix_rank(a))
print(np.diag(a))
print(np.trace(a))
print("B:")
print(la.matrix_rank(b))
print(np.diag(b))
print(np.trace(b))
print("C:")
print(la.matrix_rank(c))
print(np.diag(c))
print(np.trace(c))
print("D:")
print(la.matrix_rank(d))
print(np.diag(d))
print(np.trace(d))
print("E:")
print(la.matrix_rank(e))
print(np.diag(e))
print(np.trace(e))
```

```
A:
3
[1 5 6]
12
B:
3
[5 8 8]
21
C:
3
[23 78  8]
109
D:
3
[34 67  4]
105
E:
3
[65 45  8]
118
```

5. Find Eigen value and eigen vector for 5 matrices

In [6]:

```
print("A")
print(la.eigvals(a))
print(la.eig(a))
print("B")
print(la.eigvals(b))
print(la.eig(b))
print("C")
print(la.eigvals(c))
print(la.eig(c))
print("D")
print(la.eigvals(d))
print(la.eig(d))
print("E")
print(la.eigvals(e))
print(la.eig(e))
```

```
A
[12.49923186+0.j         -0.24961593+0.42155265j -0.24961593-0.42155265j]
(array([12.49923186+0.j        , -0.24961593+0.42155265j,
       -0.24961593-0.42155265j]), array([[ 0.29291005+0.j        , -0.3657
8859+0.40579511j,
        -0.36578859-0.40579511j],
       [ 0.68770866+0.j        ,  0.7130926 +0.j        ,
         0.7130926 -0.j        ],
       [ 0.66427442+0.j        , -0.38005132-0.22042906j,
        -0.38005132+0.22042906j]]))
B
[19.62972542  1.29137718  0.07889739]
(array([19.62972542,  1.29137718,  0.07889739]), array([[-0.52158836, -0.2
9062671,  0.25051027],
       [-0.69592657, -0.64495982, -0.81502224],
       [-0.49359072,  0.70679768,  0.52247809]]))
C
[115.16477619  -7.72308268   1.55830649]
(array([115.16477619,  -7.72308268,   1.55830649]), array([[ 0.48343583,
0.84910346,  0.64780139],
       [ 0.87176239, -0.5270406 , -0.71201378],
       [ 0.07949922, -0.03537685,  0.27090539]]))
D
[74.44448467 27.89122157  2.66429376]
(array([74.44448467, 27.89122157,  2.66429376]), array([[ 0.1514947 ,  0.6
281498 ,  0.00622771],
       [ 0.98814741, -0.77174838, -0.81154112],
       [ 0.02478009,  0.09915779,  0.58426212]]))
E
[102.46768639  18.7148294   -3.18251579]
(array([102.46768639,  18.7148294 ,  -3.18251579]), array([[-0.69290805, -
0.64721191,  0.30422294],
       [-0.71785023,  0.72791431, -0.87101239],
       [-0.06759799,  0.22640119,  0.38572765]]))
```

In [ ]:

```

```