```
##Create a Covariance Matrix, Evaluate eigen values and find Eigen Vectors
```

```
import numpy as np

A = [45,37,42,35,39]
B = [38,31,26,28,33]
C = [10,15,17,21,12]

data = np.array([A,B,C])

covMatrix = np.cov(data,bias=True)
print (covMatrix)
```

```
[[ 12.64   7.68  -9.6 ]
 [  7.68  17.36 -13.8 ]
 [ -9.6  -13.8   14.8 ]]
```

```
import numpy as np

A = [45,37,42,35,39]
B = [38,31,26,28,33]
C = [10,15,17,21,12]

data = np.array([A,B,C])

covMatrix = np.cov(data,bias=False)
print (covMatrix)
```

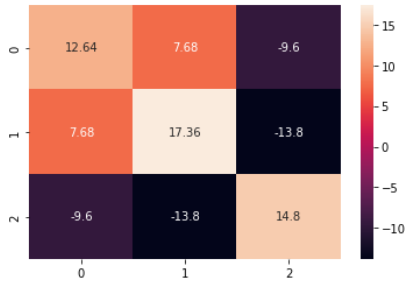
```
[[ 15.8    9.6  -12.  ]
 [  9.6   21.7  -17.25]
 [-12.   -17.25  18.5 ]]
```

```
import numpy as np
import seaborn as sn
import matplotlib.pyplot as plt

A = [45,37,42,35,39]
B = [38,31,26,28,33]
C = [10,15,17,21,12]

data = np.array([A,B,C])

covMatrix = np.cov(data,bias=True)
sn.heatmap(covMatrix, annot=True, fmt='g')
plt.show()
```




```
import pandas as pd

data = {'A': [45,37,42,35,39],
        'B': [38,31,26,28,33],
        'C': [10,15,17,21,12]
        }

df = pd.DataFrame(data,columns=['A','B','C'])

covMatrix = pd.DataFrame.cov(df)
print (covMatrix)
```

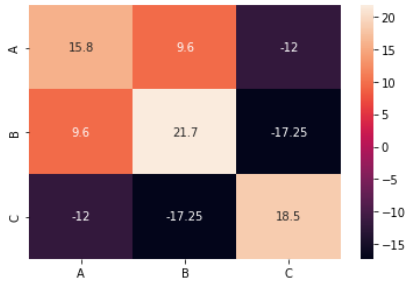
```
       A      B      C
A  15.8   9.60 -12.00
B   9.6  21.70 -17.25
C -12.0 -17.25  18.50
```

```
import pandas as pd
import seaborn as sn
import matplotlib.pyplot as plt

data = {'A': [45,37,42,35,39],
        'B': [38,31,26,28,33],
        'C': [10,15,17,21,12]
        }

df = pd.DataFrame(data,columns=['A','B','C'])

covMatrix = pd.DataFrame.cov(df)
sn.heatmap(covMatrix, annot=True, fmt='g')
plt.show()
```




```
##  TRY IT Calculate the eigenvalues and eigenvectors for matrix A= ([[0, 2], [2, 3]])
```

```
import numpy as np
from numpy.linalg import eig
```

```
a = np.array([[0, 2],
              [2, 3]])
w,v=eig(a)
print('E-value:', w)
print('E-vector', v)
```

```
E-value: [-1.  4.]
E-vector [[-0.89442719 -0.4472136 ]
 [ 0.4472136  -0.89442719]]
```

```
##TRY IT! Compute the eigenvalues and eigenvectors for matrix A= ([[2, 2, 4],[1, 3, 5], [2, 3, 4]])
```

```
a = np.array([[2, 2, 4],
              [1, 3, 5],
              [2, 3, 4]])
w,v=eig(a)
print('E-value:', w)
print('E-vector', v)
```

```
E-value: [ 8.80916362  0.92620912 -0.73537273]
E-vector [[-0.52799324 -0.77557092 -0.36272811]
 [-0.604391    0.62277013 -0.7103262 ]
 [-0.59660259 -0.10318482  0.60321224]]
```