

```
[19] #Q. what are different central measures of tendencies?
#The central value or the most occurring value that gives a general idea of the whole data set is called the Measure of Central Tendency.
# 1. Mean : Average value of the dataset and can be calculated
# 2. Median : the middle value of the data set when arranged in increasing or decreasing order
# 3. Mode : highest frequency observation of the given dataset.

# Create an array

import numpy as np
a = np.array([[1,2,3],[4,5,6]])
np.mean(a) #calculate mean of whole array
```

3.5

```
[20] a.mean(axis=1) # row wise mean
```

array([2., 5.])

```
[21] a.mean(axis=0) # column wise mean
```

array([2.5, 3.5, 4.5])

```
[41] #Calculate Median
# Create an 1D array
import numpy as np
a = np.array([12,2,13,4,15,6,20])
a.sort() # sort the array
a
```

array([ 2, 4, 6, 12, 13, 15, 20])

```
[40] np.median(a) # gives median of the array
```

12.0

```
▶ np.median(a, axis=0) # column wise median calculated
```

↪ array([ 2. , 7.5, 3. , 10. , 6. , 1. , 6.5])

```
[83] np.median(a, axis=1) # row wise median calculated
```

array([12., 15.])

```
[78] #Median for 2D array
      #Create 2D array
      import numpy as np
      a = np.array ( [ [12, 2, 13], [ 15, 6, 20] ] )
      a
```

```
array([[12,  2, 13],
       [15,  6, 20]])
```

```
[79] a.sort() # sort the array
      a
```

```
array([[ 2, 12, 13],
       [ 6, 15, 20]])
```

```
[80] np.median(a) # gives median of the array
```

```
12.5
```

```
[81] np.median(a, axis=0) # gives column wise median of the array
```


```
array([ 4. , 13.5, 16.5])
```

```
[82] np.median(a, axis=1) # gives row wise median of the array
```

```
array([12., 15.])
```

```
[84] #Calculate mode
      # Create an 2D array
      import numpy as np
      a = np.array([[ 1,2,1,3],[4,5,1,6]])
      a
```

```
array([[1, 2, 1, 3],
       [4, 5, 1, 6]])
```

 `np.mode(a)` # there is no in-built function for finding mode using any numpy function. For this, we will use scipy library.



```
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AttributeError                                Traceback (most recent call last)
<ipython-input-91-e8bdc96d903e> in <cell line: 1>()
----> 1 np.mode(a)

/usr/local/lib/python3.10/dist-packages/numpy/_init_.py in __getattr__(attr)
   309         return Tester
   310
--> 311         raise AttributeError("module {!r} has no attribute "
   312                               "{!r}".format(__name__, attr))
   313
```

```
AttributeError: module 'numpy' has no attribute 'mode'
```

❌ [102] a.mode()

```
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AttributeError                                Traceback (most recent call last)  
<ipython-input-102-39728d844e8a> in <cell line: 1>()  
----> 1 a.mode()
```

AttributeError: 'numpy.ndarray' object has no attribute 'mode'

SEARCH STACK OVERFLOW

✅ [85] `from scipy import stats`  
`stats.mode(a)`

ModeResult(mode=array([1, 2, 1, 3]), count=array([1, 1, 2, 1]))

✅ [85] `stats.mode(a, axis=0) # column wise mode calculated`

ModeResult(mode=array([1, 2, 3, 4]), count=array([1, 1, 1, 1]))

✅ [99] `stats.mode(a, axis=1) # row wise mode calculated`

ModeResult(mode=array([1, 5]), count=array([1, 1]))

✅ [98] `stats.mode(a, axis=None) # mode is calculated for the complete array`

ModeResult(mode=1, count=1)

```
[92] #Standard deviation  
#useful in finding the spread of a distribution of array values  
# Create an 2D array  
import numpy as np  
a = np.array([[ 1,2,3,4],[5,6,7,8]])  
a
```

```
array([[1, 2, 3, 4],  
       [5, 6, 7, 8]])
```

```
[93] np.std(a) # calculated standard deviation
```

```
2.29128784747792
```

```
[94] np.std(a, axis=0) # calculated column wise standard deviation
```

```
array([2., 2., 2., 2.])
```

```
[95] np.std(a, axis=1) # calculated row wise standard deviation
```

```
array([1.11803399, 1.11803399])
```