Mean

mean is the sum of the values divided by total no of values like as average

In [149…

```
def cal_mean(m):
    total=0
    for i in m:
        total+=i
    return total/len(m)
print(f' Mean:{cal_mean([10,12,15,17,18,19,21,23,25,27])}')
```

```
 Mean:18.7
```

Median

median is the middle value of the given list if the length of list is even then the median is average of middle 2 values

In [85]:

```
def cal_Median(md):
    n=len(md)
    md.sort()
    count=n//2
    if n%2==0:
        md1=md[count]
        md2=md[count-1]
        median=(md1+md2)/2
        return median

    else:
        mde=md[count]
        return mde
print(f"Median(odd):{cal_Median([23,27,12,21,19,17,10,15,25,18,11])}")
print(f"Median(even):{cal_Median([23,27,12,21,19,17,10,15,25,18])}")
```

```
Median(odd):18
Median(even):18.5
```

Mode

mode is the most repeated value in the given list

In [150…

```
# for getting first repeated number
def cal_mode(mod):
    dict_vals={i:mod.count(i) for i in mod}           ##     x=max(mod,key=mod.count)
    for i,j in dict_vals.items():
        x=max(dict_vals.values())
        if j==x:

            return i

print(f'Mode:{cal_mode([1,1,1,4,6,2,2,2,2,2,3,4,5,5,5,5,5,6,6,7,7,7,7,7])}')
```

```
Mode:2
```

In [133…

```
# for all repeated numbers
def cal_mode(mod):
    dict_vals={i:mod.count(i) for i in mod}
    max_val=[k for k,v in dict_vals.items() if v==max(dict_vals.values())]
    return max_val
print(f'Mode:{cal_mode([1,1,1,4,6,2,2,2,2,2,3,4,5,5,5,5,5,6,6,7,7,7,7,7])}')
```

```
Mode:[2, 5, 7]
```

Variance

In [144…

```
def cal_var(vr):
    n=len(vr)
    mean=sum(vr)/n
    x=0
    for i in vr:                  #[(i-mean)**2 for i in vr]
        x+=(i-mean)**2

    return x/n

print(f'Variance:{cal_var([10,12,15,17,18,19,21,23,25,27])}')
```

```
Variance:27.01
```

In [146…

```
def cal_var(vr):
    n=len(vr)
    mean=sum(vr)/n
    y=[(i-mean)**2 for i in vr]
    return sum(y)/n
print(f'Variance:{cal_var([10,12,15,17,18,19,21,23,25,27])}')
```

```
Variance:27.01
```

Standard Deviation

square root of variance is std

In [147…

```
def cal_std(sd):
    n=len(sd)
    mean=sum(sd)/n
    y=[(i-mean)**2 for i in sd]
    variance=sum(y)/n
    standard_dev=variance**(1/2)
    return standard_dev
print(f'Standard Deviation:{cal_std([10,12,15,17,18,19,21,23,25,27])}')
```

```
Standard Deviation:5.197114584074513
```