

## Central Tendencies- Assignment

1. Find mean using hand & numpy.mean()

a) 9, 7, 11, 13, 2, 4, 5, 5

$$\bar{x} = \frac{\sum x_i}{n} = \frac{(9+7+11+13+2+4+5+5)}{8} = \boxed{8.5}$$

b) 2.2, 10.2, 14.7, 5.9, 4.9, 11.1, 10.5

$$= 59.5 / 7 = \boxed{8.5} \rightarrow \text{np.mean} \rightarrow 8.5$$

c) 11/4, 21/2, 51/2, 31/4, 21/2

$$\bar{x} = 228 / 20 = \boxed{11.4}$$

import numpy as np

$$ax = 9, 7, 11, 13, 2, 4, 5, 5$$

$$\text{np.mean}(ax) \rightarrow 8.7 \downarrow$$

It returns float

`dtype`

2. Find mean of first 10 Fibonacci numbers

$$a=0$$

$$b=1$$

print(a, b, end=' ')

for i in range(2, 10):

$$K=a+b$$

$$a=b$$

$$b=K$$

print(K, end=" ")

O/P: 0 1 1 2 3 5 8 13 21 34

fx = 0, 1, 1, 2, 3, 5, 8, 13, 21, 34

np.mean(fx)

O/P:  $\boxed{8.8}$

3. Find mean & median of first 5 prime numbers

$$lw = 1$$

$$up = 12$$

for num in range(lw, up+1):

if num > 1:

    for i in range(2, num):

        if (num % i) == 0:

            break

    else:

        print(num, end=" ")

O/P: 2 3 5 7 11

$$px = 2, 3, 5, 7, 11$$

np.mean(px)

O/P: 5.6

np.median(px)

O/P: 5.0

4. Given observations 8, 11, 6, 14, x, 13

$$\mu = 66, n = 6$$

$$\mu = \sum x_i / n \Rightarrow 66 \times 6 = 52 + x$$

$$\Rightarrow x = 344$$

5. Given,  $\mu = 9$ , observations = 6, 8, x+2, 10, 2x-1, 2

$$9 = \frac{6+8+x+2+10+2x-1+2}{6}$$

$$3x = 54 - 27$$

$$\boxed{x = 9}$$

Two observations are  $x+2, 2x-1 \Rightarrow \boxed{11, 17}$

6. a)

Age	12	10	15	14	8
No. of bodies	5	3	2	6	4

$$\bar{M} = \frac{\sum f_i x_i}{n}$$

$$= \frac{(12 \times 5) + (10 \times 3) + (15 \times 2) + (14 \times 6) + (8 \times 4)}{(5 + 3 + 2 + 6 + 4)}$$

$$\bar{M} = 11.8$$

b) Marks obtained by students

Marks	25	30	15	20	24
No. of stud	8	12	10	6	4

$$\bar{M} = \frac{(25 \times 8) + (30 \times 12) + (15 \times 10) + (20 \times 6) + (24 \times 4)}{(8 + 12 + 10 + 6 + 4)}$$

$$\bar{M} = 226 / 20 = 11.3$$

7. find mode of following

a) 12, 18, 4, 8, 11, 8, 9, 11, 9, 10, 12, 18

mode  $\rightarrow$  mostly (frequency) occurred observation

$$= 18$$

b) 15, 22, 17, 19, 22, 17, 29, 24, 17, 15

$$\text{Mode} = 17$$

c) 0, 3, 2, 1, 3, 5, 4, 3, 4, 2, 1, 2, 1, 0

$$\text{Mode} = 3$$

d) 1, 7, 1, 2, 1, 4, 5, 9, 8, 3

Mode  $\rightarrow$  No Mode

8. The following observations are arranged in ascending order.  
Median = 25  $n=?$

$$17, x, 24, x+7, 35, 36, 46$$

Median is  $x+7 = 25$

$$\boxed{x=18}$$

9. In above, if given numbers are not in ascending order.  
What are possible values of  $x$  then?

Already we know that Median is 25.

Assume from left side of median should contain values less than 25.

Right side of Median contains values greater than 25

Fix 25.

$$17, 24, x, x+7, \boxed{25} \quad 35 \quad 36 \quad 46$$

Remaining observations should be less than 25.  
17, 24 are less than 25.

$$x+7 < 25$$

$x < 18$  ( $x$  should not be 18, if 18, we get that observation equal to median)

So, in this case

$$\boxed{x = \{0, 1, \dots, 17\} \text{ total no of values} = 18}$$

10. a) Temperature is Numeric variable  $\rightarrow$  mean / median central tendency can be used.  
b) Mean cannot be used everywhere, should check variable type  
c) Height is Numerical continuous variable  $\rightarrow$  Probability Mass function can be used.  
d) Color - Categorical variable  $\rightarrow$  Mode is considered.