In [26]:

```
import numpy as np
import pandas as pd
from numpy import mean,std
import matplotlib.pyplot as pp
from numpy import cov
from scipy.stats import pearsonr
from scipy.stats import spearmanr
```

In [27]:

```
a=pd.read_csv(r"C:\Users\user\Downloads\8_BreastCancerPrediction.csv")
a
```

Out[27]:

	id	diagnosis	radius_mean	texture_mean	perimeter_mean	area_mean	smoothne
0	842302	M	17.99	10.38	122.80	1001.0	
1	842517	M	20.57	17.77	132.90	1326.0	
2	84300903	M	19.69	21.25	130.00	1203.0	
3	84348301	M	11.42	20.38	77.58	386.1	
4	84358402	M	20.29	14.34	135.10	1297.0	
...	...	...	...	...	...	...	
564	926424	M	21.56	22.39	142.00	1479.0	
565	926682	M	20.13	28.25	131.20	1261.0	
566	926954	M	16.60	28.08	108.30	858.1	
567	927241	M	20.60	29.33	140.10	1265.0	
568	92751	B	7.76	24.54	47.92	181.0	

569 rows × 33 columns

a) Find mean, median, mode and describe

In [28]:

```
a.mean()
```

Out[28]:

```
id                         3.037183e+07
radius_mean                1.412729e+01
texture_mean               1.928965e+01
perimeter_mean             9.196903e+01
area_mean                  6.548891e+02
smoothness_mean            9.636028e-02
compactness_mean           1.043410e-01
concavity_mean             8.879932e-02
concave points_mean        4.891915e-02
symmetry_mean              1.811619e-01
fractal_dimension_mean     6.279761e-02
radius_se                  4.051721e-01
texture_se                 1.216853e+00
perimeter_se               2.866059e+00
area_se                    4.033708e+01
smoothness_se              7.040979e-03
compactness_se             2.547814e-02
concavity_se               3.189372e-02
concave points_se          1.179614e-02
symmetry_se                2.054230e-02
fractal_dimension_se       3.794904e-03
radius_worst               1.626919e+01
texture_worst              2.567722e+01
perimeter_worst            1.072612e+02
area_worst                 8.805831e+02
smoothness_worst           1.323686e-01
compactness_worst          2.542650e-01
concavity_worst            2.721885e-01
concave points_worst       1.146062e-01
symmetry_worst             2.900756e-01
fractal_dimension_worst    8.394582e-02
Unnamed: 32                         NaN
dtype: float64
```

In [29]:

```
y.median()
```

Out[29]:

```
id                         906024.000000
radius_mean                    13.370000
texture_mean                   18.840000
perimeter_mean                 86.240000
area_mean                     551.100000
smoothness_mean                 0.095870
compactness_mean                0.092630
concavity_mean                  0.061540
concave points_mean             0.033500
symmetry_mean                   0.179200
fractal_dimension_mean          0.061540
radius_se                       0.324200
texture_se                      1.108000
perimeter_se                    2.287000
area_se                        24.530000
smoothness_se                   0.006380
compactness_se                  0.020450
concavity_se                    0.025890
concave points_se               0.010930
symmetry_se                     0.018730
fractal_dimension_se            0.003187
radius_worst                   14.970000
texture_worst                  25.410000
perimeter_worst                97.660000
area_worst                    686.500000
smoothness_worst                0.131300
compactness_worst               0.211900
concavity_worst                 0.226700
concave points_worst            0.099930
symmetry_worst                  0.282200
fractal_dimension_worst         0.080040
Unnamed: 32                          NaN
dtype: float64
```

In [30]:

```
a.mode()
```

Out[30]:

	id	diagnosis	radius_mean	texture_mean	perimeter_mean	area_mean	smoothn
0	8670	B	12.34	14.93	82.61	512.2	
1	8913	NaN	NaN	15.70	87.76	NaN	
2	8915	NaN	NaN	16.84	134.70	NaN	
3	9047	NaN	NaN	16.85	NaN	NaN	
4	85715	NaN	NaN	17.46	NaN	NaN	
...	...	...	...	...	...	...	
564	911157302	NaN	NaN	NaN	NaN	NaN	
565	911296201	NaN	NaN	NaN	NaN	NaN	
566	911296202	NaN	NaN	NaN	NaN	NaN	
567	911320501	NaN	NaN	NaN	NaN	NaN	
568	911320502	NaN	NaN	NaN	NaN	NaN	

569 rows × 33 columns

In [31]:

```
a.describe()
```

Out[31]:

	id	radius_mean	texture_mean	perimeter_mean	area_mean	smoothness_
count	5.690000e+02	569.000000	569.000000	569.000000	569.000000	569.00
mean	3.037183e+07	14.127292	19.289649	91.969033	654.889104	0.09
std	1.250206e+08	3.524049	4.301036	24.298981	351.914129	0.01
min	8.670000e+03	6.981000	9.710000	43.790000	143.500000	0.05
25%	8.692180e+05	11.700000	16.170000	75.170000	420.300000	0.08
50%	9.060240e+05	13.370000	18.840000	86.240000	551.100000	0.09
75%	8.813129e+06	15.780000	21.800000	104.100000	782.700000	0.10
max	9.113205e+08	28.110000	39.280000	188.500000	2501.000000	0.16

8 rows × 32 columns

b) Find sum(), cumsum(), count, min and max values

In [32]:

```
a.sum()
```

Out[32]:

```
id                                                                172815720
85
diagnosis                 MMMMMMMMMMMMMMMMMMBBBMMMMMMMMMMMMMMMBMMMMMMM
M...
radius_mean                                                         8038.4
29
texture_mean                                                        10975.
81
perimeter_mean                                                      52330.
38
area_mean                                                           37263
1.9
smoothness_mean                                                      54.8
29
compactness_mean                                                    59.370
02
concavity_mean                                                      50.5268
11
concave points_mean                                                 27.8349
94
symmetry_mean                                                       103.08
11
fractal_dimension_mean                                              35.731
84
radius_se                                                           230.54
29…
texture_se                                                          692.38
96
perimeter_se                                                        1030.78
77
area_se                                                             22951.7
98
smoothness_se                                                       4.0063
17
compactness_se                                                      14.4970
61
concavity_se                                                        39.6028
25
concave points_se                                                    6.7120
02
symmetry_se                                                         11.6885
68
fractal_dimension_se                                                 2.15
93
radius_worst                                                        9257.1
69
texture_worst                                                       14610.
34
perimeter_worst                                                     61031.
63
area_worst                                                          50105
1.8
smoothness_worst                                                    75.317
73
compactness_worst                                                   144.676
81
concavity_worst                                                     154.8752
47
concave points_worst                                                65.2109
41
symmetry_worst                                                       165.0
```

In [33]:

```
a.cumsum()
```

Out[33]:

	id	diagnosis
0	842302	M
1	1684819	MM
2	2589022	MMM
3	170334023	MMMM
4	254692425	MMMMM
…	…	..
564	17278698457	MMMMMMMMMMMMMMMMMMMBBBMMMMMMMMMMMMMMMBMMMMMMMM..
565	17279625139	MMMMMMMMMMMMMMMMMMMBBBMMMMMMMMMMMMMMMBMMMMMMMM..
566	17280552093	MMMMMMMMMMMMMMMMMMMBBBMMMMMMMMMMMMMMMBMMMMMMMM..
567	17281479334	MMMMMMMMMMMMMMMMMMMBBBMMMMMMMMMMMMMMMBMMMMMMMM..
568	17281572085	MMMMMMMMMMMMMMMMMMMBBBMMMMMMMMMMMMMMMBMMMMMMMM..

569 rows × 33 columns

53
fractal_dimension_worst 47.765

In [34]:
```
a.count()
```

17
Unnamed: 32
0.0
Out[34]:
dtype: object

id	569
diagnosis	569
radius_mean	569
texture_mean	569
perimeter_mean	569
area_mean	569
smoothness_mean	569
compactness_mean	569
concavity_mean	569
concave points_mean	569
symmetry_mean	569
fractal_dimension_mean	569
radius_se	569
texture_se	569
perimeter_se	569
area_se	569
smoothness_se	569
compactness_se	569
concavity_se	569
concave points_se	569
symmetry_se	569
fractal_dimension_se	569
radius_worst	569
texture_worst	569
perimeter_worst	569
area_worst	569
smoothness_worst	569
compactness_worst	569
concavity_worst	569
concave points_worst	569
symmetry_worst	569
fractal_dimension_worst	569
Unnamed: 32	0

dtype: int64

In [35]:

```
y.count()
```

Out[35]:

```
id                         569
diagnosis                  569
radius_mean                569
texture_mean               569
perimeter_mean             569
area_mean                  569
smoothness_mean            569
compactness_mean           569
concavity_mean             569
concave points_mean        569
symmetry_mean              569
fractal_dimension_mean     569
radius_se                  569
texture_se                 569
perimeter_se               569
area_se                    569
smoothness_se              569
compactness_se             569
concavity_se               569
concave points_se          569
symmetry_se                569
fractal_dimension_se       569
radius_worst               569
texture_worst              569
perimeter_worst            569
area_worst                 569
smoothness_worst           569
compactness_worst          569
concavity_worst            569
concave points_worst       569
symmetry_worst             569
fractal_dimension_worst    569
Unnamed: 32                  0
dtype: int64
```

In [36]:

```
a.max()
```

Out[36]:

```
id                         911320502
diagnosis                          M
radius_mean                    28.11
texture_mean                   39.28
perimeter_mean                 188.5
area_mean                     2501.0
smoothness_mean               0.1634
compactness_mean              0.3454
concavity_mean                0.4268
concave points_mean           0.2012
symmetry_mean                  0.304
fractal_dimension_mean       0.09744
radius_se                      2.873
texture_se                     4.885
perimeter_se                   21.98
area_se                        542.2
smoothness_se                0.03113
compactness_se                0.1354
concavity_se                   0.396
concave points_se            0.05279
symmetry_se                  0.07895
fractal_dimension_se         0.02984
radius_worst                   36.04
texture_worst                  49.54
perimeter_worst                251.2
area_worst                    4254.0
smoothness_worst              0.2226
compactness_worst              1.058
concavity_worst                1.252
concave points_worst           0.291
symmetry_worst                0.6638
fractal_dimension_worst       0.2075
Unnamed: 32                      NaN
dtype: object
```

c) Find covariance and correlation (spearman and pearsons)

In [37]:

```
d1=a["texture_mean"]
d2=a["perimeter_mean"]
cov(d1,d2)
```

Out[37]:

```
array([[ 18.49890868,  34.43975917],
       [ 34.43975917, 590.44047952]])
```

In [38]:

```
pearsonr(d1,d2)
```

Out[38]:

```
(0.3295330586865702, 7.0419612377641145e-16)
```

In [39]:

```
spearmanr(d1,d2)
```

Out[39]:

```
SpearmanrResult(correlation=0.34814189073942986, pvalue=1.1756333023599274
e-17)
```

In [ ]:

```

```