

Importing libraries

```
In [1]: import pandas as pd
import numpy as np
from numpy import linalg as la
from numpy import cov
```

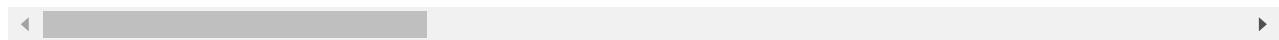
Importing dataset

```
In [2]: data=pd.read_csv(r"C:\Users\user\Downloads\bs.csv")
data
```

Out[2]:

	id	diagnosis	radius_mean	texture_mean	perimeter_mean	area_mean	smoothness_mean	compactness_mean	concavity_mean	concave points_mean	symmetry_mean	fractal_dimension_mean
0	842302	M	17.99	10.38	122.80	1001.0	0.11840	0.27210	0.08516	0.005370	0.05370	0.001320
1	842517	M	20.57	17.77	132.90	1326.0	0.08474	0.24900	0.08516	0.005370	0.05370	0.001320
2	84300903	M	19.69	21.25	130.00	1203.0	0.10960	0.24900	0.08516	0.005370	0.05370	0.001320
3	84348301	M	11.42	20.38	77.58	386.1	0.14250	0.24900	0.08516	0.005370	0.05370	0.001320
4	84358402	M	20.29	14.34	135.10	1297.0	0.10030	0.24900	0.08516	0.005370	0.05370	0.001320
...
564	926424	M	21.56	22.39	142.00	1479.0	0.11100	0.24900	0.08516	0.005370	0.05370	0.001320
565	926682	M	20.13	28.25	131.20	1261.0	0.09780	0.24900	0.08516	0.005370	0.05370	0.001320
566	926954	M	16.60	28.08	108.30	858.1	0.08455	0.24900	0.08516	0.005370	0.05370	0.001320
567	927241	M	20.60	29.33	140.10	1265.0	0.11780	0.24900	0.08516	0.005370	0.05370	0.001320
568	92751	B	7.76	24.54	47.92	181.0	0.05263	0.24900	0.08516	0.005370	0.05370	0.001320

569 rows × 32 columns



a.mean

```
In [3]: print(data.mean())
```

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
dtype: float64
```

median

In [4]:

```
print(data.median())
```

```
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
dtype: float64
```

mode

In [5]:

```
print(data.mode())
```

	id	diagnosis	radius_mean	texture_mean	perimeter_mean	\
0	8670	B	12.34	14.93	82.61	
1	8913	NaN	NaN	15.70	87.76	
2	8915	NaN	NaN	16.84	134.70	
3	9047	NaN	NaN	16.85	NaN	
4	85715	NaN	NaN	17.46	NaN	
..
564	911157302	NaN	NaN	NaN	NaN	
565	911296201	NaN	NaN	NaN	NaN	
566	911296202	NaN	NaN	NaN	NaN	
567	911320501	NaN	NaN	NaN	NaN	
568	911320502	NaN	NaN	NaN	NaN	
	area_mean	smoothness_mean	compactness_mean	concavity_mean	\	
0	512.2	0.1007	0.1147	0.0		
1	NaN	NaN	0.1206	NaN		
2	NaN	NaN	NaN	NaN		
3	NaN	NaN	NaN	NaN		
4	NaN	NaN	NaN	NaN		
..
564	NaN	NaN	NaN	NaN	NaN	
565	NaN	NaN	NaN	NaN	NaN	
566	NaN	NaN	NaN	NaN	NaN	
567	NaN	NaN	NaN	NaN	NaN	
568	NaN	NaN	NaN	NaN	NaN	
	concave points_mean	...	radius_worst	texture_worst	perimeter_worst	\
0	0.0	...	12.36	17.70	101.7	
1	NaN	...	NaN	27.26	105.9	
2	NaN	...	NaN	NaN	117.7	
3	NaN	...	NaN	NaN	NaN	
4	NaN	...	NaN	NaN	NaN	
..
564	NaN	...	NaN	NaN	NaN	
565	NaN	...	NaN	NaN	NaN	
566	NaN	...	NaN	NaN	NaN	
567	NaN	...	NaN	NaN	NaN	
568	NaN	...	NaN	NaN	NaN	
	area_worst	smoothness_worst	compactness_worst	concavity_worst	\	
0	284.4	0.1216	0.1486	0.0		
1	402.8	0.1223	0.3416	NaN		
2	439.6	0.1234	NaN	NaN		
3	458.0	0.1256	NaN	NaN		
4	472.4	0.1275	NaN	NaN		
..
564	NaN	NaN	NaN	NaN	NaN	
565	NaN	NaN	NaN	NaN	NaN	
566	NaN	NaN	NaN	NaN	NaN	
567	NaN	NaN	NaN	NaN	NaN	
568	NaN	NaN	NaN	NaN	NaN	
	concave points_worst	symmetry_worst	fractal_dimension_worst			
0	0.0	0.2226	0.07427			
1	NaN	0.2369	NaN			
2	NaN	0.2383	NaN			
3	NaN	0.2972	NaN			

4		NaN	0.3109	NaN
..	
564		NaN	NaN	NaN
565		NaN	NaN	NaN
566		NaN	NaN	NaN
567		NaN	NaN	NaN
568		NaN	NaN	NaN

[569 rows x 32 columns]

describe

In [6]:

```
print(data.describe())
```

count	5.690000e+02	569.000000	569.000000	569.000000	569.000000	\
mean	3.037183e+07	14.127292	19.289649	91.969033	654.889104	
std	1.250206e+08	3.524049	4.301036	24.298981	351.914129	
min	8.670000e+03	6.981000	9.710000	43.790000	143.500000	
25%	8.692180e+05	11.700000	16.170000	75.170000	420.300000	
50%	9.060240e+05	13.370000	18.840000	86.240000	551.100000	
75%	8.813129e+06	15.780000	21.800000	104.100000	782.700000	
max	9.113205e+08	28.110000	39.280000	188.500000	2501.000000	
count	569.000000	569.000000	569.000000	569.000000	569.000000	\
mean	0.096360	0.104341	0.088799	0.048919		
std	0.014064	0.052813	0.079720	0.038803		
min	0.052630	0.019380	0.000000	0.000000		
25%	0.086370	0.064920	0.029560	0.020310		
50%	0.095870	0.092630	0.061540	0.033500		
75%	0.105300	0.130400	0.130700	0.074000		
max	0.163400	0.345400	0.426800	0.201200		
count	569.000000	...	569.000000	569.000000	569.000000	\
mean	0.181162	...	16.269190	25.677223	107.261213	
std	0.027414	...	4.833242	6.146258	33.602542	
min	0.106000	...	7.930000	12.020000	50.410000	
25%	0.161900	...	13.010000	21.080000	84.110000	
50%	0.179200	...	14.970000	25.410000	97.660000	
75%	0.195700	...	18.790000	29.720000	125.400000	
max	0.304000	...	36.040000	49.540000	251.200000	
count	569.000000	569.000000	569.000000	569.000000	569.000000	\
mean	880.583128	0.132369	0.254265	0.272188		
std	569.356993	0.022832	0.157336	0.208624		
min	185.200000	0.071170	0.027290	0.000000		
25%	515.300000	0.116600	0.147200	0.114500		
50%	686.500000	0.131300	0.211900	0.226700		
75%	1084.000000	0.146000	0.339100	0.382900		
max	4254.000000	0.222600	1.058000	1.252000		
count	569.000000	569.000000	569.000000	569.000000	569.000000	\
mean	0.114606	0.290076		0.083946		
std	0.065732	0.061867		0.018061		
min	0.000000	0.156500		0.055040		
25%	0.064930	0.250400		0.071460		
50%	0.099930	0.282200		0.080040		
75%	0.161400	0.317900		0.092080		

```
max           0.291000           0.663800           0.207500  
[8 rows x 31 columns]
```

b.sum()

```
In [7]: print(data.sum())
```

	17281572085
id	
diagnosis	MMMMMMMMMMMMMMMBBMMMMMMMMMBMMMMMM...
radius_mean	8038.429
texture_mean	10975.81
perimeter_mean	52330.38
area_mean	372631.9
smoothness_mean	54.829
compactness_mean	59.37002
concavity_mean	50.526811
concave_points_mean	27.834994
symmetry_mean	103.0811
fractal_dimension_mean	35.73184
radius_se	230.5429
texture_se	692.3896
perimeter_se	1630.7877
area_se	22951.798
smoothness_se	4.006317
compactness_se	14.497061
concavity_se	18.147525
concave_points_se	6.712002
symmetry_se	11.688568
fractal_dimension_se	2.1593
radius_worst	9257.169
texture_worst	14610.34
perimeter_worst	61031.63
area_worst	501051.8
smoothness_worst	75.31773
compactness_worst	144.67681
concavity_worst	154.875247
concave_points_worst	65.210941
symmetry_worst	165.053
fractal_dimension_worst	47.76517
dtype: object	

cumsum()

```
In [8]: print(data.cumsum())
```

		id	diagnosis	\
0		842302		M
1		1684819		MM
2		85985722		MMM
3		170334023		MMMM
4		254692425		MMMMM
..	
564	17278698457	MMMMMMMMMMMMMMMMMBBMMMMMMMMMMMBMMMMMM... MM		
565	17279625139	MMMMMMMMMMMMMMMMMBBMMMMMMMMMMMBMMMMMM... MM		
566	17280552093	MMMMMMMMMMMMMMMMMBBMMMMMMMMMMMBMMMMMM... MM		
567	17281479334	MMMMMMMMMMMMMMMMMBBMMMMMMMMMMMBMMMMMM... MM		
568	17281572085	MMMMMMMMBMMMMMMMBBMMMMMMMBMMMMMBMMMM... MM		

	radius_mean	texture_mean	perimeter_mean	area_mean	smoothness_mean	\
0	17.990	10.38	122.80	1001.0	0.11840	
1	38.560	28.15	255.70	2327.0	0.20314	
2	58.250	49.40	385.70	3530.0	0.31274	
3	69.670	69.78	463.28	3916.1	0.45524	
4	89.960	84.12	598.38	5213.1	0.55554	
..
564	7973.339	10865.61	51902.86	369066.8	54.47622	
565	7993.469	10893.86	52034.06	370327.8	54.57402	
566	8010.069	10921.94	52142.36	371185.9	54.65857	
567	8030.669	10951.27	52282.46	372450.9	54.77637	
568	8038.429	10975.81	52330.38	372631.9	54.82900	
	compactness_mean	concavity_mean	concave points_mean	...	radius_worst	\
0	0.27760	0.300100	0.147100	...	25.380	
1	0.35624	0.387000	0.217270	...	50.370	
2	0.51614	0.584400	0.345170	...	73.940	
3	0.80004	0.825800	0.450370	...	88.850	
4	0.93284	1.023800	0.554670	...	111.390	
..
564	58.84370	49.938901	27.532064	...	9179.303	
565	58.94710	50.082901	27.629974	...	9202.993	
566	59.04940	50.175411	27.682994	...	9221.973	
567	59.32640	50.526811	27.834994	...	9247.713	
568	59.37002	50.526811	27.834994	...	9257.169	
	texture_worst	perimeter_worst	area_worst	smoothness_worst	\	
0	17.33	184.60	2019.0	0.16220		
1	40.74	343.40	3975.0	0.28600		
2	66.27	495.90	5684.0	0.43040		
3	92.77	594.77	6251.7	0.64020		
4	109.44	746.97	7826.7	0.77760		
..
564	14468.18	60506.17	496107.2	74.83227		
565	14506.43	60661.17	497838.2	74.94887		
566	14540.55	60787.87	498962.2	75.06277		
567	14579.97	60972.47	500783.2	75.22777		
568	14610.34	61031.63	501051.8	75.31773		
	compactness_worst	concavity_worst	concave points_worst	symmetry_worst	\	
0	0.66560	0.711900	0.265400	0.4601		
1	0.85220	0.953500	0.451400	0.7351		
2	1.27670	1.403900	0.694400	1.0964		
3	2.14300	2.090800	0.951900	1.7602		
4	2.34800	2.490800	1.114400	1.9966		
..
564	143.24267	153.274747	64.641341	163.8782		
565	143.43487	153.596247	64.804141	164.1354		
566	143.74427	153.936547	64.945941	164.3572		
567	144.61237	154.875247	65.210941	164.7659		
568	144.67681	154.875247	65.210941	165.0530		
	fractal_dimension_worst					
0	0.11890					
1	0.20792					
2	0.29550					
3	0.46850					
4	0.54528					
..	...					
564	47.42621					
565	47.49258					
566	47.57078					
567	47.69478					
568	47.76517					

[569 rows x 32 columns]

count

In [9]:

```
print(data.count())
```

```
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
dtype: int64
```

min

In [10]:

```
print(data.min())
```

```
id                8670
diagnosis          B
radius_mean        6.981
texture_mean       9.71
perimeter_mean    43.79
area_mean          143.5
smoothness_mean   0.05263
compactness_mean  0.01938
concavity_mean    0.0
concave_points_mean 0.0
symmetry_mean     0.106
fractal_dimension_mean 0.04996
radius_se          0.1115
texture_se         0.3602
```

```
perimeter_se          0.757
area_se               6.802
smoothness_se         0.001713
compactness_se        0.002252
concavity_se          0.0
concave points_se     0.0
symmetry_se           0.007882
fractal_dimension_se  0.000895
radius_worst          7.93
texture_worst          12.02
perimeter_worst        50.41
area_worst             185.2
smoothness_worst       0.07117
compactness_worst      0.02729
concavity_worst        0.0
concave points_worst   0.0
symmetry_worst          0.1565
fractal_dimension_worst 0.05504
dtype: object
```

max()

```
In [11]: print(data.max())
```

```
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
dtype: object
```

covariance

In [12]:

```
print(data.cov())
```

		id	radius_mean	texture_mean	\
id		1.563015e+16	3.287883e+07	5.364807e+07	
radius_mean		3.287883e+07	1.241892e+01	4.907582e+00	
texture_mean		5.364807e+07	4.907582e+00	1.849891e+01	
perimeter_mean		2.222490e+08	8.544714e+01	3.443976e+01	
area_mean		4.262946e+09	1.224483e+03	4.859938e+02	
smoothness_mean		-2.280205e+04	8.454460e-03	-1.414779e-03	
compactness_mean		6.318839e+02	9.419706e-02	5.376681e-02	
concavity_mean		4.991277e+05	1.901276e-01	1.036923e-01	
concave_points_mean		2.142177e+05	1.124751e-01	4.897693e-02	
symmetry_mean		-7.579262e+04	1.427317e-02	8.418876e-03	
fractal_dimension_mean		-4.635137e+04	-7.753706e-03	-2.321158e-03	
radius_se		4.959431e+06	6.636503e-01	3.290374e-01	
texture_se		-5.190618e+05	-1.891886e-01	9.166951e-01	
perimeter_se		3.471365e+07	4.803550e+00	2.449449e+00	
area_se		1.010874e+09	1.179682e+02	5.084087e+01	
smoothness_se		3.632916e+04	-2.355336e-03	8.540990e-05	
compactness_se		7.603492e+04	1.300051e-02	1.478660e-02	
concavity_se		2.084665e+05	2.065883e-02	1.860393e-02	
concave_points_se		6.076269e+04	8.179563e-03	4.348380e-03	
symmetry_se		-1.788548e+04	-3.038982e-03	3.245070e-04	
fractal_dimension_se		8.510281e+03	-3.976249e-04	6.197726e-04	
radius_worst		4.979381e+07	1.651375e+01	7.329267e+00	
texture_worst		4.973106e+07	6.433100e+00	2.411015e+01	
perimeter_worst		3.360214e+08	1.142886e+02	5.174593e+01	
area_worst		7.629681e+09	1.888227e+03	8.412838e+02	
smoothness_worst		2.951016e+04	9.624625e-03	7.611070e-03	
compactness_worst		-5.838341e+04	2.292492e-01	1.880100e-01	
concavity_worst		6.051816e+05	3.873864e-01	2.701101e-01	
concave_points_worst		2.890528e+05	1.723927e-01	8.349085e-02	
symmetry_worst		-3.420616e+05	3.574576e-02	2.794199e-02	
fractal_dimension_worst		-6.743751e+04	4.497351e-04	9.260129e-03	
		perimeter_mean	area_mean	smoothness_mean	\
id		2.222490e+08	4.262946e+09	-22802.053383	
radius_mean		8.544714e+01	1.224483e+03	0.008454	
texture_mean		3.443976e+01	4.859938e+02	-0.001415	
perimeter_mean		5.904405e+02	8.435772e+03	0.070836	
area_mean		8.435772e+03	1.238436e+05	0.876178	
smoothness_mean		7.083607e-02	8.761781e-01	0.000198	
compactness_mean		7.147141e-01	9.264931e+00	0.000490	
concavity_mean		1.387234e+00	1.924492e+01	0.000585	
concave_points_mean		8.023604e-01	1.124196e+01	0.000302	
symmetry_mean		1.219216e-01	1.459596e+00	0.000215	
fractal_dimension_mean		-4.485888e-02	-7.034264e-01	0.000058	
radius_se		4.661401e+00	7.149094e+01	0.001176	
texture_se		-1.162988e+00	-1.286717e+01	0.000531	
perimeter_se		3.405303e+01	5.170100e+02	0.008420	
area_se		8.234928e+02	1.280852e+04	0.157742	
smoothness_se		-1.478818e-02	-1.762210e-01	0.000014	
compactness_se		1.091112e-01	1.339725e+00	0.000080	
concavity_se		1.672962e-01	2.205952e+00	0.000105	
concave_points_se		6.105470e-02	8.084602e-01	0.000033	
symmetry_se		-1.639643e-02	-2.108964e-01	0.000023	
fractal_dimension_se		-3.551365e-04	-1.851854e-02	0.000011	
radius_worst		1.138581e+02	1.637521e+03	0.014487	
texture_worst		4.525811e+01	6.218249e+02	0.003118	
perimeter_worst		7.923282e+02	1.134179e+04	0.112879	
area_worst		1.302615e+04	1.921926e+05	1.655299	
smoothness_worst		8.352553e-02	9.925135e-01	0.000259	
compactness_worst		1.742478e+00	2.161660e+01	0.001045	

concavity_worst	2.858506e+00	3.763442e+01	0.001276
concave points_worst	1.231848e+00	1.670179e+01	0.000465
symmetry_worst	2.842997e-01	3.125809e+00	0.000343
fractal_dimension_worst	2.239052e-02	2.375623e-02	0.000127
id	compactness_mean	concavity_mean	\
radius_mean	631.883924	499127.721282	
texture_mean	0.094197	0.190128	
perimeter_mean	0.053767	0.103692	
area_mean	0.714714	1.387234	
smoothness_mean	9.264931	19.244924	
compactness_mean	0.000490	0.000585	
concavity_mean	0.002789	0.003718	
concave points_mean	0.003718	0.006355	
symmetry_mean	0.001703	0.002850	
fractal_dimension_mean	0.000873	0.001094	
radius_se	0.000211	0.000190	
texture_se	0.007286	0.013970	
perimeter_se	0.001346	0.003352	
area_se	0.058612	0.106443	
smoothness_se	1.094708	2.239119	
compactness_se	0.000021	0.000024	
concavity_se	0.000699	0.000957	
concave points_se	0.000910	0.001663	
symmetry_se	0.000209	0.000336	
fractal_dimension_se	0.000100	0.000117	
radius_worst	0.000071	0.000095	
texture_worst	0.136643	0.265181	
perimeter_worst	0.080544	0.146934	
area_worst	1.047413	1.954350	
smoothness_worst	15.323436	30.682405	
compactness_worst	0.000682	0.000817	
concavity_worst	0.007194	0.009469	
concave points_worst	0.008994	0.014704	
symmetry_worst	0.002831	0.004513	
fractal_dimension_worst	0.001667	0.002020	
	0.000656	0.000741	
id	concave points_mean	symmetry_mean	... \
radius_mean	214217.739286	-75792.615857	...
texture_mean	0.112475	0.014273	...
perimeter_mean	0.048977	0.008419	...
area_mean	0.802360	0.121922	...
smoothness_mean	11.241958	1.459596	...
compactness_mean	0.000302	0.000215	...
concavity_mean	0.001703	0.000873	...
concave points_mean	0.002850	0.001094	...
symmetry_mean	0.001506	0.000492	...
fractal_dimension_mean	0.000492	0.000752	...
radius_se	0.000046	0.000093	...
texture_se	0.007511	0.002306	...
perimeter_se	0.000460	0.001937	...
area_se	0.055753	0.017398	...
smoothness_se	1.218501	0.279314	...
compactness_se	0.000003	0.000015	...
concavity_se	0.000341	0.000207	...
concave points_se	0.000514	0.000284	...
symmetry_se	0.000147	0.000067	...
fractal_dimension_se	0.000031	0.000102	...
radius_worst	0.000026	0.000024	...
texture_worst	0.155721	0.024609	...
perimeter_worst	0.069819	0.015274	...
area_worst	1.116016	0.201896	...
smoothness_worst	17.886881	2.765725	...
	0.000401	0.000267	...

compactness_worst	0.004075	0.002041	...
concavity_worst	0.006091	0.002481	...
concave points_worst	0.002321	0.000775	...
symmetry_worst	0.000902	0.001187	...
fractal_dimension_worst	0.000258	0.000217	...
id	radius_worst	texture_worst	perimeter_worst \
radius_mean	4.979381e+07	4.973106e+07	3.360214e+08
texture_mean	1.651375e+01	6.433100e+00	1.142886e+02
perimeter_mean	7.329267e+00	2.411015e+01	5.174593e+01
area_mean	1.138581e+02	4.525811e+01	7.923282e+02
smoothness_mean	1.637521e+03	6.218249e+02	1.134179e+04
compactness_mean	1.448691e-02	3.118110e-03	1.128795e-01
concavity_mean	1.366429e-01	8.054412e-02	1.047413e+00
concave points_mean	2.651810e-01	1.469342e-01	1.954350e+00
symmetry_mean	1.557207e-01	6.981902e-02	1.116016e+00
fractal_dimension_mean	2.460890e-02	1.527421e-02	2.018958e-01
radius_se	-8.657080e-03	-2.224817e-03	-4.867133e-02
texture_se	9.584158e-01	3.320216e-01	6.706311e+00
perimeter_se	-2.977943e-01	1.386754e+00	-1.895237e+00
area_se	6.813122e+00	2.489976e+00	4.898647e+01
smoothness_se	1.665229e+02	5.494035e+01	1.163600e+03
compactness_se	-3.347759e-03	1.574005e-02	-2.192426e-02
concavity_se	1.770968e-02	1.859784e-02	1.567681e-01
concave points_se	2.726857e-02	3.289588e-03	2.299284e-01
symmetry_se	1.068023e-02	-3.936211e-03	8.189807e-02
fractal_dimension_se	-5.118857e-03	-3.936211e-03	-2.881960e-02
radius_worst	2.336022e+01	1.069193e+01	4.794329e-04
texture_worst	1.069193e+01	3.777648e+01	2.336023e+02
perimeter_worst	1.613873e+02	7.540370e+01	1.069193e+01
area_worst	2.707851e+03	1.210246e+03	3.777648e+01
smoothness_worst	2.707851e+03	1.210246e+03	7.540370e+01
compactness_worst	2.389999e-02	3.163541e-02	1.613873e+02
concavity_worst	3.618351e-01	3.489359e-01	1.069193e+01
concave points_worst	5.787568e-01	4.723400e-01	3.489359e-01
symmetry_worst	2.501648e-01	1.453437e-01	4.723400e-01
fractal_dimension_worst	7.282020e-02	8.860948e-02	1.453437e-01
radius_worst	8.161333e-03	2.432461e-02	8.860948e-02
id	area_worst	smoothness_worst	compactness_worst \
radius_mean	7.629681e+09	29510.163781	-58383.413342
texture_mean	1.888227e+03	0.009625	0.229249
perimeter_mean	8.412838e+02	0.007611	0.188010
area_mean	1.302615e+04	0.083526	1.742478
smoothness_mean	1.921926e+05	0.992514	21.616602
compactness_mean	1.655299e+00	0.000259	0.001045
concavity_mean	1.532344e+01	0.000682	0.007194
concave points_mean	3.068241e+01	0.000817	0.009469
symmetry_mean	1.788688e+01	0.000401	0.004075
fractal_dimension_mean	2.765725e+00	0.000267	0.002041
radius_se	-9.320240e-01	0.000081	-9.320240e-01
texture_se	1.186619e+02	0.000899	1.186619e+02
perimeter_se	-2.613029e+01	-0.000928	-2.613029e+01
area_se	8.411654e+02	0.006004	8.411654e+02
smoothness_se	2.101597e+04	0.130238	2.101597e+04
compactness_se	-3.114640e-01	0.000022	-3.114640e-01
concavity_se	2.032819e+00	0.000093	2.032819e+00
concave points_se	3.237150e+00	0.000116	3.237150e+00
symmetry_se	1.202431e+00	0.000030	1.202431e+00
fractal_dimension_se	-5.193299e-01	-0.000002	-5.193299e-01
radius_worst	1.202431e+00	0.000010	1.202431e+00
texture_worst	2.707851e+03	0.023900	2.707851e+03
perimeter_worst	1.210246e+03	0.031635	1.210246e+03
area_worst	1.870287e+04	0.181660	1.870287e+04
compactness_worst	3.241674e+05	2.718848	3.241674e+05

smoothness_worst	2.718848e+00	0.000521	0.002041
compactness_worst	3.926286e+01	0.002041	0.024755
concavity_worst	6.453772e+01	0.002470	0.029288
concave points_worst	2.797227e+01	0.000822	0.008285
symmetry_worst	7.367083e+00	0.000698	0.005981
fractal_dimension_worst	8.190351e-01	0.000255	0.002303

	concavity_worst	concave points_worst	\
id	605181.617857	289052.809853	
radius_mean	0.387386	0.172393	
texture_mean	0.270110	0.083491	
perimeter_mean	2.858506	1.231848	
area_mean	37.634415	16.701789	
smoothness_mean	0.001276	0.000465	
compactness_mean	0.008994	0.002831	
concavity_mean	0.014704	0.004513	
concave points_mean	0.006091	0.002321	
symmetry_mean	0.002481	0.000775	
fractal_dimension_mean	0.000510	0.000081	
radius_se	0.022018	0.009680	
texture_se	-0.007936	-0.004338	
perimeter_se	0.176695	0.073747	
area_se	3.654804	1.609241	
smoothness_se	-0.000037	-0.000020	
compactness_se	0.002388	0.000569	
concavity_se	0.004173	0.000874	
concave points_se	0.000707	0.000244	
symmetry_se	0.000064	-0.000017	
fractal_dimension_se	0.000210	0.000037	
radius_worst	0.578757	0.250165	
texture_worst	0.472340	0.145344	
perimeter_worst	4.334781	1.803071	
area_worst	64.537720	27.972274	
smoothness_worst	0.002470	0.000822	
compactness_worst	0.029288	0.008285	
concavity_worst	0.043524	0.011731	
concave points_worst	0.011731	0.004321	
symmetry_worst	0.006873	0.002044	
fractal_dimension_worst	0.002587	0.000607	

	symmetry_worst	fractal_dimension_worst
id	-342061.639212	-67437.508622
radius_mean	0.035746	0.000450
texture_mean	0.027942	0.009260
perimeter_mean	0.284300	0.022391
area_mean	3.125809	0.023756
smoothness_mean	0.000343	0.000127
compactness_mean	0.001667	0.000656
concavity_mean	0.002020	0.000741
concave points_mean	0.000902	0.000258
symmetry_mean	0.001187	0.000217
fractal_dimension_mean	0.000146	0.000098
radius_se	0.001622	0.000248
texture_se	-0.004376	-0.000455
perimeter_se	0.013751	0.003120
area_se	0.208622	0.014411
smoothness_se	-0.000020	0.000006
compactness_se	0.000308	0.000191
concavity_se	0.000369	0.000240
concave points_se	0.000055	0.000035
symmetry_se	0.000199	0.000012
fractal_dimension_se	0.000018	0.000028
radius_worst	0.072820	0.008161
texture_worst	0.088609	0.024325
perimeter_worst	0.560250	0.084334

area_worst	7.367083	0.819035
smoothness_worst	0.000698	0.000255
compactness_worst	0.005981	0.002303
concavity_worst	0.006873	0.002587
concave points_worst	0.002044	0.000607
symmetry_worst	0.003828	0.000601
fractal_dimension_worst	0.000601	0.000326

[31 rows x 31 columns]

corelation

pearson corelation

In [13]:

```
from scipy.stats import pearsonr  
print(pearsonr(data["area_mean"], data["id"]))
```

(0.09689282328169785, 0.020799020275621218)

spearmen corelation

In [14]:

```
from scipy.stats import spearmanr  
print(spearmanr(data["area_mean"], data["id"]))
```

SpearmanResult(correlation=0.04282908531039537, pvalue=0.3077975089498108)