import libraries

In [2]:
```
import numpy as np
import pandas as pd
```

import dataset

In [27]:
```
data=pd.read_csv(r"C:\Users\user\Downloads\8_BreastCancerPrediction.csv")
data
```

Out[27]:

	id	diagnosis	radius_mean	texture_mean	perimeter_mean	area_mean	smoothness_
0	842302	M	17.99	10.38	122.80	1001.0	0.
1	842517	M	20.57	17.77	132.90	1326.0	0.(
2	84300903	M	19.69	21.25	130.00	1203.0	0.1
3	84348301	M	11.42	20.38	77.58	386.1	0.1
4	84358402	M	20.29	14.34	135.10	1297.0	0.1
...	...	...	...	...	...	...	
564	926424	M	21.56	22.39	142.00	1479.0	0.
565	926682	M	20.13	28.25	131.20	1261.0	0.(
566	926954	M	16.60	28.08	108.30	858.1	0.(
567	927241	M	20.60	29.33	140.10	1265.0	0.
568	92751	B	7.76	24.54	47.92	181.0	0.(

569 rows × 33 columns

mean

In [28]:
```
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
Unnamed: 32                         NaN
dtype: float64
```

median

In [29]:
```
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
Unnamed: 32                          NaN
dtype: float64
```

mode

In [30]:
```
print(data.describe())
```

```
                 id  radius_mean  texture_mean  perimeter_mean    area_mean
\
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

       smoothness_mean  compactness_mean  concavity_mean  concave points_mean
\
count       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

       symmetry_mean  ...  texture_worst  perimeter_worst   area_worst  \
count     569.000000  ...     569.000000       569.000000   569.000000
mean        0.181162  ...      25.677223       107.261213   880.583128
std         0.027414  ...       6.146258        33.602542   569.356993
min         0.106000  ...      12.020000        50.410000   185.200000
25%         0.161900  ...      21.080000        84.110000   515.300000
50%         0.179200  ...      25.410000        97.660000   686.500000
75%         0.195700  ...      29.720000       125.400000  1084.000000
max         0.304000  ...      49.540000       251.200000  4254.000000

       smoothness_worst  compactness_worst  concavity_worst  \
count        569.000000         569.000000       569.000000
mean           0.132369           0.254265         0.272188
std            0.022832           0.157336         0.208624
min            0.071170           0.027290         0.000000
25%            0.116600           0.147200         0.114500
50%            0.131300           0.211900         0.226700
75%            0.146000           0.339100         0.382900
max            0.222600           1.058000         1.252000

       concave points_worst  symmetry_worst  fractal_dimension_worst  \
count            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

       Unnamed: 32
count          0.0
mean           NaN
std            NaN
min            NaN
```

```
25%            NaN
50%            NaN
75%            NaN
max            NaN

[8 rows x 32 columns]
```

In [31]:
```
print(data.sum())
```

```
id                                                      17281572085
diagnosis                MMMMMMMMMMMMMMMMMMMBBBMMMMMMMMMMMMMMMBMMMMMMMM...
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
Unnamed: 32                                                    0.0
dtype: object
```

In [33]:
```
df = pd.DataFrame(data[["radius_mean","texture_mean"]])
df
```

Out[33]:

	radius_mean	texture_mean
0	17.99	10.38
1	20.57	17.77
2	19.69	21.25
3	11.42	20.38
4	20.29	14.34
...	...	...
564	21.56	22.39
565	20.13	28.25
566	16.60	28.08
567	20.60	29.33
568	7.76	24.54

569 rows × 2 columns

In [34]:
```
print(df.mode())
```

```
   radius_mean  texture_mean
0        12.34         14.93
1          NaN         15.70
2          NaN         16.84
3          NaN         16.85
4          NaN         17.46
5          NaN         18.22
6          NaN         18.90
7          NaN         19.83
8          NaN         20.52
```

In [35]:
```
print(df.mean())
```

```
radius_mean     14.127292
texture_mean    19.289649
dtype: float64
```

In [36]:
```
print(df.median())
```

```
radius_mean     13.37
texture_mean    18.84
dtype: float64
```

In [37]:
```
print(df.describe())
```

```
       radius_mean  texture_mean
count   569.000000    569.000000
mean     14.127292     19.289649
std       3.524049      4.301036
min       6.981000      9.710000
25%      11.700000     16.170000
50%      13.370000     18.840000
75%      15.780000     21.800000
max      28.110000     39.280000
```

In [38]:
```
print(df.sum())
```

```
radius_mean      8038.429
texture_mean    10975.810
dtype: float64
```

In [39]:
```
print(df.cumsum())
```

```
     radius_mean  texture_mean
0         17.990         10.38
1         38.560         28.15
2         58.250         49.40
3         69.670         69.78
4         89.960         84.12
..           ...           ...
564     7973.339      10865.61
565     7993.469      10893.86
566     8010.069      10921.94
567     8030.669      10951.27
568     8038.429      10975.81

[569 rows x 2 columns]
```

In [40]:
```
print(df.min())
```

```
radius_mean     6.981
texture_mean    9.710
dtype: float64
```

In [41]:
```
print(df.max())
```

```
radius_mean     28.11
texture_mean    39.28
dtype: float64
```

In [42]:
```
print(df.count())
```

```
radius_mean     569
texture_mean    569
dtype: int64
```

In [43]:
```
from numpy import cov
```

In [44]:
```
print(cov(df))
```

```
[[ 28.95605  10.654    -5.9358  ... -43.6814  -33.21765 -63.8479 ]
 [ 10.654     3.92     -2.184   ... -16.072   -12.222   -23.492  ]
 [ -5.9358   -2.184     1.2168  ...   8.9544    6.8094   13.0884 ]
 ...
 [-43.6814  -16.072     8.9544  ...  65.8952   50.1102   96.3172 ]
 [-33.21765 -12.222     6.8094  ...  50.1102   38.10645  73.2447 ]
 [-63.8479  -23.492    13.0884  ...  96.3172   73.2447  140.7842 ]]
```

In [45]:
```
from scipy.stats import pearsonr
```

In [46]:
```
df1 = df["radius_mean"][0:100]
df2 = df["texture_mean"][0:100]
df1
df2
```

Out[46]:
```
0     10.38
1     17.77
2     21.25
3     20.38
4     14.34
      ...
95    23.03
96    17.84
97    19.94
98    12.84
99    19.77
Name: texture_mean, Length: 100, dtype: float64
```

In [51]:
```
print(pearsonr(df1,df2))
```

```
(0.37578107646960807, 0.00011678949907326985)
```

In [48]:
```
from scipy.stats import spearmanr
```

In [50]:
```
print(spearmanr(df1,df2))
```

```
SpearmanrResult(correlation=0.381462012517477, pvalue=9.010318300769893e-05)
```

In [ ]: