day-5

July 25, 2023

```
[1]: import numpy as np
      import pandas as pd
      from numpy import linalg as la
         1)Matrix
     1
     1D
 [2]: A = np.array([6,1,1])
      print(A)
     [6 1 1]
     2D
[20]: B = np.array([[1,2],
                    [4,5]])
      print(B)
     [[1 2]
      [4 5]]
     3D
[43]: C = np.array([[[1,2],
                      [3,4]],
                    [[10,20],
                     [30,40]],
                    [[100,200],
                     [300,400]]])
      print(C)
     [[[ 1
              2]
       [ 3
              4]]
      [[ 10
             20]
       [ 30 40]]
      [[100 200]
       [300 400]]]
```

```
4D
```

```
[10]: D = np.array([[[1, 2], [3, 4]],
                     [[5, 6], [7, 8]]],
                    [[[9, 10], [11, 12]],
                     [[13, 14], [15, 16]]])
      print(D)
     [[[[ 1 2]
        [3 4]]
       [[ 5 6]
        [7 8]]]
      [[[ 9 10]
        [11 12]]
       [[13 14]
        [15 16]]]
     5D
[15]: E = np.array([[[[[1,2],[2,3]],
                    [[1,2],[2,3]]],
                    [[[1,2],[2,3]],
                    [[1,2],[2,3]]],
                    [[[[1,2],[2,3]],
                    [[1,2],[2,3]]],
                    [[[1,2],[2,3]],
                    [[1,2],[2,3]]]])
      print(E)
     [[[[1 2]
         [2 3]]
        [[1 2]
         [2 3]]]
       [[[1 2]
         [2 3]]
        [[1 2]
         [2 3]]]
      [[[[1 2]
```

```
[2 3]]
        [[1 2]
         [2 3]]]
       [[[1 2]
         [2 3]]
        [[1 2]
         [2 3]]]]
         2) Determinants
     2d array
[21]: print(la.det(B))
     -2.99999999999996
     3d array
[44]: print(la.det(C))
     [-2.e+00 -2.e+02 -2.e+04]
     4d array
     5d array
         3)
     3
[46]: print(la.matrix_rank(A))
     1
[47]: print(la.matrix_rank(B))
[48]: print(la.matrix_rank(C))
     [2 2 2]
[49]: print(la.matrix_rank(D))
     [[2 2]
      [2 2]]
[50]: print(la.matrix_rank(E))
```

```
[[[2 2]
       [2 2]]
      [[2 2]
       [2 2]]]
     diagonal
[54]: print(np.diag(A))
     [[6 0 0]]
      [0 1 0]
      [0 0 1]]
[55]: print(np.diag(B))
     [1 5]
     trace
[58]: print(np.trace(B))
     6
[59]: print(np.trace(C))
     [31 42]
[61]: print(np.trace(D))
     [[14 16]
      [18 20]]
[62]: print(np.trace(E))
     [[[2 4]
       [4 6]]
      [[2 4]
       [4 6]]]
     4 5)
[64]: print(la.eig(B))
     EigResult(eigenvalues=array([-0.46410162, 6.46410162]),
     eigenvectors=array([[-0.80689822, -0.34372377],
            [ 0.59069049, -0.9390708 ]]))
[66]: print(la.eig(C))
```

```
EigResult(eigenvalues=array([[-3.72281323e-01, 5.37228132e+00],
            [-3.72281323e+00, 5.37228132e+01],
            [-3.72281323e+01, 5.37228132e+02]]), eigenvectors=array([[[-0.82456484,
     -0.41597356,
             [0.56576746, -0.90937671]],
            [[-0.82456484, -0.41597356],
             [0.56576746, -0.90937671]],
            [[-0.82456484, -0.41597356],
             [0.56576746, -0.90937671]]))
[67]: print(la.eig(D))
     EigResult(eigenvalues=array([[[-0.37228132, 5.37228132],
             [-0.15206735, 13.15206735]],
            [[-0.09481005, 21.09481005],
             [-0.06880228, 29.06880228]]]), eigenvectors=array([[[[-0.82456484,
     -0.41597356,
              [0.56576746, -0.90937671]],
             [[-0.75868086, -0.59276441],
              [ 0.65146248, -0.80537591]]],
            [[-0.73979641, -0.63720844],
              [0.67283079, -0.77069151]],
             [[-0.73099964, -0.65690325],
              [ 0.68237784, -0.75397488]]]]))
[68]: print(la.eig(E))
     EigResult(eigenvalues=array([[[[-0.23606798, 4.23606798],
              [-0.23606798, 4.23606798]],
             [[-0.23606798, 4.23606798],
              [-0.23606798, 4.23606798]]],
            [[[-0.23606798, 4.23606798],
              [-0.23606798, 4.23606798]],
             [[-0.23606798, 4.23606798],
              [-0.23606798, 4.23606798]]]]), eigenvectors=array([[[[[-0.85065081,
     -0.52573111],
               [0.52573111, -0.85065081]],
```

```
[[-0.85065081, -0.52573111],
    [ 0.52573111, -0.85065081]]],

[[[-0.85065081, -0.52573111],
    [ 0.52573111, -0.85065081]],

[[-0.85065081, -0.52573111],
    [ 0.52573111, -0.85065081]]]],

[[[-0.85065081, -0.52573111],
    [ 0.52573111, -0.85065081]]],

[[-0.85065081, -0.52573111],
    [ 0.52573111, -0.85065081]]],

[[-0.85065081, -0.52573111],
    [ 0.52573111, -0.85065081]]],

[[-0.85065081, -0.52573111],
    [ 0.52573111, -0.85065081]]]])))
```

5 EDA

```
[1]: import pandas as pd
[2]: df = pd.read_csv(r"C:\Users\SHREYAS\Downloads\8_BreastCancerPrediction.csv")
     df
[2]:
                id diagnosis
                               radius_mean
                                            texture_mean perimeter_mean
                                                                            area_mean \
            842302
                                     17.99
     0
                            Μ
                                                    10.38
                                                                    122.80
                                                                               1001.0
                                                    17.77
     1
            842517
                            Μ
                                     20.57
                                                                    132.90
                                                                               1326.0
     2
                                     19.69
                                                    21.25
                                                                    130.00
                                                                               1203.0
          84300903
                            Μ
     3
                                                    20.38
                                                                     77.58
          84348301
                                     11.42
                                                                                386.1
          84358402
                                     20.29
                                                    14.34
                                                                    135.10
                                                                               1297.0
                            Μ
                                     21.56
                                                    22.39
                                                                    142.00
     564
            926424
                            М
                                                                               1479.0
     565
                                     20.13
                                                    28.25
                                                                    131.20
                                                                               1261.0
            926682
                            Μ
     566
                            М
                                     16.60
                                                    28.08
                                                                    108.30
                                                                                858.1
            926954
     567
            927241
                            Μ
                                     20.60
                                                    29.33
                                                                    140.10
                                                                               1265.0
     568
                                      7.76
                                                    24.54
                                                                     47.92
             92751
                                                                                181.0
          smoothness_mean compactness_mean concavity_mean concave points_mean \
     0
                  0.11840
                                     0.27760
                                                      0.30010
                                                                            0.14710
```

1	0.08474	0.07864	0.08	690 (0.07017	
2	0.10960	0.15990	0.19	740	0.12790	
3	0.14250	0.28390	0.24	140	0.10520	
4	0.10030	0.13280	0.19	800	0.10430	
	•••	•••				
564	0.11100	0.11590	0.24	390	0.13890	
565	0.09780	0.10340	0.14	400	0.09791	
566	0.08455	0.10230	0.09	251 (0.05302	
567	0.11780	0.27700	0.35	140	0.15200	
568	0.05263	0.04362	0.00	000	0.0000	
	texture_worst	perimeter_worst	area_worst	smoothness_worst	\	
0	17.33	184.60	2019.0	0.16220		
1	23.41	158.80	1956.0	0.12380		
2	25.53	152.50	1709.0	0.14440		
3	26.50	98.87	567.7	0.20980		
4	16.67	152.20	1575.0	0.13740		
			•••	•••		
564	26.40	166.10	2027.0	0.14100		
565	38.25	155.00	1731.0	0.11660		
566	34.12	126.70	1124.0	0.11390		
567	39.42	184.60	1821.0	0.16500		
568	30.37	59.16	268.6	0.08996		
	compactness_worst	concavity_worst	concave po	ints_worst symmet	try_worst	\
0	compactness_worst	· · · · · · · · · · · · · · · · · · ·	concave po	ints_worst symmet 0.2654	0.4601	\
0	-	0.7119	concave po	•	-	\
	0.66560	0.7119 0.2416	concave po	0.2654	0.4601	\
1	0.66560 0.18660	0.7119 0.2416 0.4504	concave po	0.2654 0.1860	0.4601 0.2750	\
1 2	0.66560 0.18660 0.42450	0.7119 0.2416 0.4504 0.6869	concave po	0.2654 0.1860 0.2430	0.4601 0.2750 0.3613	\
1 2 3	0.66560 0.18660 0.42450 0.86630	0.7119 0.2416 0.4504 0.6869	concave po	0.2654 0.1860 0.2430 0.2575	0.4601 0.2750 0.3613 0.6638	\
1 2 3 4	0.66560 0.18660 0.42450 0.86630 0.20500	0.7119 0.2416 0.4504 0.6869 0.4000	concave po	0.2654 0.1860 0.2430 0.2575	0.4601 0.2750 0.3613 0.6638	\
1 2 3 4	0.66560 0.18660 0.42450 0.86630 0.20500	0.7119 0.2416 0.4504 0.6869 0.4000 0.4107	concave po	0.2654 0.1860 0.2430 0.2575 0.1625	0.4601 0.2750 0.3613 0.6638 0.2364	\
1 2 3 4 564	0.66560 0.18660 0.42450 0.86630 0.20500 	0.7119 0.2416 0.4504 0.6869 0.4000 0.4107 0.3215	concave po	0.2654 0.1860 0.2430 0.2575 0.1625 	0.4601 0.2750 0.3613 0.6638 0.2364	\
1 2 3 4 564 565	0.66560 0.18660 0.42450 0.86630 0.20500 0.21130 0.19220	0.7119 0.2416 0.4504 0.6869 0.4000 0.4107 0.3215 0.3403	concave po	0.2654 0.1860 0.2430 0.2575 0.1625 0.2216 0.1628	0.4601 0.2750 0.3613 0.6638 0.2364 0.2060 0.2572	\
1 2 3 4 564 565 566	0.66560 0.18660 0.42450 0.86630 0.20500 0.21130 0.19220 0.30940	0.7119 0.2416 0.4504 0.6869 0.4000 0.4107 0.3215 0.3403 0.9387	concave po	0.2654 0.1860 0.2430 0.2575 0.1625 0.2216 0.1628 0.1418	0.4601 0.2750 0.3613 0.6638 0.2364 0.2060 0.2572 0.2218	\
1 2 3 4 564 565 566 567	0.66560 0.18660 0.42450 0.86630 0.20500 0.21130 0.19220 0.30940 0.86810	0.7119 0.2416 0.4504 0.6869 0.4000 0.4107 0.3215 0.3403 0.9387	concave po	0.2654 0.1860 0.2430 0.2575 0.1625 0.2216 0.1628 0.1418 0.2650	0.4601 0.2750 0.3613 0.6638 0.2364 0.2060 0.2572 0.2218 0.4087	\
1 2 3 4 564 565 566 567	0.66560 0.18660 0.42450 0.86630 0.20500 0.21130 0.19220 0.30940 0.86810	0.7119 0.2416 0.4504 0.6869 0.4000 0.4107 0.3215 0.3403 0.9387 0.0000		0.2654 0.1860 0.2430 0.2575 0.1625 0.2216 0.1628 0.1418 0.2650	0.4601 0.2750 0.3613 0.6638 0.2364 0.2060 0.2572 0.2218 0.4087	\
1 2 3 4 564 565 566 567	0.66560 0.18660 0.42450 0.86630 0.20500 0.21130 0.19220 0.30940 0.86810 0.06444	0.7119 0.2416 0.4504 0.6869 0.4000 0.4107 0.3215 0.3403 0.9387 0.0000	32	0.2654 0.1860 0.2430 0.2575 0.1625 0.2216 0.1628 0.1418 0.2650	0.4601 0.2750 0.3613 0.6638 0.2364 0.2060 0.2572 0.2218 0.4087	\
1 2 3 4 564 565 566 567 568	0.66560 0.18660 0.42450 0.86630 0.20500 0.21130 0.19220 0.30940 0.86810 0.06444 fractal_dimension	0.7119 0.2416 0.4504 0.6869 0.4000 0.4107 0.3215 0.3403 0.9387 0.0000	- 32 aN	0.2654 0.1860 0.2430 0.2575 0.1625 0.2216 0.1628 0.1418 0.2650	0.4601 0.2750 0.3613 0.6638 0.2364 0.2060 0.2572 0.2218 0.4087	
1 2 3 4 564 565 566 567 568	0.66560 0.18660 0.42450 0.86630 0.20500 0.21130 0.19220 0.30940 0.86810 0.06444 fractal_dimension	0.7119 0.2416 0.4504 0.6869 0.4000 0.4107 0.3215 0.3403 0.9387 0.0000 Lworst Unnamed: 3	32 aN	0.2654 0.1860 0.2430 0.2575 0.1625 0.2216 0.1628 0.1418 0.2650	0.4601 0.2750 0.3613 0.6638 0.2364 0.2060 0.2572 0.2218 0.4087	
1 2 3 4 564 565 566 567 568	0.66560 0.18660 0.42450 0.86630 0.20500 0.21130 0.19220 0.30940 0.86810 0.06444 fractal_dimension	0.7119 0.2416 0.4504 0.6869 0.4000 0.4107 0.3215 0.3403 0.9387 0.0000 4_worst Unnamed: 3	32 aN aN	0.2654 0.1860 0.2430 0.2575 0.1625 0.2216 0.1628 0.1418 0.2650	0.4601 0.2750 0.3613 0.6638 0.2364 0.2060 0.2572 0.2218 0.4087	
1 2 3 4 564 565 566 567 568	0.66560 0.18660 0.42450 0.86630 0.20500 0.21130 0.19220 0.30940 0.86810 0.06444 fractal_dimension	0.7119 0.2416 0.4504 0.6869 0.4000 0.4107 0.3215 0.3403 0.9387 0.0000 Lworst Unnamed: 3	32 aN aN aN	0.2654 0.1860 0.2430 0.2575 0.1625 0.2216 0.1628 0.1418 0.2650	0.4601 0.2750 0.3613 0.6638 0.2364 0.2060 0.2572 0.2218 0.4087	
1 2 3 4 564 565 566 567 568	0.66560 0.18660 0.42450 0.86630 0.20500 0.21130 0.19220 0.30940 0.86810 0.06444 fractal_dimension	0.7119 0.2416 0.4504 0.6869 0.4000 0.4107 0.3215 0.3403 0.9387 0.0000 L_worst Unnamed: 3 0.11890 0.08902 Name of the control of the cont	32 aN aN aN	0.2654 0.1860 0.2430 0.2575 0.1625 0.2216 0.1628 0.1418 0.2650	0.4601 0.2750 0.3613 0.6638 0.2364 0.2060 0.2572 0.2218 0.4087	
1 2 3 4 564 565 566 567 568	0.66560 0.18660 0.42450 0.86630 0.20500 0.21130 0.19220 0.30940 0.86810 0.06444 fractal_dimension	0.7119 0.2416 0.4504 0.6869 0.4000 0.4107 0.3215 0.3403 0.9387 0.0000 Unnamed: 3 0.11890 Na 0.08902 Na 0.08758 Na 0.07678 Na	32 aN aN aN aN	0.2654 0.1860 0.2430 0.2575 0.1625 0.2216 0.1628 0.1418 0.2650	0.4601 0.2750 0.3613 0.6638 0.2364 0.2060 0.2572 0.2218 0.4087	
1 2 3 4 564 565 566 567 568	0.66560 0.18660 0.42450 0.86630 0.20500 0.21130 0.19220 0.30940 0.86810 0.06444 fractal_dimension	0.7119 0.2416 0.4504 0.6869 0.4000 0.4107 0.3215 0.3403 0.9387 0.0000 Lworst Unnamed: 3 0.08902 Na 0.08902 Na 0.08758 Na 0.07678 Na	32 aN aN aN aN aN	0.2654 0.1860 0.2430 0.2575 0.1625 0.2216 0.1628 0.1418 0.2650	0.4601 0.2750 0.3613 0.6638 0.2364 0.2060 0.2572 0.2218 0.4087	
1 2 3 4 564 565 566 567 568	0.66560 0.18660 0.42450 0.86630 0.20500 0.21130 0.19220 0.30940 0.86810 0.06444 fractal_dimension	0.7119 0.2416 0.4504 0.6869 0.4000 0.4107 0.3215 0.3403 0.9387 0.0000 L_worst Unnamed: 3 0.11890 0.08902 0.08758 0.17300 0.07678 Na 0.07115 Na	32 aN aN aN aN aN	0.2654 0.1860 0.2430 0.2575 0.1625 0.2216 0.1628 0.1418 0.2650	0.4601 0.2750 0.3613 0.6638 0.2364 0.2060 0.2572 0.2218 0.4087	

567	0.12400	${\tt NaN}$
568	0.07039	NaN

[569 rows x 33 columns]

ı	[3]	۱.	дf	isnull	()
ı	LOJ		uı.	TPHUTI	_ (/

[3]:		id	diagnosis	radius_mean	texture_mean	perimeter_mean	area_mean	\
	0	False	False	False	False	False	False	
	1	False	False	False	False	False	False	
	2	False	False	False	False	False	False	
	3	False	False	False	False	False	False	
	4	False	False	False	False	False	False	
		•••	•••	•••	•••			
	564	False	False	False	False	False	False	
	565	False	False	False	False	False	False	
	566	False	False	False	False	False	False	
	567	False	False	False	False	False	False	
	568	False	False	False	False	False	False	
		smooth		-	~	_mean concave	=	\
	0		False	Fal		False	False	
	1		False	Fal		False	False	
	2		False	Fal		False	False	
	3		False	Fal		False	False	
	4		False	Fal	se	False	False	
			•••	•••	•••		•••	
	564		False	Fal		False	False	
	565		False	Fal		False	False	
	566		False	Fal	se	False	False	
	567		False	Fal	se	False	False	
	568		False	Fal	se	False	False	
		tov	tura worst	nerimeter wor	st area wors	t smoothness_w	orst \	
	0		False	Fal			alse	
	1	•••	False	Fal			alse	
	2	•••	False	Fal			alse	
	3	•••	False	Fal			alse	
	4	•••	False	Fal			alse	
	-	•••	1 0150	rui	bo raib		arbe	
	 564	•••	 False	 Fal	se Fals	 _ F	alse	
	565	•••	False	Fal			alse	
	566	•••	False	Fal			alse	
	567	•••	False	Fal			alse alse	
	568	•••	False	Fal			alse alse	
	500	•••	raise	rai	sc rais	C P	u T D C	

	0	False	е	Fals	se	False	False
	1	False	е	Fals	se	False	False
	2	False	е	Fals	se	False	False
	3	False	е	Fals	se	False	False
	4	False	е	Fals	se	False	False
		***		•••			
	564	Fals	e	Fals	se	False	False
	565	Fals		Fals		False	False
	566	Fals		Fals		False	False
	567	Fals		Fals		False	False
	568	Fals	е	Fals	se	False	False
		fmootol dimension	na+	Ilmnomod	. 20		
	^	fractal_dimension					
	0		False		[rue		
	1		False		ſrue -		
	2		False		[rue		
	3		False]	True		
	4		False	ר	True		
			•••				
	564		False	7	True		
	565		False	ר	True		
	566		False	7	True		
	567		False	7	True		
	568		False		True		
	Γ569	rows x 33 column	sl				
	•						
[5]:	d1 =	df.fillna(value=	1)				
	d1						
[5]:		id diagnos	is radi	us_mean	texture_mean	perimeter_mean	n area_mean \
	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	
	3	84348301	M	11.42	20.38	77.58	
	4	84358402	M	20.29	14.34	135.10	
			11	20.20			1201.0
	 564	 926424	М	 21.56	 22.39	 142.00	1479.0
	565	926682	M	20.13	28.25	131.20	
	566	926954	M	16.60	28.08	108.30	
	567	927241	M	20.60	29.33	140.10	
	568	92751	В	7.76	24.54	47.92	181.0
		_					
		smoothness_mean	compact	ness_mear	• –		-
	0	0.11840		0.27760			0.14710
	1	0.08474		0.07864			0.07017
	2	0.10960		0.15990	0.19	740	0.12790

```
3
              0.14250
                                  0.28390
                                                   0.24140
                                                                           0.10520
4
              0.10030
                                  0.13280
                                                   0.19800
                                                                           0.10430
. .
                                                    0.24390
                                                                           0.13890
564
              0.11100
                                  0.11590
565
              0.09780
                                  0.10340
                                                   0.14400
                                                                           0.09791
              0.08455
                                                   0.09251
                                                                           0.05302
566
                                  0.10230
567
              0.11780
                                  0.27700
                                                   0.35140
                                                                           0.15200
568
                                                   0.00000
                                                                           0.00000
              0.05263
                                  0.04362
        texture_worst
                         perimeter_worst
                                            area_worst
                                                         smoothness_worst
0
                 17.33
                                                2019.0
                                                                   0.16220
                                   184.60
1
                 23.41
                                   158.80
                                                1956.0
                                                                   0.12380
2
                 25.53
                                   152.50
                                                1709.0
                                                                   0.14440
3
                 26.50
                                    98.87
                                                 567.7
                                                                   0.20980
4
                 16.67
                                                1575.0
                                                                   0.13740
                                   152.20
. .
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     compactness_worst
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     fractal_dimension_worst
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568
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```

[569 rows x 33 columns]

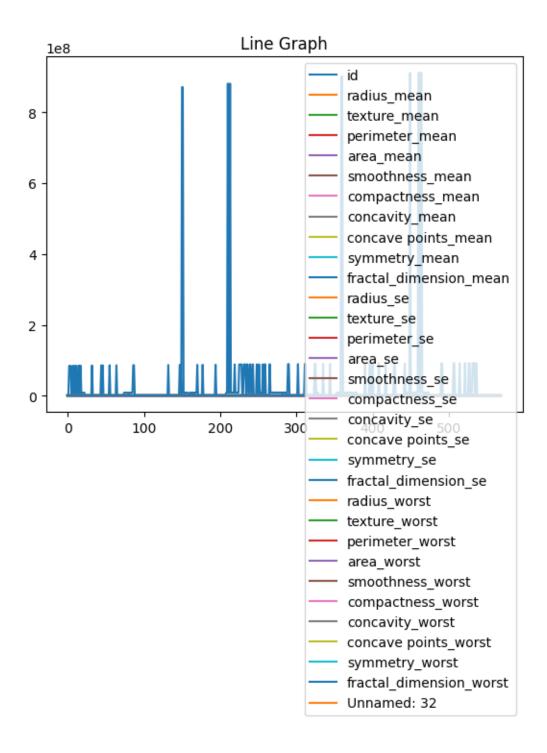
[8]:	d2 = d2	df.dropna	a(axis=1)					
[8]:		id	diagnosis	radius_mean	texture_mean	perimeter_mea	an area_mea	n \
	0	842302	M	17.99	10.38	122.8	30 1001.	0
	1	842517	M		17.77	132.9	90 1326.	0
	2	84300903	M	19.69	21.25	130.0	1203.	0
	3	84348301	M		20.38	77.5		1
	4	84358402	M	1 20.29	14.34	135.1	1297.	0
	 564	 926424	 M	 1 21.56	 22.39	142.0		0
	565	926682	M		28.25	131.2		
	566	926954	M		28.08	108.3		
	567	927241	M		29.33	140.1		
	568	92751	E		24.54	47.9		
		smoothnes	ss_mean c	compactness_mea	-	ean concave p		\
	0	(0.11840	0.2776	0.30	010	0.14710	
	1	(0.08474	0.0786	0.08	690	0.07017	
	2	(0.10960	0.1599	0.19	740	0.12790	
	3	(0.14250	0.2839	0.24	140	0.10520	
	4	(0.10030	0.1328	30 0.19	800	0.10430	
	••							
	564		0.11100	0.1159			0.13890	
	565		0.09780	0.1034			0.09791	
	566		0.08455	0.1023			0.05302	
	567		0.11780	0.2770			0.15200	
	568	(0.05263	0.0436	0.00	000	0.00000	
		radius	s_worst t	texture_worst	perimeter_wors	t area_worst	\	
	0	•••	25.380	17.33	184.6	0 2019.0		
	1	•••	24.990	23.41	158.8			
	2	•••	23.570	25.53	152.5	0 1709.0		
	3	•••	14.910	26.50	98.8			
	4	•••	22.540	16.67	152.2	0 1575.0		
		•••			•••			
	564	•••	25.450	26.40	166.1			
	565	•••	23.690	38.25	155.0			
	566	•••	18.980	34.12	126.7			
	567	•••	25.740	39.42	184.6			
	568	•••	9.456	30.37	59.1	6 268.6		
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567
                    0.2650
                                     0.4087
                                                               0.12400
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                                     0.2871
                                                               0.07039
```

[569 rows x 32 columns]

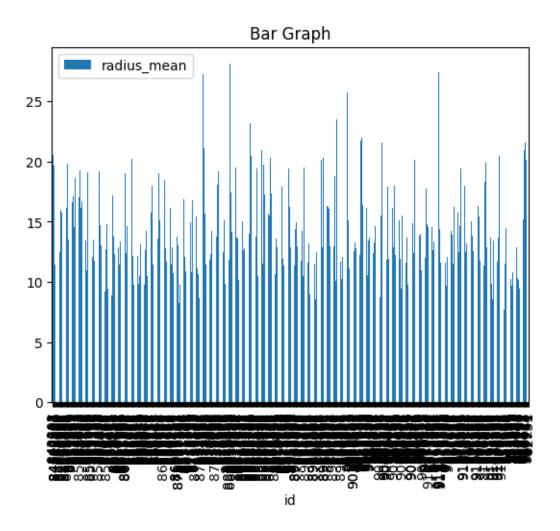
```
[13]: df.plot.line(title="Line Graph")
```

[13]: <Axes: title={'center': 'Line Graph'}>



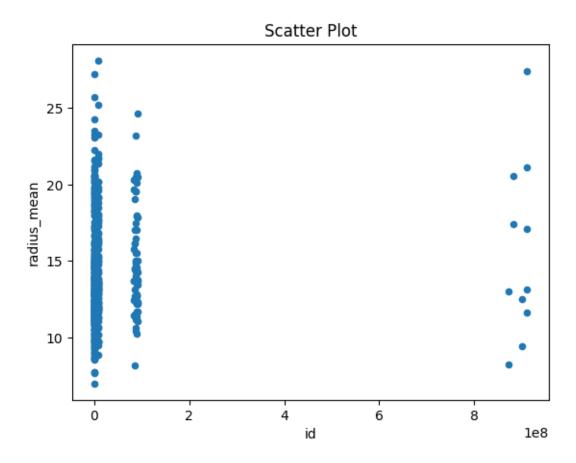
```
[12]: df.plot.bar(x="id",y="radius_mean",title="Bar Graph")
```

[12]: <Axes: title={'center': 'Bar Graph'}, xlabel='id'>



```
[14]: df.plot.scatter(x="id",y="radius_mean",title="Scatter Plot")
```

[14]: <Axes: title={'center': 'Scatter Plot'}, xlabel='id', ylabel='radius_mean'>

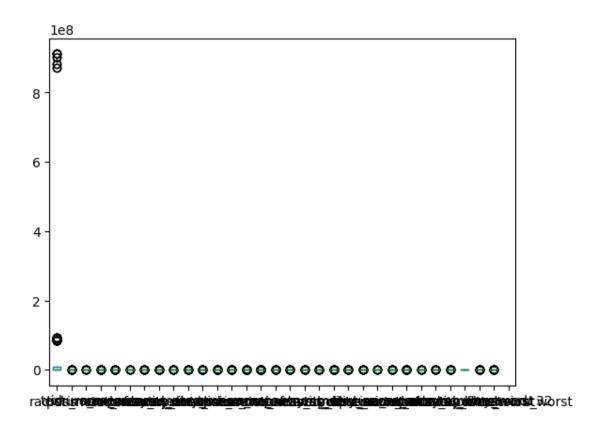


```
[15]: df.plot.pie(y="radius_mean",title="Pie Chart")
```

[15]: <Axes: title={'center': 'Pie Chart'}, ylabel='radius_mean'>

```
[16]: df.plot.box()
```

[16]: <Axes: >



6 Dataset 2

```
[32]: data = pd.read_csv(r"C:\Users\SHREYAS\Downloads\9_bottle.csv")
data
```

C:\Users\SHREYAS\AppData\Local\Temp\ipykernel_6856\1714720592.py:1: DtypeWarning: Columns (47,73) have mixed types. Specify dtype option on import or set low_memory=False.

data = pd.read_csv(r"C:\Users\SHREYAS\Downloads\9_bottle.csv")

4	1	5	5 054.0	056.0	19-4903CR	-HY-060-0	930-	05400560-	·0020A-7
 864858	 34404	 864859		026.4	20-1611SR	MV 210 0	220	 00240264	00004 7
864859	34404			026.4	20-1611SR				
	34404			026.4					
864860				026.4	20-1611SR				
864861	34404				20-1611SR				
864862	34404	864863	3 093.4	026.4	20-1611SR	-MX-310-2	239-	09340264-	·0015A-3
	Depthm	T_degC	Salnty	02m1_I	. STheta	a O2Sat		R_PHAEO	\
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3	19	10.450	33.4200	Nal	1 25.6430) NaN		NaN	
4	20	10.450	33.4210	Nal	1 25.6430) NaN	•••	NaN	
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864858	0	18.744	33.4083	5.805	23.8705	5 108.74	•••	0.18	
864859	2	18.744	33.4083	5.805	23.8707	2 108.74	•••	0.18	
864860	5	18.692	33.4150	5.796	23.8891	1 108.46	•••	0.18	
864861	10	18.161	33.4062	5.816	3 24.0142	3 107.74	•••	0.31	
864862	15	17.533	33.3880	5.774	4 24.1529	7 105.66	•••	0.61	
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0	0	NaN	NaN 1	NaN Nal	I NaN Nal	NaN			NaN
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2	10	NaN	NaN 1	NaN Nal	I NaN Nal	NaN			NaN
3	19	NaN	NaN 1	NaN Nal	I NaN Nal	NaN			NaN
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864860	5	3.0	NaN 1	NaN Nal	NaN Nal	NaN			NaN
864861	10	2.0	NaN 1	NaN Nal	NaN Na	NaN			NaN
864862	15	1.0	NaN 1	NaN Nal	NaN Na	NaN			NaN

[864863 rows x 74 columns]

[18]: data.isnull() [18]: Cst_Cnt Btl_Cnt Sta_ID Depth_ID Depthm T_degC Salnty O2ml_L \ 0 False False False False False False False True 1 False False False False False False False True 2 False False False False False False False True 3 False False False False False False True False 4 False False False False False False False True False False False False 864858 False False False False False False False 864859 False False False False False

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      [864863 rows x 74 columns]
[19]: data1 = data.fillna(value=0)
      data1
               \texttt{Cst}_{\texttt{Cnt}}
                         Btl_Cnt
                                        Sta_ID
                                                                                  Depth_ID
      0
                      1
                                1
                                   054.0 056.0
                                                 19-4903CR-HY-060-0930-05400560-0000A-3
      1
                      1
                                2
                                   054.0 056.0
                                                 19-4903CR-HY-060-0930-05400560-0008A-3
      2
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                                3
                                   054.0 056.0
                                                 19-4903CR-HY-060-0930-05400560-0010A-7
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                                   054.0 056.0
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      864858
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                          864859
                                   093.4 026.4
                                                 20-1611SR-MX-310-2239-09340264-0000A-7
```

[19]:

864859

864860

864861

864862

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864860

864861

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864863

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093.4 026.4

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093.4 026.4

20-1611SR-MX-310-2239-09340264-0002A-3

20-1611SR-MX-310-2239-09340264-0005A-3

20-1611SR-MX-310-2239-09340264-0010A-3

20-1611SR-MX-310-2239-09340264-0015A-3

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Depthm
                                     02ml_L
                                                           02Sat
                 T_degC
                            Salnty
                                                 STheta
                                                                      R_PHAEO
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                           33.4083
                                      5.805
                                              23.87072
                                                          108.74
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              5
                  18.692
                           33.4150
                                                          108.46
                                                                          0.18
864860
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                                              23.88911
864861
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                           33.4062
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                                              24.01426
                                                          107.74
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864862
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                                      5.774
                                              24.15297
                                                          105.66
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        R PRES
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                                                               DIC Quality Comment
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```

[864863 rows x 74 columns]

```
[22]: data2 = data.dropna(axis=)
data2
```

```
[22]:
              Cst_Cnt
                        Btl_Cnt
                                      Sta_ID
                                                                               Depth_ID
      0
                                 054.0 056.0
                                               19-4903CR-HY-060-0930-05400560-0000A-3
                     1
                              1
                     1
                              2
                                 054.0 056.0
                                               19-4903CR-HY-060-0930-05400560-0008A-3
      1
      2
                     1
                              3
                                 054.0 056.0
                                               19-4903CR-HY-060-0930-05400560-0010A-7
      3
                     1
                              4
                                 054.0 056.0
                                               19-4903CR-HY-060-0930-05400560-0019A-3
      4
                     1
                                 054.0 056.0
                              5
                                               19-4903CR-HY-060-0930-05400560-0020A-7
                         864859
                                 093.4 026.4
      864858
                34404
                                               20-1611SR-MX-310-2239-09340264-0000A-7
      864859
                34404
                         864860
                                 093.4 026.4
                                               20-1611SR-MX-310-2239-09340264-0002A-3
      864860
                34404
                         864861
                                 093.4 026.4
                                               20-1611SR-MX-310-2239-09340264-0005A-3
                                 093.4 026.4
      864861
                34404
                         864862
                                               20-1611SR-MX-310-2239-09340264-0010A-3
      864862
                34404
                         864863
                                 093.4 026.4
                                               20-1611SR-MX-310-2239-09340264-0015A-3
                      RecInd R_Depth R_PRES
              Depthm
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864858
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864860
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864861
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864862
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```

[864863 rows x 8 columns]

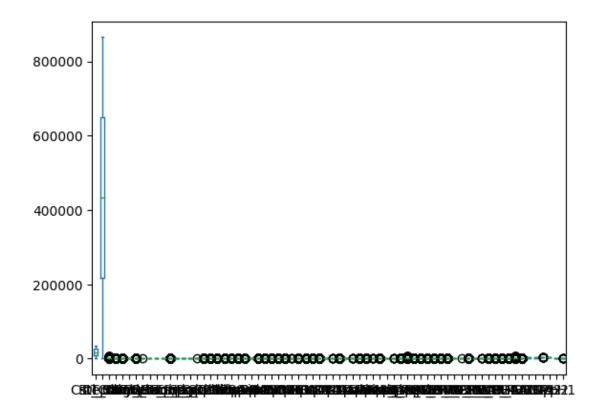
```
[26]: data.plot.line(title="Line Graph")
```

[26]: <Axes: title={'center': 'Line Graph'}>



```
[34]: data.plot.box()
```

[34]: <Axes: >



```
[ ]: data.plot.bar(title="Bar Graph")
[ ]: data.plot.scatter(x="Cst_Cnt",y="RecInd",title="Scatter Plot")
[ ]:
```