stat-assignment-5

September 5, 2024

1 Question-02

4

Yes

```
[42]: import pandas as pd
      d=pd.read_csv('/diabetes_data_upload.csv')
      print(d)
                 Gender Polyuria Polydipsia sudden weight loss weakness Polyphagia
           Age
      0
                   Male
                                No
                                           Yes
                                                                           Yes
      1
            58
                   Male
                                No
                                            No
                                                                  No
                                                                           Yes
                                                                                         No
      2
                                                                                       Yes
            41
                   Male
                               Yes
                                            No
                                                                  No
                                                                           Yes
      3
            45
                   Male
                                No
                                            No
                                                                 Yes
                                                                           Yes
                                                                                       Yes
      4
            60
                   Male
                               Yes
                                           Yes
                                                                 Yes
                                                                           Yes
                                                                                       Yes
      515
            39
                 Female
                               Yes
                                           Yes
                                                                            No
                                                                                       Yes
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      516
                 Female
                               Yes
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            48
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      517
            58
                 Female
                               Yes
                                           Yes
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      518
            32
                 Female
                                No
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      519
            42
                   Male
                                No
                                            No
                                                                  No
                                                                            No
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          Genital thrush visual blurring Itching Irritability delayed healing
     0
                                          No
                                                  Yes
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          partial paresis muscle stiffness Alopecia Obesity
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                        Yes
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Yes

Yes

Positive

Yes

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                                                 No
                                                         Yes Positive
                       No
                                        No
                                                 Yes
                                                          No Negative
     518
     519
                       No
                                        No
                                                 No
                                                          No Negative
     [520 rows x 17 columns]
[43]: d.dtypes
[43]: Age
                             int64
      Gender
                            object
      Polyuria
                            object
      Polydipsia
                            object
      sudden weight loss
                            object
      weakness
                            object
      Polyphagia
                            object
      Genital thrush
                            object
      visual blurring
                            object
      Itching
                            object
      Irritability
                            object
      delayed healing
                            object
     partial paresis
                            object
     muscle stiffness
                            object
      Alopecia
                            object
      Obesity
                            object
      class
                            object
      dtype: object
[44]: features=d.columns
      print(features)
     Index(['Age', 'Gender', 'Polyuria', 'Polydipsia', 'sudden weight loss',
             'weakness', 'Polyphagia', 'Genital thrush', 'visual blurring',
             'Itching', 'Irritability', 'delayed healing', 'partial paresis',
             'muscle stiffness', 'Alopecia', 'Obesity', 'class'],
           dtype='object')
[46]: target=d.columns[-1]
      print(target)
     class
[47]: mapping={'Female':1,'Male':0,'No':3,'Yes':4,'Positive':5,'Negative':6}
```

d=d.replace(mapping)

print(d)

```
Polyuria Polydipsia sudden weight loss weakness \
           Gender
     Age
0
      40
                0
                0
                           3
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1
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                  Genital thrush visual blurring Itching Irritability \
     Polyphagia
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     delayed healing partial paresis muscle stiffness Alopecia
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     class
0
          5
          5
1
2
          5
3
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4
          5
. .
515
          5
516
          5
```

```
517 5
518 6
519 6
```

[520 rows x 17 columns]

[48]: df=d-d.min()/(d.max()-d.min()) print(df)

	Age	Gender	Polyuria	Polyd	ipsia	sudd	den wei	ght loss	weakness	. \
0	39.783784	0.0	0.0		1.0			0.0	1.0)
1	57.783784	0.0	0.0		0.0			0.0	1.0)
2	40.783784	0.0	1.0		0.0			0.0	1.0)
3	44.783784	0.0	0.0		0.0			1.0	1.0	1
4	59.783784	0.0	1.0		1.0			1.0	1.0)
	•••	•••	•••	•••			•••	•••		
515	38.783784	1.0	1.0		1.0			1.0	0.0)
516	47.783784	1.0	1.0		1.0			1.0	1.0)
517	57.783784	1.0	1.0		1.0			1.0	1.0	1
518	31.783784	1.0	0.0		0.0			0.0	1.0	1
519	41.783784	0.0	0.0		0.0			0.0	0.0	1
	Polyphagia	Genita	l thrush	visual	blurr	ing	Itchin	g Irrita	ability \	
0	0.0		0.0			0.0	1.	0	0.0	
1	0.0		0.0			1.0	0.	0	0.0	
2	1.0		0.0			0.0	1.	0	0.0	
3	1.0		1.0			0.0	1.	0	0.0	
4	1.0		0.0			1.0	1.	0	1.0	
			•••		•••	•••		•••		
515	1.0		0.0			0.0	1.	0	0.0	
516	1.0		0.0			0.0	1.	0	1.0	
517	1.0		0.0			1.0	0.	0	0.0	
518	0.0		0.0			1.0	1.	0	0.0	
519	0.0		0.0			0.0	0.	0	0.0	
	delayed he	aling pa	artial par	resis n	nuscle	stif	fness	Alopecia	a Obesity	. \
0		1.0		0.0			1.0	1.0	1.0	1
1		0.0		1.0			0.0	1.0	0.0)
2		1.0		0.0			1.0	1.0	0.0)
3		1.0		0.0			0.0	0.0	0.0	1
4		1.0		1.0			1.0	1.0	1.0)
• •			•			•••				
515		1.0		1.0			0.0	0.0		
516		1.0		1.0			0.0	0.0		
517		0.0		1.0			1.0	0.0		
518		1.0		0.0			0.0	1.0		
519		0.0		0.0			0.0	0.0	0.0	l

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     519
             1.0
     [520 rows x 17 columns]
[50]: y=d["class"]
      print(y)
     0
             5
     1
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     3
             5
     4
             5
     515
             5
     516
             5
             5
     517
     518
             6
     519
             6
     Name: class, Length: 520, dtype: int64
[51]: x=d.drop("class",axis=1)
      print(x)
                Gender Polyuria Polydipsia sudden weight loss weakness \
           Age
                                3
     0
            40
                     0
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                     0
                                3
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            58
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          Polyphagia Genital thrush visual blurring Itching Irritability \
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class

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0
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           delayed healing partial paresis
                                               muscle stiffness Alopecia
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                                                                                     3
      [520 rows x 16 columns]
[52]: x = x.replace({'Gender': {'Male': 0, 'Female': 1},
                           'Polyuria': {'Yes': 1, 'No': 0},
                           'Polydipsia': {'Yes': 1, 'No': 0},
                           'sudden weight loss': {'Yes': 1, 'No': 0},
                           'weakness': {'Yes': 1, 'No': 0},
                           'Polyphagia': {'Yes': 1, 'No': 0},
                           'Genital thrush': {'Yes': 1, 'No': 0},
                           'visual blurring': {'Yes': 1, 'No': 0},
                           'Itching': {'Yes': 1, 'No': 0},
                           'Irritability': {'Yes': 1, 'No': 0},
                           'delayed healing': {'Yes': 1, 'No': 0},
                           'partial paresis': {'Yes': 1, 'No': 0},
                           'muscle stiffness': {'Yes': 1, 'No': 0},
```

	Age	Gender	Polyuria	Polydipsia	sudden weight loss	weakness	\
0	40	0	3	4	3	4	
1	58	0	3	3	3	4	
2	41	0	4	3	3	4	

'Alopecia': {'Yes': 1, 'No': 0}, 'Obesity': {'Yes': 1, 'No': 0}})

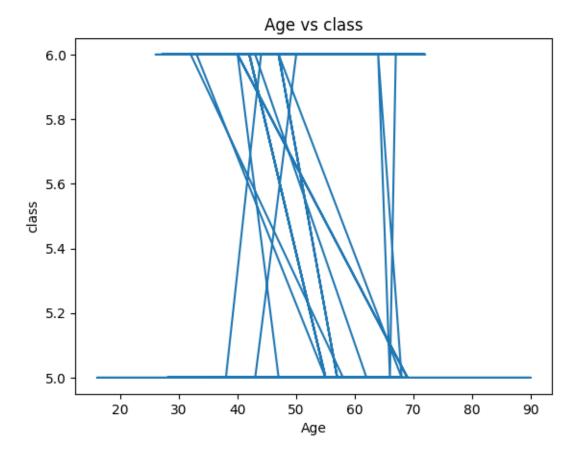
print(x)

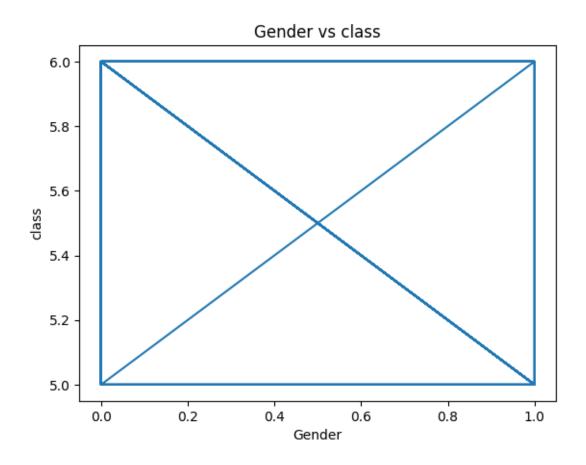
```
3
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            42
           Polyphagia Genital thrush visual blurring Itching Irritability \
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           delayed healing partial paresis muscle stiffness Alopecia Obesity
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      [520 rows x 16 columns]
[53]: y = y.replace({'Positive': 0, 'Negative': 1})
      print(y)
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     3
             5
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     515
             5
     516
             5
```

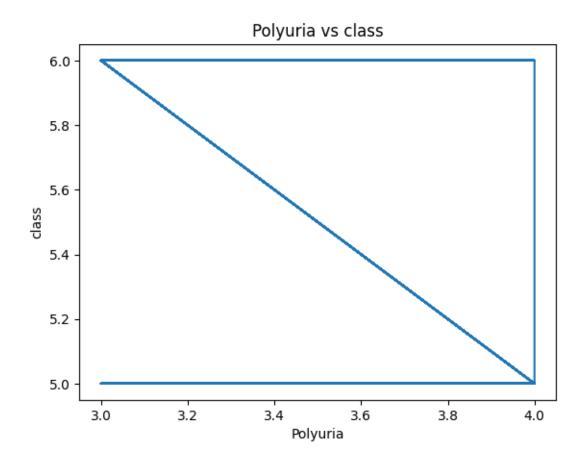
```
517 5
518 6
519 6
Name: class, Length: 520, dtype: int64

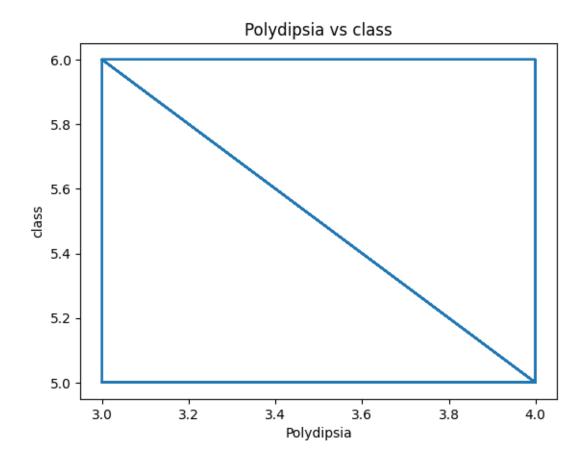
[54]: import pandas as pd
import matplotlib.pyplot as plt

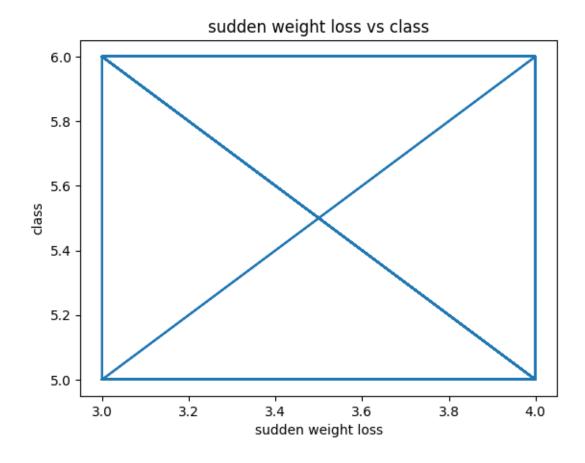
[55]: for column in x.columns:
    plt.plot(x[column], y)
    plt.xlabel(column)
    plt.ylabel('class')
    plt.title(f'{column} vs class')
    plt.show()
```

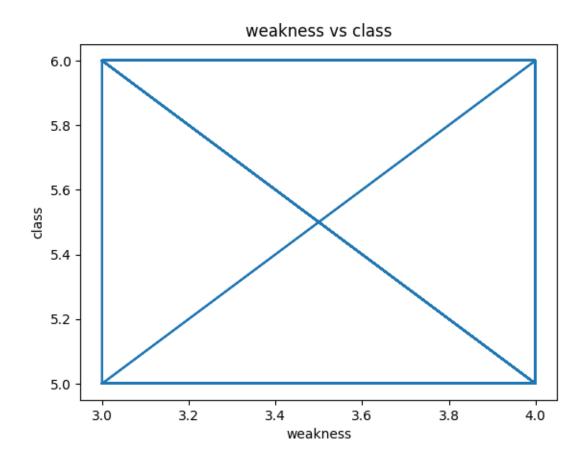


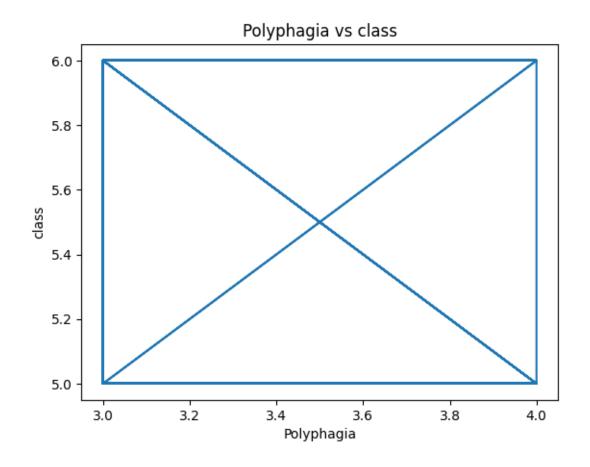


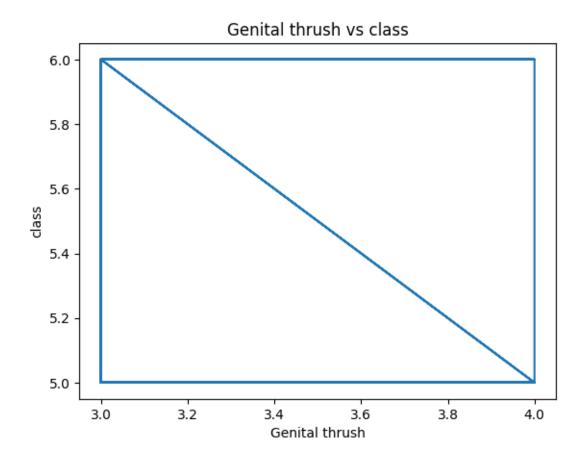


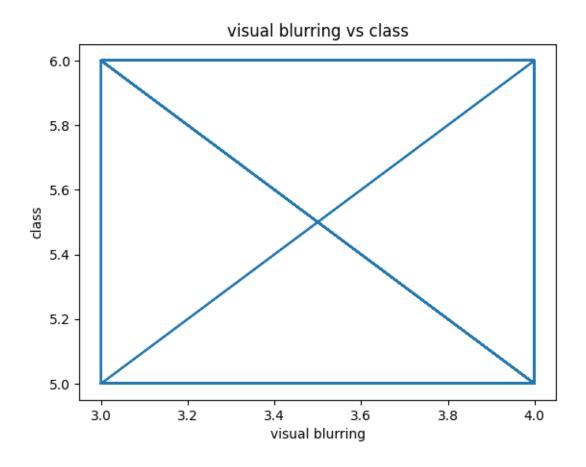


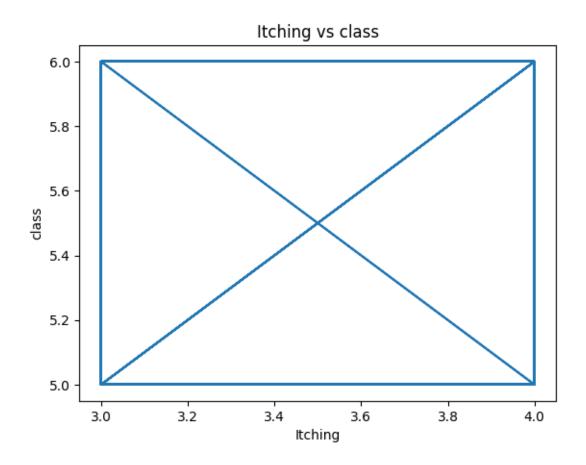


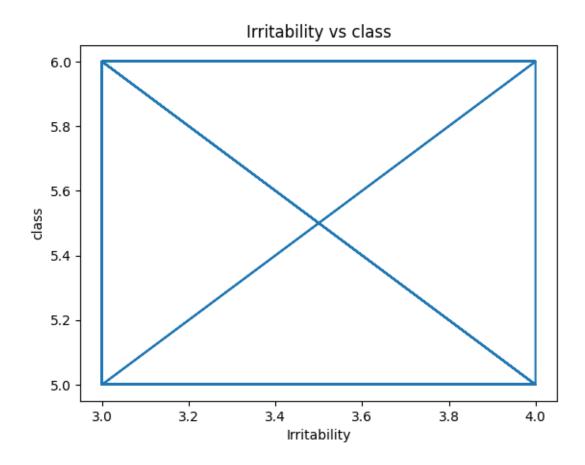


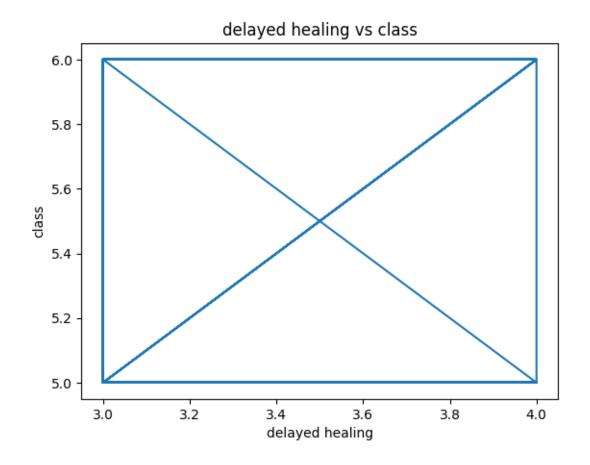


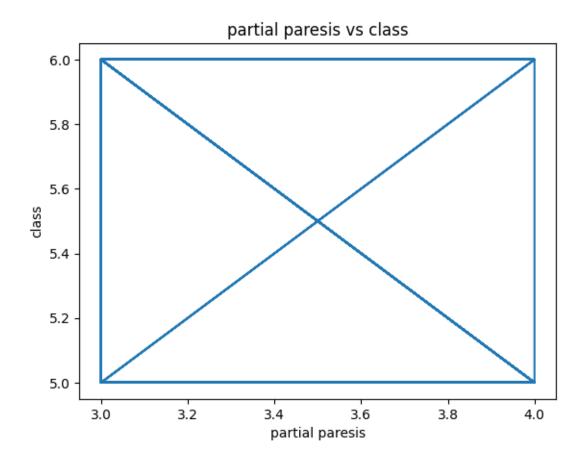


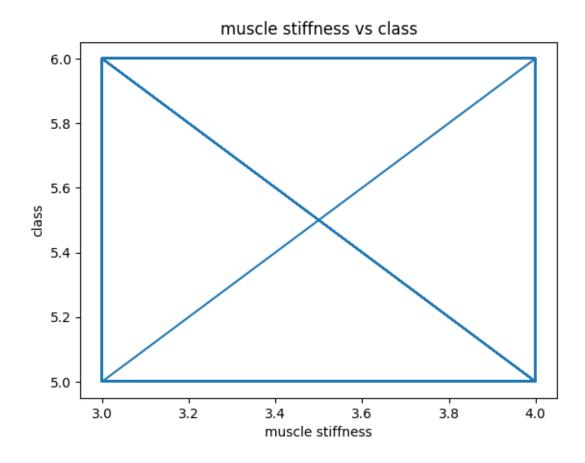


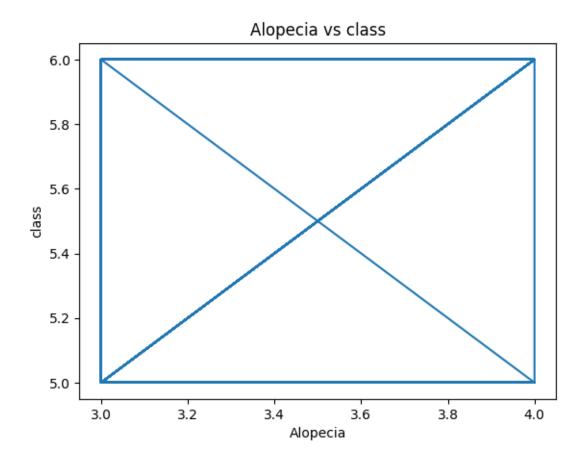


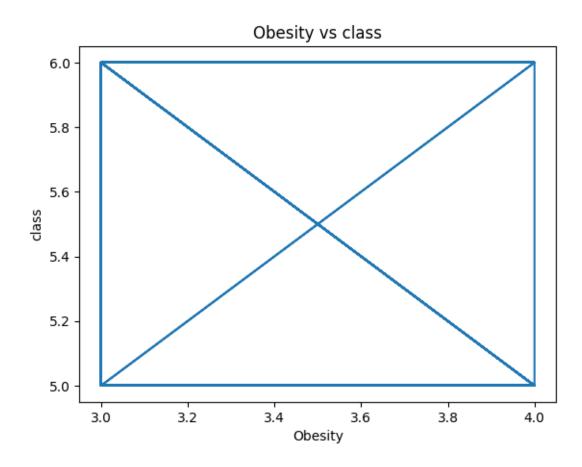












```
[56]: x.isnull().sum()
      x.fillna(0, inplace=True)
      print(x)
                         Polyuria Polydipsia
                Gender
                                                 sudden weight loss
                                                                       weakness
           Age
     0
            40
                      0
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            58
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           Polyphagia Genital thrush visual blurring Itching Irritability \setminus
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4		4	3			4	4		4	
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2		4		3			4		4	3
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518		4		3			3		4	3
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[520] from from sca x_n print 0 1	m sklearn.n m sklearn.n ler = MinMa orm = pd.Da nt(x_norm) Age 0.324324 0.567568	columns preproce model_se axScaler ataFrame Gender 0.0 0.0	essing imposite control	rt Minl port t: t_trans	sform(x ipsia 1.0 0.0	est_spli	umns=x.	loss 0.0 0.0	weakness)
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[520] from from sca x_n pri: 0 1 2 3 4 515 516	m sklearn. m sklearn. ler = MinMa orm = pd.Da nt(x_norm) Age 0.324324 0.567568 0.337838 0.391892 0.594595 0.310811 0.432432	columns preproce model_se axScaler ataFrame Gender 0.0 0.0 0.0 0.0 1.0	Polyuria 0.0 0.0 1.0 0.0 1.0 1.0 1.0	rt Minl port t: t_trans	ipsia 1.0 0.0 0.0 1.0	est_spli	umns=x.	1 loss 0.0 0.0 0.0 1.0 1.0	weakness 1.0 1.0 1.0 1.0 1.0 1.0 1.0)))))
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[520 xtra prin prin prin prin 195 349 257 157 459	ain,xt nt(xti nt(xte nt(yti nt(yte Age 31 37 48	Gest, ytr rain) est) rain) est) Gender 0 0	Polyuria 4 3 4	Polydipsia	sudden	,y,test_	oss 3 3	weaknes	ss \ 3 3 4	tate
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[520 xtra prin prin prin 195 349 257 157 459 430 145 140	ain,xt nt(xti nt(xti nt(yti nt(yti 137 48 48 57 32 61 47	Gest, ytr rain) est) rain) est) Gender 0 0 1 0 0 0	Polyuria 4 3 4 4 3 4 4	Polydipsia 3 4 4 3	sudden	,y,test_	oss 3 3 4 4 3 3 3	weaknes	3 3 4 3 4 3 4 3	tate
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145		4			4		4	4		4	
140		3			3		3	3		3	
500		3			4		3	4		4	
421		4			3		3	3		4	
	delayed	heal	ling pa	rtial	paresis	muscle	sti	ffness <i>F</i>	lopecia	Obes	ity
195			3		4			3	4		3
349			3		3			3	3		3
257			4		4			3	3		3
157			4		3			3	3		3
459			3		4			3	3		3
 430			 4		 3		•••	 3	 3		4
145			4		4			3	3		3
140			3		3			4	3		3
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162	35	1		3	3			3	3	3	
391	58	0		3	4			3	3	3	
493	44	0		4	3			4	Ŀ	4	
			•••				•••	•••			
188	70	0		4	3			4		4	
158	56	0		4	3			4		4	
363	68	1		4	4			3		4	
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42	50	1		3	4				•	4	
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248		3			3		3	3		3	
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162		3			3		3	3		3	
391		3			3		4	4		3	
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	•			•••	4	•••			•••	_	
188		4			4		3	3		4	
158		3			4		3	4		4	
363		4			3		4	4		3	
164		4			3		4	4		4	
42		4			3		4	4		4	

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delayed healing partial paresis muscle stiffness Alopecia
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248
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60
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162
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164
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42
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[104 rows x 16 columns]
195
349
       6
257
       5
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157
459
       5
430
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145
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140
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500
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421
Name: class, Length: 416, dtype: int64
248
60
       5
162
391
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493
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188
       5
158
       5
363
       5
164
       5
Name: class, Length: 104, dtype: int64
```

2 Question-01

```
[60]: import pandas as pd
d=pd.read_csv('/content/Salary_Data.csv')
print(d)
```

YearsExperience Salary

```
0
                            39343.0
                      1.1
     1
                      1.3
                            46205.0
     2
                      1.5
                            37731.0
     3
                      2.0
                            43525.0
     4
                      2.2
                            39891.0
     5
                      2.9
                            56642.0
     6
                      3.0
                            60150.0
     7
                      3.2
                            54445.0
     8
                      3.2
                            64445.0
     9
                      3.7
                            57189.0
                      3.9
     10
                            63218.0
     11
                      4.0
                            55794.0
                      4.0
     12
                            56957.0
     13
                      4.1
                            57081.0
     14
                      4.5
                            61111.0
     15
                      4.9
                            67938.0
     16
                      5.1
                            66029.0
     17
                      5.3
                            83088.0
     18
                      5.9
                            81363.0
     19
                      6.0
                            93940.0
     20
                      6.8
                            91738.0
     21
                      7.1
                            98273.0
     22
                      7.9 101302.0
     23
                      8.2 113812.0
     24
                      8.7 109431.0
     25
                      9.0 105582.0
     26
                      9.5 116969.0
     27
                      9.6 112635.0
     28
                     10.3 122391.0
     29
                     10.5 121872.0
[61]: d.dtypes
[61]: YearsExperience
                          float64
      Salary
                          float64
      dtype: object
[62]: features=d.columns
      print(features)
     Index(['YearsExperience', 'Salary'], dtype='object')
[63]: target=d.columns[-1]
      print(target)
```

Salary

```
[64]: y=d['Salary']
      print(y)
     0
             39343.0
     1
             46205.0
     2
             37731.0
     3
             43525.0
     4
             39891.0
     5
             56642.0
     6
             60150.0
     7
             54445.0
     8
             64445.0
     9
             57189.0
     10
             63218.0
     11
             55794.0
     12
             56957.0
     13
             57081.0
     14
             61111.0
     15
             67938.0
     16
             66029.0
     17
             83088.0
     18
             81363.0
     19
             93940.0
     20
             91738.0
     21
             98273.0
     22
            101302.0
     23
            113812.0
     24
            109431.0
     25
            105582.0
     26
            116969.0
     27
            112635.0
     28
            122391.0
     29
            121872.0
     Name: Salary, dtype: float64
[65]: x=d.drop('Salary',axis=1)
      print(x)
          YearsExperience
     0
                      1.1
     1
                      1.3
     2
                      1.5
     3
                      2.0
     4
                      2.2
```

5

6

7

8

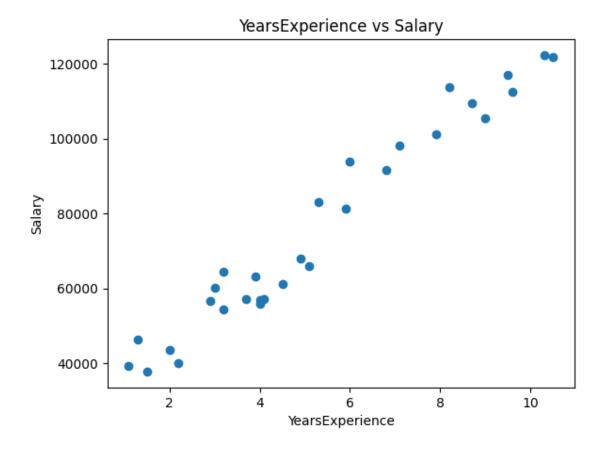
2.9

3.0

3.2

3.2

```
3.7
     9
                     3.9
     10
                     4.0
     11
     12
                     4.0
     13
                     4.1
     14
                     4.5
                     4.9
     15
                     5.1
     16
     17
                     5.3
     18
                     5.9
     19
                     6.0
     20
                     6.8
     21
                     7.1
                     7.9
     22
     23
                     8.2
     24
                     8.7
                     9.0
     25
     26
                     9.5
     27
                     9.6
     28
                    10.3
     29
                    10.5
[66]: plt.scatter(d['YearsExperience'], d['Salary'])
     plt.xlabel('YearsExperience')
     plt.ylabel('Salary')
      plt.title('YearsExperience vs Salary')
     plt.show()
```



```
[67]: d_norm = (d - d.min()) / (d.max() - d.min()) print(d_norm)
```

```
YearsExperience
                       Salary
           0.000000 0.019041
0
1
           0.021277 0.100094
2
           0.042553 0.000000
3
           0.095745 0.068438
4
           0.117021 0.025514
5
           0.191489 0.223376
6
           0.202128 0.264812
7
           0.223404 0.197425
8
           0.223404 0.315545
9
           0.276596 0.229837
10
           0.297872 0.301051
11
           0.308511 0.213359
12
           0.308511 0.227097
13
           0.319149 0.228561
14
           0.361702 0.276163
15
           0.404255 0.356804
16
           0.425532 0.334255
```

17	0.446809	0.535755
18	0.510638	0.515379
19	0.521277	0.663938
20	0.606383	0.637928
21	0.638298	0.715119
22	0.723404	0.750898
23	0.755319	0.898665
24	0.808511	0.846917
25	0.840426	0.801453
26	0.893617	0.935956
27	0.904255	0.884763
28	0.978723	1.000000
29	1.000000	0.993870