```
import pandas as pd
df=pd.read_csv('/content/Book1.csv')
df
```

```
     study hours per week  class attendance %  previous exam score  \
0                      10                  90                   85
1                       5                  60                   70
2                      15                  95                   90
3                       2                  30                   50
4                      12                  85                   88
5                       8                  74                   65
6                      14                  92                   93
7                       3                  50                   55
8                      11                  88                   80
9                       6                  65                   60

   participation in group study  subission of assignments  pass or fail
0                              1                       100             1
1                              0                        80             0
2                              1                       100             1
3                              0                        40             0
4                              1                        90             1
5                              0                        70             0
6                              1                        95             1
7                              0                        60             0
8                              1                        85             1
9                              0                        75             0
```

```
target='pass or fail'
print(df[target])
```

```
0    1
1    0
2    1
3    0
4    1
5    0
6    1
```

```
7    0
8    1
9    0
Name: pass or fail, dtype: int64
```

```python
x=df.drop(target,axis=1)
print(x)
```

```
   study hours per week  class attendance %  previous exam score  \
0                    10                  90                   85
1                     5                  60                   70
2                    15                  95                   90
3                     2                  30                   50
4                    12                  85                   88
5                     8                  74                   65
6                    14                  92                   93
7                     3                  50                   55
8                    11                  88                   80
9                     6                  65                   60

   participation in group study  subission of assignments
0                              1                       100
1                              0                        80
2                              1                       100
3                              0                        40
4                              1                        90
5                              0                        70
6                              1                        95
7                              0                        60
8                              1                        85
9                              0                        75
```

```python
w0=1
w1=3
w2=2
w3=4
w4=1
w5=2
z=w0*1+w1*x["study hours per week"]+w2*x["class attendance %"]+w3*x["previous␣
 ↪exam score"]+w4*x["participation in group study"]+w5*x["subission of␣
 ↪assignments"]
print(z)
yp=[]
for i in range(10):
  if z[i]>0:
    yp.append(1)
    #print(yp)
```

```
    else:
        yp.append(0)
    # print(yp)
```

```
0    752
1    576
2    797
3    347
4    740
5    573
6    790
7    450
8    701
9    539
dtype: int64
```

[ ]: `print(yp)`

```
[1, 1, 1, 1, 1, 1, 1, 1, 1, 1]
```

[ ]:
```
error=df[target]-yp
print(error)
```

```
0     0
1    -1
2     0
3    -1
4     0
5    -1
6     0
7    -1
8     0
9    -1
Name: pass or fail, dtype: int64
```

[ ]:
```
mean=error.mean()
print(mean)
```

```
-0.5
```

[ ]:
```
e_update=w0+0.01*mean
print(e_update)
e_update1=w1+0.01*mean
print(e_update1)
e_update2=w2+0.01*mean
print(e_update2)
e_update3=w3+0.01*mean
print(e_update3)
```

```
e_update4=w4+0.01*mean
print(e_update4)
e_update5=w5+0.01*mean
print(e_update5)
```

```
0.995
2.995
1.995
3.995
0.995
1.995
```

```
w0=e_update
w1=e_update1
w2=e_update2
w3=e_update3
w4=e_update4
w5=e_update5
z=w0*1+w1*x["study hours per week"]+w2*x["class attendance %"]+w3*x["previous␣
 ↪exam score"]+w4*x["participation in group study"]+w5*x["subission of␣
 ↪assignments"]
print(z)
yp1=[]
for i in range(10):
  if z[i]>0:
    yp1.append(1)
  else:
    yp1.append(0)
```

```
0    750.565
1    574.920
2    795.490
3    346.385
4    738.615
5    571.910
6    788.520
7    449.155
8    699.670
9    537.965
dtype: float64
```

```
print(yp1)
```

```
[1, 1, 1, 1, 1, 1, 1, 1, 1, 1]
```

```
error=df[target]-yp1
print(error)
```

```
0     0
1    -1
2     0
3    -1
4     0
5    -1
6     0
7    -1
8     0
9    -1
Name: pass or fail, dtype: int64
```

```
[ ]: error_mean=error.mean()
     print(error_mean)
```

```
-0.5
```

```
[ ]: e_update=w0+0.01*error_mean
     print(e_update)
     e_update1=w1+0.01*error_mean
     print(e_update1)
     e_update2=w2+0.01*error_mean
     print(e_update2)
     e_update3=w3+0.01*error_mean
     print(e_update3)
     e_update4=w4+0.01*error_mean
     print(e_update4)
     e_update5=w5+0.01*error_mean
     print(e_update5)
```

```
0.99
2.99
1.9900000000000002
3.99
0.99
1.9900000000000002
```

```
[ ]: w0=e_update
     w1=e_update1
     w2=e_update2
     w3=e_update3
     w4=e_update4
     w5=e_update5
     z=w0*1+w1*x["study hours per week"]+w2*x["class attendance %"]+w3*x["previous␣
      ↪exam score"]+w4*x["participation in group study"]+w5*x["subission of␣
      ↪assignments"]
     print(z)
```

```
0    749.13
1    573.84
2    793.98
3    345.77
4    737.23
5    570.82
6    787.04
7    448.31
8    698.34
9    536.93
dtype: float64
```

```python
yp2=[]
for i in range(10):
  if z[i]>0:
    yp2.append(1)
  else:
    yp2.append(0)
print(yp2)
```

```
[1, 1, 1, 1, 1, 1, 1, 1, 1, 1]
```

```python
import pandas as pd
df=pd.read_csv('/content/diabetes_data_upload.csv')
df
```

	Age	Gender	Polyuria	Polydipsia	sudden weight loss	weakness	Polyphagia
0	40	Male	No	Yes	No	Yes	No
1	58	Male	No	No	No	Yes	No
2	41	Male	Yes	No	No	Yes	Yes
3	45	Male	No	No	Yes	Yes	Yes
4	60	Male	Yes	Yes	Yes	Yes	Yes
..	…	…	…	…	…	…	…
515	39	Female	Yes	Yes	Yes	No	Yes
516	48	Female	Yes	Yes	Yes	Yes	Yes
517	58	Female	Yes	Yes	Yes	Yes	Yes
518	32	Female	No	No	No	Yes	No
519	42	Male	No	No	No	No	No

	Genital thrush	visual blurring	Itching	Irritability	delayed healing
0	No	No	Yes	No	Yes
1	No	Yes	No	No	No
2	No	No	Yes	No	Yes
3	Yes	No	Yes	No	Yes
4	No	Yes	Yes	Yes	Yes
..	…	…	…	…	…
515	No	No	Yes	No	Yes

```
516            No            No   Yes         Yes              Yes
517            No           Yes    No          No               No
518            No           Yes   Yes          No              Yes
519            No            No    No          No               No

     partial paresis muscle stiffness Alopecia Obesity      class
0                 No              Yes      Yes     Yes  Positive
1                Yes               No      Yes      No  Positive
2                 No              Yes      Yes      No  Positive
3                 No               No       No      No  Positive
4                Yes              Yes      Yes     Yes  Positive
..               ...              ...      ...     ...       ...
515              Yes               No       No      No  Positive
516              Yes               No       No      No  Positive
517              Yes              Yes       No     Yes  Positive
518               No               No      Yes      No  Negative
519               No               No       No      No  Negative

[520 rows x 17 columns]
```

```python
y='class'
print(df[y])
```

```
0      Positive
1      Positive
2      Positive
3      Positive
4      Positive
         ...
515    Positive
516    Positive
517    Positive
518    Negative
519    Negative
Name: class, Length: 520, dtype: object
```

```python
x=df.drop(y,axis=1)
print(x)
```

```
     Age  Gender Polyuria Polydipsia sudden weight loss weakness Polyphagia  \
0     40    Male       No        Yes                No      Yes         No
1     58    Male       No         No                No      Yes         No
2     41    Male      Yes         No                No      Yes        Yes
3     45    Male       No         No               Yes      Yes        Yes
4     60    Male      Yes        Yes               Yes      Yes        Yes
..   ...     ...      ...        ...               ...      ...        ...
515   39  Female      Yes        Yes               Yes       No        Yes
516   48  Female      Yes        Yes               Yes      Yes        Yes
```

```
517  58  Female    Yes       Yes              Yes      Yes       Yes
518  32  Female     No        No               No      Yes        No
519  42   Male      No        No               No       No        No

     Genital thrush visual blurring Itching Irritability delayed healing  \
0               No             No     Yes           No              Yes
1               No            Yes      No           No               No
2               No             No     Yes           No              Yes
3              Yes             No     Yes           No              Yes
4               No            Yes     Yes          Yes              Yes
..             ...            ...     ...          ...              ...
515             No             No     Yes           No              Yes
516             No             No     Yes          Yes              Yes
517             No            Yes      No           No               No
518             No            Yes     Yes           No              Yes
519             No             No      No           No               No

     partial paresis muscle stiffness Alopecia Obesity
0                 No              Yes      Yes     Yes
1                Yes               No      Yes      No
2                 No              Yes      Yes      No
3                 No               No       No      No
4                Yes              Yes      Yes     Yes
..               ...              ...      ...      ...
515              Yes               No       No      No
516              Yes               No       No      No
517              Yes              Yes       No     Yes
518               No               No      Yes      No
519               No               No       No      No

[520 rows x 16 columns]
```

```python
df['class']=df['class'].replace({'Negative':0,'Positive':1})
df['Gender'] = df['Gender'].replace({'Female': 0, 'Male': 1})
df['Polyuria'] = df['Polyuria'].replace({'No': 0, 'Yes': 1})
df['Polydipsia'] = df['Polydipsia'].replace({'No': 0, 'Yes': 1})
df['sudden weight loss'] = df['sudden weight loss'].replace({'No': 0, 'Yes': 1})
df['weakness'] = df['weakness'].replace({'No': 0, 'Yes': 1})
df['Polyphagia'] = df['Polyphagia'].replace({'No': 0, 'Yes': 1})
df['Genital thrush'] = df['Genital thrush'].replace({'No': 0, 'Yes': 1})
df['visual blurring'] = df['visual blurring'].replace({'No': 0, 'Yes': 1})
df['Itching'] = df['Itching'].replace({'No': 0, 'Yes': 1})
df['Irritability'] = df['Irritability'].replace({'No': 0, 'Yes': 1})
df['delayed healing'] = df['delayed healing'].replace({'No': 0, 'Yes': 1})
df['partial paresis'] = df['partial paresis'].replace({'No': 0, 'Yes': 1})
df['muscle stiffness'] = df['muscle stiffness'].replace({'No': 0, 'Yes': 1})
df['Alopecia'] = df['Alopecia'].replace({'No': 0, 'Yes': 1})
```

```
df['Obesity'] = df['Obesity'].replace({'No': 0, 'Yes': 1})
print(df)
```

	Age	Gender	Polyuria	Polydipsia	sudden weight loss	weakness \
0	40	1	0	1	0	1
1	58	1	0	0	0	1
2	41	1	1	0	0	1
3	45	1	0	0	1	1
4	60	1	1	1	1	1
..	...	...	...	...	...	...
515	39	0	1	1	1	0
516	48	0	1	1	1	1
517	58	0	1	1	1	1
518	32	0	0	0	0	1
519	42	1	0	0	0	0

	Polyphagia	Genital thrush	visual blurring	Itching	Irritability \
0	0	0	0	1	0
1	0	0	1	0	0
2	1	0	0	1	0
3	1	1	0	1	0
4	1	0	1	1	1
..	...	...	...	...	...
515	1	0	0	1	0
516	1	0	0	1	1
517	1	0	1	0	0
518	0	0	1	1	0
519	0	0	0	0	0

	delayed healing	partial paresis	muscle stiffness	Alopecia	Obesity \
0	1	0	1	1	1
1	0	1	0	1	0
2	1	0	1	1	0
3	1	0	0	0	0
4	1	1	1	1	1
..	...	...	...	...	...
515	1	1	0	0	0
516	1	1	0	0	0
517	0	1	1	0	1
518	1	0	0	1	0
519	0	0	0	0	0

	class
0	1
1	1
2	1
3	1

```
4        1
..       …
515      1
516      1
517      1
518      0
519      0

[520 rows x 17 columns]
```

```python
w0=1
w1=3
w2=2
w3=4
w4=1
w5=2
w6=3
w7=1
w8=2
w9=1
w10=3
w11=1
w12=2
w13=1
w14=3
w15=1
w16=2
z=␣
 ↪w0*1+w1*df['Age']+w2*df['Gender']+w3*df['Polyuria']+w4*df['Polydipsia']+w5*df['sudden␣
 ↪weight loss']+w6*df['weakness']+w7*df['Polyphagia']+w8*df['Genital␣
 ↪thrush']+w9*df['visual␣
 ↪blurring']+w10*df['Itching']+w11*df['Irritability']+w12*df['delayed␣
 ↪healing']+w13*df['partial paresis']+w14*df['muscle␣
 ↪stiffness']+w15*df['Alopecia']+w16*df['Obesity']
print(z)
yp=[]
for i in range(520):
  if z[i]>0:
    yp.append(1)
  else:
    yp.append(0)
```

```
0        138
1        183
2        143
3        151
4        208
         …
```

```
515      132
516      163
517      193
518      107
519      129
Length: 520, dtype: int64
```

[ ]: `print(yp)`

```
[1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
 1, 1, 1, 1, 1, 1, 1, 1]
```

[ ]:
```
error =df['class']-yp
c=0
for i in range(520):
  if error[i]==0:
    c=c+1
print(c/520)
```

```
0.6153846153846154
```

[ ]:
```
mean=error.mean()
print(mean)
```

```
-0.38461538461538464
```

[ ]:
```
e_update=w0+0.01*mean
print(e_update)
e_update1=w1+0.01*mean
print(e_update1)
```

```python
e_update2=w2+0.01*mean
print(e_update2)
e_update3=w3+0.01*mean
print(e_update3)
e_update4=w4+0.01*mean
print(e_update4)
e_update5=w5+0.01*mean
print(e_update5)
e_update6=w6+0.01*mean
print(e_update6)
e_update7=w7+0.01*mean
print(e_update7)
e_update8=w8+0.01*mean
print(e_update8)
e_update9=w9+0.01*mean
print(e_update9)
e_update10=w10+0.01*mean
print(e_update10)
e_update11=w11+0.01*mean
print(e_update11)
e_update12=w12+0.01*mean
print(e_update12)
e_update13=w13+0.01*mean
print(e_update13)
e_update14=w14+0.01*mean
print(e_update14)
e_update15=w15+0.01*mean
print(e_update15)
e_update16=w16+0.01*mean
print(e_update16)
```

```
0.9961538461538462
2.996153846153846
1.9961538461538462
3.996153846153846
0.9961538461538462
1.9961538461538462
2.996153846153846
0.9961538461538462
1.9961538461538462
0.9961538461538462
2.996153846153846
0.9961538461538462
1.9961538461538462
0.9961538461538462
2.996153846153846
0.9961538461538462
```

```
1.9961538461538462
```

```python
w0=e_update
w1=e_update1
w2=e_update2
w3=e_update3
w4=e_update4
w5=e_update5
w6=e_update6
w7=e_update7
w8=e_update8
w9=e_update9
w10=e_update10
w11=e_update11
w12=e_update12
w13=e_update13
w14=e_update14
w15=e_update15
w16=e_update16
z=␣
 ↪w0*1+w1*df['Age']+w2*df['Gender']+w3*df['Polyuria']+w4*df['Polydipsia']+w5*df['sudden␣
 ↪weight loss']+w6*df['weakness']+w7*df['Polyphagia']+w8*df['Genital␣
 ↪thrush']+w9*df['visual␣
 ↪blurring']+w10*df['Itching']+w11*df['Irritability']+w12*df['delayed␣
 ↪healing']+w13*df['partial paresis']+w14*df['muscle␣
 ↪stiffness']+w15*df['Alopecia']+w16*df['Obesity']
print(z)
yp1=[]
for i in range(520):
  if z[i]>0:
    yp1.append(1)
  else:
    yp1.append(0)
```

```
0       137.811538
1       182.753846
2       142.807692
3       150.796154
4       207.711538
           …
515     131.819231
516     162.776923
517     192.738462
518     106.853846
519     128.830769
Length: 520, dtype: float64
```

```python
print(yp1)
```

```
[1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
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 1, 1, 1, 1, 1, 1, 1, 1]
```

```python
error=df['class']-yp1
print(error)
```

```
0      0
1      0
2      0
3      0
4      0
      ..
515    0
516    0
517    0
518   -1
519   -1
Name: class, Length: 520, dtype: int64
```

```python
X_train=df.drop('class',axis=1)
print(X_train)
```

```
    Age  Gender  Polyuria  Polydipsia  sudden weight loss  weakness  \
0    40       1         0           1                   0         1
1    58       1         0           0                   0         1
2    41       1         1           0                   0         1
3    45       1         0           0                   1         1
4    60       1         1           1                   1         1
```

```
..     …     …       …           …                 …          …
515    39     0       1           1                 1          0
516    48     0       1           1                 1          1
517    58     0       1           1                 1          1
518    32     0       0           0                 0          1
519    42     1       0           0                 0          0

       Polyphagia  Genital thrush  visual blurring  Itching  Irritability  \
0              0               0                0        1             0
1              0               0                1        0             0
2              1               0                0        1             0
3              1               1                0        1             0
4              1               0                1        1             1
..           …               …                …        …             …
515            1               0                0        1             0
516            1               0                0        1             1
517            1               0                1        0             0
518            0               0                1        1             0
519            0               0                0        0             0

       delayed healing  partial paresis  muscle stiffness  Alopecia  Obesity
0                    1                0                 1         1        1
1                    0                1                 0         1        0
2                    1                0                 1         1        0
3                    1                0                 0         0        0
4                    1                1                 1         1        1
..                 …                …                 …         …        …
515                  1                1                 0         0        0
516                  1                1                 0         0        0
517                  0                1                 1         0        1
518                  1                0                 0         1        0
519                  0                0                 0         0        0

[520 rows x 16 columns]
```

```
[ ]: Y_train=df['class']
     print(Y_train)
```

```
0      1
1      1
2      1
3      1
4      1
      ..
515    1
516    1
517    1
518    0
```

```
519    0
Name: class, Length: 520, dtype: int64
```