```
import pandas as pd
import seaborn as sb
import numpy as np
import matplotlib.pyplot as plt
from sklearn.linear_model import LinearRegression
```

```
df=pd.read_excel('/content/LAB 4.xlsx')
df
```

	No.	Outdoor_temp_x	Supply_temp_y
0	1	7.8	32.1
1	2	7.3	32.6
2	3	2.7	37.4
3	4	2.0	38.3
4	5	2.9	37.3
5	6	3.7	36.5
6	7	4.1	36.1
7	8	4.3	35.8
8	9	4.4	35.7
9	10	4.3	35.7
10	11	5.7	34.4
11	12	4.6	35.5
12	13	7.5	32.4
13	14	9.6	30.2

```
xmean=df.mean()['Outdoor_temp_x']
ymean=df.mean()['Supply_temp_y']
df.mean()
```

```
No.               7.500000
Outdoor_temp_x    5.064286
Supply_temp_y    35.000000
dtype: float64
```

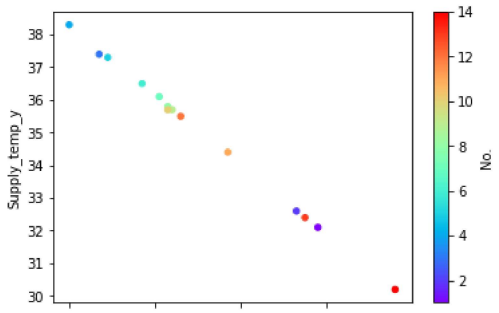
y=mx+c written as y=w1x+w0

```
df['y-ymean']=df['Supply_temp_y']-ymean
df['x-xmean']=df['Outdoor_temp_x']-xmean
df['(y-ymean)^2']=df['y-ymean']**2
df['(x-xmean)^2']=df['x-xmean']**2
df['(y-ymean)(x-xmean)']=df['y-ymean']*df['x-xmean']
df
```

	No.	Outdoor_temp_x	Supply_temp_y	y-ymean	x-xmean	(y-ymean)^2	(x-xmean)^2	(y-ymean)(x-xmean)
0	1	7.8	32.1	-2.9	2.735714	8.41	7.484133	-7.933571

```
df.plot.scatter(x='Outdoor_temp_x', y='Supply_temp_y', c='No.', colormap='rainbow')
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7fc2f33e5790>
```



11	12	4.6	35.5	0.5	-0.464286	0.25	0.215561	-0.232143

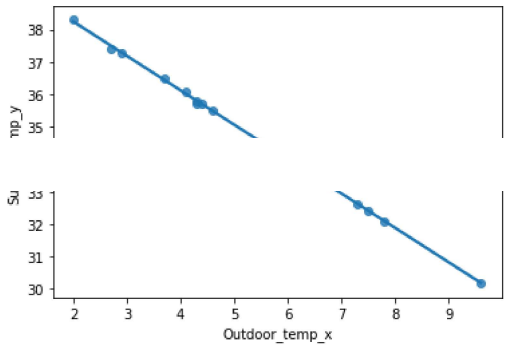
```
x=df.drop(['No.'], axis=1)
y=df['Supply_temp_y']
model=LinearRegression()
model.fit(x, y)
y_pred = model.predict(x) #predicted values


df['y-ymean']=df['Supply_temp_y']-ymean
df['x-xmean']=df['Outdoor_temp_x']-xmean
df['(y-ymean)^2']=df['y-ymean']**2
df['(x-xmean)^2']=df['x-xmean']**2
df['(y-ymean)(x-xmean)']=df['y-ymean']*df['x-xmean']
df['y_pred']=y_pred
df
```

	No.	Outdoor_temp_x	Supply_temp_y	y-ymean	x-xmean	(y-ymean)^2	(x-xmean)^2	(y-ymean)(x-xmean)	y_pred
0	1	7.8	32.1	-2.9	2.735714	8.41	7.484133	-7.933571	32.1
1	2	7.3	32.6	-2.4	2.235714	5.76	4.998418	-5.365714	32.6
2	3	2.7	37.4	2.4	-2.364286	5.76	5.589847	-5.674286	37.4
3	4	2.0	38.3	3.3	-3.064286	10.89	9.389847	-10.112143	38.3
4	5	2.9	37.3	2.3	-2.164286	5.29	4.684133	-4.977857	37.3
5	6	3.7	36.5	1.5	-1.364286	2.25	1.861276	-2.046429	36.5
6	7	4.1	36.1	1.1	-0.964286	1.21	0.929847	-1.060714	36.1
7	8	4.3	35.8	0.8	-0.764286	0.64	0.584133	-0.611429	35.8
8	9	4.4	35.7	0.7	-0.664286	0.49	0.441276	-0.465000	35.7
9	10	4.3	35.7	0.7	-0.764286	0.49	0.584133	-0.535000	35.7
10	11	5.7	34.4	-0.6	0.635714	0.36	0.404133	-0.381429	34.4
11	12	4.6	35.5	0.5	-0.464286	0.25	0.215561	-0.232143	35.5
12	13	7.5	32.4	-2.6	2.435714	6.76	5.932704	-6.332857	32.4
13	14	9.6	30.2	-4.8	4.535714	23.04	20.572704	-21.771429	30.2

```
sb.regplot(x = 'Outdoor_temp_x', y = "Supply_temp_y", data = df)
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7fc2f32e3760>
```



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