```
In [1]: import pandas as pd
        import numpy as np
        import matplotlib.pyplot as plt
        import warnings
        warnings.filterwarnings("ignore")
```

```
In [2]: data=pd.read_csv("/home/placement/Downloads/Advertising.csv")
```

```
In [3]: data.describe()
```

Out[3]:

	Unnamed: 0	TV	radio	newspaper	sales
count	200.000000	200.000000	200.000000	200.000000	200.000000
mean	100.500000	147.042500	23.264000	30.554000	14.022500
std	57.879185	85.854236	14.846809	21.778621	5.217457
min	1.000000	0.700000	0.000000	0.300000	1.600000
25%	50.750000	74.375000	9.975000	12.750000	10.375000
50%	100.500000	149.750000	22.900000	25.750000	12.900000
75%	150.250000	218.825000	36.525000	45.100000	17.400000
max	200.000000	296.400000	49.600000	114.000000	27.000000

```
In [4]: data.head()
```

Out[4]:

	Unnamed: 0	TV	radio	newspaper	sales
0	1	230.1	37.8	69.2	22.1
1	2	44.5	39.3	45.1	10.4
2	3	17.2	45.9	69.3	9.3
3	4	151.5	41.3	58.5	18.5
4	5	180.8	10.8	58.4	12.9

In [5]: `data.info()`

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 200 entries, 0 to 199
Data columns (total 5 columns):
 #   Column      Non-Null Count  Dtype
---  ------      --------------  -----
 0   Unnamed: 0  200 non-null    int64
 1   TV          200 non-null    float64
 2   radio       200 non-null    float64
 3   newspaper   200 non-null    float64
 4   sales       200 non-null    float64
dtypes: float64(4), int64(1)
memory usage: 7.9 KB
```

In [6]: `data1=data.drop(['Unnamed: 0'],axis=1)`

In [7]: `data1`

Out[7]:

	TV	radio	newspaper	sales
0	230.1	37.8	69.2	22.1
1	44.5	39.3	45.1	10.4
2	17.2	45.9	69.3	9.3
3	151.5	41.3	58.5	18.5
4	180.8	10.8	58.4	12.9
...	...	...	...	...
195	38.2	3.7	13.8	7.6
196	94.2	4.9	8.1	9.7
197	177.0	9.3	6.4	12.8
198	283.6	42.0	66.2	25.5
199	232.1	8.6	8.7	13.4

200 rows × 4 columns

In [8]: `list(data)`

Out[8]: `['Unnamed: 0', 'TV', 'radio', 'newspaper', 'sales']`

In [9]: `list(data1)`

Out[9]: `['TV', 'radio', 'newspaper', 'sales']`

In [10]:
```
y=data1['sales']
x=data1.drop('sales',axis=1)    #
```

In [11]: `y`

Out[11]:
```
0        22.1
1        10.4
2         9.3
3        18.5
4        12.9
          ...
195       7.6
196       9.7
197      12.8
198      25.5
199      13.4
Name: sales, Length: 200, dtype: float64
```

In [12]:
```python
from sklearn.model_selection import train_test_split
x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=0.33,random_state=42)
```

In [13]: `x_test.head()`

Out[13]:

	TV	radio	newspaper
95	163.3	31.6	52.9
15	195.4	47.7	52.9
30	292.9	28.3	43.2
158	11.7	36.9	45.2
128	220.3	49.0	3.2

In [14]: `y_train.head()`

Out[14]:
```
42       20.7
189       6.7
90       11.2
136       9.5
51       10.7
Name: sales, dtype: float64
```

```
In [15]: from sklearn.linear_model import Lasso
         from sklearn.model_selection import GridSearchCV
         lasso=Lasso()
         parameters={'alpha': [1e-15,1e-10,1e-8,1e-4,1e-3,1e-2,1,5,10,20]}
         lasso_regressor=GridSearchCV(lasso,parameters)
         lasso_regressor.fit(x_train,y_train)
```

```
Out[15]: GridSearchCV(estimator=Lasso(),
                      param_grid={'alpha': [1e-15, 1e-10, 1e-08, 0.0001, 0.001, 0.01, 1,
                                            5, 10, 20]})
```

```
In [16]: lasso_regressor.best_params_
```

```
Out[16]: {'alpha': 1}
```

```
In [17]: lasso=Lasso(alpha=1)
         lasso.fit(x_train,y_train)
         y_pred_lasso=lasso.predict(x_test)
```

```
In [18]: from sklearn.metrics import mean_squared_error
         Lasso_Error=mean_squared_error(y_pred_lasso,y_test)
         Lasso_Error
```

```
Out[18]: 3.641439660278575
```

```
In [19]: from sklearn.metrics import r2_score
         r2_score(y_test,y_pred_lasso)
```

```
Out[19]: 0.8589079527148957
```

```
In [ ]:
```