In [1]:

```
import pandas as pd
```

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.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 [5]:

```
data.head()
```

Out[5]:

	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 [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]:

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

In [9]:

```
y
```

Out[9]:

```
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 [10]:

```
x
```

Out[10]:

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

200 rows × 3 columns

In [11]:

```
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)#dividing training dat
```

In [12]:

```
x_test.head(5)#display top 5 data in testing data
```

Out[12]:

	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 [13]:

```
y_test.head(5)#display top 5 data in testing data price dataframe
```

Out[13]:

```
95     16.9
15     22.4
30     21.4
158     7.3
128    24.7
Name: sales, dtype: float64
```

In [14]:

```
x_train.head(5)#display top 5 data in training data
```

Out[14]:

	TV	radio	newspaper
42	293.6	27.7	1.8
189	18.7	12.1	23.4
90	134.3	4.9	9.3
136	25.6	39.0	9.3
51	100.4	9.6	3.6

In [15]:

```
y_train.head(5)#display top 5 data in training data price dataframe
```

Out[15]:

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

In [21]:

```
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[21]:

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

In [22]:

```
lasso_regressor.best_params_
```

Out[22]:

```
{'alpha': 1}
```

In [23]:

```
lasso=Lasso(alpha=0.01)
lasso.fit(x_train,y_train)
y_pred_lasso=lasso.predict(x_test)
```

In [24]:

```
from sklearn.metrics import r2_score
r2_score(y_test,y_pred_lasso)
```

Out[24]:

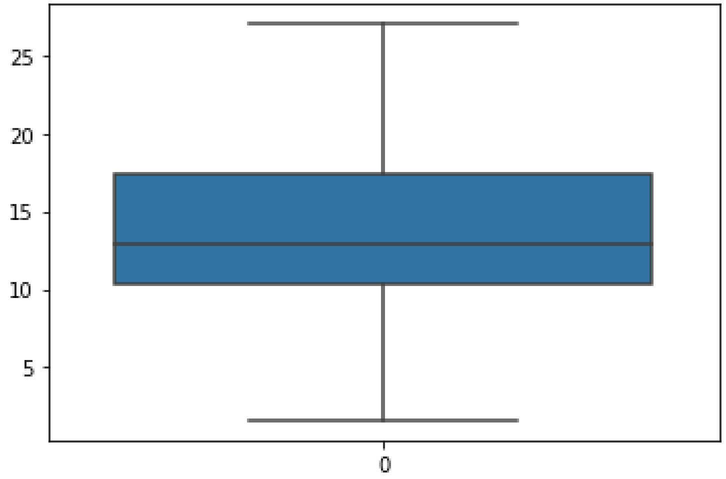
```
0.8555927456329158
```

In [25]:

```
import seaborn as sns
import matplotlib.pyplot as mp
sns.boxplot(data1.sales)#plotting for age
```

Out[25]:

```
<AxesSubplot:>
```



In [ ]:

```

```