```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
```

```
df=pd.read_csv('/content/advertising.csv')
df.head(10)
```

	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	12.0
3	151.5	41.3	58.5	16.5
4	180.8	10.8	58.4	17.9
5	8.7	48.9	75.0	7.2
6	57.5	32.8	23.5	11.8
7	120.2	19.6	11.6	13.2
8	8.6	2.1	1.0	4.8
9	199.8	2.6	21.2	15.6

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 200 entries, 0 to 199
Data columns (total 4 columns):
 #   Column     Non-Null Count  Dtype  
---  ------     --------------  -----  
 0   TV         200 non-null    float64
 1   Radio      200 non-null    float64
 2   Newspaper  200 non-null    float64
 3   Sales      200 non-null    float64
dtypes: float64(4)
memory usage: 6.4 KB
```

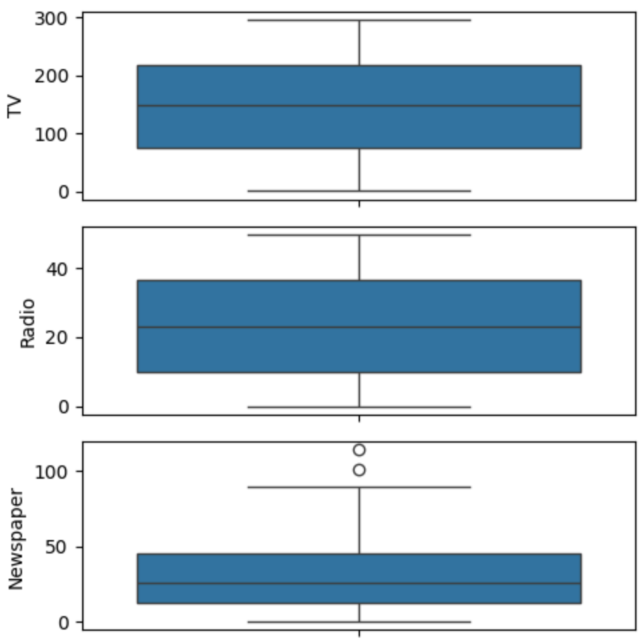
```
df.describe()
```

	TV	Radio	Newspaper	Sales
count	200.000000	200.000000	200.000000	200.000000
mean	147.042500	23.264000	30.554000	15.130500
std	85.854236	14.846809	21.778621	5.283892
min	0.700000	0.000000	0.300000	1.600000
25%	74.375000	9.975000	12.750000	11.000000
50%	149.750000	22.900000	25.750000	16.000000
75%	218.825000	36.525000	45.100000	19.050000
max	296.400000	49.600000	114.000000	27.000000

```
print(df.shape)
print(df.columns)
```

```
(200, 4)
Index(['TV', 'Radio', 'Newspaper', 'Sales'], dtype='object')
```

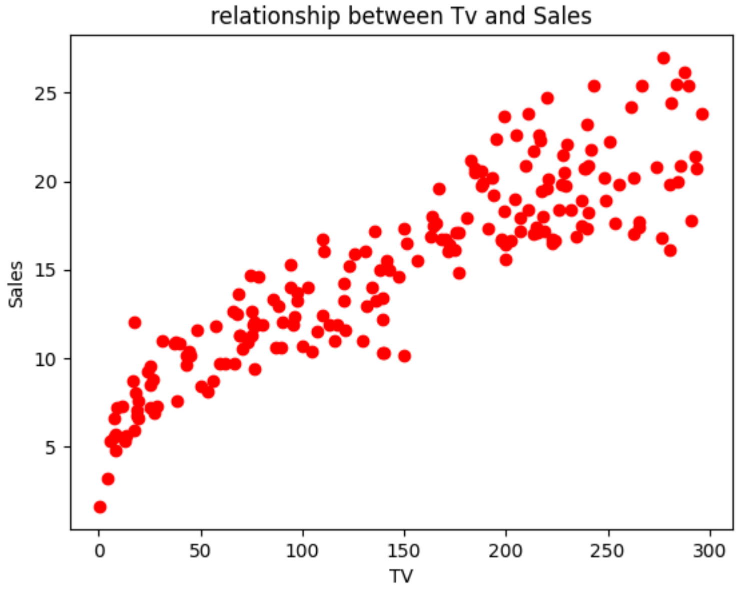
```
fig,axs=plt.subplots(3,figsize=(5,5))
plt1=sns.boxplot(df['TV'],ax=axs[0])
plt2=sns.boxplot(df['Radio'],ax=axs[1])
plt3=sns.boxplot(df['Newspaper'],ax=axs[2])
plt.tight_layout()
#
```



```
x=df[['TV']]
y=df['Sales']
#mmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmmm
```

```
plt.scatter(x,y,color='red',label='Scatter Plot')
plt.title('relationship between Tv and Sales')
plt.xlabel('TV')
plt.ylabel('Sales')
```

```
Text(0, 0.5, 'Sales')
```



```
print(x.shape)
print(y.shape)
```

```
(200, 1)
(200,)
```

```
X=np.array(x)
y=np.array(y)
```

```
print(X.shape)
print(y.shape)
```

```
(200, 1)
(200,)
```

```
from sklearn.model_selection import train_test_split
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)
```

```
print(X_train.shape)
print(X_test.shape)
print(y_train.shape)
print(y_test.shape)
```

```
(160, 1)
(40, 1)
(160,)
(40,)
```

```
from sklearn.linear_model import LinearRegression
lm=LinearRegression()
```

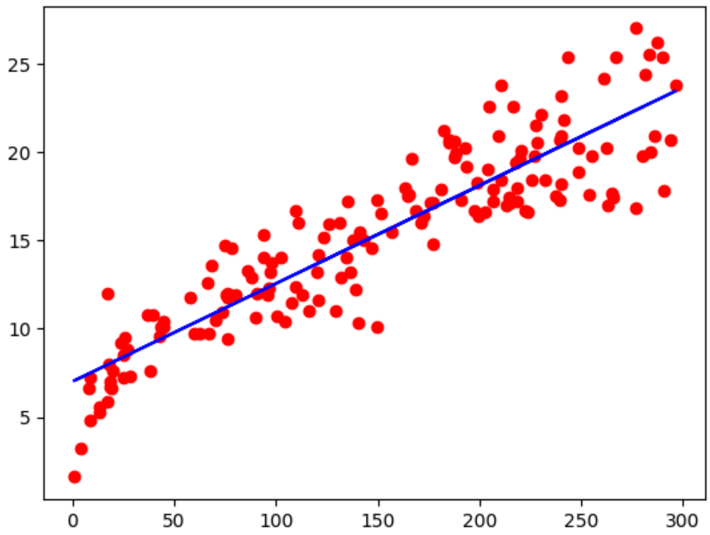
```
lm.fit(X_train,y_train)
```

```
▾ LinearRegression
LinearRegression()
```

```
y_pred=lm.predict(X_test)
```

```
plt.scatter(X_train,y_train,color='red')
plt.plot(X_train,lm.predict(X_train),color='blue')
```

```
[<matplotlib.lines.Line2D at 0x7b9338e91db0>]
```



```
slope=lm.coef_
intercept=lm.intercept_
print("Estimated model slope:",slope)
print("Estimated model intercept:",intercept)
```

```
Estimated model slope: [0.05548294]
Estimated model intercept: 7.007108428241848
```

```
X_new=[[200]]
lm.predict(X_new)
```

```
array([18.10369721])
```