GRIP @ THE SPARKS FOUNDATION

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TASK-1 Predection using Supervised ML

(LEVEL-BEGINNER)

Predict the percentage of an student based on the no. of study hours. What will be predicted score if a student studies for 9.25 hrs/day. Use R, Python, SAS Enterprise Miner or any other tool.

Here the aim is to predict the marks/number obtained by a student on the basis of the number of hours he/she studies.

In [ ]:
```
# Importing Librabies

import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn import metrics
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
```

In [2]:
```
#  To Avoid any warnings in the code
import warnings
warnings.filterwarnings('ignore')

#Reading Data
data = pd.read_csv(r'C:\Users\HAPPY\Desktop\Sparks Foundation\Student score\student_scores.csv',header=0)
data.head()
```

Out[2]:

	Hours	Scores
0	2.5	21
1	5.1	47
2	3.2	27
3	8.5	75
4	3.5	30

In [3]:
```
print(data.dtypes)
print(data.shape)
```

```
data.describe()
```

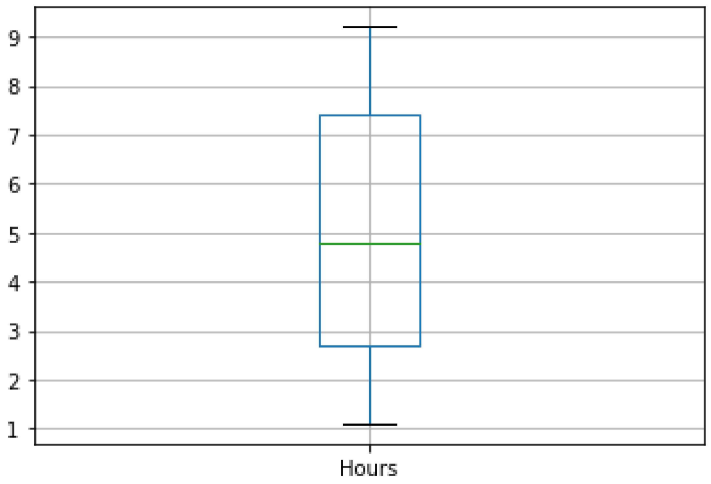
```
Hours    float64
Scores     int64
dtype: object
(25, 2)
```

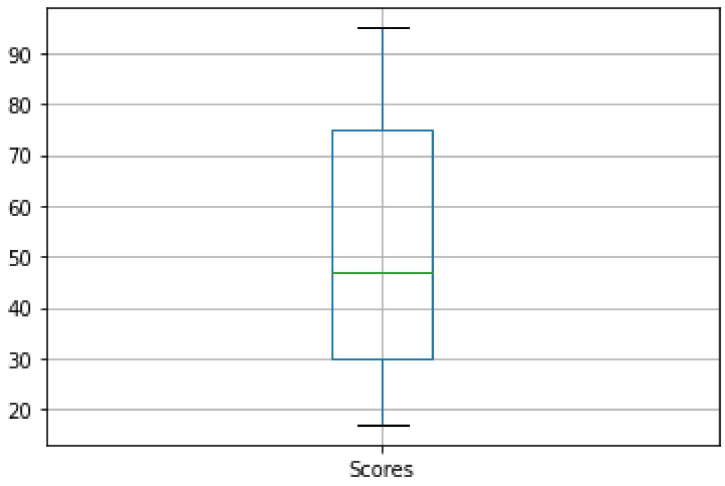
Out[3]:

	Hours	Scores
count	25.000000	25.000000
mean	5.012000	51.480000
std	2.525094	25.286887
min	1.100000	17.000000
25%	2.700000	30.000000
50%	4.800000	47.000000
75%	7.400000	75.000000
max	9.200000	95.000000

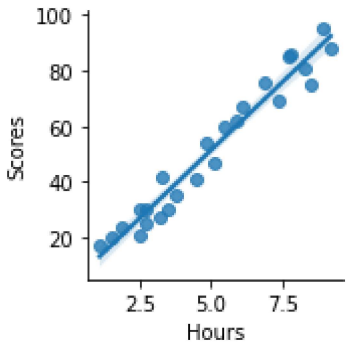
In [4]:

```
#Outlier treatment
for i in data.columns:
    data.boxplot(column=i)
    plt.show()
```





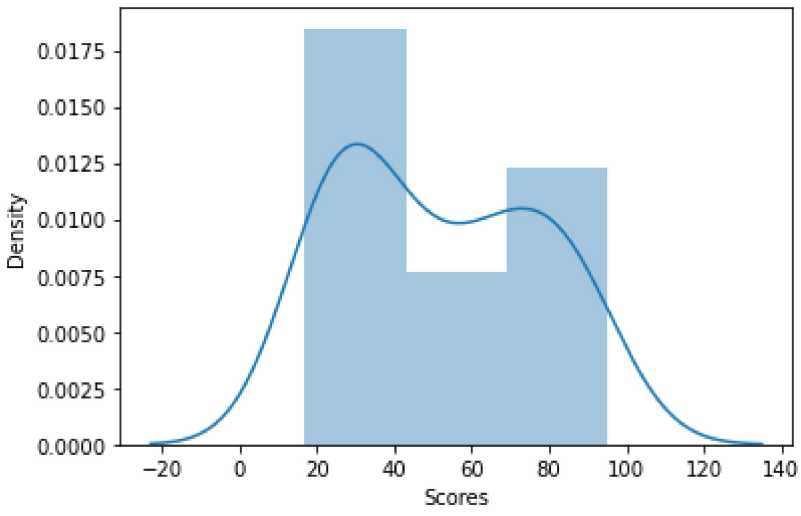
In [5]:
```
#Linearity with independent var
sns.pairplot(data,x_vars='Hours',y_vars='Scores',kind='reg')
plt.show()
```



In [6]:
```
#Check for the Approx Normal distribution of the dependent variable
X=data['Hours']
Y=data['Scores']
```

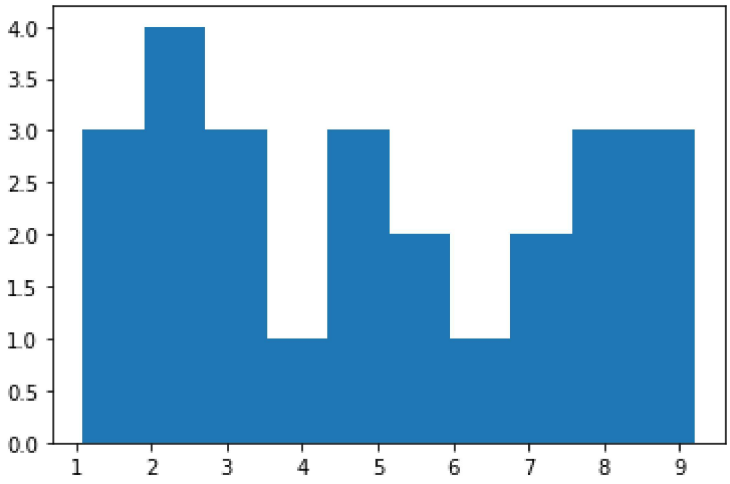
In [7]:
```
sns.distplot(Y)
```

Out[7]: <AxesSubplot:xlabel='Scores', ylabel='Density'>



In [8]:
```
#Check for the skewness in the independent Variable
plt.hist(X)
```

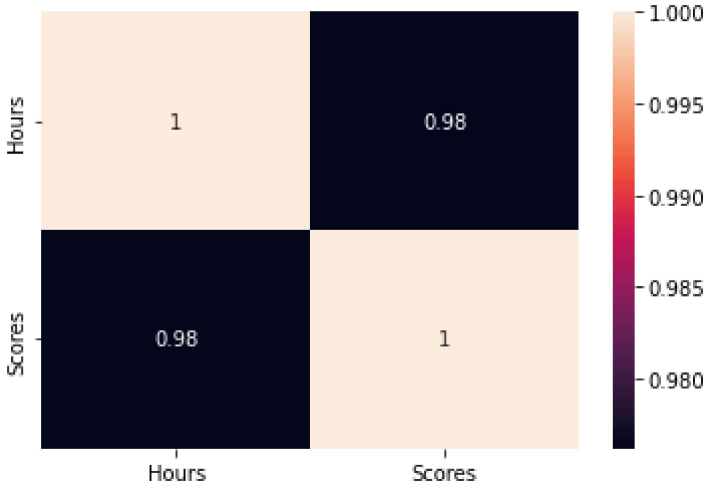
Out[8]:
```
(array([3., 4., 3., 1., 3., 2., 1., 2., 3., 3.]),
 array([1.1 , 1.91, 2.72, 3.53, 4.34, 5.15, 5.96, 6.77, 7.58, 8.39, 9.2 ]),
 <BarContainer object of 10 artists>)
```



In [9]:

```
#There should be no multicolinearity between independent variables
correlation=data.corr()
sns.heatmap(correlation, annot=True)
```

Out[9]: <AxesSubplot:>



In [10]:

```
#Regression Model

x=data.iloc[:,:1]
y=data.iloc[:,1:]

x.head()
```

Out[10]:

	Hours
0	2.5
1	5.1
2	3.2
3	8.5
4	3.5

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

Out[13]:

	Hours
0	2.5
1	5.1
2	3.2
3	8.5
4	3.5

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

Out[14]:

	Scores
0	21
1	47
2	27
3	75
4	30

In [15]:
```
# Splitting the Training & Testing data

x_train,x_test,y_train,y_test = train_test_split(x,y,test_size=0.30,random_state=0)
```

In [16]:
```
print("Testing Set")
print(x_test.shape)
print(y_test.shape)
```

```
Testing Set
(8, 1)
(8, 1)
```

In [17]:
```
print("Training set")
print(x_train.shape)
print(y_train.shape)
```

```
Training set
(17, 1)
(17, 1)
```

In [18]:
```
#Training the model

regressor=LinearRegression()
regressor.fit(x_train,y_train)
```

Out[18]:
```
LinearRegression()
```

In [19]:
```
regressor.coef_
```

Out[19]:
```
array([[9.78856669]])
```

In [20]:
```
regressor.intercept_
```

Out[20]:
```
array([2.37081538])
```

In [21]:
```
#Predicting the Model

y_pred = regressor.predict(x_test)
```

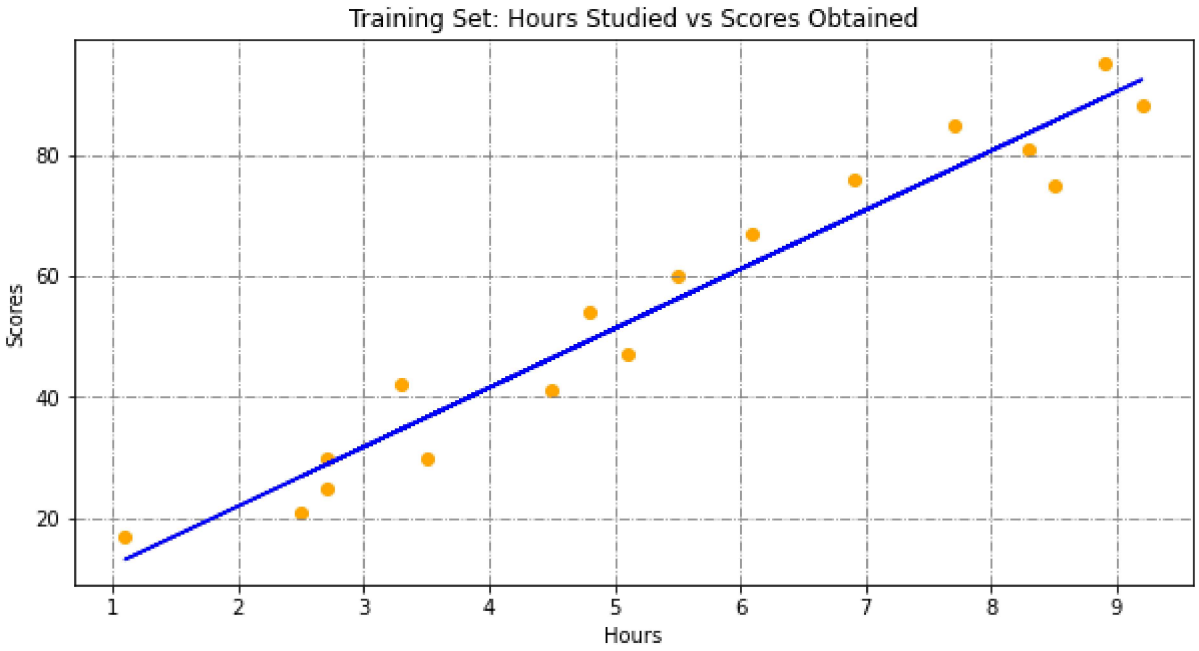
In [22]:
```
y_pred=pd.DataFrame(y_pred, columns=["Predicted Values"])

y_pred.head()
```

Out[22]:

	Predicted Values
0	17.053665
1	33.694229
2	74.806209
3	26.842232
4	60.123359

In [23]:
```
plt.figure(figsize=(10,5))
plt.scatter(x_train, y_train, color='orange')
plt.plot(x_train, regressor.predict(x_train), color='blue')
plt.title('Training Set: Hours Studied vs Scores Obtained')
plt.xlabel('Hours')
plt.ylabel('Scores')
plt.grid(True, color='gray', linestyle='-.')
plt.show()
```



In [24]:
```
# Checking the accuracy scores for training and test set

print('Test Score')
print(regressor.score(x_test, y_test))
print('Training Score')
print(regressor.score(x_train, y_train))
```

```
Test Score
0.9568211104435257
Training Score
0.9484997422695115
```

In [25]:
```
#Making Predictions

#predicting how much does he/she will score if he/she will study for 9.25hrs in a day

hours=9.25
pred = regressor.predict([[hours]])
print('Number of hours = {}' .format(hours))
print('Predicted Score = {}' .format(pred[0]))
```

```
Number of hours = 9.25
Predicted Score = [92.91505723]
```

In [28]:
```
#Evaluating the model

print('Root Mean Square Error: ', np.sqrt(metrics.mean_squared_error(y_test, y_pred)))
```

```
Root Mean Square Error:  4.792191274636315
```

In [ ]:
```
# Here we can conclude that the predicted score for the student if he/she studies for 9.25 hrs in a day is 92.91

# Thank You
```