ANCHAL SHARMA

TASK-1

IMPORTING ALL LIBRARIES REQUIRED

In [1]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
%matplotlib inline
import seaborn as sns
```

IMPORTING DATA

In [2]:
```
path='http://bit.ly/w-data'
Pct=pd.read_csv('http://bit.ly/w-data')
```

DATA UNDERSTANDING

In [3]:
```
Pct.shape
```

Out[3]:
```
(25, 2)
```

In [4]:
```
Pct.describe().T
```

Out[4]:

	count	mean	std	min	25%	50%	75%	max

	count	mean	std	min	25%	50%	75%	max
Hours	25.0	5.012	2.525094	1.1	2.7	4.8	7.4	9.2
Scores	25.0	51.480	25.286887	17.0	30.0	47.0	75.0	95.0

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

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 25 entries, 0 to 24
Data columns (total 2 columns):
 #   Column  Non-Null Count  Dtype  
---  ------  --------------  -----  
 0   Hours   25 non-null     float64
 1   Scores  25 non-null     int64  
dtypes: float64(1), int64(1)
memory usage: 528.0 bytes
```

In [6]:
```
print(Pct.head())
print(Pct.tail())
```

```
   Hours  Scores
0    2.5      21
1    5.1      47
2    3.2      27
3    8.5      75
4    3.5      30
    Hours  Scores
20    2.7      30
21    4.8      54
22    3.8      35
23    6.9      76
24    7.8      86
```

In [7]:
```
Pct.size
```

Out[7]:
```
50
```

CHECKING FOR MISSING VALUE

In [8]:
```
Pct.isnull().sum()
```

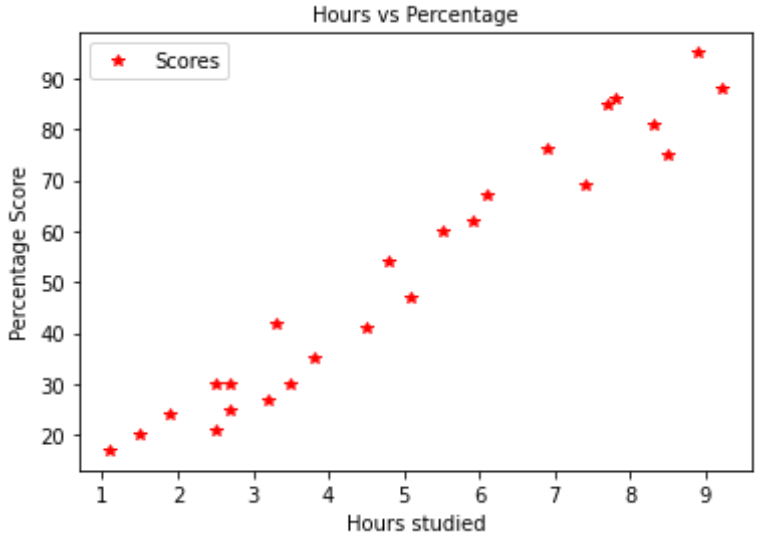
Out[8]:
```
Hours     0
Scores    0
dtype: int64
```

DATA VISUALIZATION

SCATTER PLOT

In [12]:
```
Pct.plot(x='Hours',y='Scores',style='*',color='red')
plt.xlabel('Hours studied')
plt.ylabel('Percentage Score')
plt.title('Hours vs Percentage',fontsize=10)
```

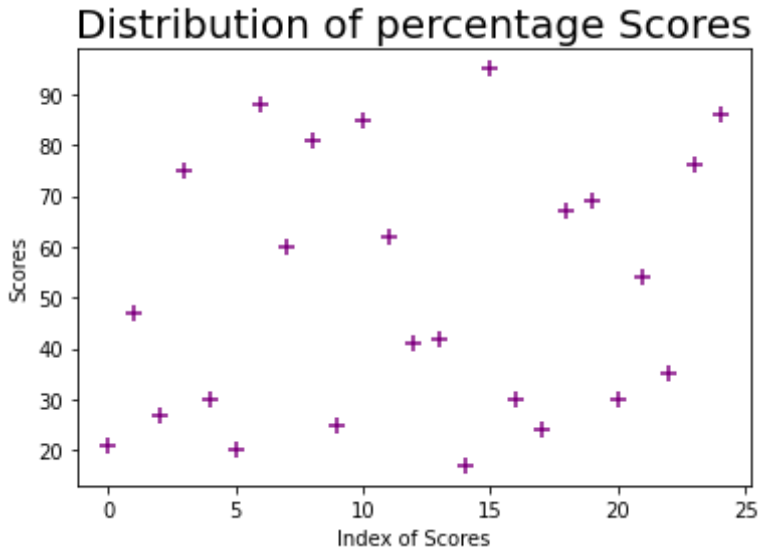
Out[12]:
```
Text(0.5, 1.0, 'Hours vs Percentage')
```



In [13]:
```
x=Pct.Scores.index
```

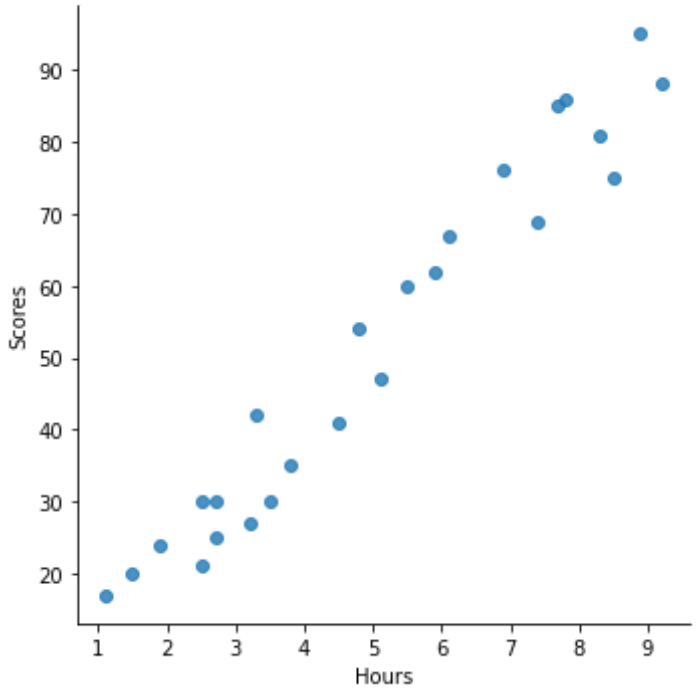
```
y=Pct.Scores
plt.scatter(x=Pct.Scores.index,y=Pct.Scores,c='purple',s=50,marker="+"
,)
plt.xlabel('Index of Scores')
plt.ylabel('Scores')
plt.title('Distribution of percentage Scores',fontsize=20)
```

Out[13]: Text(0.5, 1.0, 'Distribution of percentage Scores')



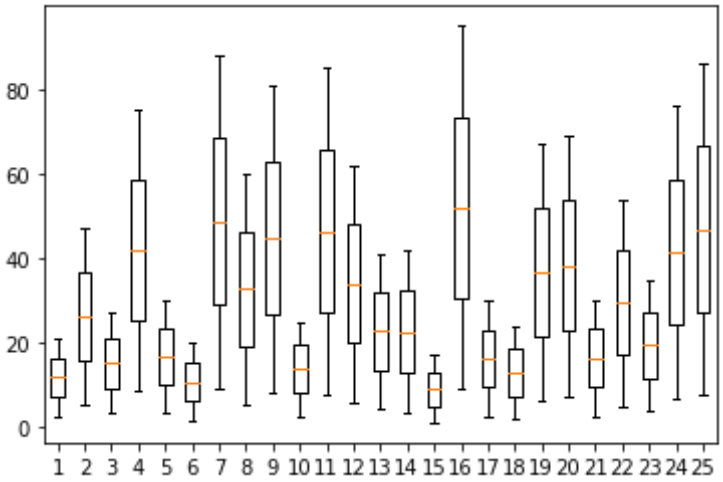
In [14]:
```
#Using seaborn
sns.lmplot(x='Hours',y='Scores',data=Pct,fit_reg=False)
```

Out[14]: <seaborn.axisgrid.FacetGrid at 0x2d3bf67a190>



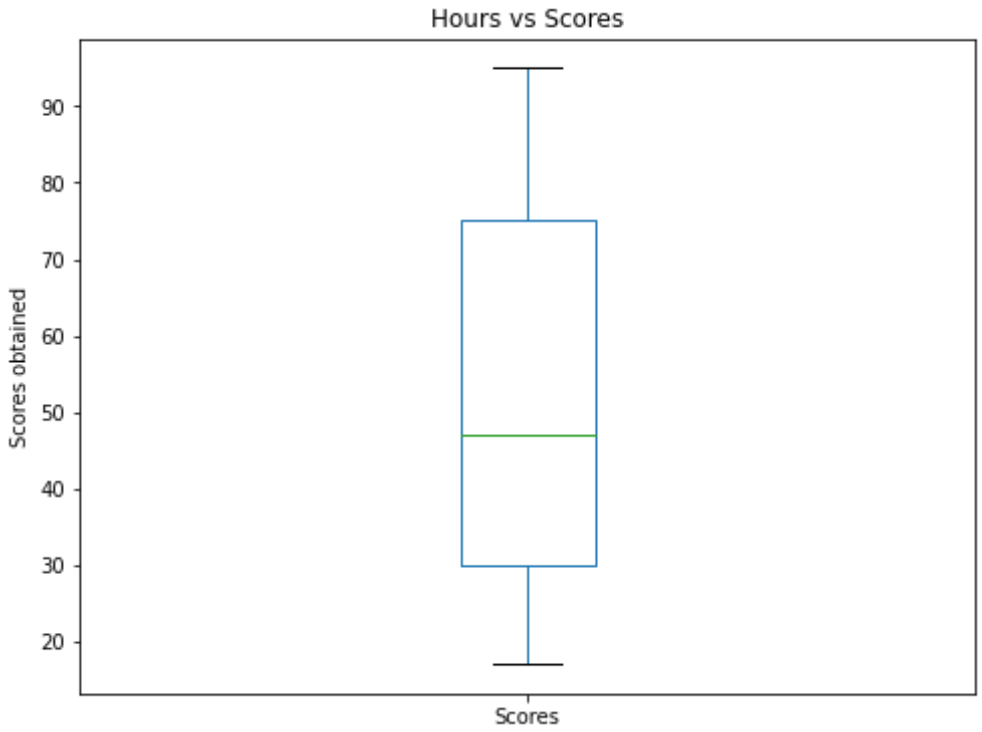
BOX PLOT

In [15]:
```
plt.boxplot(Pct)
plt.show()
```



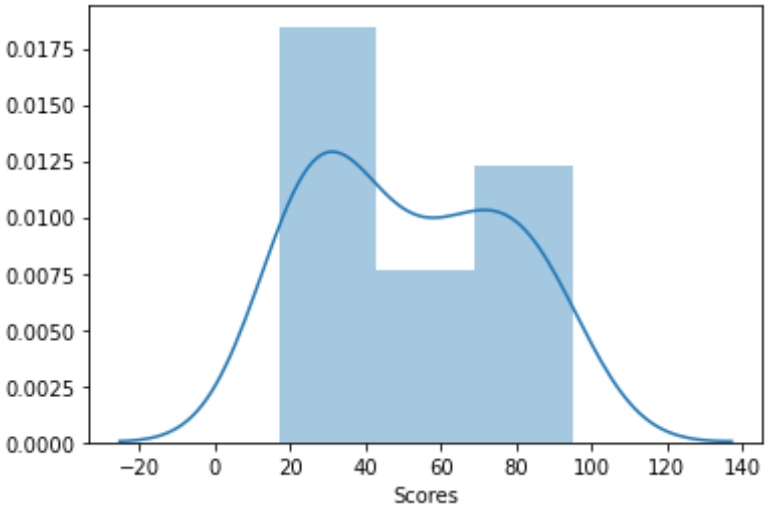
In [16]:
```
pct_scored=Pct['Scores']
pct_scored.plot(kind='box',figsize=(8,6))
plt.title('Hours vs Scores')
plt.ylabel('Scores obtained')
```

Out[16]:
```
Text(0, 0.5, 'Scores obtained')
```



In [17]:
```
#using seaborn
sns.distplot(Pct['Scores'])
```

Out[17]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x2d3bf685bb0>
```



In [ ]:

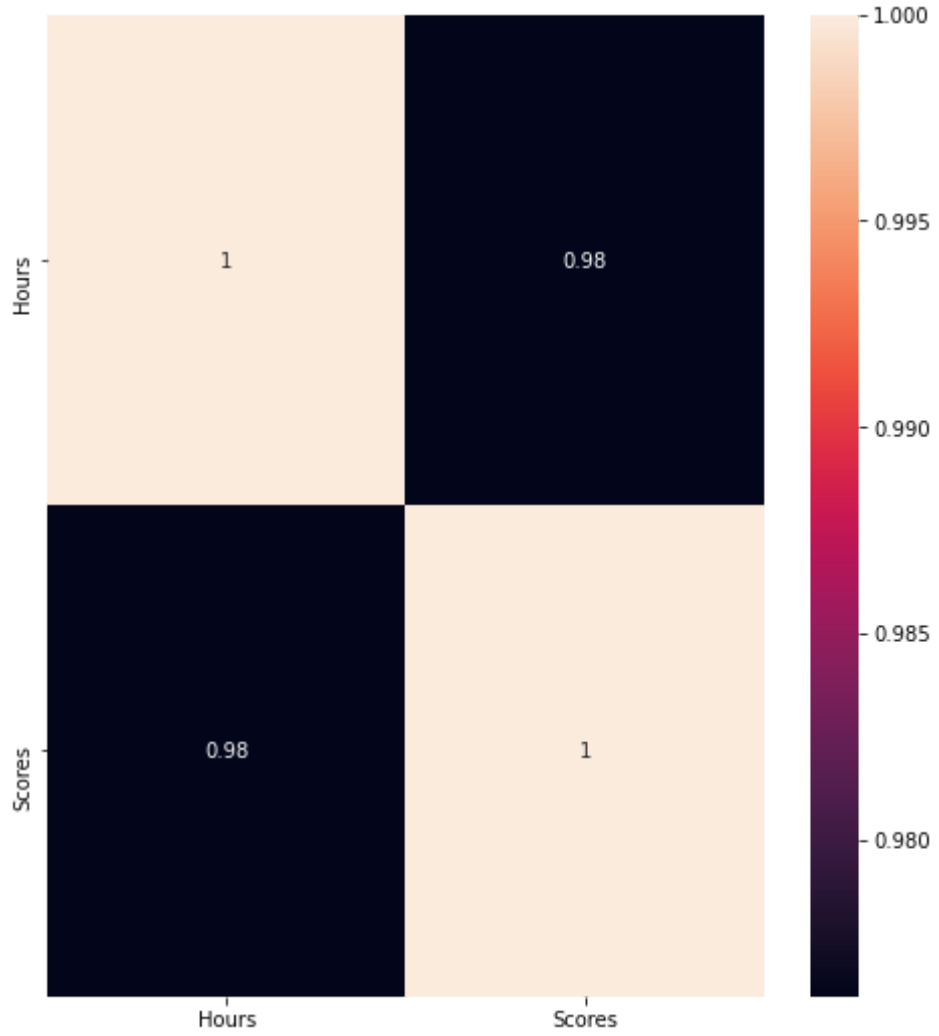
```
```

In [18]:

```
corre=Pct.corr()
plt.figure(figsize=(8,9))
sns.heatmap(data=corre,annot=True)
```

Out[18]:

```
<matplotlib.axes._subplots.AxesSubplot at 0x2d3bf6df340>
```



LINEAR REGRESSION

DATA PREPARATION

In [19]:
```
X=Pct.iloc[:,:-1].values
Y=Pct.iloc[:,1].values
```

In [20]:
```
#Divide the dataset into training and testing
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=4)
```

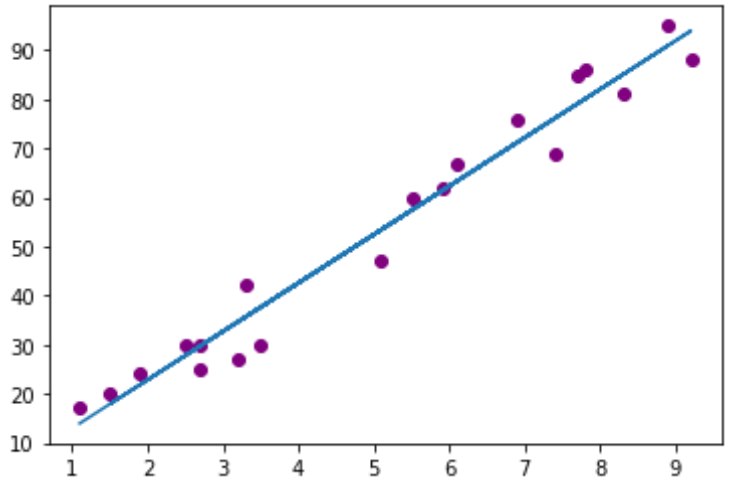
TRAINING

In [21]:
```
from sklearn.linear_model import LinearRegression
regressor=LinearRegression()
regressor.fit(X_train,Y_train)
```

Out[21]:
```
LinearRegression()
```

In [22]:
```
#Plotting regression line for training
line = regressor.coef_*X_train+regressor.intercept_
plt.scatter(X_train,Y_train,color='purple',marker='o')
plt.plot(X_train,line)
```

Out[22]:
```
[<matplotlib.lines.Line2D at 0x2d3bfc29ca0>]
```



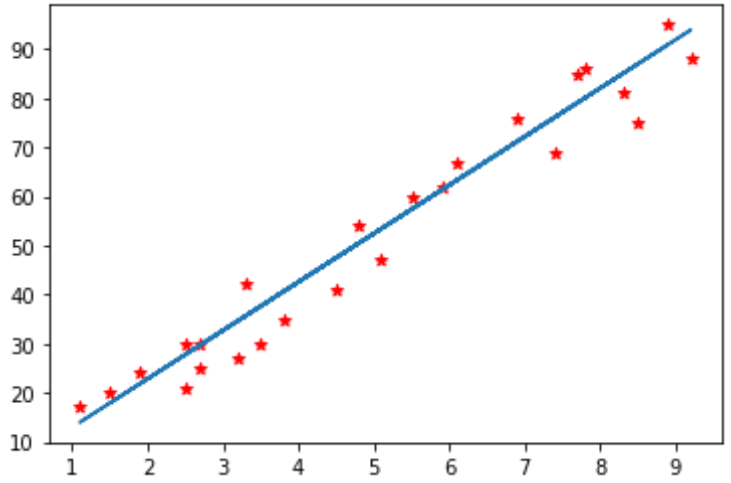
In [ ]:

PREDICTIONS

In [23]:
```
y_pred=regressor.predict(X_test)

#Plotting regression line for testing
line = regressor.coef_*X+regressor.intercept_
plt.scatter(X,Y,color='red',marker='*')
plt.plot(X,line)
```

Out[23]:
```
[<matplotlib.lines.Line2D at 0x2d3bfc95790>]
```



In [24]:
```
#comparing the Actual vs Predicted
Data=pd.DataFrame({'Actual':Y_test,'Predicted':y_pred})
Data
```

Out[24]:

	Actual	Predicted
0	35	40.604168
1	54	50.481812
2	21	27.763230
3	75	87.029097

	Actual	Predicted
4	41	47.518519

ACCURACY

In [25]:
```
from sklearn import metrics
metrics.r2_score(Y_test,y_pred)
```

Out[25]:
```
0.8345792140066828
```

In [26]:
```
mse=print('Mean absolute error=',metrics.mean_absolute_error(Y_test,y_pred))
rootsqe=print('Root mean squared error=',np.sqrt(metrics.mean_squared_error(Y_test,y_pred)))
```

```
Mean absolute error= 6.8866403471761775
Root mean squared error= 7.43929957468606
```

SCORE PREDICTIONS

In [27]:
```
pred_score=print('Predicted score for a student studying 9.25 hours per day is:',regressor.predict([[9.25]]))
```

```
Predicted score for a student studying 9.25 hours per day is: [94.43733048]
```

In [ ]:
```

```