Import libraries and packages

In [2]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
%matplotlib inline
import seaborn as sns
from sklearn.linear_model import LinearRegression
from sklearn import metrics
from sklearn.model_selection import train_test_split
```

Importing dataset

In [3]:
```
df_score = pd.read_csv('https://raw.githubusercontent.com/AdiPersonalWorks/Random/master/student_scores%20-%20c
```

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

Out[4]:

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

In [5]:
```
df_score.tail()
```

Out[5]:

	Hours	Scores
20	2.7	30
21	4.8	54
22	3.8	35
23	6.9	76
24	7.8	86

Checking dataset for missing values

In [6]:
```
df_score.isnull().sum()
```

Out[6]:
```
Hours     0
Scores    0
dtype: int64
```

> So there are no null/missing values

In [7]:
```
df_score.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 [8]:
```
df_score.describe()
```

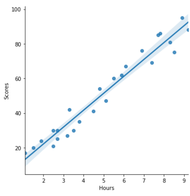
Out[8]:

	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

Plot relationship between the hours variable and the target score

In [9]:
```
sns.lmplot(x='Hours',y='Scores',data=df_score)
```

Out[9]:
```
<seaborn.axisgrid.FacetGrid at 0x1fc1d65e250>
```



> There is a linear relationship between the feature hours and target score

In [10]:
```
df_score.corr()
```

Out[10]:

	Hours	Scores
Hours	1.000000	0.976191
Scores	0.976191	1.000000

Splitting data

In [11]:
```
X = df_score[['Hours']]
y= df_score['Scores']

X_train, X_test, y_train, y_test = train_test_split(X,y,random_state=18, test_size=0.20)
```

In [12]:
```
X_train.shape
```

Out[12]:
```
(20, 1)
```

Training the model

In [13]:
```
lr_model = LinearRegression()
lr_model.fit(X_train,y_train)
```

Out[13]:
```
LinearRegression()
```

> print out coefficients and intercept of the Linear Regression Model

In [14]:
```
print("Coefficients: ", lr_model.coef_)
print("Intercept: ", lr_model.intercept_)
```

```
Coefficients:  [9.59195136]
Intercept:  3.680042001416318
```

> Thus,
>
> score = hours*(9.59) + 3.68

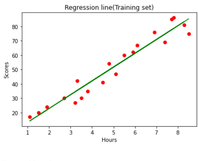
In [37]:
```
yo = lr_model.intercept_ + (lr_model.coef_ * X_train)
```

> Plotting on trained data

In [38]:
```
plt.scatter(X_train,y_train, color='red',marker='o')
plt.plot(X_train,yo,color='green')

plt.xlabel('Hours')
plt.ylabel('Scores')
plt.title('Regression line(Training set)')
```

Out[38]:
```
Text(0.5, 1.0, 'Regression line(Training set)')
```



Predicting test data

In [39]:
```
ypred = lr_model.predict(X_test)
```

In [40]:
```
ypred
```

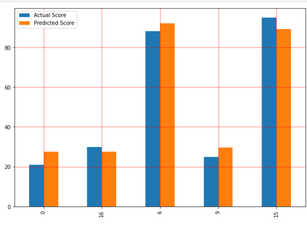
Out[40]:
```
array([27.65992039, 27.65992039, 91.92599448, 29.57831066, 89.04840907])
```

In [41]:
```
scoretable = pd.DataFrame({'Actual Score':y_test, 'Predicted Score': ypred})
scoretable
```

Out[41]:

	Actual Score	Predicted Score
0	21	27.659920
16	30	27.659920
6	88	91.925994
9	25	29.578311
15	95	89.048409

In [42]:
```
scoretable.plot(kind='bar',figsize=(10,7))
plt.grid(which='major', linewidth='0.5', color='red')
plt.grid(which='minor', linewidth='0.5', color='blue')
plt.show()
```



> plotting regression line on testing set

Evaluating the model

> Metrics:
>
> Mean absolute error
> Mean squared error
> R squared

In [43]:
```
print('MAE: ', metrics.mean_absolute_error(y_test,ypred))
print("MSE: ", metrics.mean_squared_error(y_test,ypred))
print("RMSE: ", np.sqrt(metrics.mean_absolute_error(y_test,ypred)))
```

```
MAE:  4.691179214182799
MSE:  24.325261590981185
RMSE:  2.1659130209181527
```

In [44]:
```
print("Accuracy of the model : " , metrics.r2_score(ypred,y_test))
```

```
Accuracy of the model :  0.9738290779581299
```

the model has 97% accuracy which indicates that above fitted model is GOOD MODEL

What will be predicted score if a student studies for 9.25 hrs/ day?

In [45]:
```
predictionScore = lr_model.predict([[9.25]])

print("Predicted score of a student studying for 9.25 hrs/day is : ", predictionScore)
```

```
Predicted score of a student studying for 9.25 hrs/day is :  [92.40559205]
```

Final result:

> If a student studies for 9.25 hrs/day, he/she can approximately score 92.4055 marks