In [1]:

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

from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
from sklearn import metrics
```

In [2]:

```
link = 'https://raw.githubusercontent.com/AdiPersonalWorks/Random/master/student_scores%20-%20student_scores.csv'
df = pd.read_csv(link)
print("successful import")

```

```
successful import
```

In [3]:

```
df.head(5)
```

Out[3]:

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

In [4]:

```
df.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.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

```
In [6]: df.columns
```

```
Out[6]: Index(['Hours', 'Scores'], dtype='object')
```

```
In [7]: df.shape
```

```
Out[7]: (25, 2)
```

```
In [8]: df.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 [9]: df.describe()
```

Out[9]:

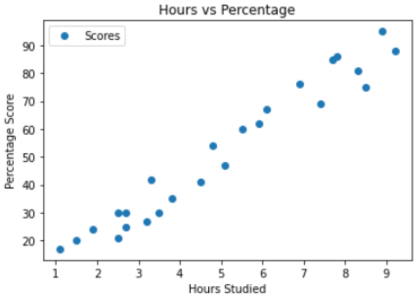
	Hours	Scores
count	25.000000	25.000000
mean	5.012000	51.480000
std	2.525094	25.286887
min	1.100000	17.000000
25%	2.700000	30.000000
50%	4.800000	47.000000
75%	7.400000	75.000000
max	9.200000	95.000000

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

Out[10]:

	Hours	Scores
Hours	1.000000	0.976191
Scores	0.976191	1.000000

```
In [11]: # Plotting the distribution of scores
df.plot(x='Hours', y='Scores', style='o')
plt.title('Hours vs Percentage')
plt.xlabel('Hours Studied')
plt.ylabel('Percentage Score')
plt.show()
```

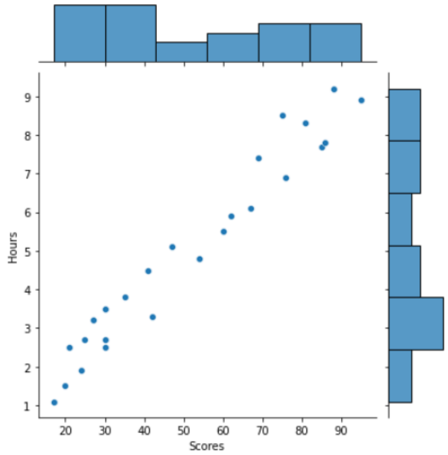


In [12]:

```
sns.jointplot(y= 'Hours' ,x='Scores', data= df)
```

Out[12]:

```
<seaborn.axisgrid.JointGrid at 0x16a77b6a100>
```



Data Preprocessing

In [13]:

```
x = df.iloc[:, :-1].values
y = df.iloc[:, 1].values
```

Model Training

In [14]:

```
x_train, x_test, y_train, y_test = train_test_split(x, y, test_size=0.2, random_state=0)
model = LinearRegression()
model.fit(x_train.reshape(-1,1), y_train)
print('done')
```

```
done
```

Predictions

In [15]:

```
# Testing data
print(x_test)
# Model Prediction
y_pred = model.predict(x_test)
```

```
[[1.5]
 [3.2]
 [7.4]
 [2.5]
 [5.9]]
```

In [16]:

```
newDF = pd.DataFrame({'Reg':y_test , 'Predicted':y_pred})
newDF
```

Out[16]:

	Reg	Predicted
0	20	16.884145
1	27	33.732261
2	69	75.357018
3	30	26.794801
4	62	60.491033

In [17]:

```python
#Estimating training and test score
print("Training Score:",model.score(x_train,y_train)*100,'%')
```

```
Training Score: 95.15510725211553 %
```

In [18]:

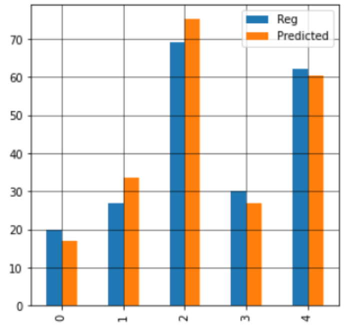
```python
print("Test Score:",model.score(x_test,y_test) * 100,'%')
```

```
Test Score: 94.54906892105356 %
```

In [19]:

```python
# Plotting the Bar graph to depict the difference between the actual and predicted value

newDF.plot(kind='bar',figsize=(5,5))
plt.grid(which='major', linewidth='0.5', color='black')
plt.grid(which='minor', linewidth='0.5', color='black')
plt.show()
```



In [20]:

```python
# testing the given sample
hours = 9.25
newTest=np.array([hours])
newTest = newTest.reshape(-1,1)
newPred = model.predict(newTest)
```

In [21]:

```python
print("No of Hours = {}".format(hours))
print("Predicted Score = {}".format(newPred[0]))
```

```
No of Hours = 9.25
Predicted Score = 93.69173248737538
```

In [22]:

```python
print('Mean Absolute Error:',metrics.mean_absolute_error(y_test, y_pred))
print('Mean Squared Error:', metrics.mean_squared_error(y_test, y_pred))
print('Root Mean Squared Error:', np.sqrt(metrics.mean_squared_error(y_test, y_pred)))
print('R-2:', metrics.r2_score(y_test, y_pred))
```

```
Mean Absolute Error: 4.183859899002975
Mean Squared Error: 21.5987693072174
Root Mean Squared Error: 4.6474476121003665
R-2: 0.9454906892105356
```