Task 2 - Suprvised Machine learning

Problem definition :

Using regression technique, predicting the percentage of marks that a student is expected to score based upon the number of hours they have studied. This simple linear regression task includes just two variables.

Dataset :

http://bit.ly/w-data

In [33]:

```
#importing all the required libraries
import pandas as pd
import matplotlib.pyplot as plt
import numpy as np
import seaborn as sns
```

In [60]:

```
#reading the data into a file
file_path = 'http://bit.ly/w-data'
dataset = pd.read_csv(file_path)
print('File created successfully')
dataset.head(10)
```

```
File created successfully
```

Out[60]:

	Hours	Scores
0	2.5	21

	Hours	Scores
1	5.1	47
2	3.2	27
3	8.5	75
4	3.5	30
5	1.5	20
6	9.2	88
7	5.5	60
8	8.3	81
9	2.7	25

In [61]:

```
dataset.describe()
```

Out[61]:

	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

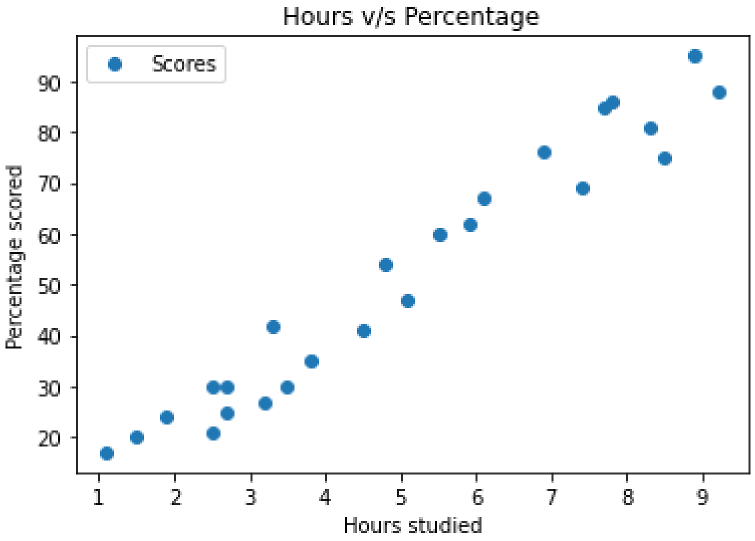
In [14]:

```
#Marking down data by converting into labels(output) and attributes(inp
uts)
X = dataset.iloc[:, :-1].values
y = dataset.iloc[:,1].values
print('created labels and attributes successfully')
```

```
created labels and attributes successfully
```

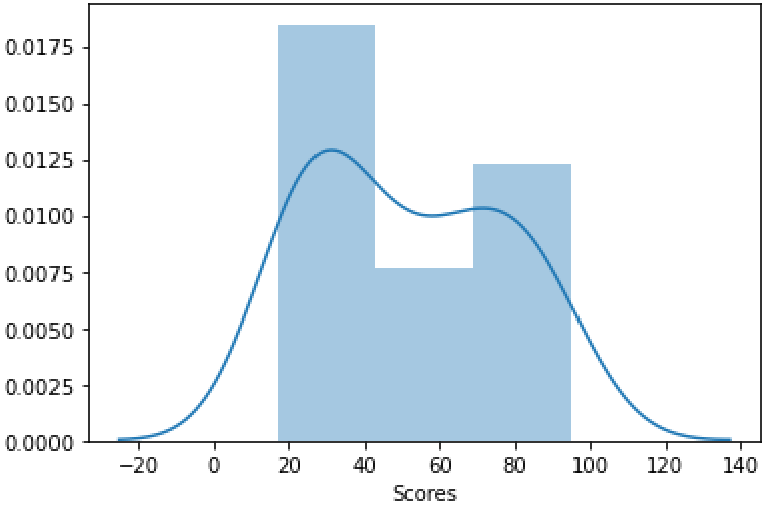
Data Visualization

In [11]:
```
#Plotting an Hours v/s Percentage graph
dataset.plot(x='Hours', y='Scores', style='o')
plt.title('Hours v/s Percentage')
plt.xlabel('Hours studied')
plt.ylabel('Percentage scored')
plt.show()
```



In [58]:
```
#checking the scores distribution
sns.distplot(dataset['Scores'])
```

Out[58]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x191064b3370>
```



```
In [27]: #splitting the dataset into train and test data for the model
         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 = 0)
         print('train and test datasets created successfully')
```

```
train and test datasets created successfully
```

Model Training

```
In [28]: #using train dataset to for a linear regression model
         from sklearn.linear_model import LinearRegression
         model = LinearRegression()
         model.fit(X_train, y_train)
         print('training successful')
```

```
training successful
```

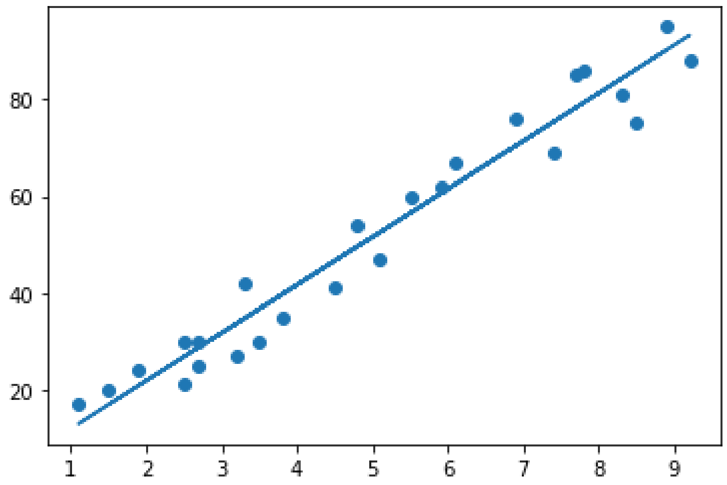
Regression line visualization

y = ax + b

In [38]:

```
#plotting a graph for the test data
line = model.coef_*X+model.intercept_

plt.scatter(X,y)
plt.plot(X, line)
plt.show()
```



Model predictions

In [63]:

```
#comapring actual values with predicted ones
y_pred = model.predict(X_test)
df = pd.DataFrame({'Actual': y_test, 'Predicted': y_pred})
df
```

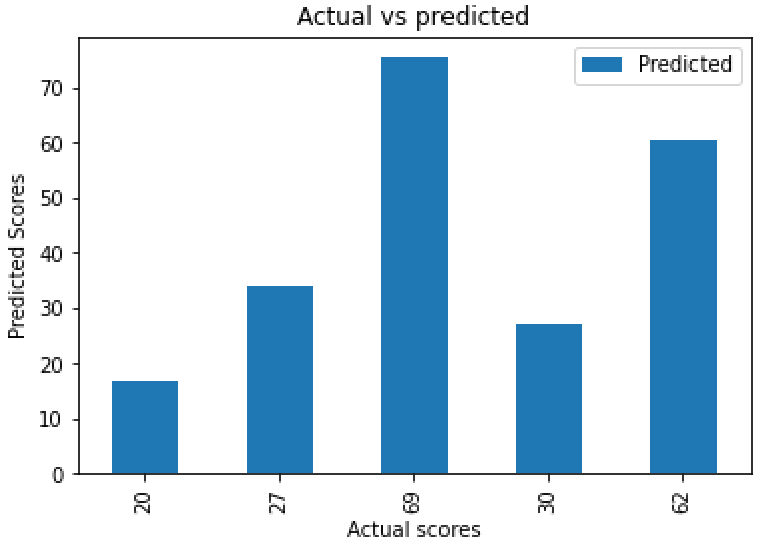
Out[63]:

	Actual	Predicted
0	20	16.884145

	Actual	Predicted
1	27	33.732261
2	69	75.357018
3	30	26.794801
4	62	60.491033

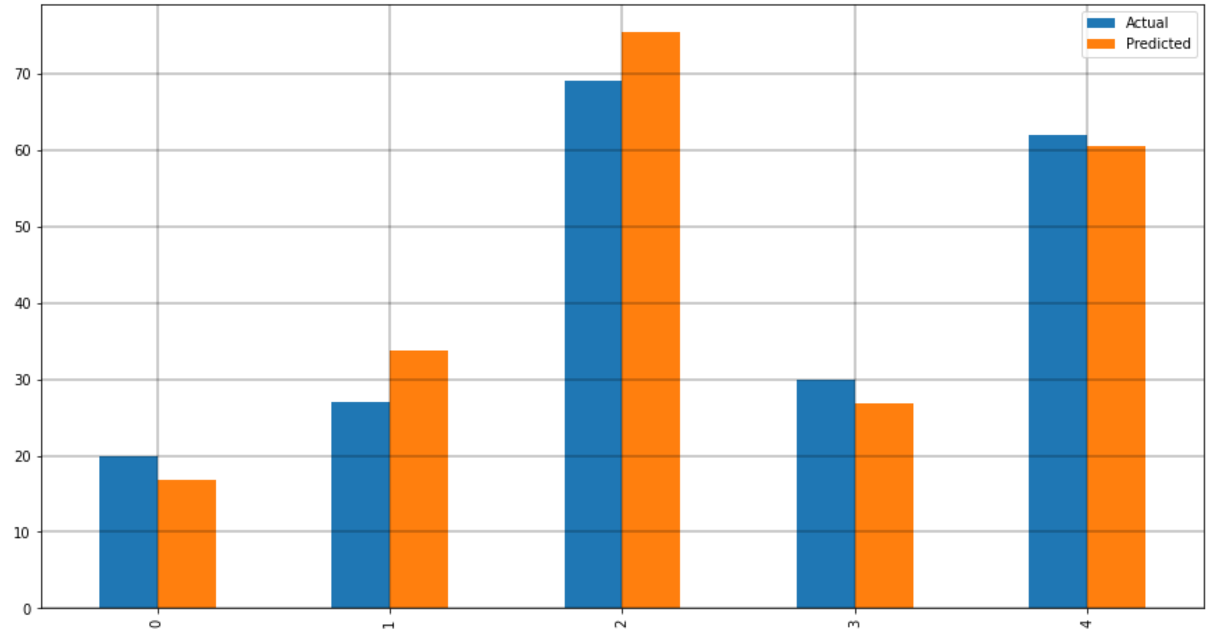
In [65]:

```
# Plotting the prediction with actual values
df.plot(x='Actual', y='Predicted',kind = 'bar')
plt.title('Actual vs predicted')
plt.xlabel('Actual scores')
plt.ylabel('Predicted Scores')
plt.show()
```



In [67]:

```
#visualising comparison result as a bar graph
df1 = df.head()
df1.plot(kind='bar',figsize=(15,8))
plt.grid(which='major', linestyle='-', linewidth='0.4', color='black')
plt.grid(which='minor', linestyle=':', linewidth='0.4', color='black')
plt.show()
```



```
In [56]: #testing with custom data
         hours = [[9.2]]
         own_pred = model.predict(hours)
         print("No of Hours = {}".format(hours))
         print("Predicted Score = {}".format(own_pred[0]))
         #final_prediction = model.predict(np.array([[9.25]]).reshape(1,1))[0]
         [0]
         #print("Predicted scores on 9.25 hours study:", final_prediction)
```

```
No of Hours = [[9.2]]
Predicted Score = 93.19619966334326
```

Model evaluation

```
In [ ]: Evaluating the model performance using the mean absolute error
```

In [51]:

```
from sklearn.metrics import mean_absolute_error
mae = mean_absolute_error(y_test, y_pred)
print('Mean absolute error :', mae)
```

```
Mean absolute error : 4.183859899002982
```