The Spark Foundation

Predict the percentage of an student based on the no. of study hours.

ML Algorithm = Simple Linear Regression

Problem To Be Solved = What will be predicted score if a student studies for 9.25 hrs/ day? ¶

In [1]:
```
#importing all the libraries.
import numpy as np
import matplotlib.pyplot as plt
import pandas as pd
import seaborn as sns
```

In [2]:
```
#importing and reaading the dataset
dataset = pd.read_csv("student_scores.csv")
```

In [3]:
```
#the first five values in the dataset
dataset.head()
```

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]:
```
#number of rows and columns
dataset.shape
```

Out[4]:
```
(25, 2)
```

In [5]:

```
dataset.describe()
```

Out[5]:

	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 [6]:

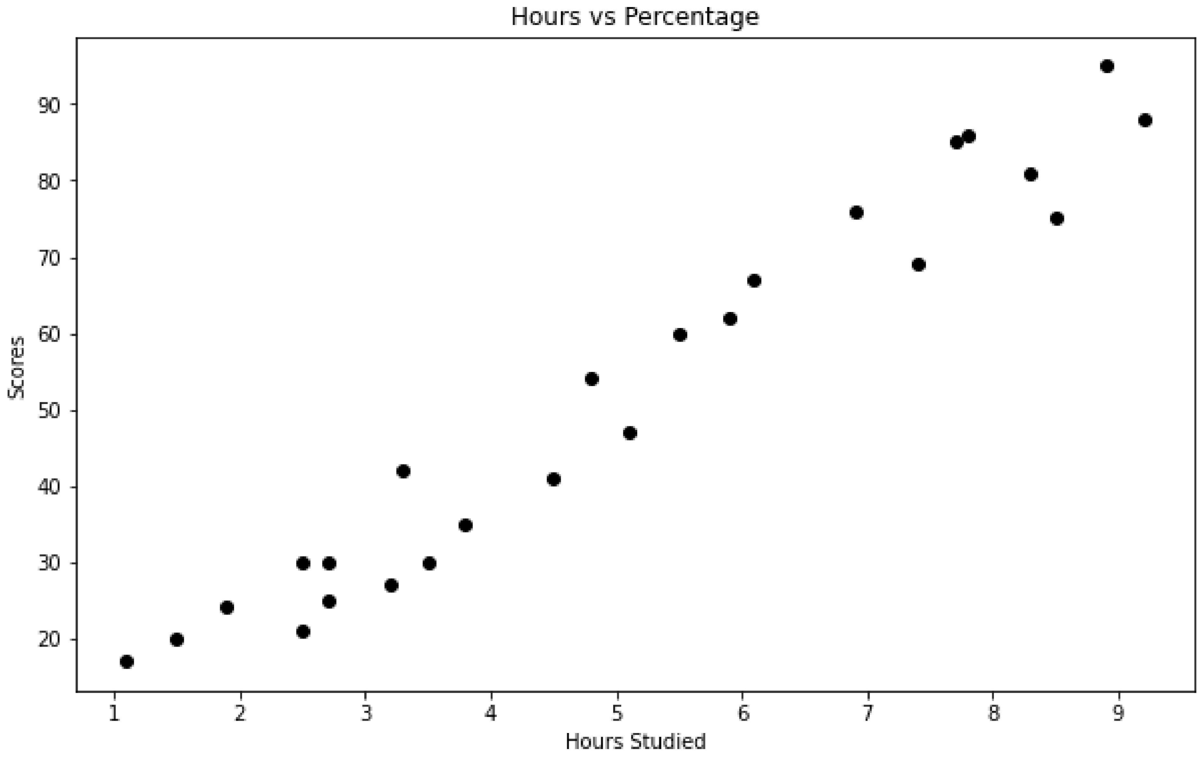
```
dataset.info()
```

```
<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
```

Visualization Of Data

In [7]:

```
#Hours Vs Percentage of Scores
plt.figure(figsize=(10,6))
plt.scatter(dataset['Hours'], dataset['Scores'], c='black')
plt.title('Hours vs Percentage')
plt.xlabel('Hours Studied')
plt.ylabel('Scores')
plt.show()
```

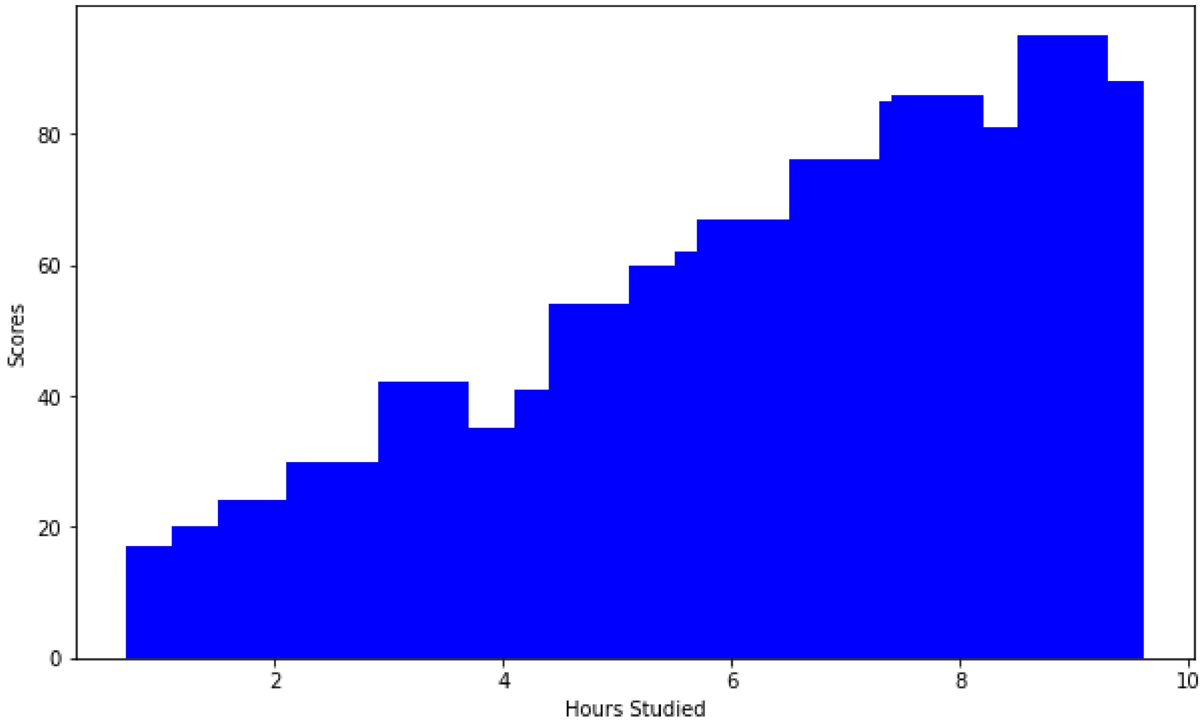


In [8]:

```
plt.figure(figsize=(10,6))
plt.bar(dataset['Hours'], dataset['Scores'], color='blue')
plt.xlabel('Hours Studied')
plt.ylabel('Scores')
```

Out[8]:

```
Text(0, 0.5, 'Scores')
```

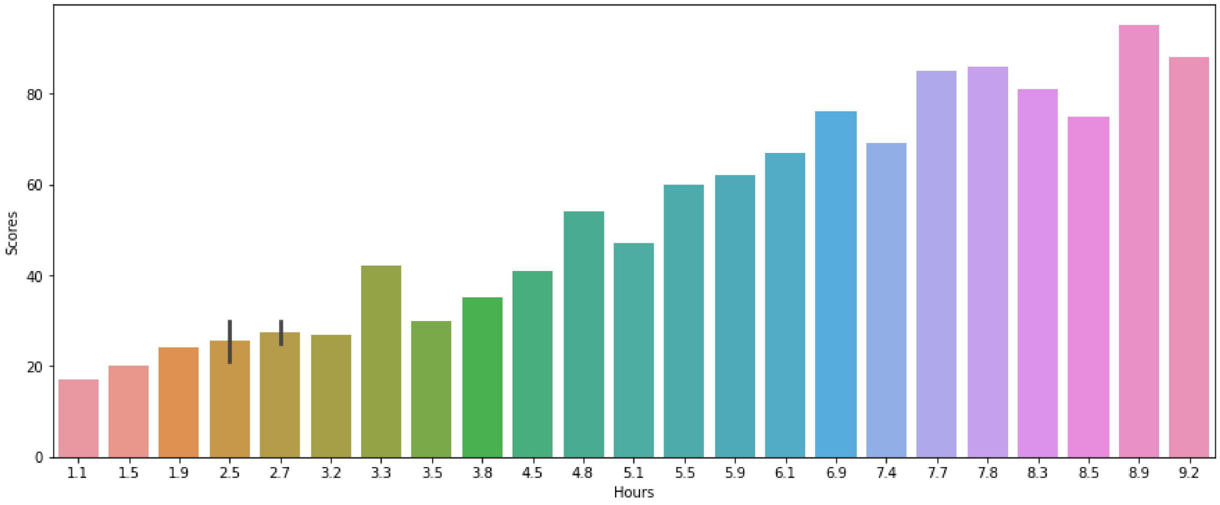


In [9]:

```
plt.figure(figsize=(15,6))
sns.barplot(x='Hours', y='Scores', data=dataset)
```

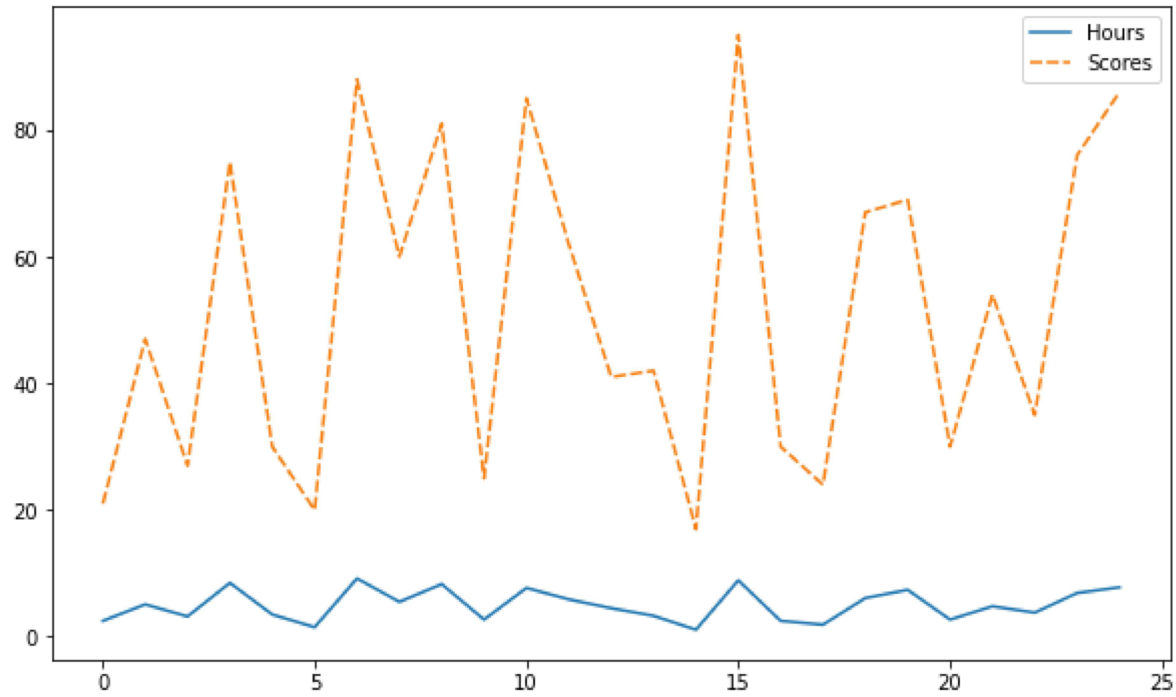
Out[9]:

```
<AxesSubplot:xlabel='Hours', ylabel='Scores'>
```



```
In [10]: plt.figure(figsize=(10,6))
         sns.lineplot(data=dataset)
```

```
Out[10]: <AxesSubplot:>
```



Train-Test separation of data

```
In [11]: #X will take all the values except for the last column which is our dependent var
         X = dataset.iloc[:, :-1].values
         y = dataset.iloc[:, -1].values
```

```
In [12]: from sklearn.model_selection import train_test_split
         X_train, X_test, y_train, y_test = train_test_split(X, y, test_size = 0.3, random
```

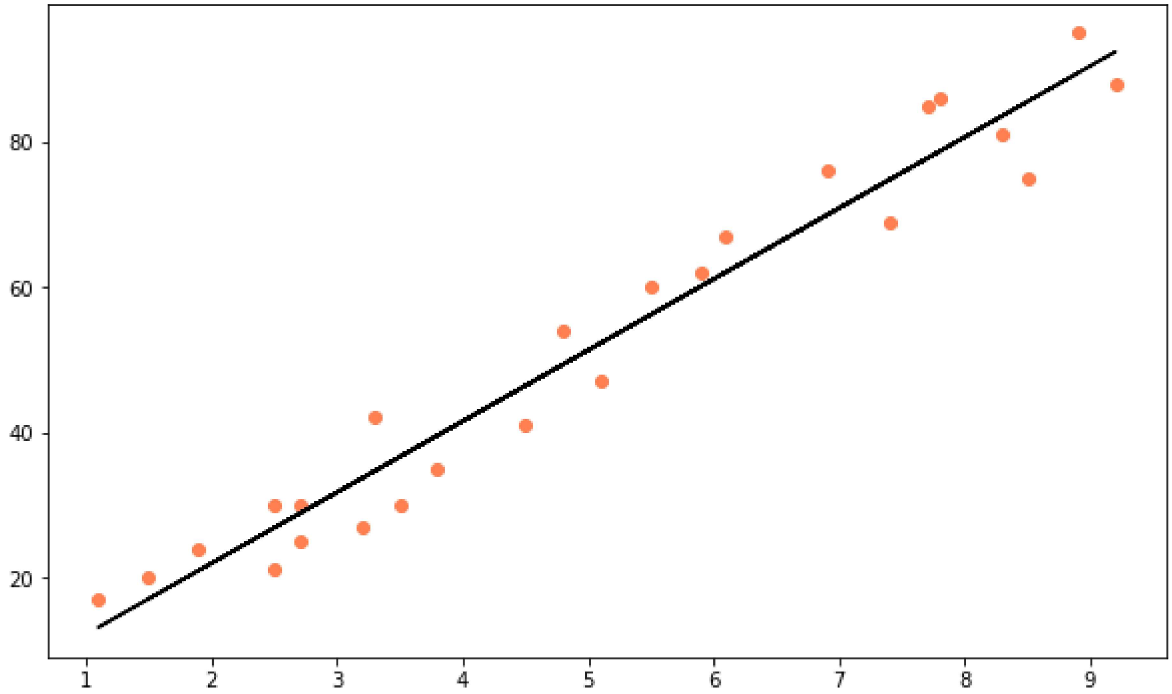
Training the Simple Linear Regression model on the Training set

```
In [13]: from sklearn.linear_model import LinearRegression
         regressor = LinearRegression()
         regressor.fit(X_train, y_train)
```

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

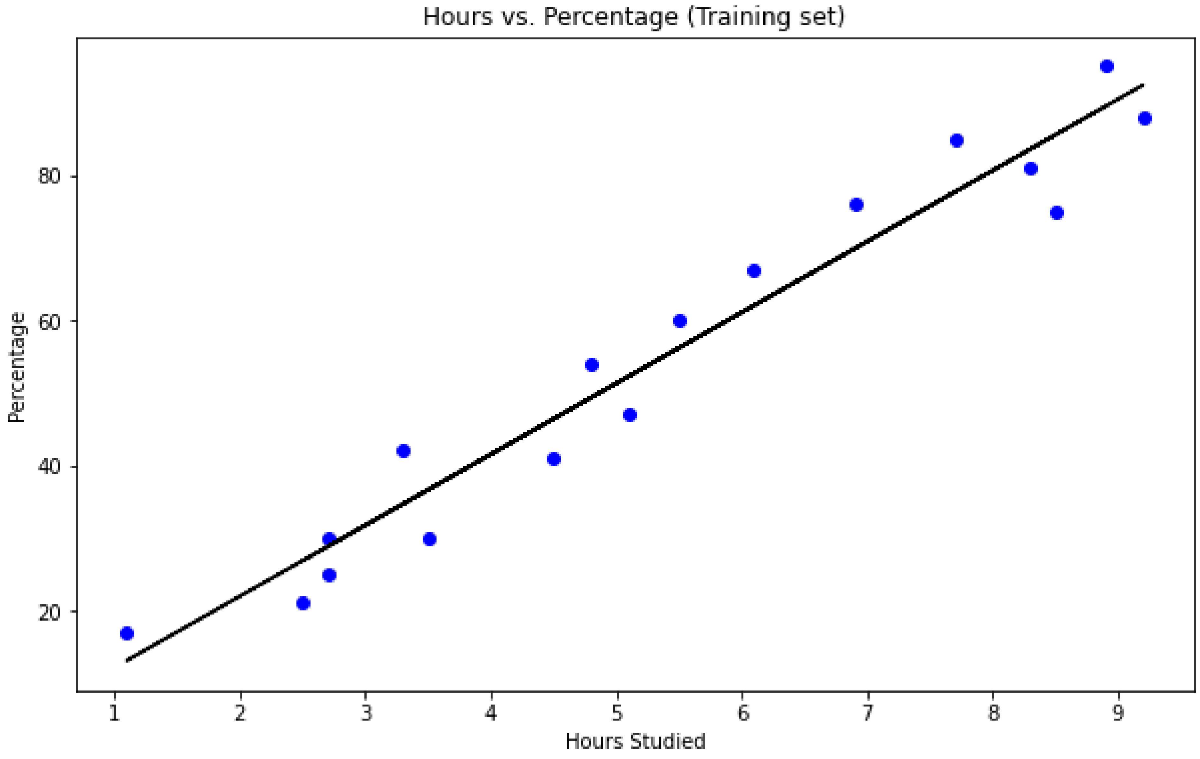
In [14]:
```
# Plotting the regression line
line = regressor.coef_*X+regressor.intercept_

# Plotting for the test data
plt.figure(figsize=(10,6))
plt.scatter(X, y, c='coral')
plt.plot(X, line,c = 'black');
plt.show()
```



In [15]:

```
#Visualising the Training set results
plt.figure(figsize=(10,6))
plt.scatter(X_train, y_train, c='blue')
plt.plot(X_train, regressor.predict(X_train), c='black')
plt.title('Hours vs. Percentage (Training set)')
plt.xlabel('Hours Studied')
plt.ylabel('Percentage')
plt.show()
```



In [16]:

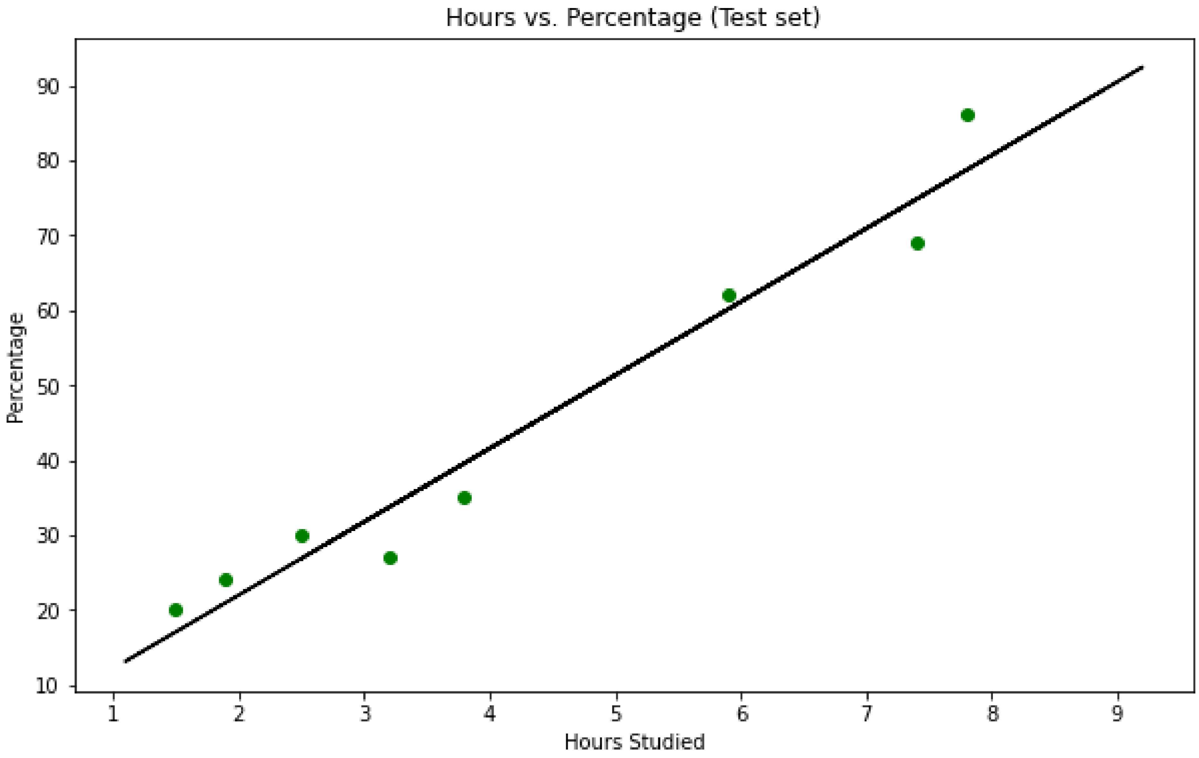
```
#Predicting the Test set results

y_pred = regressor.predict(X_test)
print(y_pred)
```

```
[17.05366541 33.69422878 74.80620886 26.8422321  60.12335883 39.56736879
 20.96909209 78.72163554]
```

In [17]:

```
#Visualising the Test set results
plt.figure(figsize=(10,6))
plt.scatter(X_test, y_test, color = 'green')
plt.plot(X_train, regressor.predict(X_train), color = 'black')
plt.title('Hours vs. Percentage (Test set)')
plt.xlabel('Hours Studied')
plt.ylabel('Percentage')
plt.show()
```



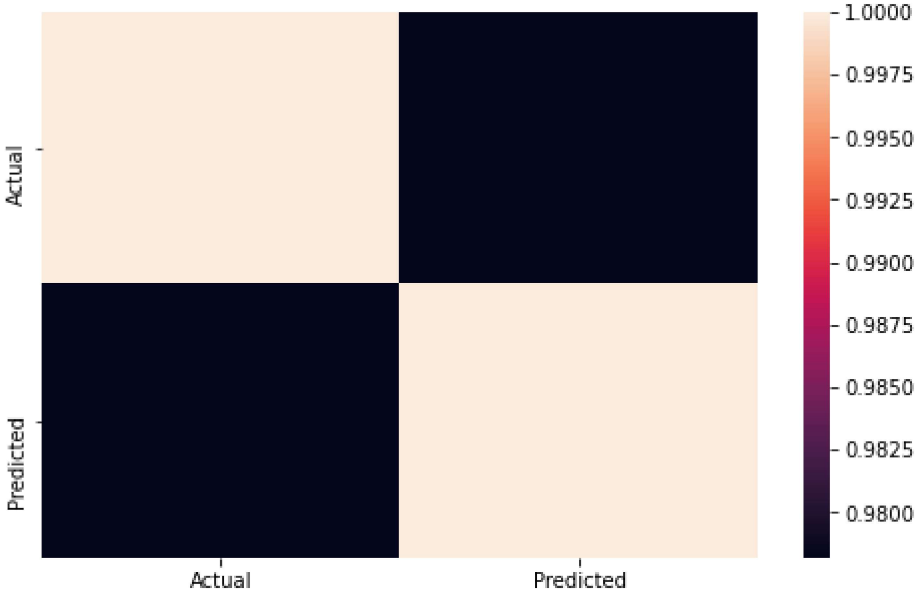
In [18]:
```
#Comparing the actual values with the predicted ones.
ds = pd.DataFrame({'Actual': y_test, 'Predicted': y_pred})
ds
```

Out[18]:

	Actual	Predicted
0	20	17.053665
1	27	33.694229
2	69	74.806209
3	30	26.842232
4	62	60.123359
5	35	39.567369
6	24	20.969092
7	86	78.721636

In [19]:
```
plt.figure(figsize=(8,5))
sns.heatmap(ds.corr())
```

Out[19]:
```
<AxesSubplot:>
```



Predicting the score if the student studies for 9.25 hours/day

In [20]:
```
dataset = np.array(9.25)
dataset = dataset.reshape(-1, 1)
pred = regressor.predict(dataset)
print("If the student studies for 9.25 hours/day, the score is {}.".format(pred))
```

```
If the student studies for 9.25 hours/day, the score is [92.91505723].
```

Check the predicting score if the student studies for 6 hours/day

In [21]:

```
dataset = np.array(6)
dataset = dataset.reshape(-1, 1)
pred = regressor.predict(dataset)
print("If the student studies for 6 hours/day, the score is {}.".format(pred))
```

```
If the student studies for 6 hours/day, the score is [61.1022155].
```

Conclusion:

We used a Linear Regression Model to predict the score of a student if he/she studies for 9.25 hours/day and the Predicted Score came out to be 92.91.