```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression


# Read the data
df_regression = pd.read_csv("/content/sample_data/KingKohli.csv")
print("Data imported successfully")
df_regression.head(10)
```

```
Data imported successfully
```

	Score	Out/Not Out	Against	Batting Order	Inn.	Strike Rate	Venue	Column1	H/A	
0	116	Out	Australia	6	2	NaN	Adelaide Oval	Adelaide	Away	
1	103	Out	New Zealand	5	2	NaN	M. Chinnaswamy Stadium	Bangalore	Home	
2	103	Out	England	5	2	NaN	Vidarbha Cricket Association Stadium	Nagpur	Home	
3	107	Out	Australia	5	2	NaN	M. A. Chidambaram Stadium	Chennai	Home	
4	119	Out	South Africa	4	1	NaN	Wanderers Stadium	Johannesburg	Away	
5	105	Not Out	New Zealand	4	4	NaN	Basin Reserve	Wellington	Away	
6	115	Out	Australia	4	2	NaN	Adelaide Oval	Adelaide	Away	
7	141	Out	Australia	4	4	NaN	Adelaide Oval	Adelaide	Away	
8	169	Out	Australia	4	2	NaN	Melbourne Cricket Ground	Melbourne	Away	
							Sydney			

Next steps: View recommended plots

```
df_regression.shape
```

```
(71, 15)
```

```
df_regression.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 71 entries, 0 to 70
Data columns (total 15 columns):
 #   Column            Non-Null Count  Dtype
---  ------            --------------  -----
 0   Score             71 non-null     int64
 1   Out/Not Out       71 non-null     object
 2   Against           71 non-null     object
 3   Batting Order     71 non-null     int64
 4   Inn.              71 non-null     int64
 5   Strike Rate       44 non-null     float64
 6   Venue             71 non-null     object
 7   Column1           71 non-null     object
 8   H/A               71 non-null     object
 9   Date              71 non-null     object
 10  Result            71 non-null     object
 11  Format            71 non-null     object
 12  Man of the Match  71 non-null     object
 13  Captain           71 non-null     object
 14  Unnamed: 14       0 non-null      float64
dtypes: float64(2), int64(3), object(10)
```

```
memory usage: 8.4+ KB
```

```
df_regression.columns
```

```
Index(['Score', 'Out/Not Out', 'Against', 'Batting Order', 'Inn.',
       'Strike Rate', 'Venue', 'Column1', 'H/A', 'Date', 'Result', 'Format',
       'Man of the Match', 'Captain', 'Unnamed: 14'],
      dtype='object')
```

```
df_regression.describe()
```

	Score	Batting Order	Inn.	Strike Rate	Unnamed: 14
count	71.000000	71.000000	71.000000	44.000000	0.0
mean	132.140845	3.521127	1.732394	114.019545	NaN
std	35.911119	0.714326	0.675230	25.257567	NaN
min	100.000000	1.000000	1.000000	84.900000	NaN
25%	107.000000	3.000000	1.000000	96.632500	NaN
50%	119.000000	3.000000	2.000000	108.935000	NaN
75%	139.500000	4.000000	2.000000	120.787500	NaN
max	254.000000	6.000000	4.000000	200.000000	NaN

```
#count na values under entire dataframe
df_regression.isna().sum()
```

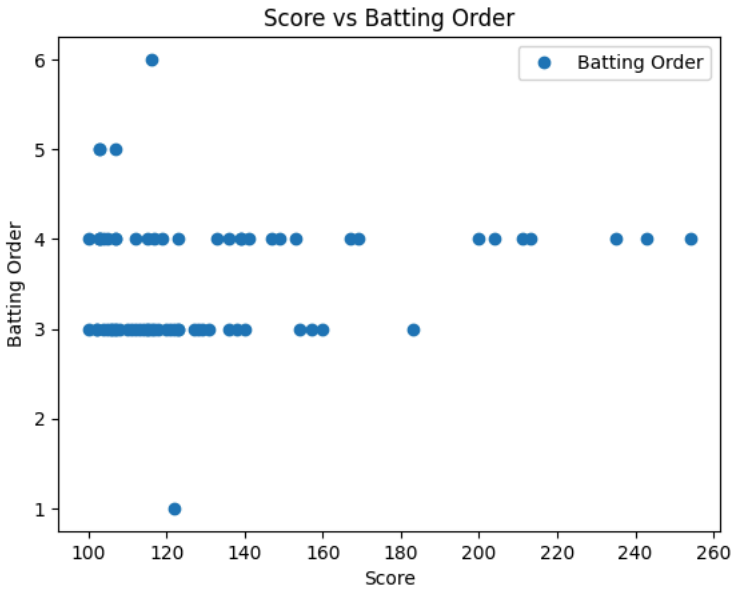
```
Score               0
Out/Not Out         0
Against             0
Batting Order       0
Inn.                0
Strike Rate        27
Venue               0
Column1             0
H/A                 0
Date                0
Result              0
Format              0
Man of the Match    0
Captain             0
Unnamed: 14        71
dtype: int64
```

```
# Select relevant columns for regression
df_regression = df_regression[['Score', 'Batting Order']]
```

```
#Finding correlation of Dependent & Independent Variables
df_regression.corr()
```

	Score	Batting Order
Score	1.000000	0.162497
Batting Order	0.162497	1.000000

```
# Plot the data
df_regression.plot(x="Score", y="Batting Order", style='o')
plt.title("Score vs Batting Order")
plt.xlabel("Score")
plt.ylabel("Batting Order")
plt.show()
```



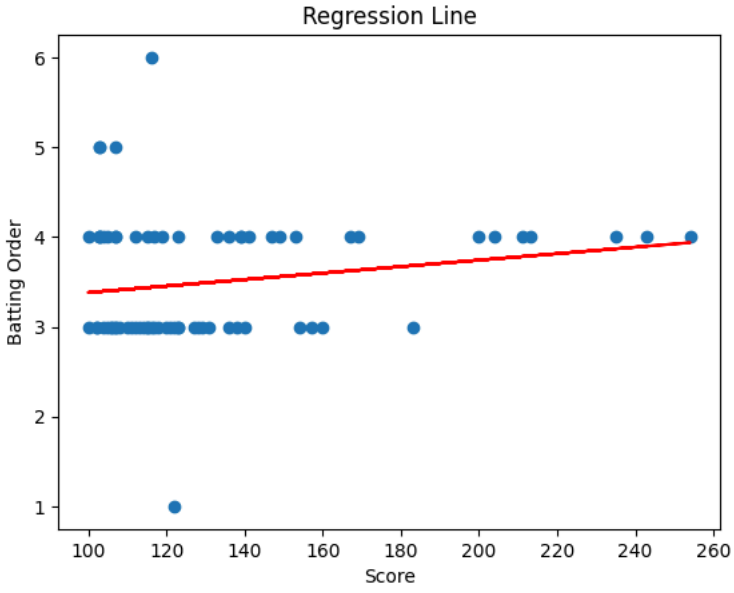

```
# Extracting features and target variable
X = df_regression[['Score']].values
y = df_regression['Batting Order'].values


# Splitting the data
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2)


# Creating and fitting the model
regressor = LinearRegression()
regressor.fit(X_train, y_train)
print("Training Complete")
```

```
Training Complete
```

```
# Plotting the regression line
plt.scatter(X, y)
plt.plot(X, regressor.predict(X), color='red')
plt.title("Regression Line")
plt.xlabel("Score")
plt.ylabel("Batting Order")
plt.show()
```




```
# Predicting on test set
y_pred = regressor.predict(X_test)
```

```
# Comparing actual vs predicted scores
df_results = pd.DataFrame({'Actual': y_test, 'Predicted': y_pred})
print(df_results)
```

```
    Actual  Predicted
0        3   3.587212
1        4   3.868558
2        3   3.457360
3        3   3.453753
4        4   3.392434
5        3   3.388827
6        5   3.392434
7        3   3.388827
8        3   3.442932
9        4   3.406862
10       3   3.417683
11       4   3.529500
12       4   3.450146
13       4   3.392434
14       4   3.756741
```

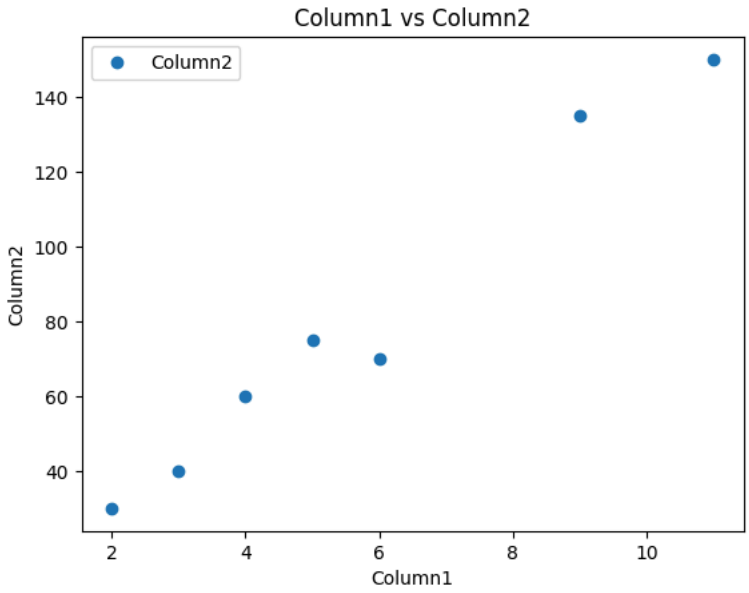
```
regressor.score(X_train, y_train)
```

```
0.029336945966426997
```

```
# Evaluating the model
print("Train Score:", regressor.score(X_train, y_train))
print("Test Score:", regressor.score(X_test, y_test))
```

```
Train Score: 0.029336945966426997
Test Score: -0.019182854684864914
```

```
import pandas as pd
x=[2,4,6,11,9,3,5]
y=[30,60,70,150,135,40,75]
df=pd.DataFrame({'Column1':x,'Column2':y})
df.plot(x="Column1", y="Column2", style='o')
plt.title("Column1 vs Column2")
plt.xlabel("Column1")
plt.ylabel("Column2")
plt.show()
```



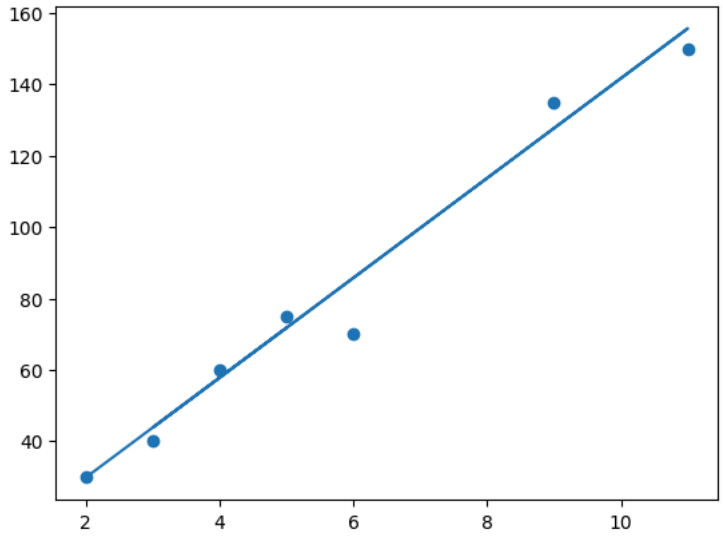

```
x_regression = df.iloc[:,:-1].values
y_regression = df.iloc[:,1].values
```

```
#Splitting the data
from sklearn.model_selection import train_test_split
X_train, X_test, y_train, y_test = train_test_split(x_regression, y_regression,test_size=0.2)
from sklearn.linear_model import LinearRegression
regressor = LinearRegression()
```

```
regressor.fit(X_train, y_train)
print("Training Complete")
```

```
Training Complete
```

```
#Plotting the regression line y=mx+c
line = regressor.coef_*x_regression + regressor.intercept_
#plotting fot the test data
plt.scatter(x_regression, y_regression)
plt.plot(x_regression, line)
plt.show()
```




```
print(X_test) #testing data in hours
y_pred = regressor.predict(X_test)
```

```
[[6]
 [5]]
```

```
#Comparing actual vs predicted scores
df = pd.DataFrame({'Actual':y_test, 'Predicted':y_pred})
df
```

	Actual	Predicted
0	70	85.796178
1	75	71.815287

Next steps: View recommended plots

```
regressor.score(X_train, y_train)
```

```
0.991536585616826
```

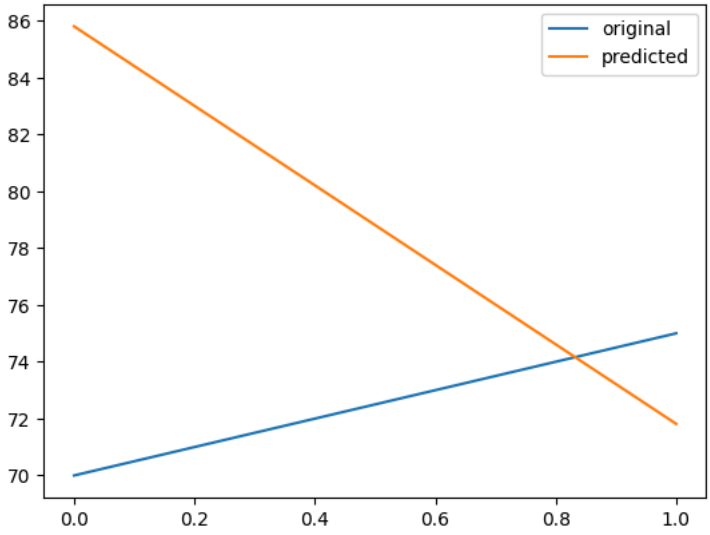
```
#Calculate Error in Model
from sklearn import metrics
print("Mean Absolute Error: ",metrics.mean_absolute_error(y_test,y_pred))
```

```
Mean Absolute Error:  9.490445859872615
```

```
print('r2 score',metrics.r2_score(y_test,y_pred))
x_axis = range(len(y_test))
x_axis
range(0, 2)
```

```
r2 score -19.772931964785606
range(0, 2)
```

```
#Plotting the values to visualize how well our model works
plt.plot(x_axis,y_test, label='original')
plt.plot(x_axis,y_pred,label='predicted')
plt.legend()
plt.show()
```



Further practical is performed on another data set so make sure to add the new dataset mydata.csv in sample_data folder.

```
import pandas as pd

# Create DataFrame with the provided data
data = {
    'ID': [101, 102, 103, 104, 105, 106, 107, 108, 109, 110],
    'Name': ['Adam', 'Steve', 'Josh', 'Joe', 'Johny', 'Marnus', 'Maxwell', 'Kane', 'Chrish', 'David'],
    'Gender': ['M', 'F', 'M', 'F', 'M', 'M', 'M', 'M', 'M', 'M'],
    'Salary': [21000, 28000, 26000, 25000, 19000, 31000, 37000, 15000, 18000, 24000],
    'Cost of Item': [15000, 16678, 23444, 16999, 21000, 84000, 69000, 12333, 15555, 11870],
    'Purchased': [0, 1, 0, 1, 0, 0, 0, 0, 0, 1]
}

df = pd.DataFrame(data)

# Save DataFrame to CSV file
df.to_csv('/content/sample_data/MyData.csv', index=False)
print(df)
```

```
   ID     Name Gender  Salary  Cost of Item  Purchased
0  101     Adam      M   21000         15000          0
1  102    Steve      F   28000         16678          1
2  103     Josh      M   26000         23444          0
3  104      Joe      F   25000         16999          1
4  105    Johny      M   19000         21000          0
5  106   Marnus      M   31000         84000          0
6  107  Maxwell      M   37000         69000          0
7  108     Kane      M   15000         12333          0
8  109   Chrish      M   18000         15555          0
9  110    David      M   24000         11870          1
```

Creating inputs and output(target) and splitting the inputs and targets into trianing and testing set

```
from sklearn.model_selection import train_test_split

X = df[['Salary', 'Cost of Item']].values
Y = df[['Purchased']].values

x_train, x_test, y_train, y_test = train_test_split(X, Y, test_size=0.25, random_state=0)
```

Performing feature scaling to get acurate result of the prediction

```
from sklearn.preprocessing import StandardScaler
```

Fitting the training sets of x_train and y_traininto logistic regression model

```
x_test=st_x.fit_transform(x_test)
```

```
from sklearn.linear_model import LogisticRegression
lm=LogisticRegression(random_state=0)
lm.fit(x_train,y_train)
```

```
/usr/local/lib/python3.10/dist-packages/sklearn/utils/validation.py:1143: DataConver
  y = column_or_1d(y, warn=True)
```

LogisticRegression
LogisticRegression(random_state=0)

```
LogisticRegression(random_state=0)
```

LogisticRegression
LogisticRegression(random_state=0)

Predicting the logistic regression model

```
y_pred=lm.predict(x_test)
print(y_pred)
```

```
[0 1 0]
```

Printing the accuracy and confusion Matrix

```
from sklearn.metrics import confusion_matrix as cm, accuracy_score
print(accuracy_score(y_test,y_pred))
df_cm=cm(y_test,y_pred)
print(df_cm)
```

```
0.6666666666666666
[[2 1]
 [0 0]]
```

```
import seaborn as sn
import matplotlib.pyplot as plt
plt.figure(figsize=(5,3))
sn.heatmap(df_cm,annot=True)
```

```
<Axes: >
```