Ex. No.: 7 Write a program for Multiple Regression

AIM:

To write a Python program to calculate the Multiple Regression by using the given csv files.

(i) Program (By using the given csv file):

```
import pandas as pd
from sklearn import linear_model
df=pd.read_csv("Book.csv", header=0, sep=",")
x=df[['Pulse','Maxpule']]
y=df['Duration']
regr=linear_model.LinearRegression()
regr.fit(x,y)
predicted_Duration=regr.predict([[110,130]])
print(predicted_Duration)
print(regr.coef_)
```

Output:

If Pulse is 110 and Maxpule is 130 then the predicted Duration is 51.14841052.

The regression coefficient is [0.08745016 0.00268539].

Scale Features:

When our data has different values and even different measurement units, it can be difficult to compare them. We can scale data into new values that are easier to compare. There are different methods for scaling data, here we use a method called standardization.

Program:

```
import pandas as pd
from sklearn import linear_model
from sklearn.preprocessing import StandardScaler
scale=StandardScaler()
```

```
df=pd.read_csv("Book.csv", header=0, sep=",")
x=df[['Pulse','Maxpule']]
y=df['Duration']
scaledx=scale.fit_transform(x)
regr=linear_model.LinearRegression()
regr.fit(scaledx,y)
scaled=scale.transform([[110,130]])
Duration_predicted=regr.predict([scaled[0]])
print(scaledx)
print(Duration_predicted)
```

Output:

The scaled value of Pulse and Maxpule are

```
[[-0.9727531  -0.39076967]
 [-0.89044323 -0.15966933]
 [-0.80813335 -0.46009977]
[ 1.08499385 -0.12500428]
[ 1.90809263 -0.21744441]
[ 0.26189507 -0.47165479]
 [-0.06734445 -0.47165479]
 [-1.71354201 -0.13655929]
[ 0.83806421 -0.44854475]
[ 0.09727531 -0.25210946]
[ 0.26189507  3.13351054]]
```

If Pulse is 110 and Maxpule is 130 then the predicted Duration is 51.14841052.