Implementation of Univariate Linear Regression

Aim:

To implement univariate Linear Regression to fit a straight line using least squares.

Equipment's required:

1. Hardware – PCs
2. Anaconda – Python 3.7 Installation / Moodle-Code Runner

Algorithm:

1. Get the independent variable X and dependent variable Y.
2. Calculate the mean of the X -values and the mean of the Y -values.
3. Find the slope m of the line of best fit using the formula.

$$m = \frac{\sum_{i=1}^{n}(x_i-\overline{X})(y_i-\overline{Y})}{\sum_{i=1}^{n}(x_i-\overline{X})^2}$$

4. Compute the y -intercept of the line by using the formula: $b = \overline{Y} - m\overline{X}$
5. Use the slope m and the y -intercept to form the equation of the line.
6. Obtain the straight line equation Y=mX+b and plot the scatterplot.

Program

```
'''
Program for Univariate linear regression using the least squares method.
Developed by: your name:Meiyaasi.V
RegisterNumber: 21005984
'''
```

```
import numpy as np
```

Preprocessing Input data

X = np.array(eval(input())) Y = np.array(eval(input()))

Building the model

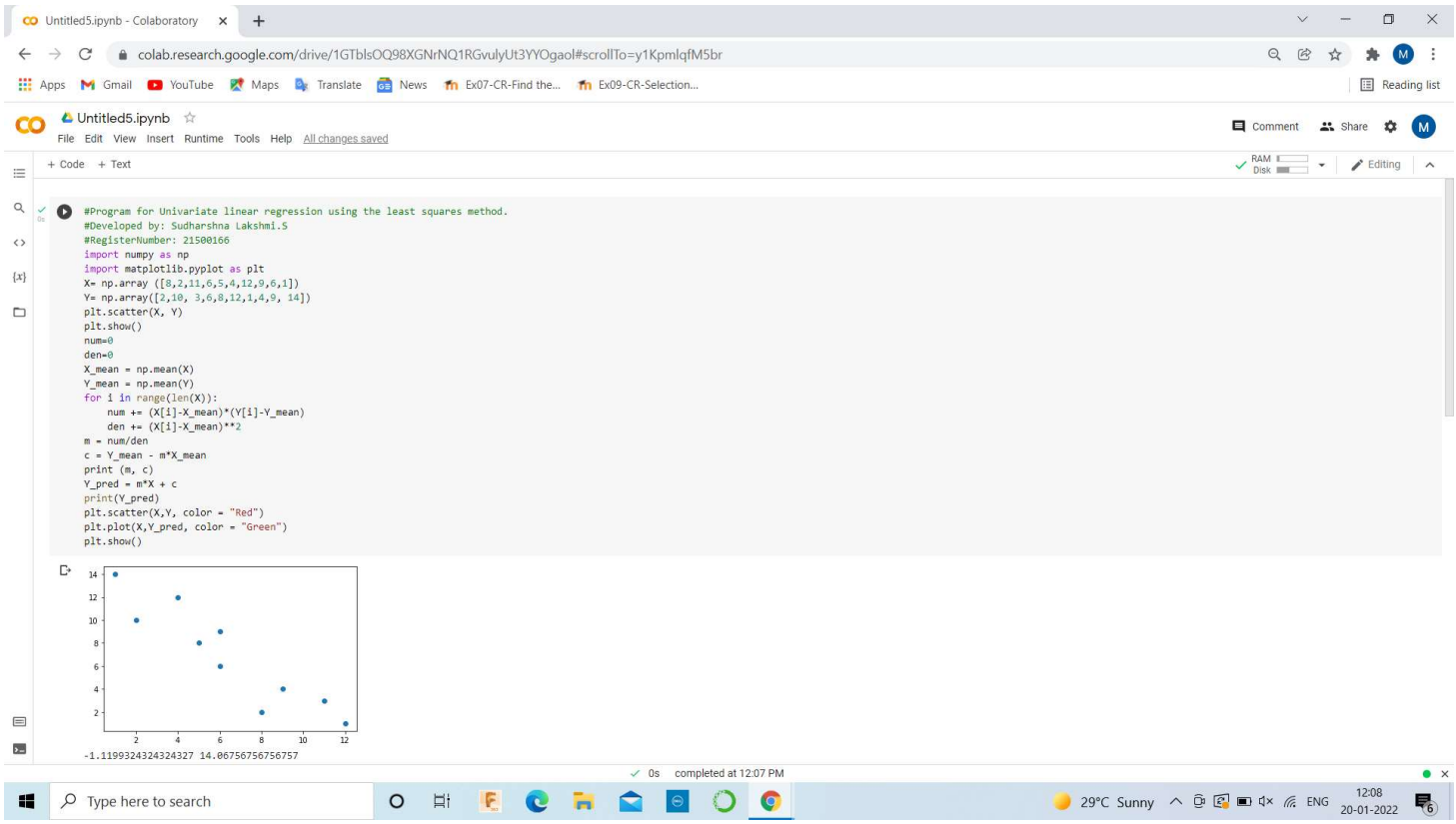
X_mean = np.mean(X) Y_mean = np.mean(Y) num = 0 den = 0 for i in range(len(X)): num += (X[i] - X_mean)*(Y[i] - Y_mean) den += (X[i] - X_mean)**2 m = num / den c = Y_mean - m*X_mean

write your code here

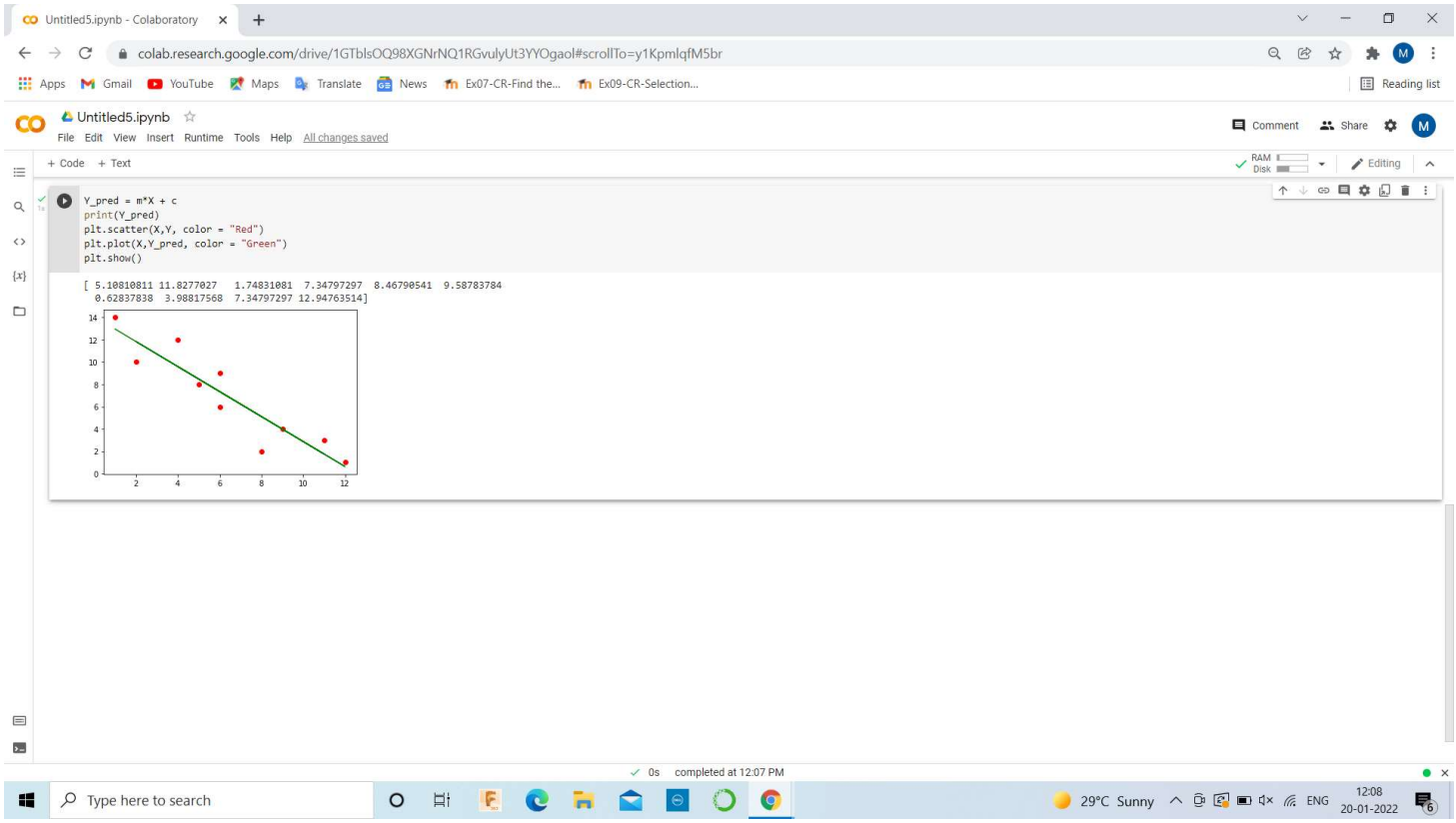
print (m, c) Y_pred = m*X + c

#Predict the output print (Y_pred)

Output



Output



Sample Input and Output

Input	Result
[0, 1, 2, 3, 4, 5, 6, 7, 8, 9] [1, 3, 2, 5, 7, 8, 8, 9, 10, 12]	1.1696969696969697 1.2363636363636363 [1.23636364 2.40606061 3.57575758 4.74545455 5.91515152 7.08484848 8.25454545 9.42424242 10.59393939 11.76363636]

Result

Thus the univariate Linear Regression was implemented to fit a straight line using least squares.