AIM:

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

Equipments Required:

1. Hardware – PCs
2. Anaconda – Python 3.7 Installation / Jupyter notebook

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.

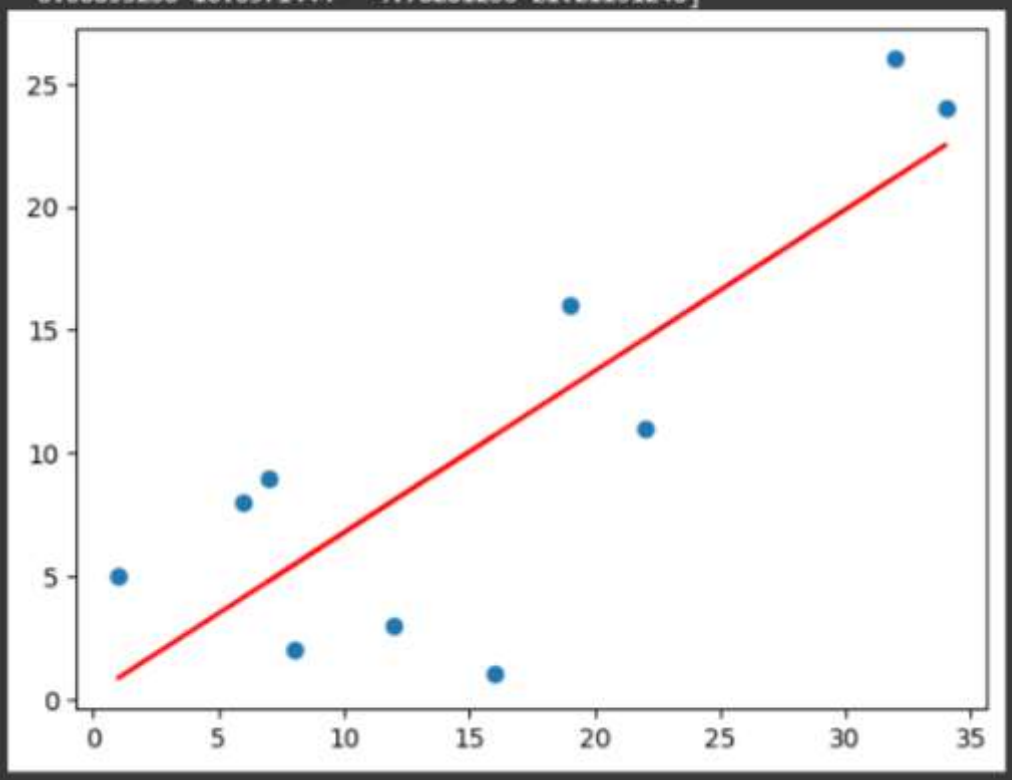
Program:

/* Program to implement univariate Linear Regression to fit a straight line using least squares.
Developed by: PREMJI P RegisterNumber: 212221043004 */

py import numpy as np import matplotlib.pyplot as plt X=np.array(eval(input())) Y=np.array(eval(input())) Xmean=np.mean(X) Ymean=np.mean(Y) num,den=0,0 # num = numerator, den = denomenator for i in range(len(X)): num+=(X[i]-Xmean)*(Y[i]-Ymean) den+=(X[i]-Xmean)**2 m=num/den c=Ymean-m*Xmean print(m,c) Y_pred=m*X+c print(Y_pred) plt.scatter(X,Y) plt.plot(X,Y_pred,color="red") plt.show()

Output:

```
22,34,19,1,6,8,12,16,7,32
11,24,16,5,8,2,3,1,9,26
0.6571480046842627 0.1827763264570752
[14.64003243 22.52580849 12.66858842  0.83992433  4.12566435  5.43996036
  8.06855238 10.6971444   4.78281236 21.21151248]
```



Result:

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