

Program no :7

Aim : Program to implement linear regression techniques using any standard dataset available in the public domain and evaluate its performance(without using inbuilt function)

Program

```
import numpy as np
import matplotlib.pyplot as plt

def estimate_coef(x, y):
    # number of observations/points
    n = np.size(x)

    # mean of x and y vector
    m_x = np.mean(x)
    m_y = np.mean(y)

    # calculating cross-deviation and deviation about x
    SS_xy = np.sum(y*x) - n*m_y*m_x
    SS_xx = np.sum(x*x) - n*m_x*m_x

    # calculating regression coefficients
    b_1 = SS_xy / SS_xx
    b_0 = m_y - b_1*m_x

    return (b_0, b_1)

def plot_regression_line(x, y, b):
    # plotting the actual points as scatter plot
    plt.scatter(x, y, color = "m",
               marker = "o", s = 30)
```

```

# predicted response vector
y_pred = b[0] + b[1]*x

# plotting the regression line
plt.plot(x, y_pred, color = "g")

# putting labels
plt.xlabel('x')
plt.ylabel('y')

# function to show plot
plt.show()

def main():
    # observations / data
    x = np.array([0, 1, 2, 3, 4, 5, 6, 7, 8, 9])
    y = np.array([1, 3, 2, 5, 7, 8, 8, 9, 10, 12])

    # estimating coefficients
    b = estimate_coef(x, y)
    print("Estimated coefficients:\nb_0 = {} \
        \nb_1 = {}".format(b[0], b[1]))

    # plotting regression line
    plot_regression_line(x, y, b)

if __name__ == "__main__":
    main()

```

OUTPUT

```
linearregression x linearregressionwotbltin x  
C:\Users\mca\PycharmProjectspython\pythonproject-ML\venv\Scripts\python.exe C:/Users/mca/PycharmProjectspython/pythonPro  
Estimated coefficients:  
b_0 = 1.2363636363636363  
b_1 = 1.1696969696969697
```

Figure 1

