

# **MACHINE LEARNING LAB**

## **ASSIGNMENT-3**

**Tulasi Sai Tharun Peram**

**AP20110010801**

**CSE-L**

### **Exercise: 3**

### **Implement Linear Regression**

**B)** Write the Python Program and check with the manual results, whether they are same or not. if not why?

#### **PYTHON 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():
```

```
    a=list(map(int,input().split()))
```

```
    b=list(map(int,input().split()))
```

```
    # observations / data
```

```
    x = np.array(a)
```

```
    y = np.array(b)
```

```
    # estimating coefficients
```

```
    b = estimate_coef(x, y)
```

```
    print("Estimated coefficients:\nb_0 = {} \
```

```
\nb_1 = {}".format(b[0], b[1]))
```

```
# plotting regression line
```

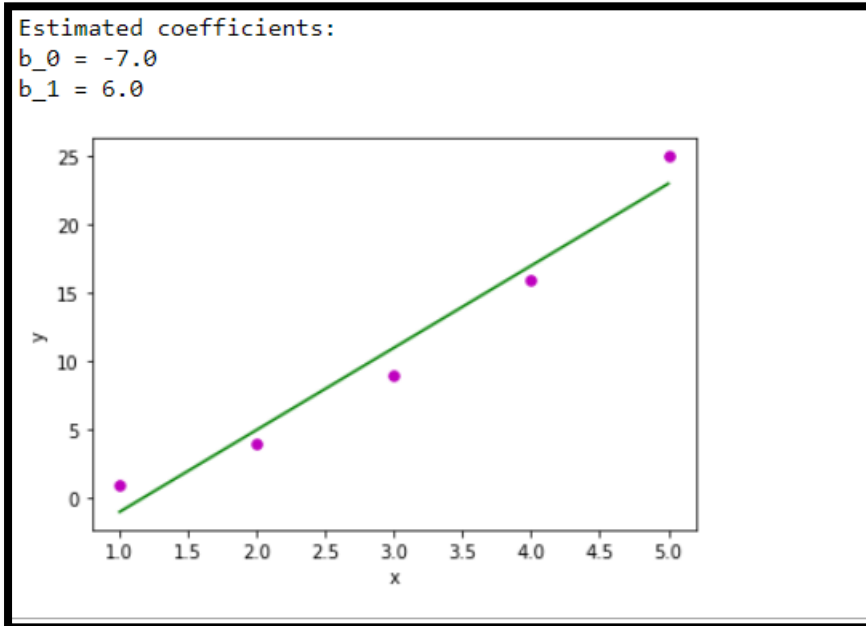
```
plot_regression_line(x, y, b)
```

```
if __name__ == "__main__":
```

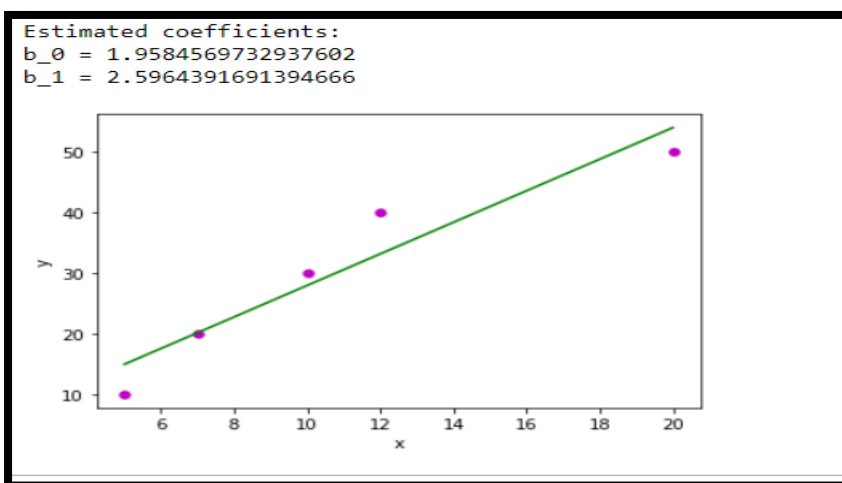
```
    main()
```

### **SCREENSHOT OF THE OUTPUT:**

**a.)**



**b.)**



**The values we have got in the output are the same as the manual result.**