Lab-2
Linear Regression

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Linear Regression

① $y = ax + c$

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

x = np.array([1, 2, 3, 4, 5])
y = np.array([1.2, 1.8, 2.6, 3.2, 3.8])

xb = np.

slope, intercept = np.polyfit(x, y, 1)

print("Intercept: {intercept, Slop}")

x_input = float(input("Enter value of x:"))
y_pred = slope * x_input + intercept
print("Predicted y: {y_pred}")
```

⟹

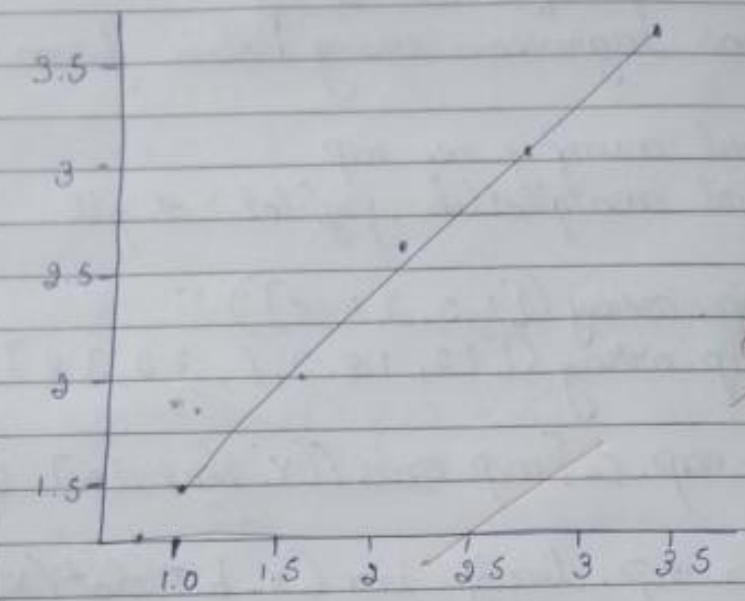
```
Intercept: 0.5400...
Slope: 0.659
Enter a value for x: 7
predicted y: 5.159//
```

Theta

$$\beta = [(X^T X)^{-1} X^T] y$$

=> Linear regression using Matrix form.

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

X = np.array([1,2,3,4,5])
y = np.array([1.2, 1.8, 2.6, 3.2, 3.8])

X_b = np.c_[np.ones((X.shape[0], 1)), X]

Theta = np.linalg.inv(X_b.T.dot(X_b)).
        dot(X_b.T).dot(y)

intercept, Slope = Theta

print(intercept);
print(Slope);

X_input = float(input("Enter a value of X"))
X_input_b = np.array([1, X_input])
y_pred = X_input_b.dot(Theta)
                    (np.7)
print("Predicted y for x =
      {X_input} : {y_pred}).
```

=> Intercept : 0.540
Slope : 0.66 [Theta 1]
Enter a value of x to predict y : 7
predicted y for X : 7.0 : 5.160

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