Linear Regression

weight	price
2	35
4	60
5	20
3	50
6	50
5	55
7	60

Task 01:

Your objective is to manually compute the slope (M) and y-intercept (C) using Ordinary Least Squares Linear Regression. Once determined, apply these values to predict the price when the vegetable weight is 6.

Task 02:

Compute the residuals for each data point.

Task 03:

Calculate both the Mean Squared Error (MSE) and Mean Absolute Error (MAE).

Final Task:

Generate an Excel file for the given dataset. Utilize Python for all the calculations.

Note: To validate your manual calculations, use the entire dataset. It's unnecessary to split the dataset.

Solution:

Here,

Mean of weight, x = (2+4+5+3+6+5+7)/7 = 4.571

Mean of price, y= (35+60+20+50+50+55+60)/7 = 47.143

$\sum(x-\overline{x})(y-\overline{y})$: 46.526

$\sum(x-\overline{x})^2$=17.714

Slope m=$\frac{\sum(x-\overline{x})(y-\overline{y})}{\sum(x-\overline{x})^2}$ = 46.526/17.714 =2.63

Intercept , c = $\overline{y}-m\overline{x} = 47.143 - 2.63 * 4.57$ =35.12127

Resident:

Weight,x	**Price,y**	**predicted**	**residual**
2	35	40.38	-5.38
4	60	45.64	15.358
5	20	48.27	-28.27
3	50	43.011	6.99
6	50	50.90	-0.09
5	55	48.27	6.73
7	60	53.53	6.47

MSE= 1/7*(($-5.38)^2$ + $(14.36)^2 + (-28.27)^2 + (6.99)^2 + (-0.99)^2 + (6.73)^2 + (6.47)^2$)

167.196

MAE= 1/7*68.29 =9.76