Assignment # 02

Question

In this Assignment you are required to create Linear Regression Classifier from Scratch using any programming language C++, C, Matlab or python.

X	Y
1	1
2	3
3	3
4	2
5	5
6	5

In Above Dataset X is your Feature and Y is your output values. You have to find a best fit Hypothesis for this particular dataset using Simple Linear Regression.

1. **At First make Your Theta values equal to zero and then update each theta using Gradient Descent Optimization Algorithm.**
2. **Compute The Hypothesis of Simple Linear Regression when both theta values are 0.**

$$h_\theta(x) = \theta_0 + \theta_1 x$$

1. **Compute the Cost Function for resultant Hypothesis when both theta(0) and theta(1) are equal to zero.**

$$J(\theta_0, \theta_1) = \frac{1}{2m} \sum_{i=1}^{m} (h_\theta(x^i) - y^i)^2$$

2. **Update the values of both theta(0) and theta(1) using Gradient Descent Optimization Algorithm and again compute the hypothesis. For Updation of values of theta, initialize two new temp variables. Compute the updated values of both theta's using Gradient Descent and store the result in Temp variables. When both theta values are computed then save the values from temp variable to actual theta's.**

$$J=0$$
$$\text{Theta\_0} = \theta_0 - \alpha \frac{\partial}{\partial \theta_0} J(\theta_0, \theta_1)$$

$$J=1$$
$$\text{Theta\_1} = \theta_1 - \alpha \frac{\partial}{\partial \theta_1} J(\theta_0, \theta_1)$$

$\theta_0 = \text{Theta\_0}$
$\theta_1 = \text{Theta\_1}$

3. **Repeat the process upto, nth iteration until you get the best fit Hypothesis.**
4. **At first keep the Learning Rate = 0.001 and check the classifier using different learning Rates.**
5. **Your Output should clearly show the values of theta at every iteration along with the error rate. If you are running your code for 10 iterations, your output must show the updated values of theta for each 10 iterations along with the error it got at every iteration.**
6. **You can Also show it graphically (Plus point).**

Submission Guidlines:

- **Assignment must be submitted in HARDFORM, with code and screenshots of YOUR OUTPUT.**
- **The Assignment should be Submitted in the class to the instructor on Deadline Date.**
- **No Assignment will be accepted after the class.**
- **NO VIVA NO MARKS.**
- **Don't Copy Assignment from your friend as it will be directly given Zero marks to both parties.**