ASSIGNMENT-5.

Data

X	Y
75.1	577.8
74.3	572
88.7	570.9

Iteration-1

$\eta = 0.1, m = 1, c = 1$

$$\frac{\partial \epsilon}{\partial m} = -\frac{1}{2}\left[\left(\left(y_{a_1} - mx_1 - c\right) * x_1\right) + \left(\left(y_{a_2} - mx_2 - c\right) * x_2\right) + \left(\left(y_{a_3} - mx_3 - c\right) * x_3\right)\right]$$

$$= -\frac{1}{2}\left[\left((577.8 - (1)(75.1) + 1) * 75.1\right) + \left((577 - (1)(74.3) + 1) * 74.3\right) + \left((570.9 - (1)(88.7) + 1) * 88.7\right)\right]$$

$$= -59056.31$$

$$\frac{\partial \epsilon}{\partial c} = -\frac{1}{2}\left[\left(y_{a_1} - mx_1 - c\right) + \left(y_{a_2} - mx_2 - c\right) + \left(Y_{a_3} - mx_3 * c\right)\right]$$

$$= -\frac{1}{2}\left[502.7 + 503.7 + 483.2\right]$$

$$= -745.3$$

$$\Delta m = -\eta \frac{\partial \epsilon}{\partial m} = -(0.1)(-59056.31) = 5905.631$$

$$\Delta c = -\eta \frac{\partial \epsilon}{\partial c} = -(0.1)(-745.3) = 74.53$$

$$m = 1 + \Delta m = 5906.631$$

$$c = -1 + \Delta c = 73.53$$

Iteration - 2

$m = 5906.631$, $c = 73.53$

$$\frac{\partial E}{\partial m} = -\frac{1}{2}\left[\left((577.8 - (5906.631)(75.1) - 73.53) * 75.1\right) + \left((577 - (5906.631)(74.3) - 73.53) * 74.3\right) + \left((570.9 - (5906.631)(88.7) - 73.53) * 88.7\right)\right]$$

$$= -\frac{1}{2}\left[-1122713085.855\right) =$$

$$= 50136542.928$$

$$\frac{\partial E}{\partial c} \Big| = -\frac{1}{2}\left[(577.8 - (5906.631)(75.1) - 73.53) + (577 - (5906.631)(74.3) - 73.53) + \left((570.9) - (5906.631)(88.7 - 73.59)\right)\right]$$

$$= -\frac{1}{2}\left[-1404863.731\right] = 702431.865$$

$$\Delta m = -(0.1)(50136542.928) = -5613654.293$$

$$\Delta c = -(0.1)(702431.865) = -70242.187$$

$$m = 5906.631 + (-5613654.293)$$

$$= -5607747.662$$

$$c = 73.53 - 70242.182$$

$$= -70169.652$$