Assignment - 4

sample	x	y
1	7.6	157
2	7.1	174

step1: Read dataset, $\eta = 0.01$, epochs = 0.01, $m = 1$, $c = -1$

step2: set iteration = 1

step3: set sample $i = 1$

step4: $Y = mx + c \Rightarrow 1(7.6) - 1 = 6.6$

step5: $E = \frac{1}{2}(y_i^a - mx_i^a - c)^2$

$= \frac{1}{2}(157 - 6.6)^2 = 11310.08$

step6: $\frac{\partial E}{\partial m} = -(y_i^a - mx_i^a - c)x_i^a = -(157 - 6.6)7.6$

$= -1143.04$

$\frac{\partial E}{\partial c} = -(y_i^a - mx_i^a - c) = -(157 - 6.6) = -150.4$

step7: $\Delta m = -\eta\left(\frac{\partial E}{\partial m}\right) = -(0.01)(-1143.04) = 11.4304$

$\Delta c = -\eta\left(\frac{\partial E}{\partial c}\right) = -(0.01)(-15.04) = 1.504$

step8: $m = m + \Delta m = 1 + 11.4304 = 12.4304$.

$c = c + \Delta c = -1 + 1.504 = 0.504$

step9: sample $i = 1 + 1 = 2$ $\quad i \leq n_s$ $\quad 2 \leq 2$ $\quad$ True $\longrightarrow$ step 4

step 4: $Y = (12.4304)7.1 + 0.504$

$= 88.7598$

step 5: $E = \frac{1}{2}(174 - 88.75)^2 = 3633.78$

step 6: $\frac{\partial E}{\partial m} = -(174 - 88.75)(7.1) = -605.275$

$\frac{\partial E}{\partial c} = -(174 - 88.75) = -85.25$

step 7: $\Delta m = -\eta \frac{\partial E}{\partial m} = -(0.01)(-605.275)$

$= 6.05$

$\Delta c = -\eta \frac{\partial E}{\partial c} = -(0.01)(-85.25)$

$= 0.85$

step 8: $m = m + \Delta m = 12.4304 + 6.05$

$= 18.48$

$c = c + \Delta c = 0.504 + 0.85$

$= 1.354$

step 9: sample $= 1 = 1 + 1 = 2 + 1 = 3$. $1 < n_s$ (3, 2) False

↓ next step

step 10: iter $=$ iter $+ 1 = 1 + 1 = 2$ iter (2) > epochs True

↓ next step

Step 11: Stop