Assignment-7

1) $[x, y]$, $m=1$, $c=-1$, $\eta=0.1$, epochs $=2$, $ns=2$

2) $it=1$

X	Y
0.2	3.4
0.4	3.8
0.6	4.2
0.8	4.6

3) $\frac{\partial E}{\partial m} = -\frac{1}{ns}\sum_{i=1}^{ns}(y_i - mx_i - c)x_i$

$= -\frac{1}{2}\left[(3.4 - 1(0.2)+1)(0.2) + (3.8 - 1(0.4)+1)(0.4)\right]$

$= -\frac{1}{2}\left[+0.84 + (1.76)\right] = -1.3$

$\frac{\partial E}{\partial c} = -\frac{1}{2}\left[(3.4 - 1(0.2)+1) + (3.8 - 1(0.4)+1)\right]$

$= -\frac{1}{2}\left[4.2 + 4.4\right] = -4.3$

4) $\Delta m = -\eta\frac{\partial E}{\partial m} = -0.1(-1.3) = 0.13$

$\Delta c = -\eta\frac{\partial E}{\partial c} = -0.1(-4.3) = 0.43$

5) $m = m + \Delta m = 1 + 0.13 = 1.13$

$c = c + \Delta c = -1 + 0.43 = -0.57$

6) $it = it + 1 = 1 + 1 = 2$.

7) $it < (2 \times 2)$ ✓

↳ 3) $\frac{\partial E}{\partial m} = -\frac{1}{2}\left[(3.4 - 1.13(0.2) + 0.57)(0.2) + (3.8 - 1.13(0.4) + 0.57)(0.4)\right]$

$= -\frac{1}{2}\left[3.744 \times 0.2 + 3.916 \times 0.4\right]$

$= -\frac{1}{2}(0.7488 + 1.5664)$

$= -\frac{1}{2}(2.3128)$

$= -1.1564$

$\frac{\partial E}{\partial c} = -\frac{1}{2}[3.4 - 1.13(0.2) + 0.57 + 3.8 - 1.13(0.4) + 0.57]$

$= -\frac{1}{2}[3.744 + 3.916]$

$= -\frac{1}{2}(7.662)$

$= -3.831$

4) $\Delta m = -\eta \frac{\partial E}{\partial c} = -0.1(-1.564) = 0.1156$

$\Delta c = -\eta \frac{\partial E}{\partial c} = -0.1(-3.831) = 0.3831$

5) $m = m + \Delta m = 0.13 + 0.1156 = 1.2456$

$c = c + \Delta c = -0.57 + 0.3831 = -0.1869$

6) $t = 2 + 1 = 3$

7) if $(3 > 2)$ ~

8) $m = 1.0182$, $c = -0.9331$