Assignment 2

Find global minimum point and value for function $f(x,y) = x^2+y^2+10$

→ Do manual calculations for 2 iterations

step1: $x=-1$ $y=+1$ $\eta=0.1$ epoches $=2$

step2: iter $=1$

step3: $\frac{\partial f}{\partial x} = 2x = -2$

$\frac{\partial f}{\partial y} = 2y = 2$

step4: $dx = -\eta \partial f/dx = -2(0.1)$

$= 0.2$

$\Delta y = -\eta \frac{df}{dy} = -(0.1)(2)$

$= -0.2$

step5:

$x = x + \Delta x = -1 + 0.2 = -0.8$

$y = y + \Delta y = 1 - 0.2 = 0.8$

step6: iter $=$ iter $+1 = 1+1 = 2$

step7: if (iter > epochs)

goto step8

else

goto step3

step8:

$df/dx = 2x = 2(-0.8) = -1.6$

$df/dy = 2y = 2(0.8) = 1.6$

step 4: $\Delta x = -\eta \frac{\partial f}{\partial x}$

$= -(0.1)(-1.6) = 0.16$

$\Delta y = -\eta \frac{\partial f}{\partial y}$

$= -(0.1)(1.6) = -0.16$

step 5: $x = x + \Delta x$

$= -0.8 + 0.16 \Rightarrow -0.64$

$y = y + \Delta y$

$= 0.8 - 0.16 \Rightarrow 0.64$

step 6: $itr = itr + 1 = 2 + 1 = 3$

step 7: if (itr > epochs)

$3 > 2$

goto step8

else : goto step3

step 8: $x = -0.64$

$y = 0.64$

$f(x, y) = x^2 + y^2 + 10$

$= (-0.64)^2 + (0.64)^2 + 10$

$= 0.4 + 0.4 + 10$

$= 10.8$