Assignment 2:-

Find the global minimum point and value for the function

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

* Do manual calculations for two iterations.

step1:- $x=-1, y=1, \eta=0.1$, epochs $=2$

step2:- iter $=1$

step3:- $\left.\frac{\partial f}{\partial x}\right|_{x=-1} = 2x+0+0 = 2(-1) = -2$

$\left.\frac{\partial f}{\partial y}\right|_{y=1} = 0+2y+0 = 2(1) = 2$

step4:- $\Delta x = -\eta \frac{\partial f}{\partial x} = -(0.1)(-2) = 0.2$

$\Delta y = -\eta \frac{\partial f}{\partial y} = -(0.1)(2) = -0.2$

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)

$2 > 2$

false; goto step 3.

step3:- $\left.\frac{\partial f}{\partial x}\right|_{x=-0.8} = 2x = 2(-0.8) = -1.6$

$\left.\frac{\partial f}{\partial y}\right|_{x=0.8} = 2y = 2(0.8) = 1.6$

step4:- $\Delta x = -\eta \frac{\partial f}{\partial x} = -(0.1)(-1.6) = 0.16$

$\Delta y = -\eta \frac{\partial f}{\partial y} = -(0.1)(1.6) = -0.16$

step5: $x = x + \Delta x = -0.8 + 0.16 = -0.64$

$y = y + \Delta y = 0.8 - 0.16 = 0.64$

step6:- iter = iter + 1 = 2 + 1 = 3

step7:- if (iter > epochs)

3 > 2

True; goto step 8

step8:- print x & y values

$x = -0.64$

$y = 0.64$.

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

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

$f(x,y) = 10.81$