Assignment-2

- 18K41A0502

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

- Do manual calculations for two iterations
- find the optimal solution using python programming.

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

S-2: itr $=2$

S-3: $\frac{\partial f}{\partial x} = 2x = -2$

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

S-4: $dx = -\eta \frac{\partial f}{\partial x} = -2(-0.1)$

$= +0.2$

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

$= -0.2$

S-5: $x = x + \Delta x = -1 + 0.2 = -0.8$

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

S-6: itr $=$ itr $+1$

$= 1+1 = 2$

S-7: if (itr > epochs)

goto S-5

else

goto S-3

S-3: $\frac{\partial f}{\partial x} = 2x = 2(-0.8) = -1.6$

$\frac{\partial f}{\partial y} = 2y = 2(0.8) = 1.6$

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

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

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

$= -(0.1)(1.6)$

$= -0.16$

S-5: $x = x + \Delta x$

$= -0.8 + 0.16$

$= -0.64$

$y = y + \Delta y$

$= 0.8 - 0.16$

$= 0.64$

S-6: $itr = itr + 1$

$= 2 + 1 = 3$

S-7: if (itr > epochs)

$3 > 2$

goto S-8

else

goto S-3

S-8: $x = -0.64$

$y = 0.64$

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

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

$= 0.4 + 0.4 + 10$

$= 10.8$