→ Find the global minimum point & value for the function $f(x,y) = x^2 + y^2 + 10$.

Step-1: $x=1, y=1$, epochs = 2, itr = 1, $\eta = 0.01$

Step-2: $\dfrac{\partial f}{\partial x} = 2x + 0$ $\dfrac{\partial f}{\partial y} = 2y$

$\dfrac{\partial f}{\partial x} = 2(1) = 2$ $\dfrac{\partial f}{\partial y} = 2(1) = 2$

Step-3: $\Delta x = -\eta \dfrac{\partial f}{\partial x}$ $\Delta y = -\eta \dfrac{\partial f}{\partial y}$

$\qquad = -(0.01)(2)$ $\qquad = -(0.01)(2)$

$\Delta x = -0.02$ $\Delta y = -0.02$

Step-4: $x = x + \Delta x$ $y = y + \Delta y$

$\qquad = 1 + (-0.02)$ $\qquad = 1 + (-0.02)$

$\qquad x = 0.98$ $\qquad y = 0.98$

Step-5: $itr = itr + 1 = 1 + 1 = 2$

Step-6: If (itr > epochs)

$\qquad 2 > 2 (×)$

$\qquad$ goto step-2.

Step-2: $\dfrac{\partial f}{\partial x} = 2(0.98) = 1.96$

$\qquad \dfrac{\partial f}{\partial y} = 2(0.98) = 1.96$

Step-3: $\Delta x = -\eta \dfrac{\partial f}{\partial x}$ $\Delta y = -\eta \dfrac{\partial f}{\partial x}$

$\qquad = -(0.01)(1.96)$ $\qquad = -(0.01)(1.96)$

$\Delta x = -0.0196$ $\Delta y = -0.0196$

Step-4: $x = x + \Delta x$

$= 0.98 + (-0.0196)$

$x = 0.9604$

$y = y + \Delta y$

$= 0.98 + (-0.0196)$

$y = 0.9604$

Step-5: $its = its + 1 = 2 + 1 = 3$

Step-6: $if (its > epochs)$

$3 > 2 (\checkmark)$

go to step-7

Step-7: Print $x - 0.9604$, $y = 0.9604$.