Assignment 2

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

Manual Calculations for 2 iterations :

1. $x = -1$, $y = 1$, $\eta = 0.1$, epochs = 2
2. iter = 1
3. $\frac{\partial f}{\partial x} = 2x = -2$, $\frac{\partial f}{\partial y} = 2y = 2$
4. $dx = -\eta \frac{\partial f}{\partial x} = -2(-0.1) = 0.2$

   $dy = -\eta \frac{\partial f}{\partial y} = -(0.1)(2) = -0.2$
5. $x = x + \Delta x = -1 + 0.2 = -0.8$

   $y = y + \Delta y = 1 - 0.2 = 0.8$
6. iter = iter + 1 = 2
7. if (iter > epochs)

   goto step8

   else

   goto step3

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

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

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

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

5. $x = x + \Delta x = -0.8 + 0.16 = -0.64$

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

6. iter = 2 + 1 = 3
7. if (iter > epochs)

   3 > 2

   goto step 8

   else

   goto step3

8. $x = -0.64$, $y = 0.64$

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

$$= (-0.64)^2 + (0.64)^2 + 10 = 10.8$$