Using Newton's method, write a `python` code to find a root of

$$f(x,y) = \begin{bmatrix} 1 - 4x + 2x^2 - 2y^3 \\ -4 + x^4 + 4y + 4y^4 \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \end{bmatrix} \in \mathbb{R}^2 \tag{1}$$

$$J_f(x,y) = \begin{bmatrix} -4 + 4x & -6y^2 \\ 4x^3 & 4 + 16y^3 \end{bmatrix} \in \mathbb{R}^{2\times 2} \tag{2}$$

Algorithm :

1. Start with $\begin{bmatrix} x_0 \\ y_0 \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \end{bmatrix}$.
2. Iterate 100 times

$$\begin{bmatrix} x_{n+1} \\ y_{n+1} \end{bmatrix} = \begin{bmatrix} x_n \\ y_n \end{bmatrix} - J_f(x_n, y_n)^{-1} f(x_n, y_n) \tag{3}$$

3. Print $\begin{bmatrix} x_{101} \\ y_{101} \end{bmatrix}$