E.1: Python Exercise

The vectors in the ordered set defined below were obtained by measuring the weight and ear lengths of toy rabbits and bears in the Fuzzy Wuzzy Animal Factory. The target values indicate whether the respective input vector was taken from a rabbit (0) or a bear (1). The first element of the input vector is the weight of the toy, and the second element is the ear length.

$$p_1 = \begin{bmatrix}1\\4\end{bmatrix}, t_1 = 0; \quad p_2 = \begin{bmatrix}1\\5\end{bmatrix}, t_2 = 0; \quad p_3 = \begin{bmatrix}2\\4\end{bmatrix}, t_3 = 0; \quad p_4 = \begin{bmatrix}2\\5\end{bmatrix}, t_4 = 0;$$

$$p_5 = \begin{bmatrix}3\\1\end{bmatrix}, t_5 = 1; \quad p_6 = \begin{bmatrix}3\\2\end{bmatrix}, t_6 = 1; \quad p_7 = \begin{bmatrix}4\\1\end{bmatrix}, t_7 = 1; \quad p_8 = \begin{bmatrix}4\\2\end{bmatrix}, t_8 = 1;$$

i. i. Use Python to initialize and train a network to solve this ”practical” problem.

ii. Use Python test the resulting weight and bias values against the input vectors.

iii. Please plot the inputs and check your trained weight vector and validate your results by plotting the trained weight and bias.