Problem Set: Linear Regression

1. Suppose we have the following training data:

   $(x_1, y_1) = (0, 2), (x_2, y_2) = (1, 1), (x_3, y_3) = (2, 4), (x_4, y_4) = (3, 4).$

   Find the best fit line using the least squares method. Find the predicted value for $x = 4$.

2. Suppose we have the following training data:

   $(x_1, y_1), (x_2, y_2), (x_3, y_3)$ where $x_1 = \begin{bmatrix} 0 \\ 0 \end{bmatrix}, x_2 = \begin{bmatrix} 1 \\ 0 \end{bmatrix}, x_3 = \begin{bmatrix} 0 \\ 1 \end{bmatrix}, x_4 = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$
   and $y_1 = 1, y_2 = 0, y_3 = 0, y_4 = 2.$

   Find the best fit plane using the least squares method. Find the predicted value for $x = \begin{bmatrix} 2 \\ 2 \end{bmatrix}$.