

Notations

$$m = 4$$

$$n = 3$$

These are the notations that we will use throughout this course:

- m is the **number of instances** in the dataset or of given set if specified (e.g., the training set);
- n is the **number of features** (excluding the label / dependent variable / outcome);
- $\mathbf{x}^{(i)}$ is a **vector of all the feature values / feature vector** (excluding the label / dependent variable / outcome), and
- $y^{(i)}$ is its **label** (the desired **output value** for that instance).
- \mathbf{X} is a **matrix** containing **all the feature values** (excluding labels) of all **instances in the dataset** → **feature matrix**.
- \mathbf{y} is a **vector** containing **all the labels** of **all instances in the dataset** → **true labels**.
- h is the **hypothesis** (prediction function).
- $\hat{y}^{(i)} = h(\mathbf{x}^{(i)})$ is the **predicted value** for the given **instance's feature vector** $\mathbf{x}^{(i)}$.

housing median age	population	median income	housing price
10	546	76000.0	162500.0
7	6274	244970.0	90900.0
37	1095	432030.0	232800.0
32	1818	429690.0	145800.0

$$\mathbf{x}^{(2)} = \begin{bmatrix} 7 \\ 6274 \\ 244970.0 \end{bmatrix} \quad y^{(2)} = 90900.0$$

$$\mathbf{X} = \begin{bmatrix} (\mathbf{x}^{(1)})^T \\ (\mathbf{x}^{(2)})^T \\ (\mathbf{x}^{(3)})^T \\ (\mathbf{x}^{(4)})^T \end{bmatrix} = \begin{bmatrix} 10 & 546 & 76000.0 \\ 7 & 6274 & 244970.0 \\ 37 & 1095 & 432030.0 \\ 32 & 1818 & 429690.0 \end{bmatrix}$$

$$\mathbf{y} = \begin{bmatrix} y^{(1)} & y^{(2)} & y^{(3)} & y^{(4)} \end{bmatrix} \\ = \begin{bmatrix} 162500.0 & 90900.0 & 232800.0 & 145800.0 \end{bmatrix}$$

