



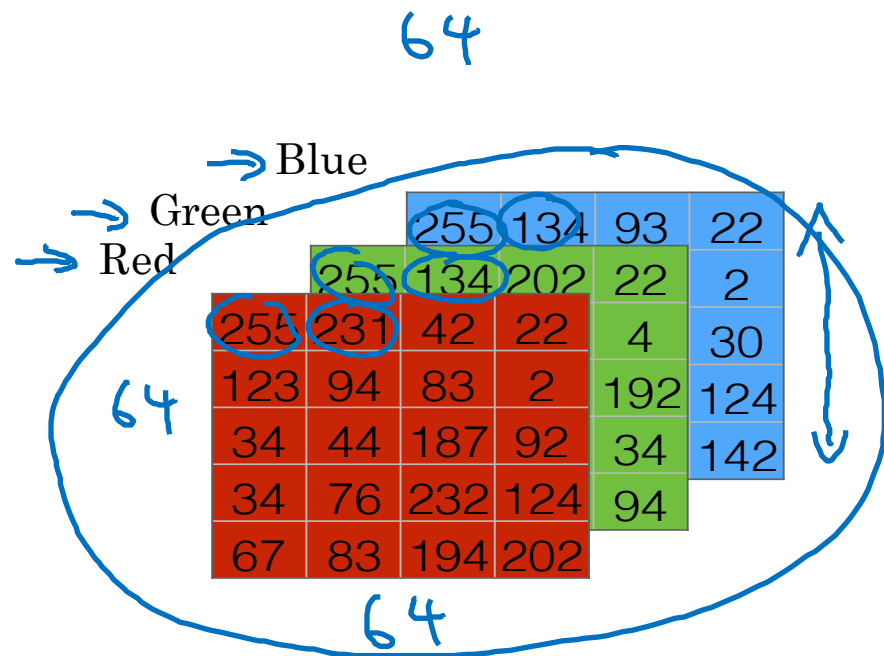
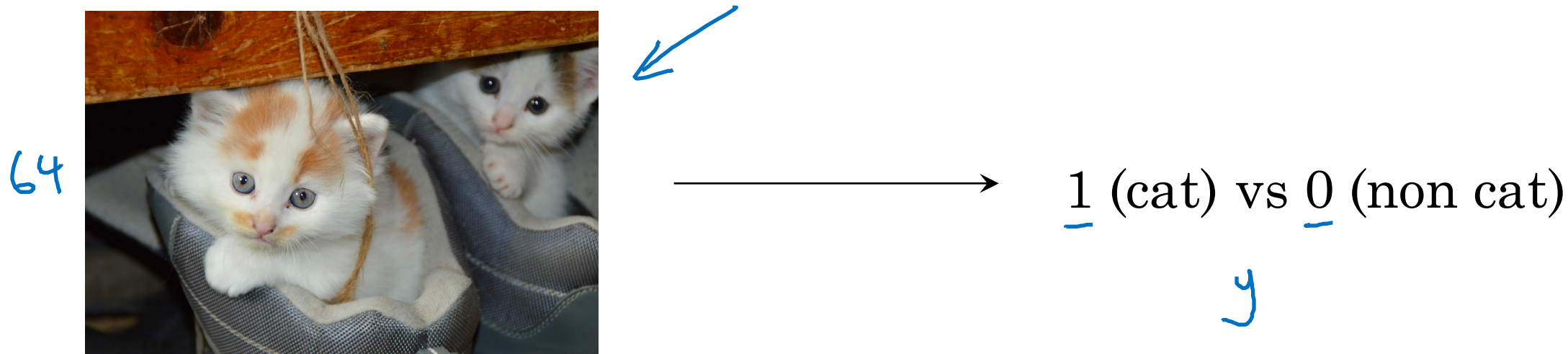
deeplearning.ai

# Basics of Neural Network Programming

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## Binary Classification

# Binary Classification



$X = \begin{bmatrix} 255 \\ 231 \\ \vdots \\ 255 \\ 134 \\ \vdots \end{bmatrix}$

$64 \times 64 \times 3 = 12288$

$n = n_x = 12288$

$X \rightarrow y$

# Notation

$$(x, y) \quad x \in \mathbb{R}^{n_x}, y \in \{0, 1\}$$

$$m \text{ training examples} : \{(\underline{x}^{(1)}, \underline{y}^{(1)}), (\underline{x}^{(2)}, \underline{y}^{(2)}), \dots, (\underline{x}^{(m)}, \underline{y}^{(m)})\}$$

$$M = M_{\text{train}}$$

$$M_{\text{test}} = \# \text{test examples.}$$

$$X = \begin{bmatrix} | & | & & | \\ x^{(1)} & x^{(2)} & \dots & x^{(m)} \\ | & | & & | \end{bmatrix}$$

Diagram illustrating the matrix  $X$  with dimensions  $n_x$  (vertical) and  $m$  (horizontal). A crossed-out diagram shows a single example  $x^{(i)}$  as a row vector, indicating that the matrix  $X$  contains multiple such examples stacked vertically.

$$X \in \mathbb{R}^{n_x \times m}$$

$$X.\text{shape} = (n_x, m)$$

$$Y = [y^{(1)} \ y^{(2)} \ \dots \ y^{(m)}]$$

$$Y \in \mathbb{R}^{1 \times m}$$

$$Y \text{ shape} = (1, m)$$