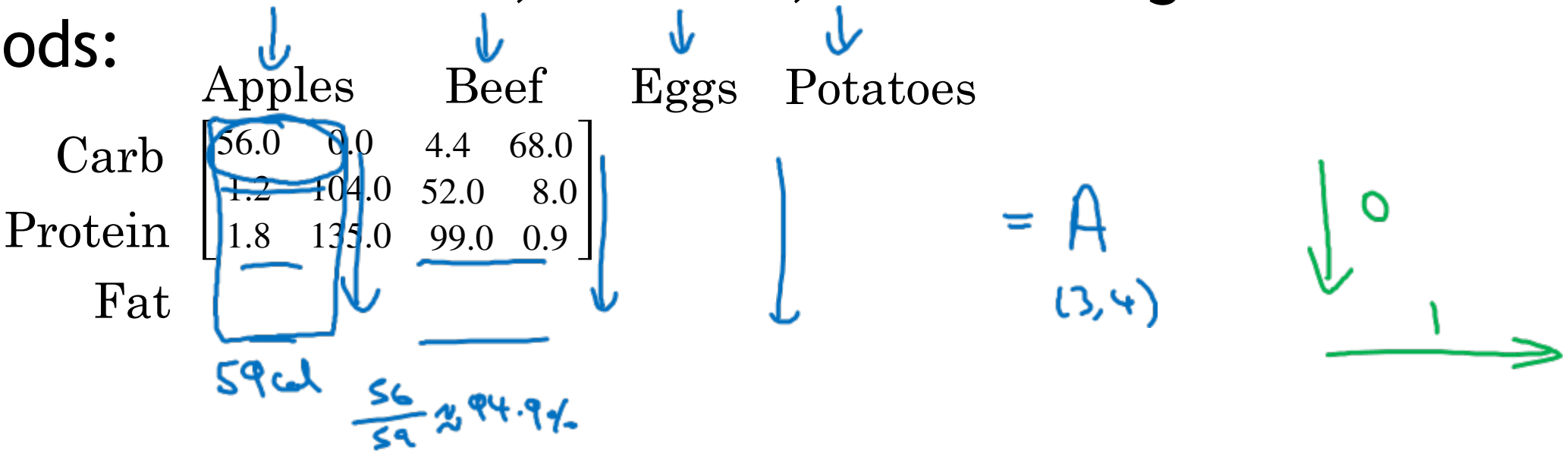
deeplearning.ai

Basics of Neural Network Programming

Broadcasting in Python

Broadcasting example

Calories from Carbs, Proteins, Fats in 100g of different foods:



Calculate % of calories from Carb, Protein, Fat. Can you do this without explicit for-loop?

```
cal = A.sum(axis = 0)
percentage = 100*A/(cal.reshape(1,4))
```

(3,4) / (1,4)

Broadcasting example

$$\begin{bmatrix}1\\2\\3\\4\end{bmatrix} + \begin{bmatrix}100\\100\\100\\100\end{bmatrix}$$

100

$$+ \begin{bmatrix}100 & 200 & 300\\100 & 200 & 300\end{bmatrix}$$

(m, n) (2,3) (1, n) ⇝ (m, n) (2,3)

$$+ \begin{bmatrix}100\\200\end{bmatrix}$$

(m, n) (m, 1) ⇝ (m, n)

$$= \begin{bmatrix}100 & 100 & 100\\200 & 200 & 200\end{bmatrix}$$

General Principle

(m, n) matrix

$+$ $-$ $*$ $/$

$(1, n) \rightsquigarrow (m, n)$

$(m, 1) \rightsquigarrow (m, n)$

$(m, 1) + \mathbb{R}$

$\begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix} + 100 = \begin{bmatrix} 101 \\ 102 \\ 103 \end{bmatrix}$

$[1\ 2\ 3] + 100 = [101\ \ 102\ \ 103]$

Matlab/Octave: bsxfun