



deeplearning.ai

# Recurrent Neural Networks

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## Notation

# Motivating example

NLP

x: Harry Potter and Hermione Granger invented a new spell.

→  $x^{(1)}$   $x^{(2)}$   $x^{(3)}$  ...  $x^{(t)}$  ...  $x^{(9)}$   
 $T_x = 9$

→ y:

1 1 0 1 1 0 0 0 0  
 $y^{(1)}$   $y^{(2)}$   $y^{(3)}$  ...  $y^{(9)}$   
 $T_y = 9$

$x^{(i)(t)}$

$y^{(i)(t)}$   
 ↑

$T_x^{(i)} = 9$

$T_y^{(i)}$

15

# Representing words

$x^{(t)}$

$(x, y)$

$x \rightarrow y$

x: Harry Potter and Hermione Granger invented a new spell.

$x^{(1)}$

$x^{(2)}$

$x^{(3)}$

...

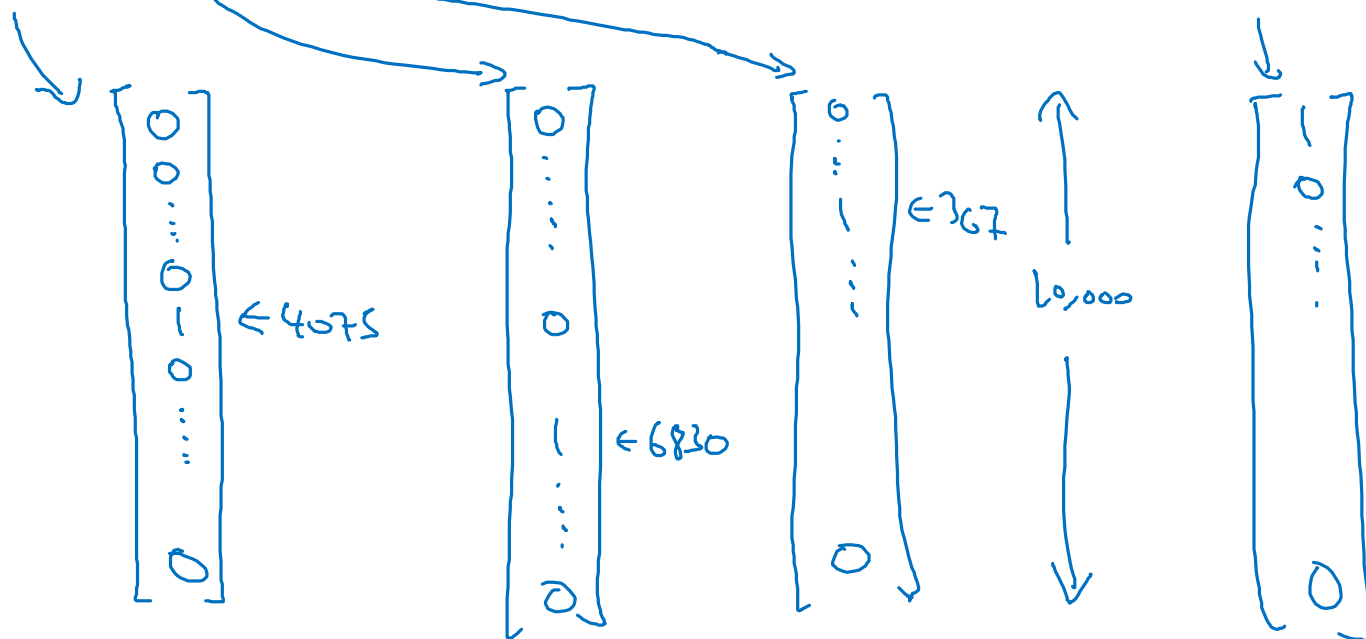
$x^{(7)}$

$x^{(9)}$

Vocabulary

a	1	←
aaron	2	
...	...	
and	367	←
...	...	
harry	4075	
...	...	
potter	6830	
...	...	
zulu	10,000	

<UNK> 10,000



One-hot

# Representing words

**x:** Harry Potter and Hermione Granger invented a new spell.

$$x^{<1>} \quad x^{<2>} \quad x^{<3>} \quad \dots \quad x^{<9>}$$

And = 367

Invented = 4700

$$A = 1$$

New = 5976

Spell = 8376

Harry = 4075

Potter = 6830

Hermione = 4200

Gran... = 4000