

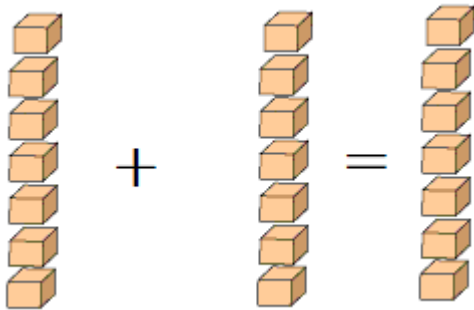
Lesson 17:

Arithmetic Operations on Tensors

Operations between two Tensors

Given two tensors x and y ,

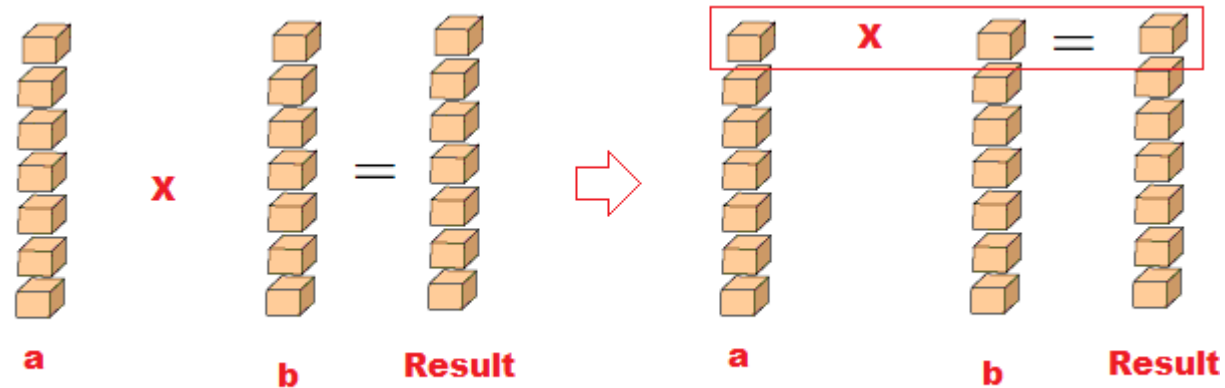
- Arithmetic operations such as **plus, minus, multiplication, division** can be performed between x and y , and produce another tensor.
 - $x + y$, $x - y$, $x * y$, x / y
- To perform a binary operation between two tensors, the shape of the two should be compatible.
- Element wise operations between the two tensors are performed.



Operations between two Tensors

Given two tensors **x** and **y**,

- Arithmetic operations such as **plus, minus, multiplication, division** can be performed between **x** and **y**, and produce another tensor.
 - $x + y$, $x - y$, $x * y$, x / y
- To perform a binary operation between two tensors, the shape of the two should be compatible.
- Element wise operations between the two tensors are performed.



Broadcast (Stretch)

X (1d array): 3

Y (1d array) 1

Result (1d array) : 3

Broadcast (Stretch)

X (1d array): 3 [1, 2, 3]

Y (1d array) 1 2

Result (1d array) : 3

Broadcast (Stretch)

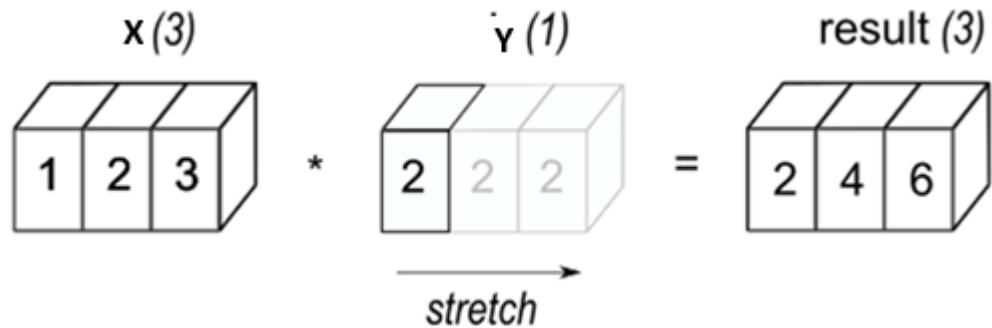
X (1d array): 3 [1, 2, 3]

Y (1d array) 1 2

Result (1d array) : 3

TensorFlow performs broadcast of the lower shape tensor.

It means, the low dimensional tensor is replicated till we find the matching shape



Broadcast (Stretch)

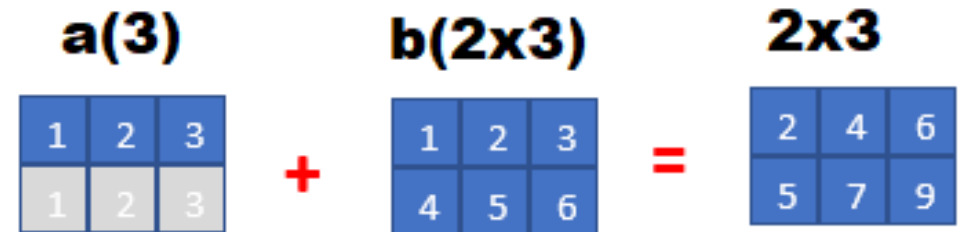
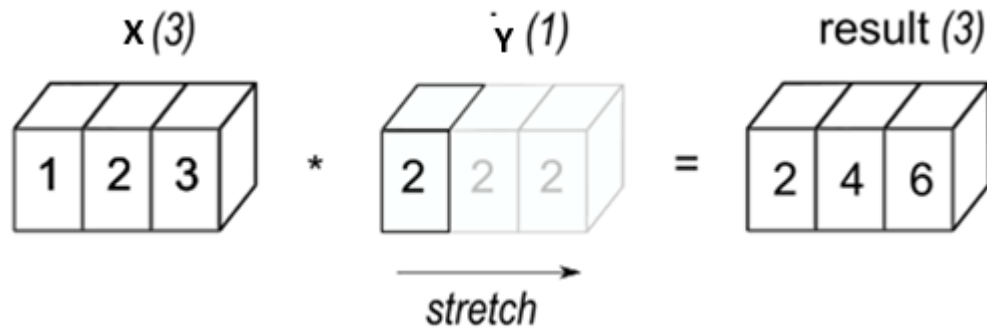
X (1d array): 3 [1, 2, 3]

Y (1d array) 1 2

Result (1d array) : 3

TensorFlow performs broadcast of the lower shape tensor.

It means, the low dimensional tensor is replicated till we find the matching shape



Two Sides Broadcast (Stretch)

X (1d array): 3

Y (2d array): 3 x 1

Result (2d array): 3 x 3

1	2	3
1	2	3
1	2	3

+

4	4	4
5	5	5
6	6	6

=

5	6	7
6	7	8
7	8	9