Agenda

{ → Vectorization
→ Broadcasting } ✓ depth

funct^n → → Matrix multiplication
→ logical }

① np.all → True if all elements meets the condition

② np.any → ______ atleast 1 ______

③ np.where → logical operation → If true the "what"
else "what"

$$\begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix} \quad \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix} = \text{Takes time}$$

2×3   3×3

Multiplication

1. element wise ✓
2. Matrix

$$\begin{bmatrix}1 & 2 & 3 & 4\end{bmatrix} \times \begin{bmatrix}2 & 3 & 4 & 5\end{bmatrix} \Rightarrow \begin{bmatrix}2 & 6 & 12 & 20\end{bmatrix}$$

Same no. of elements and seq.

$[1 \times 5]$
$[1 \times 0]$

$$\begin{bmatrix}1 & 2\\ 3 & 4\end{bmatrix} \quad \begin{bmatrix}2 & 0\\ 1 & 8\end{bmatrix}$$

$2 \times 2 \;@\; 2 \times 2$

$$\begin{bmatrix}1\times2 + 2\times1 & \\ & \end{bmatrix}$$

2×2

$3 \times 1 \;@\; 1 \times 4 \rightarrow 3 \times 4$

Bonus

$$\begin{bmatrix}1 & 2\\ 3 & 4\\ 5 & 6\end{bmatrix}$$

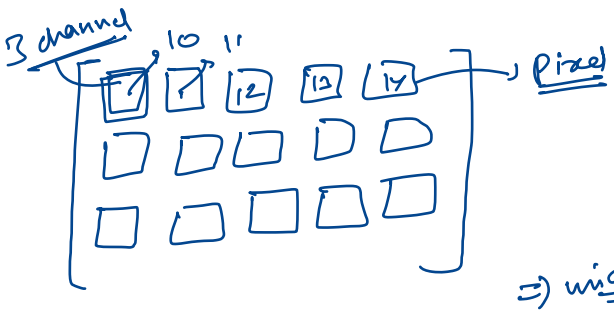
3×2

$$\begin{bmatrix}1 & 2\\ 3 & 4\\ 5 & 6\\ 7 & 8\end{bmatrix}^T \Rightarrow \begin{bmatrix}1 & 3 & 5 & 7\\ 2 & 4 & 6 & 8\end{bmatrix}$$

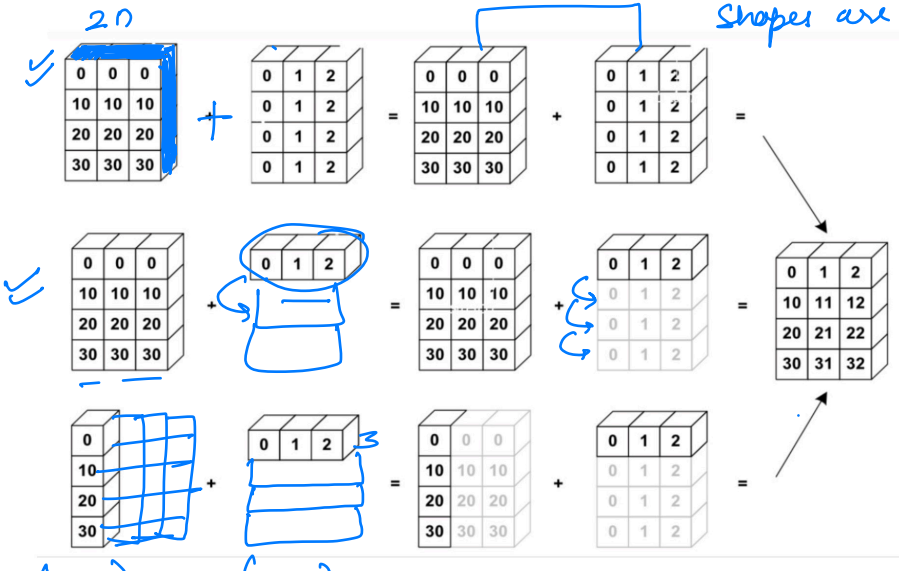
4×2

2×4

$\Rightarrow 3 \times 4$



⇒ image



(4,1) (1,4)

1 | 10 | 20 | 30

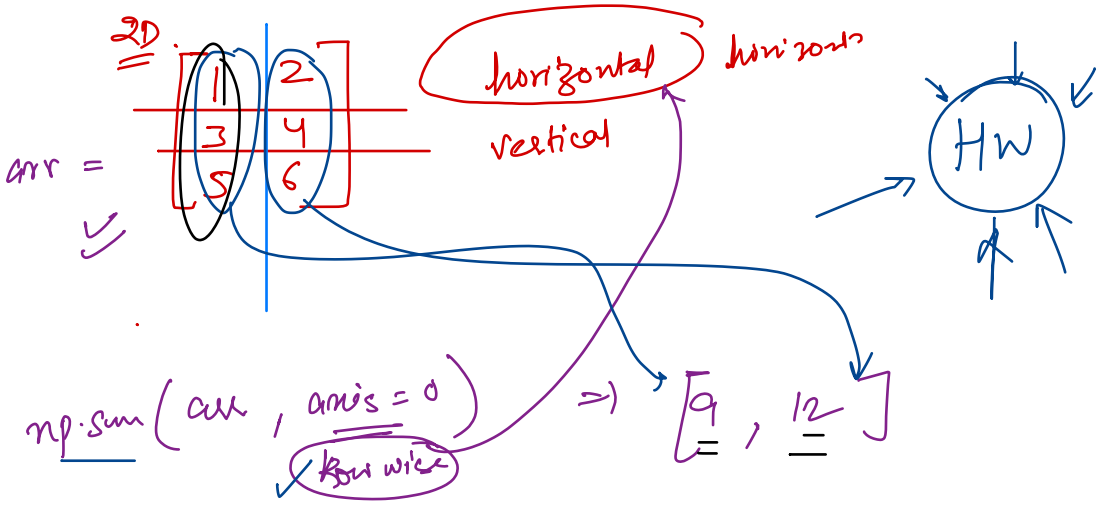
2 | 10 | 20 | 30

3 | 10 | 20 | 30

11 21 31

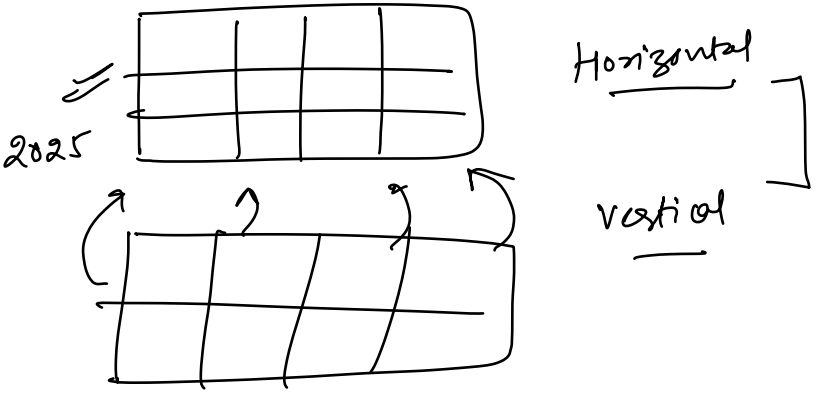
12 22 32

13 23 33



np.hsplit(arr, 2)

Stack



1D

→ [2D]

axis = 0 (Rows) ✓

axis = 1 (columns) ✓

np.sum

axis = 0

Sum all the rows

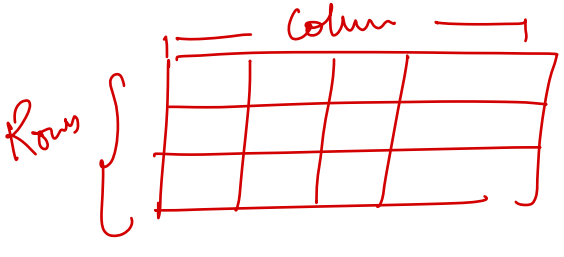
2D → Sum

numpy

[Stacking 2D , Concatenate 2D , Spliting (2D)]

↙ 1D

2D → pandas



Pandas ✓