

↳ 3D Matrix

↳ Dot, @, \* matmul.

Matrix Multiplication

A  
 $m \times k$

B  
 $k \times n$

$3 \times 4$

⇒  $m \times n$

↳ Argmin & Argmax (axis = 0, → columnwise →  
axis = 1; rowwise)

$\begin{pmatrix} -2 & -1 \\ 0 & 1 \end{pmatrix}$   
col=0 2D

axis = -1  
-2

(row, column)

1D

argmin

axis = 0

column wise.

⇒  $\begin{bmatrix} - & - & - & - \\ - & - & - & - \\ - & - & - & - \end{bmatrix}$

(4, )

np.sum(b, axis=0)

axis = 1  
row wise.

1D.

(3, -)

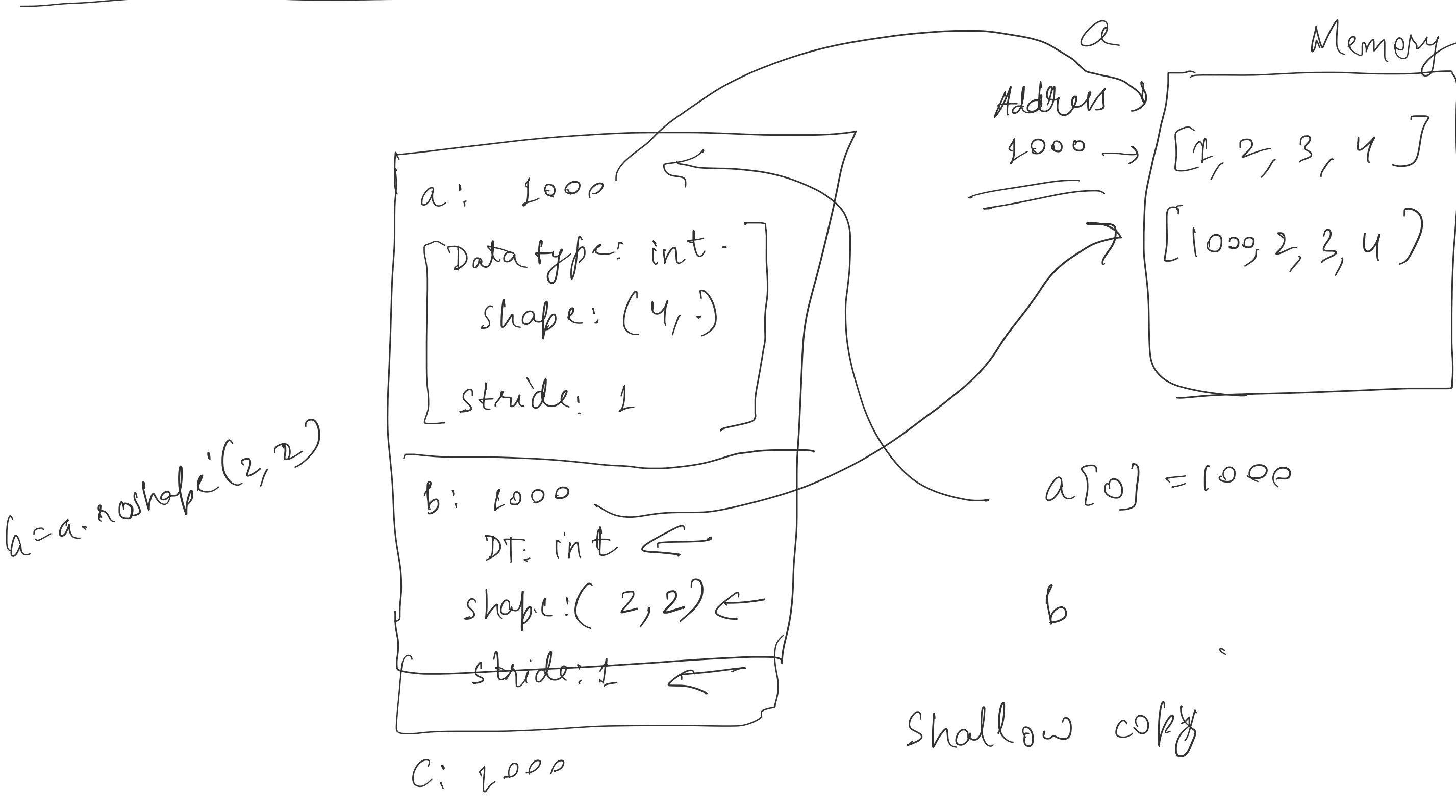
→ Vectorize.

→ 3D Matrix, indexing, slicing

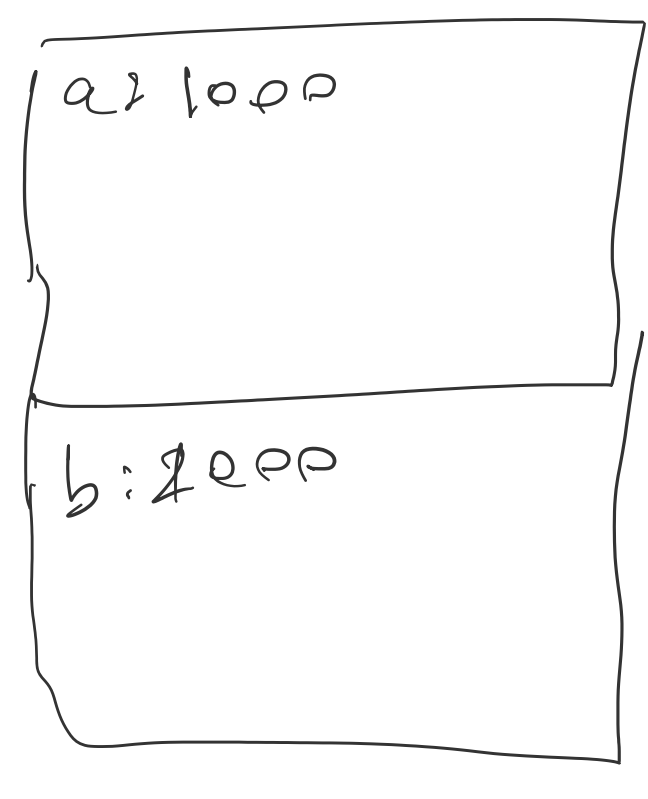
→ Broadcasting

→ Image Manipulation (Matplotlib).

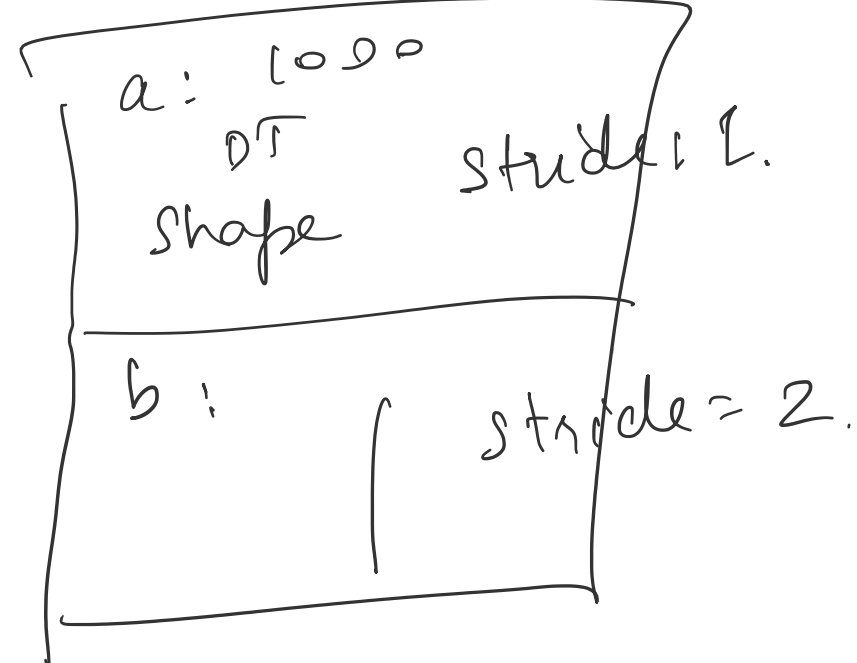
load show.



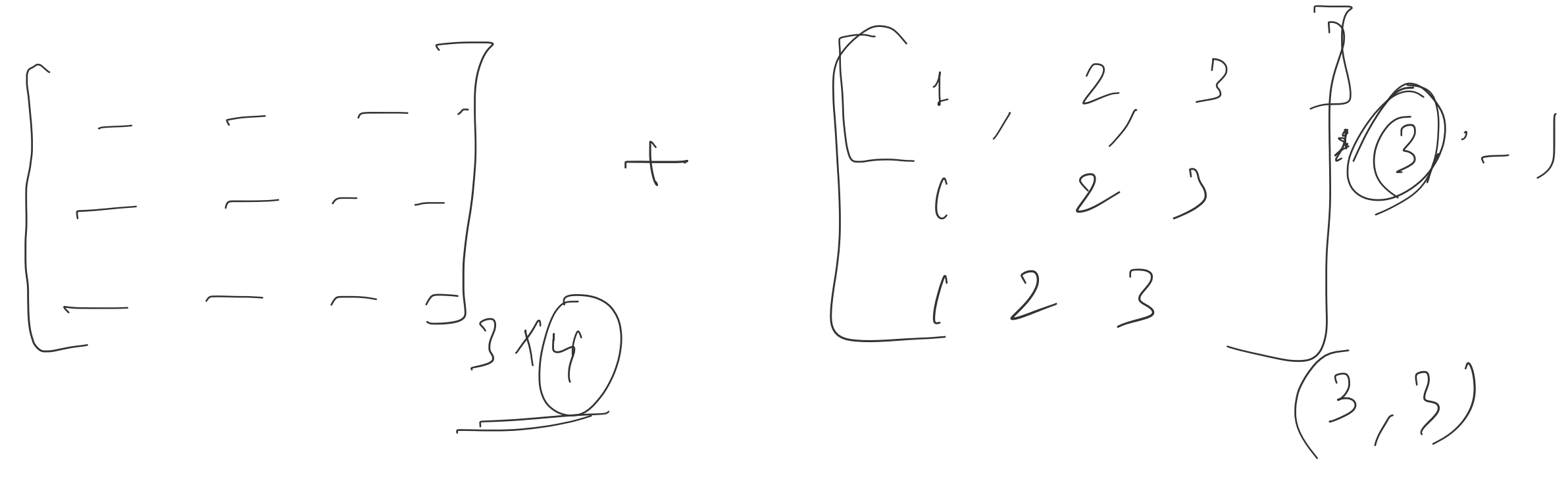
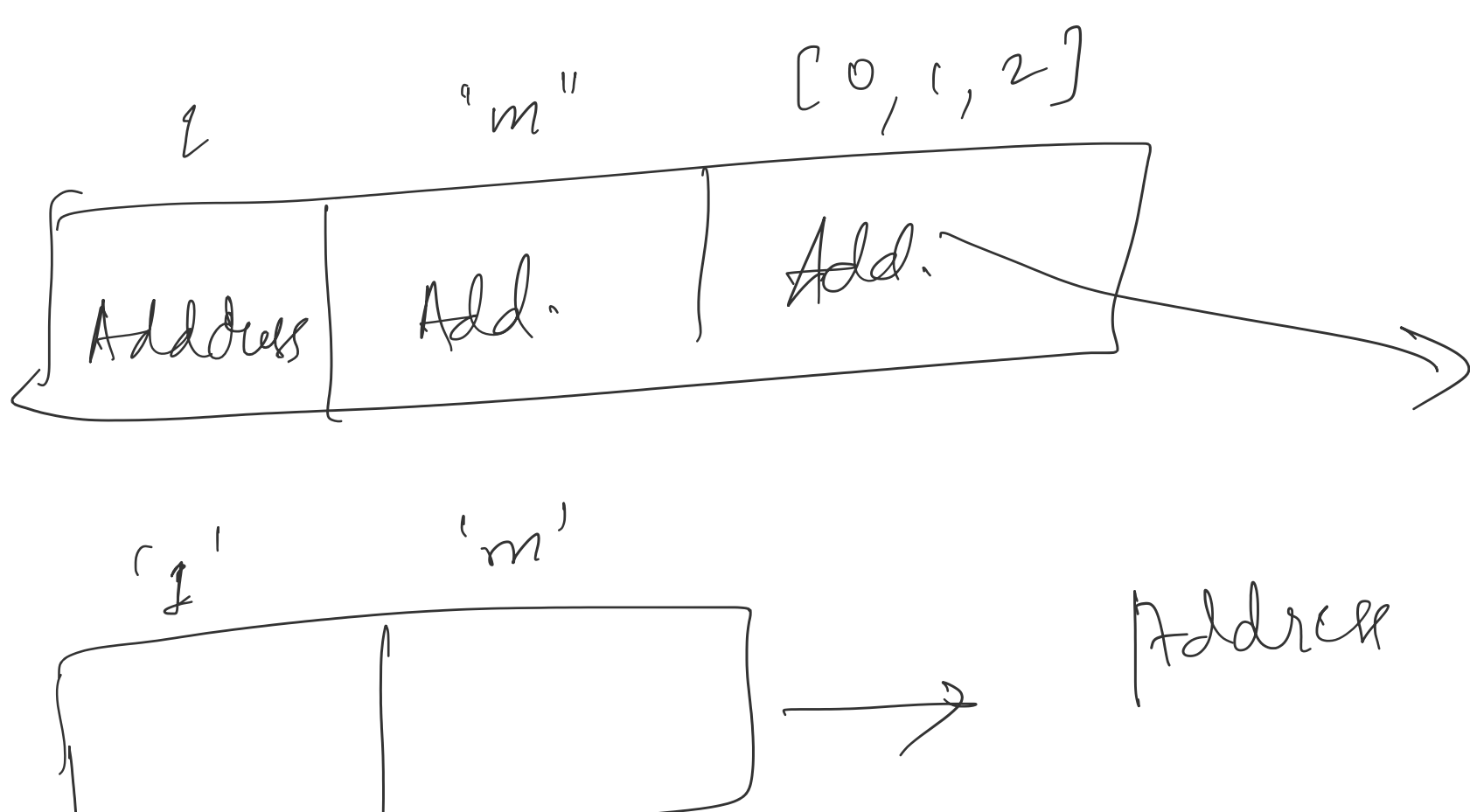
Deep Copy



$a[::2]$



b = step size 2



$\begin{bmatrix} - & - & - & - \\ - & - & - & - \\ - & - & - & - \end{bmatrix} + \begin{bmatrix} 1 & 2 & 3 \\ 1 & 2 & 3 \\ 1 & 2 & 3 \end{bmatrix}$

$\begin{bmatrix} - & - & - & - \\ - & - & - & - \\ - & - & - & - \end{bmatrix}_{m \times n}$

$\begin{bmatrix} - & - & - & - \\ - & - & - & - \\ - & - & - & - \end{bmatrix}_{1 \times n} \Rightarrow \checkmark$   
 $\begin{bmatrix} - & - & - & - \\ - & - & - & - \\ - & - & - & - \end{bmatrix}_{1 \times m} \Rightarrow \times$   
 $\begin{bmatrix} - & - & - & - \\ - & - & - & - \\ - & - & - & - \end{bmatrix}_{1 \times k} \Rightarrow \times$   
 $\begin{bmatrix} - & - & - & - \\ - & - & - & - \\ - & - & - & - \end{bmatrix}_{m \times 1} \Rightarrow \times$   
 $\begin{bmatrix} - & - & - & - \\ - & - & - & - \\ - & - & - & - \end{bmatrix}_{n \times 1} \Rightarrow \times$

$(m \times n) \quad (m \times n)$

