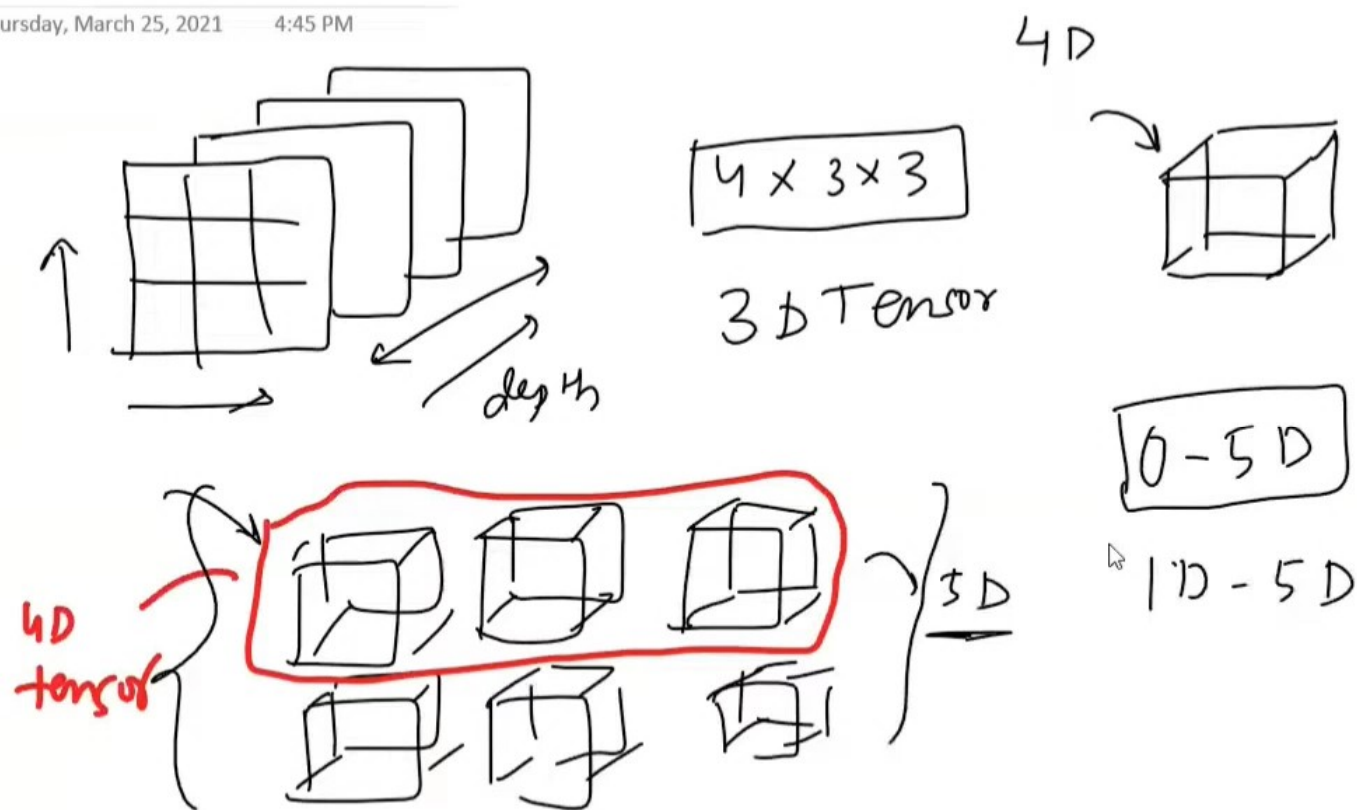


100 Days of ML

Day 4 - Batch ML	1. What are Tensors
Day 5 - Online ML	2. 0D Tensor/Scalar
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	10. Example of 4D Tensors
	12. Example of 5D Tensors

5. ND Tensors

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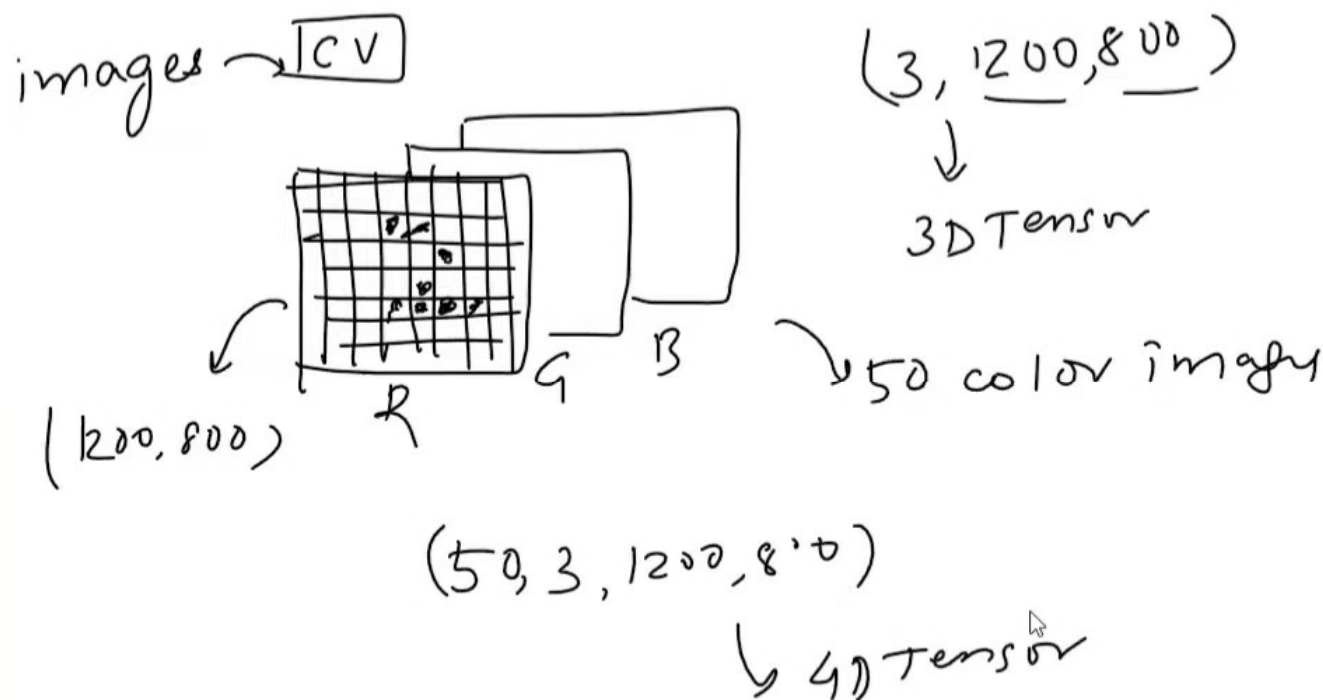


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10. Example of 4D Tensors

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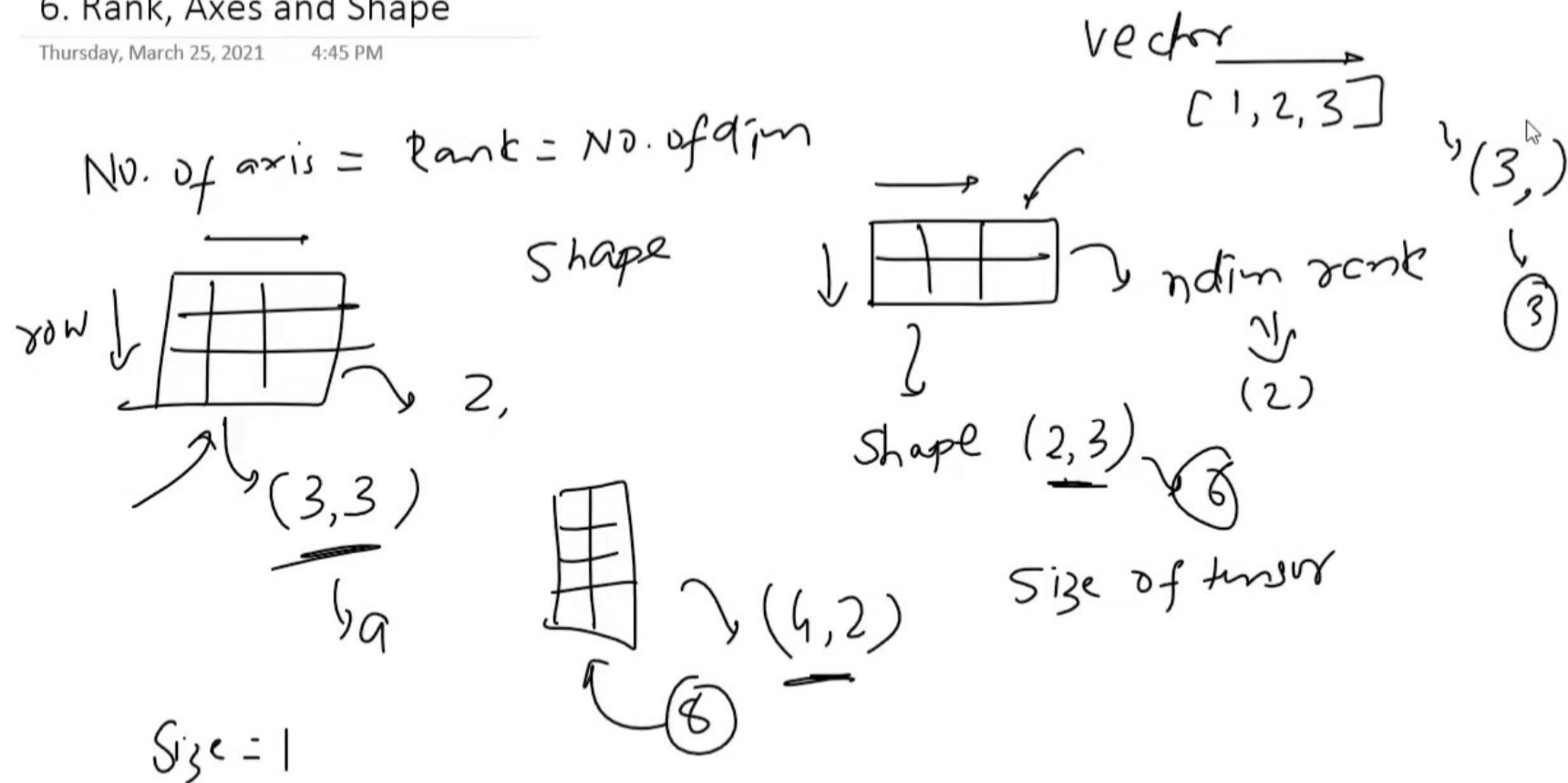
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6. Rank, Axes and Shape

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Videos
↳ frames

60 sec → 4 videos
↳ 30 fps
↳ 480p → 480 × 720 (3 channels)

(4, 1800, 480, 720, 3)
↑
5D tensor



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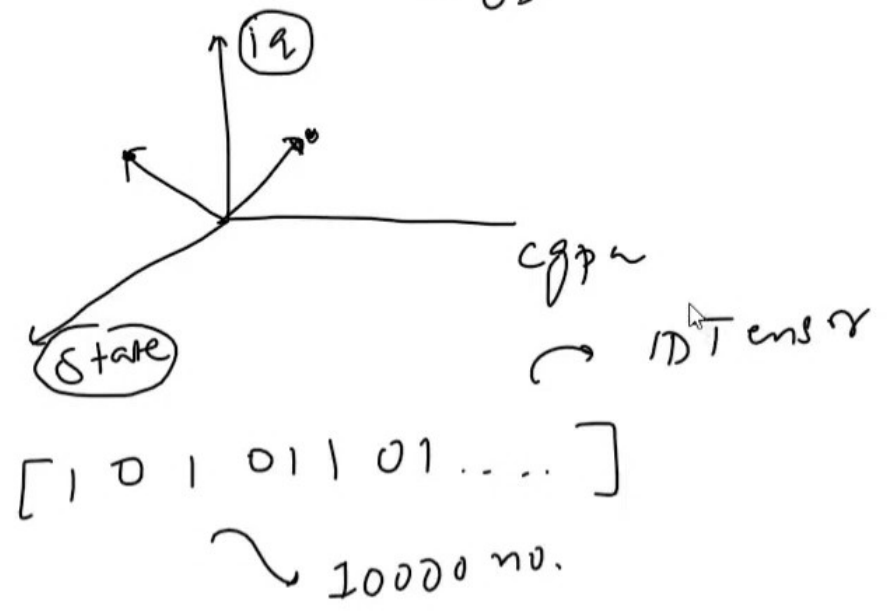
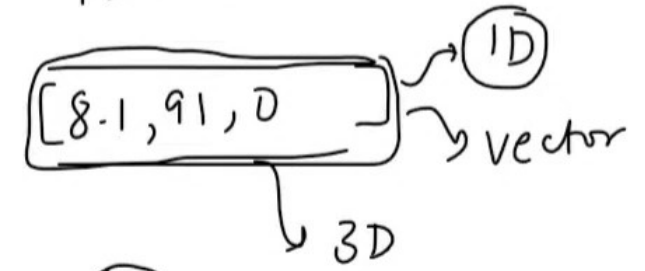
7. Example of 1D Tensors

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Students 10000 $WB=0$
 $KR=1$
cgpa | iq | state | placement

8.1 91 WB 1
0
[7.2 102 KR]

1D Tensor / Vector



100 Days of ML	1. What are Tensors
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2. 0D Tensor/Scalar

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(2) (3)
✓
Scalars → 0D Tensor



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8. Example of 2D Tensors

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~~2D~~ cgpa | iq | status | place

10000

$\begin{bmatrix} [- & - & -] \\ [- & - & -] \end{bmatrix}$ \rightarrow vector

2D tensor \boxed{b}

$\begin{bmatrix} [- & - & -] \\ [- & - & -] \\ [- & - & -] \\ [- & - & -] \end{bmatrix}$ $\begin{bmatrix} \end{bmatrix}$ 1D tensor

2D tensor



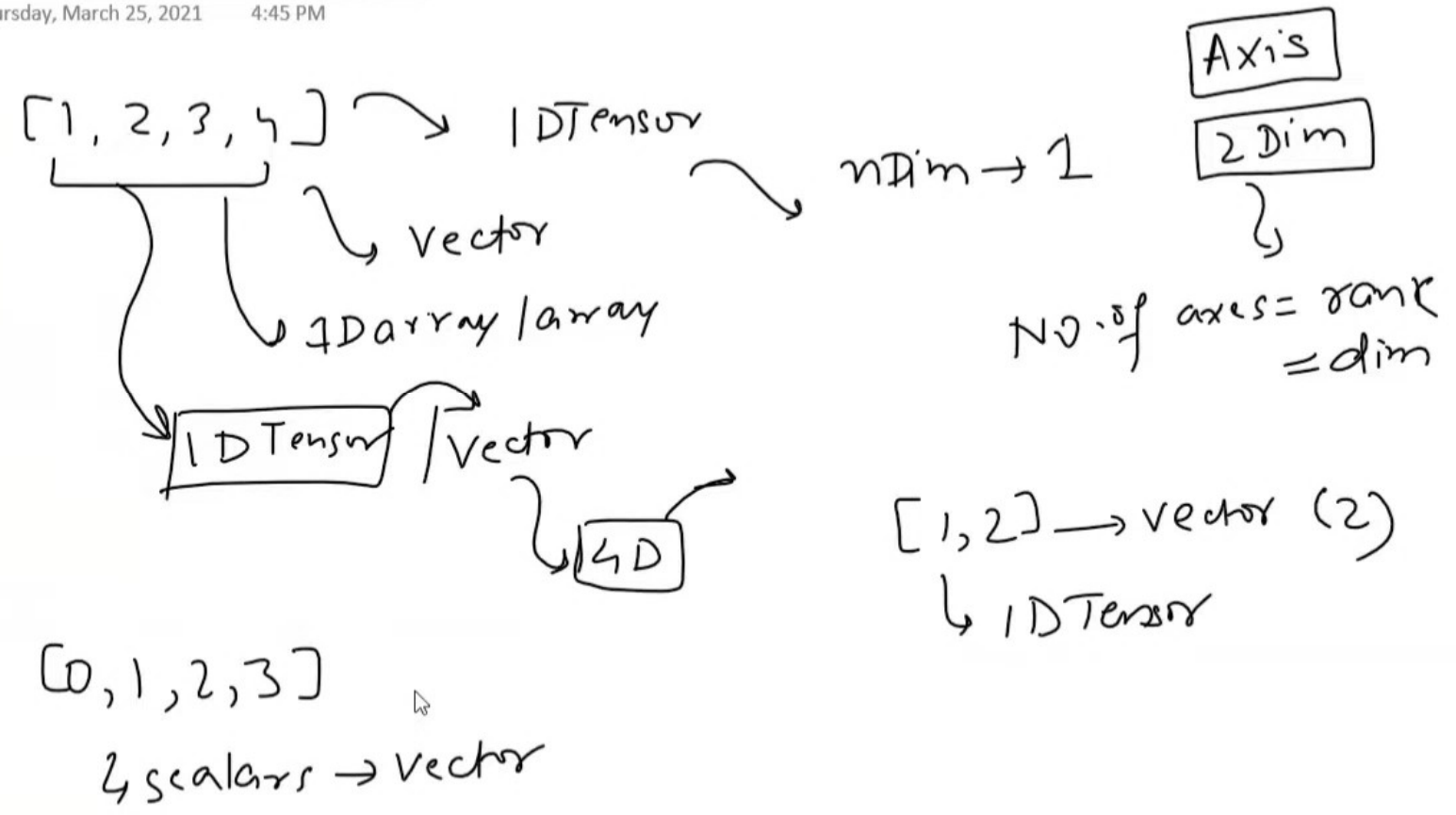
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3. 1D Tensor/Vector

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9. Example of 3D Tensors

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NLP

Hi Nitish
Hi Rahul
Hi Ankit

Hi	Nitish	Rahul	Ankit
1	0	0	0
0	1	0	0
0	0	1	0
0	0	0	1

$\left[\begin{matrix} [1, 0, 0, 0] \\ [0, 1, 0, 0] \\ [0, 0, 1, 0] \\ [0, 0, 0, 1] \end{matrix} \right]$ $\xrightarrow{(2,4)}$ $(3, 2, 4)$

$\left[\begin{matrix} [1, 0, 0, 0] \\ [0, 0, 1, 0] \\ [0, 0, 0, 1] \end{matrix} \right]$ \rightarrow 3D Tensor

4. 2D Tensor/Matrices

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$[1, 2, 3]$ $[4, 5, 6]$ $[7, 8, 9]$

$\begin{bmatrix} [1, 2, 3] \\ [4, 5, 1] \\ [7, 8, 9] \end{bmatrix} \rightarrow 2D$



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$\begin{bmatrix} [1,0,0,0], [0,0,1,0] \end{bmatrix}$ 3D Tensor
 $\begin{bmatrix} [1,0,0,0], [0,0,0,1] \end{bmatrix}$

Timeseries Data (2)

Highest | Lowest

70 years
 $(365, 2)$

Day 1 — —
Day 2 — —
Day 365 — —
365

2D → 10 → (10, 365, 2) time axis
3D Tensor