2.numpy_pandas

Monday, June 8, 2020 12:44 PM

① Scalar

② Vector

③ matrix / Array

④ tensor

① Scalar → single observation with magnitude

Sachin 80 kg 5.11 feet

② Vector → collection of scalars with direction (Dimension)

s student's height

① Column Vector

one dimension

$$V = \begin{bmatrix} 140 \\ 160 \\ 150 \\ 145 \\ 170 \end{bmatrix}$$

0 1 2 3 4

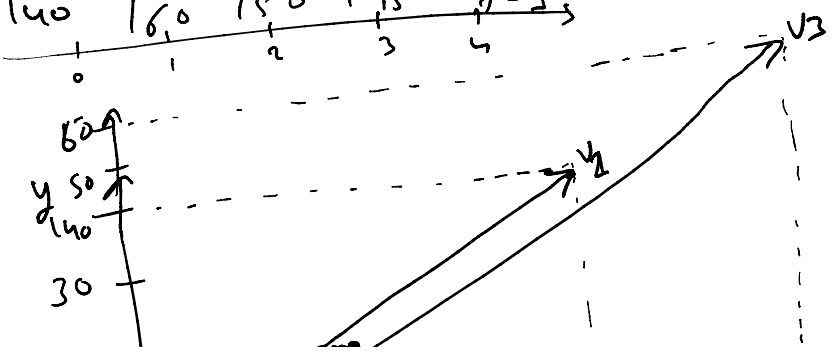
V[3] → 145

② Row vector

[140 160 150 145 170]

0 1 2 3 4

$\vec{V_3} = \vec{V_1} + \vec{V_2}$

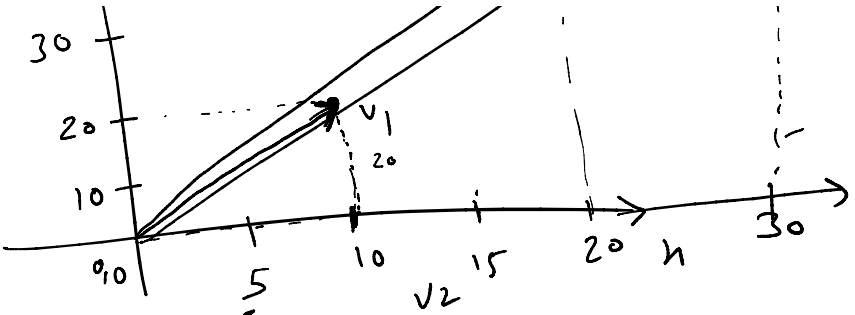


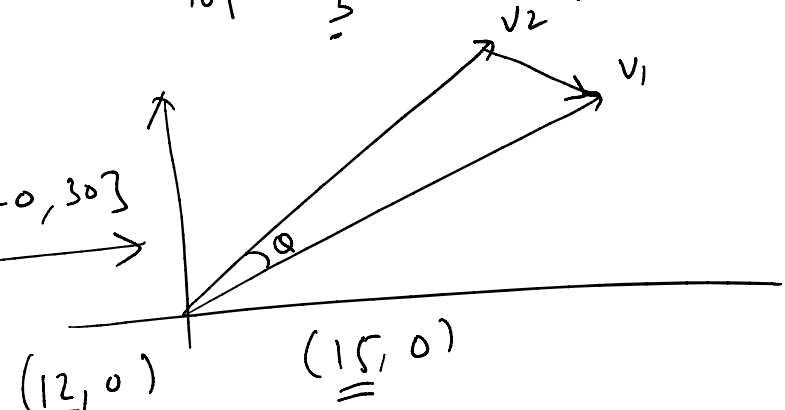
$\vec{V} = (10, 20)$

$\vec{V_1} = (10, 20)$

$\vec{V_2} = (20, 40)$

$|\vec{V_1}| = \sqrt{425}$



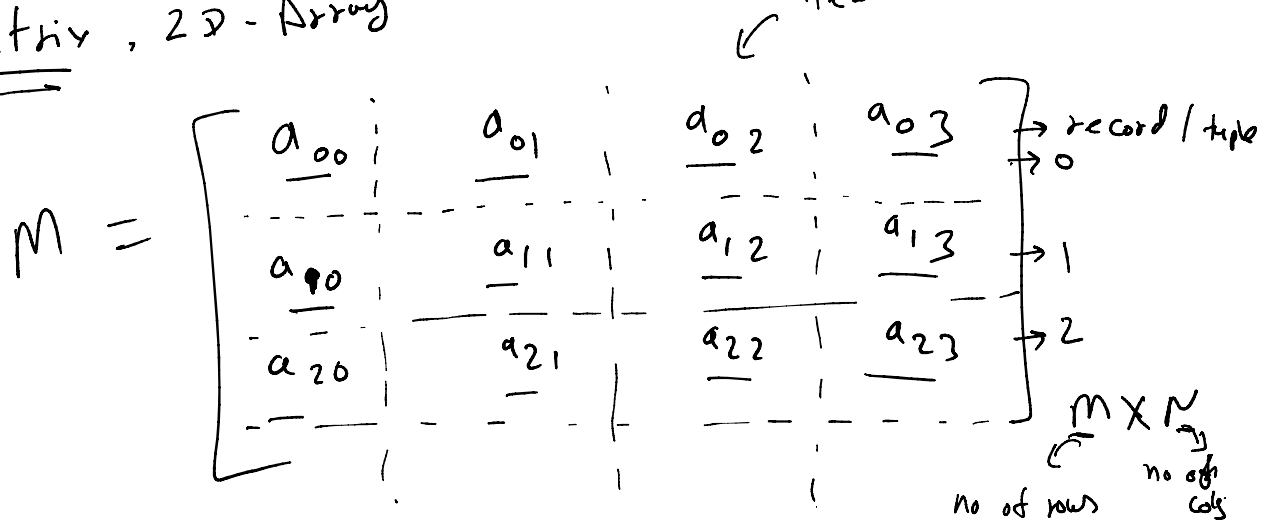


$V_1 = [10, 50, 70, 30]$

1D Array

Vectors are 1D and also can be represent a line

③ Matrix, 2D-Array



Matrix is collection of vectors

Shape of matrix shows how vectors are arranged

→ sales per day according to product

product = [P_1 P_2 P_3]

$$\text{product} = \begin{bmatrix} P_1 \\ P_2 \\ P_3 \end{bmatrix} \quad \begin{bmatrix} 450 \\ 500 \\ 350 \end{bmatrix}$$

matrix → sells

M =

	P_1	P_2	P_3
mon	25	5	10
Tue	15	20	30
wed	16	8	10
thu	30	20	25
FRI	40	4	5
SAT	20	10	20
sun	10	20	30

shape ↓ → scalar

5 X 4

↓ vectors

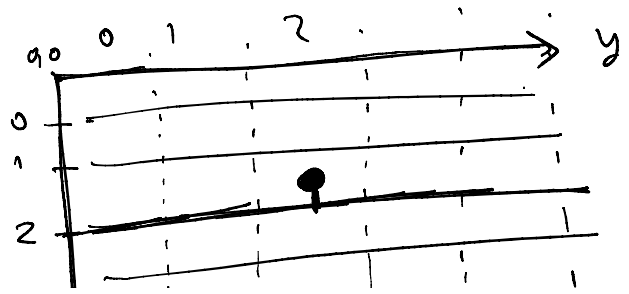
30 size

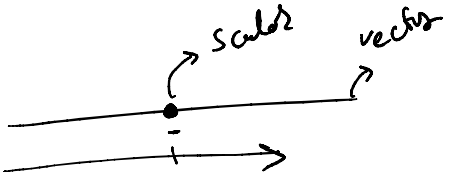
$$\gamma = \begin{bmatrix} P_{1\,total} & P_{2\,total} & P_{3\,total} \end{bmatrix}$$

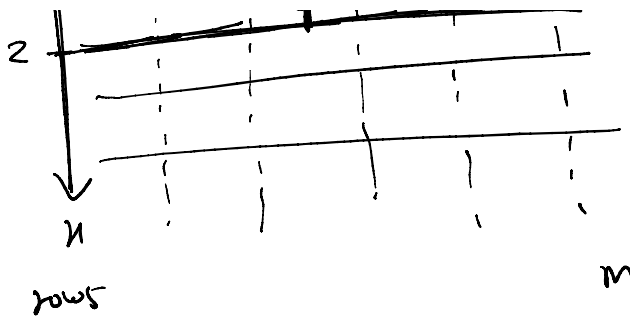
Co-ordination

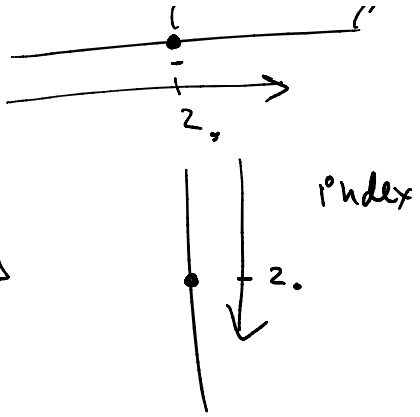
matrix - x-y plain

2 Direction





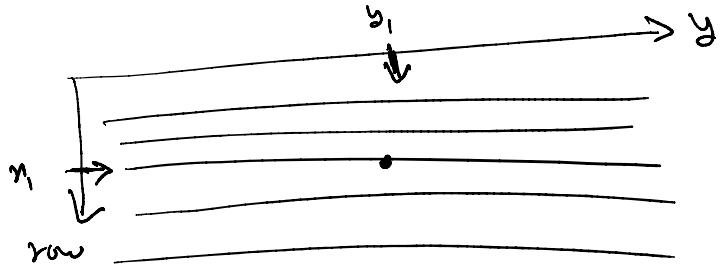




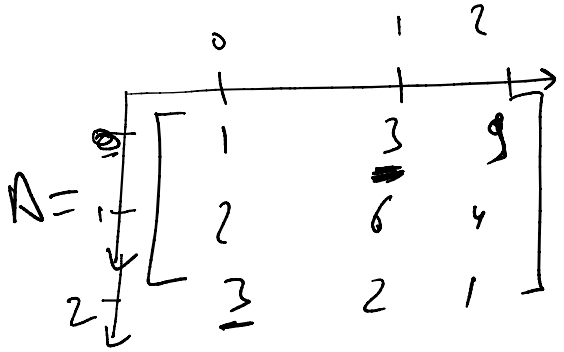
$m[2,2]$

$m[x, y]$

row, col



$m[x_1, y_1]$

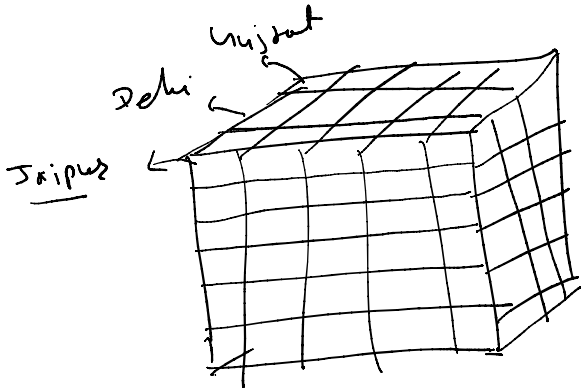


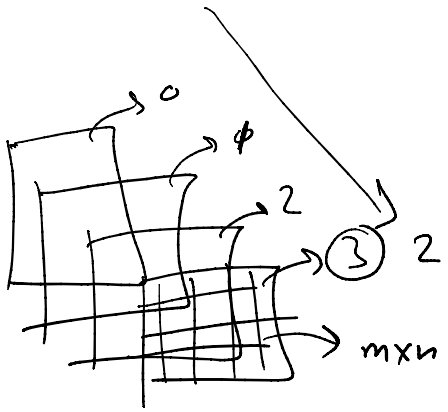
$A[p, q]$

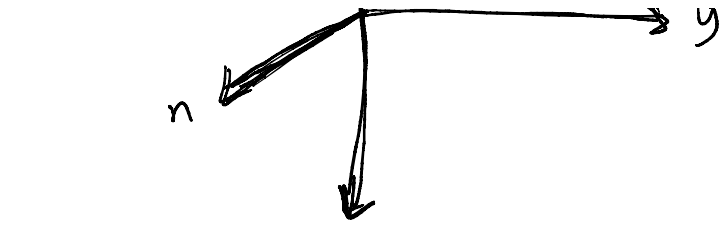
3 → ① $A[0, 1]$

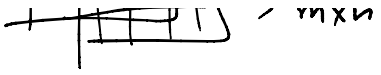
② $A[2, 0]$

④ Tensors → High-Dimensional Arrays









n m l
↓ ↓ ↓
3 × 5 × 4
↓ ↓ ↓
z n y

features 4
records 5
sheets 3

Tensor
3 × [50]
⇒ 150

3 × 10 × 5 → cols
↓ ↓ ↓
no of matrix | rows | matrix

3 × 10 × 5 → scalers
↓ ↓
matrices | vectors — matrix → 50

→ numpy Arrays

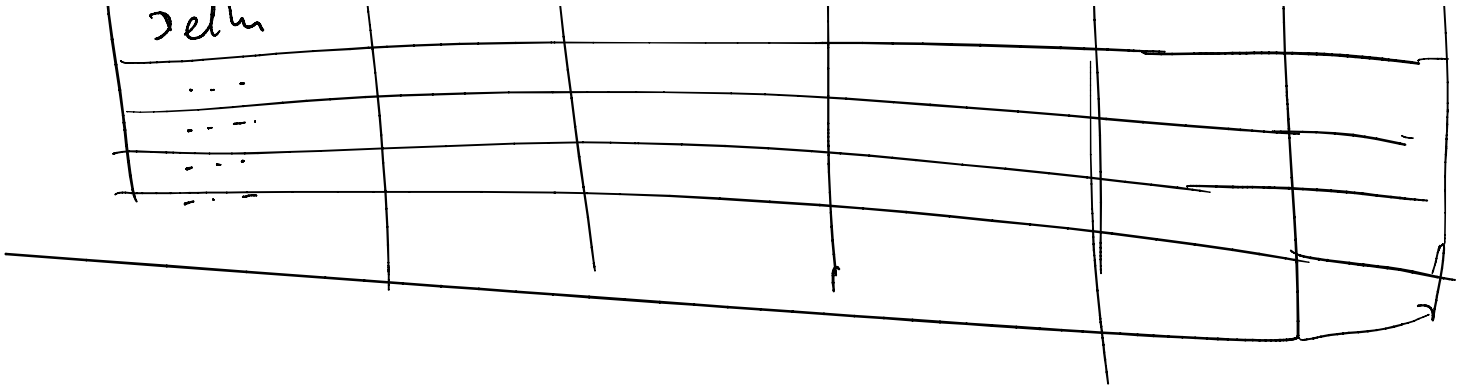
① Creations
② operations
③ Visualisation

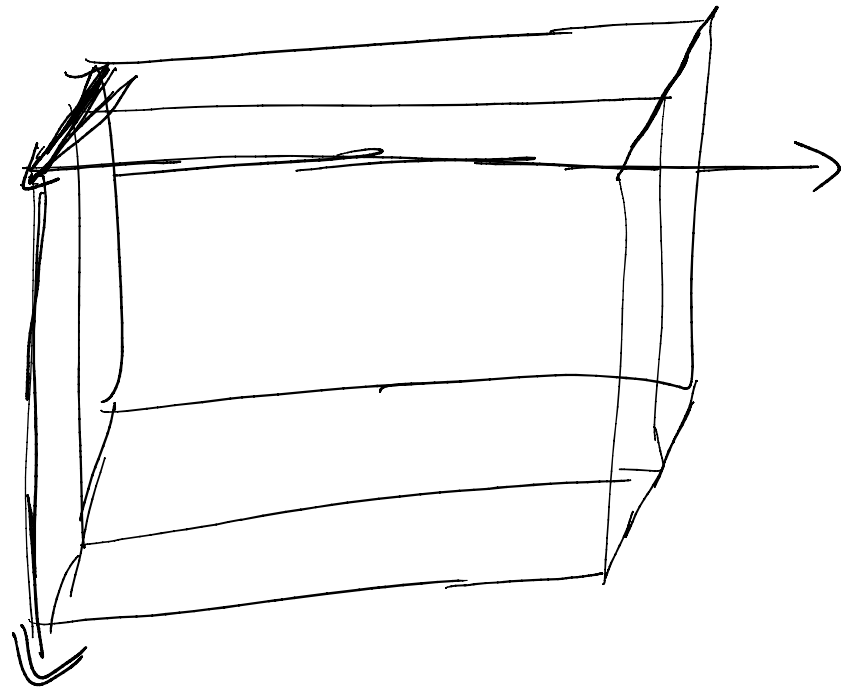
Covid-19 → store

Country
↓
States

Indian features → total case, total death, total test, population, 1m/test
↓ ↓ ↓ ↓ ↓
C_1 C_2 C_3 C_4 C_5

	total case	total death	total test	population	1m/test
Rajasthan					
Gujrat					
Delhi					
...					





→ Numpy

→ Numerical x python