

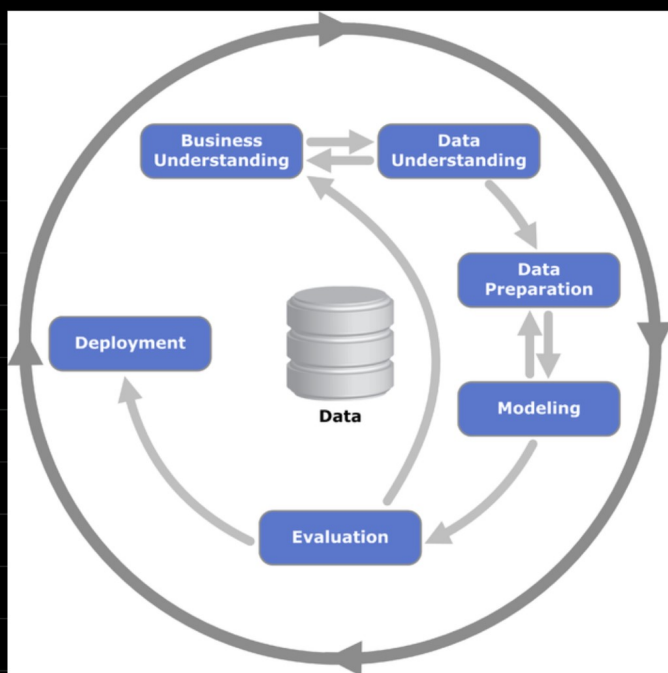
Data toolkit

- Numpy
- Pandas
- Matplotlib
- Seaborn
- Plotly
- Bokeh.

* Data science process

* CRISP-DM Framework \Rightarrow Cross-industry process for data mining.

\Downarrow getting insights from data.



① Business Understanding.

Problem statement :-

* To Predict price of House.

- ① Area of house
- ② No. of rooms.

② Data Understanding

✓ * How area of house decides the price of house

{ Area of House \uparrow Price of Houses \uparrow
No. of rooms \uparrow Price \uparrow
No. of rooms \uparrow Area \uparrow

\rightarrow Exploratory data Analysis (EDA)

③ Data preparation

④ Modelling

⑤ Evaluation

⑥ Deployment

* library \Rightarrow A library is a collection of pre-written code, that is used to perform common task.

basic Calculations

{ addition
subtraction
multiplication }

modules

^{LA}
{ Linear
Algebra }

module

^C
{ Calculus }

module

\rightarrow All of these modules kept together is called as package

Analogy

→ Multiple package together is called as library and packages.

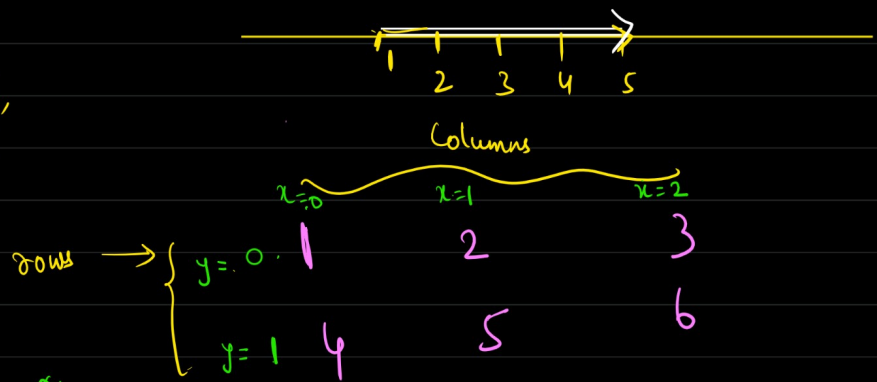
Library (multiple books) → Packages

↓
Lessons/chapters ⇒ modules.

↓
Paragraphs ⇒ functions.

* $arr = [1, 2, 3, 4, 5] = \underline{\text{only rows}}$

* $arr = \begin{bmatrix} 1, & 2, & 3 \\ 4, & 5, & 6 \end{bmatrix}$



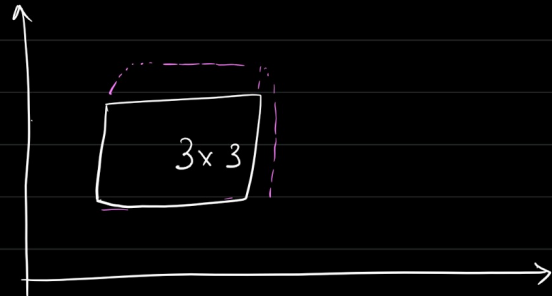
$np.fromfunction(\text{lambda } i, j : i == j \quad (3,3))$

$i = \text{row}$ $j = \text{col}$	$j \rightarrow$	0	1	2
$i \downarrow$	0	$0==0$ True	False	False
1	False	$1==1$ True	False	False
2	False	False	$2==2$ True	True

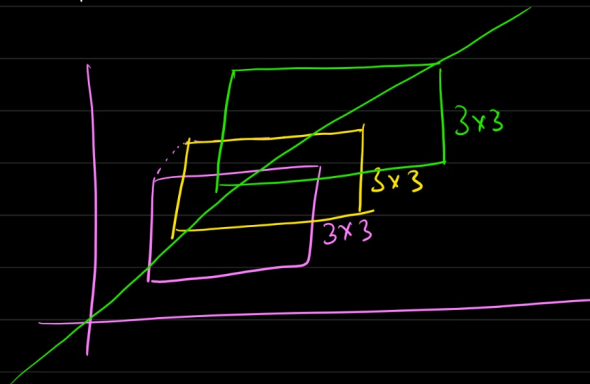
$np.from(\text{lambda } i, j : i \times j, (3,3))$

i \ j	0	1	2
0	0x0 0	0x1 0	0x2 0
1	1x0 0	1x1 1	1x2 2
2	2x0 0	2x1 2	2x2 4

1, 3, 3



3, (3,3)
↑



Ans $\begin{bmatrix} 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{bmatrix} + 5$ (index wise)

$$\begin{bmatrix} 0+5 & 0+5 & 0+5 & 0+5 \\ 0+5 & - & - & 0+5 \\ . & - & - & . \\ 0+5 & - & - & 0+5 \end{bmatrix}$$

$$\begin{bmatrix} 5 \times 2 & 5 \times 2 & 5 \times 2 & 5 \times 2 \\ 5 \times 2 & 5 \times 2 & 5 \times 2 & 5 \\ 5 & 5 & 5 & 5 \end{bmatrix} * 2 = \begin{bmatrix} 10 & 10 & 10 & 10 \\ . & . & . & . \\ . & . & . & . \end{bmatrix}$$

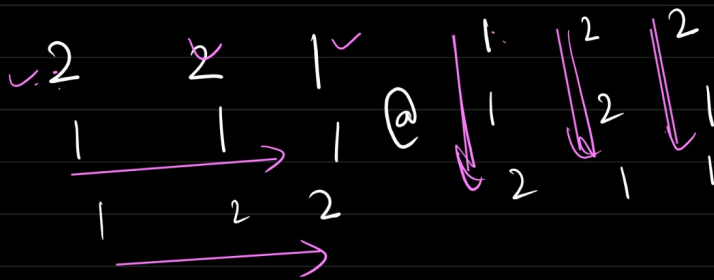
np.eye(3) \Rightarrow 3x3 \rightarrow All diagonal elements = 1 & rest 0.

$$\begin{matrix} \downarrow & \downarrow & \downarrow \\ \rightarrow & 1 & 0 & 0 \\ \rightarrow & 0 & 1 & 0 \\ \rightarrow & 0 & 0 & 1 \end{matrix}$$

index wise multiplication

2d array

Matrix multiplication



$$\begin{bmatrix} 2 \times 1 + 2 \times 1 + 1 \times 2 & 2 \times 2 + 2 \times 2 + 1 \times 1 & 2 \times 2 + 2 \times 1 + 1 \times 1 \\ 1 \times 1 + 1 \times 1 + 1 \times 2 & 1 \times 2 + 1 \times 2 + 1 \times 1 & 1 \times 2 + 1 \times 1 + 1 \times 1 \\ 1 \times 1 + 2 \times 1 + 2 \times 2 & 1 \times 2 + 2 \times 2 + 2 \times 1 & 1 \times 2 + 2 \times 1 + 2 \times 1 \end{bmatrix}$$

Condition for matrix multiplication

arr1 @ arr2

3x4

4x3

a x b @ b x c

(no. of columns of A = No. of rows of B)

resulting matrices will be of shape a x c

