PS5841

Data Science in Finance & Insurance

Data Wrangling

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Numpy Indexing

- Indexing

```
a[0:2]
```

- Fancy Indexing
  - Indexing with arrays of indices

```
a[[…],[…]]
```

  - Indexing with Boolean arrays

```
a[a>10]
```

  - Indexing with strings
    - Structured Arrays - ndarrays whose datatype is a composition of simpler datatypes organized as a sequence of named fields

```
a['uni']
```

Numpy Broadcasting (1)

- Broadcasting – rules for working with two ndarrays
- Rule 1 – If the two arrays differ in their number of dimensions, the shape of the one with fewer dimensions is padded with ones on its leading (left) side
- Rule 2 – If the shape of the two arrays does not match in a particular dimension, the array with shape equal to 1 in that dimension is stretched to match the other shape
- Rule 3 – If in any dimension the sizes disagree and neither is equal to 1, an error is raised

Numpy Broadcasting (2)

```
np.ones((2,3)) + np.arange(3)
```

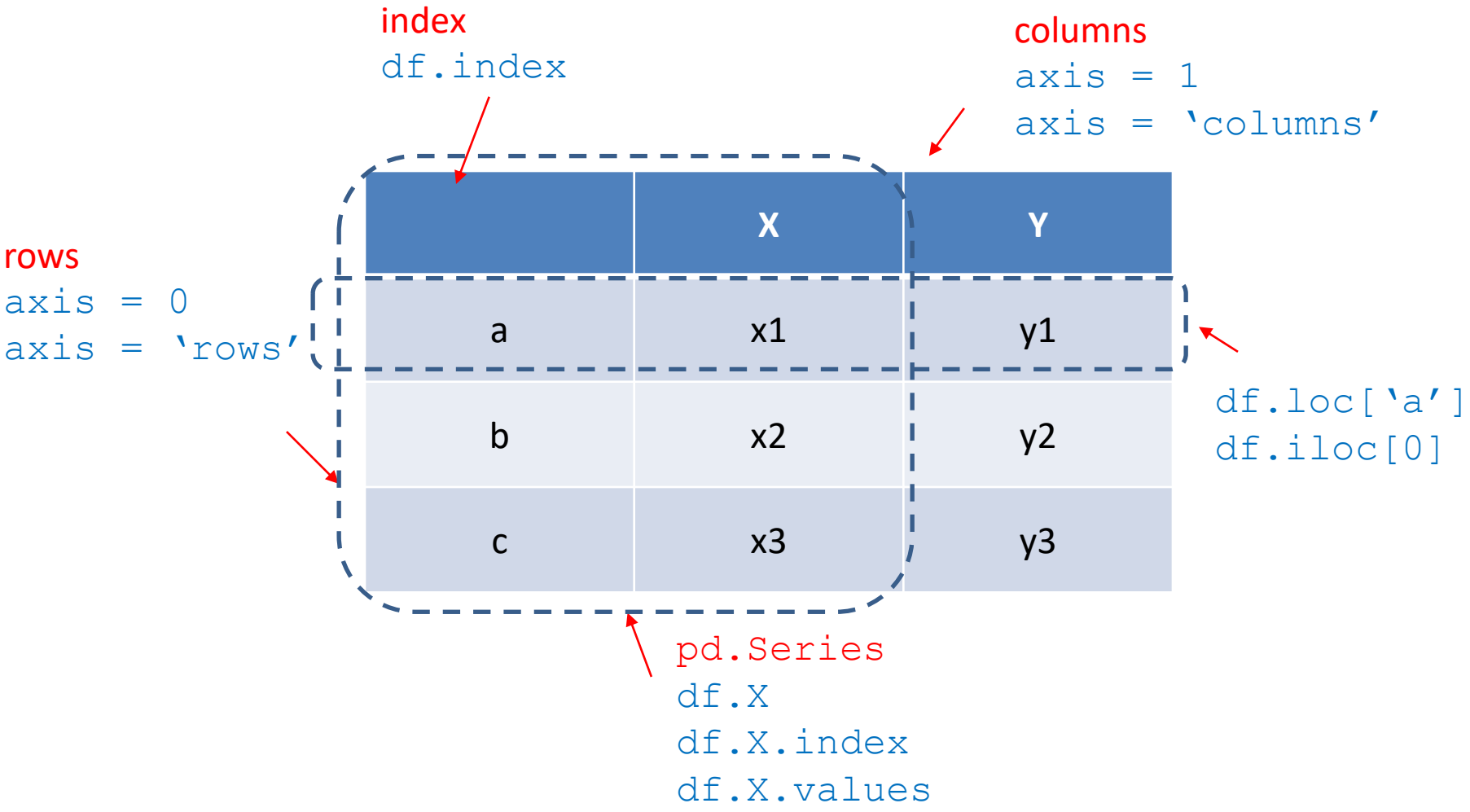
$$\begin{pmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \end{pmatrix}_{(2,3)} + \begin{pmatrix} 0 \\ 1 \\ 2 \end{pmatrix}_{(3,)}$$

$$rule\ 1 \rightarrow \begin{pmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \end{pmatrix}_{(2,3)} + \begin{pmatrix} 0 & 1 & 2 \end{pmatrix}_{(1,3)}$$

$$rule\ 2 \rightarrow \begin{pmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \end{pmatrix}_{(2,3)} + \begin{pmatrix} 0 & 1 & 2 \\ 0 & 1 & 2 \end{pmatrix}_{(2,3)}$$

$$\rightarrow \begin{pmatrix} 1 & 2 & 3 \\ 1 & 2 & 3 \end{pmatrix}_{(2,3)}$$

Pandas DataFrame



Wide vs Long Format

- Wide format

index Variable(s)

	A	B	C	D
0	jan	1	4	7
1	feb	2	5	8
2	mar	3	6	9

value(s)

- Long format

	A	variable	value
0	jan	B	1
1	feb	B	2
2	mar	B	3
3	jan	C	4
4	feb	C	5
5	mar	C	6
6	jan	D	7
7	feb	D	8
8	mar	D	9

That was