INTRODUCTION TO PANDAS DATAFRAMES

365 DataScience

Plan for the next few lectures:

- Introduce the pandas DataFrame object and discuss its purpose
- Create several DataFrames from scratch
- Relate what you have already learnt to what's written in the pandas documentation

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The Pandas DataFrame : Introduction

Series

DataFrame

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The Pandas DataFrame : Introduction

Series **DataFrame**

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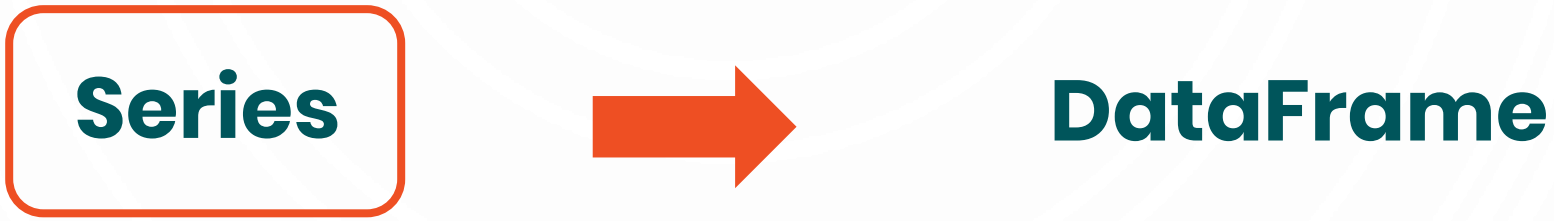
The Pandas DataFrame : Introduction



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The Pandas DataFrame : Introduction

Series **DataFrame**

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The Pandas DataFrame : Introduction

Series

DataFrame

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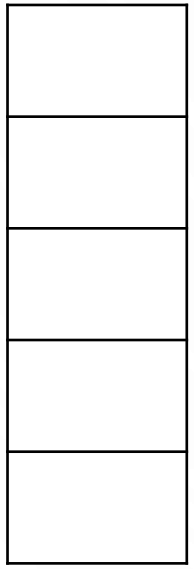

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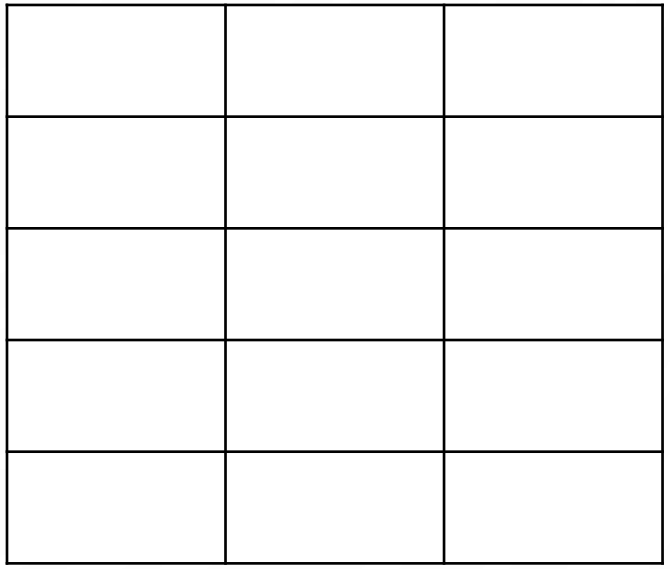

DataFrame

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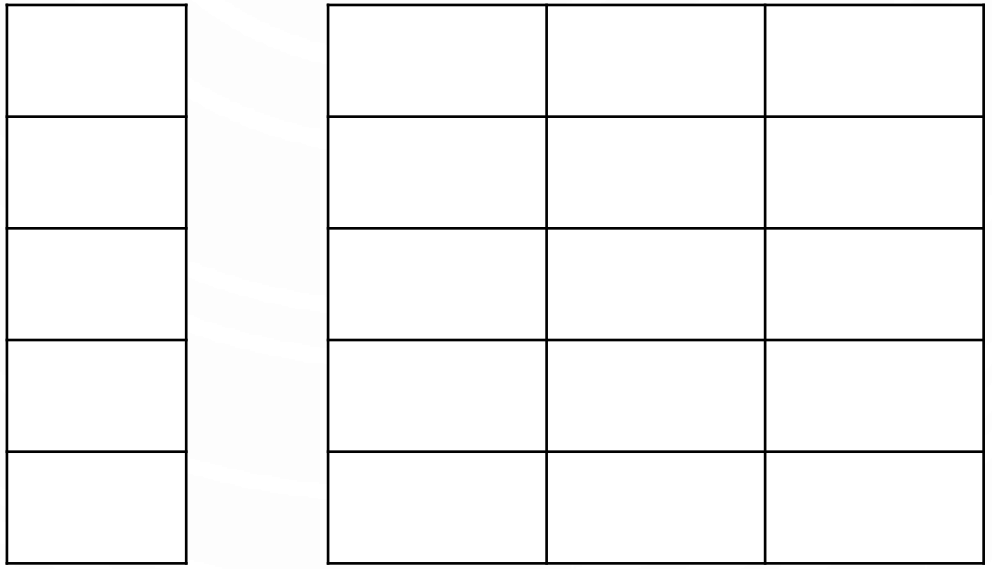
The Pandas DataFrame : Introduction



Series DataFrame

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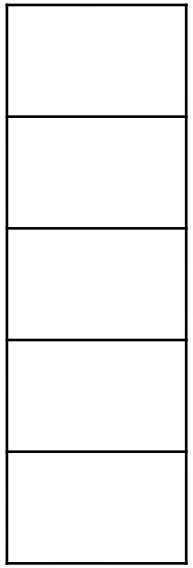
The Pandas DataFrame : Introduction

Single column data

- corresponds to a **single variable**
- information of a **single type**
- we can preserve **data consistency**



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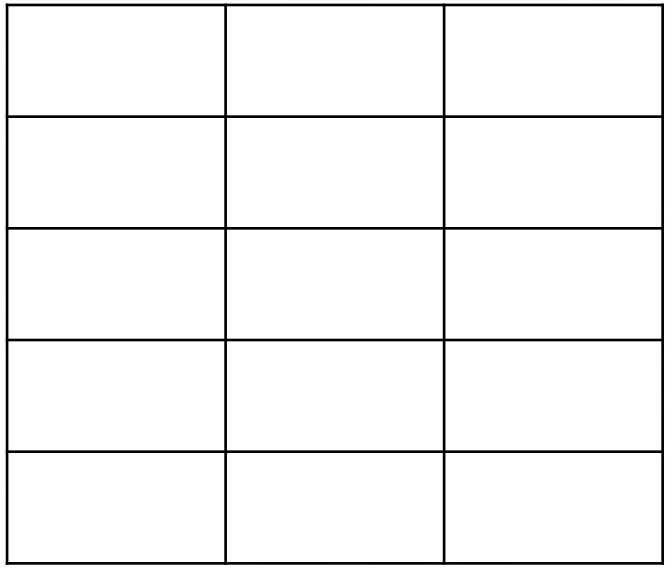

DataFrame

Multi-column data

- each column represents a **different** variable
- every column contains data of **its own type**
- the information can potentially **be heterogeneous**
- we can preserve **data consistency**

(we aim for having information of the same type **within** a certain column)

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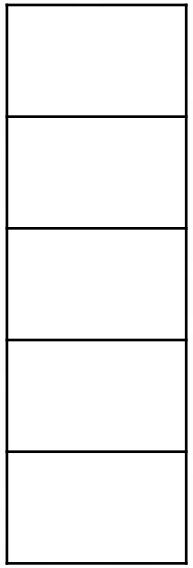

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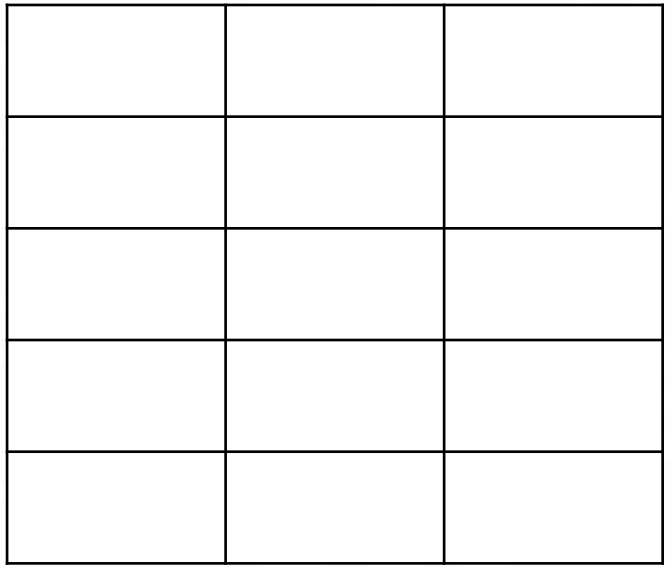

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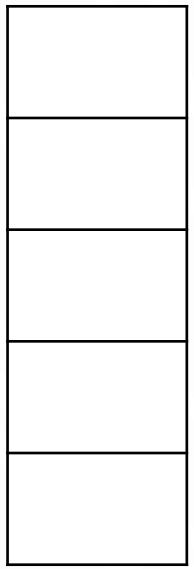

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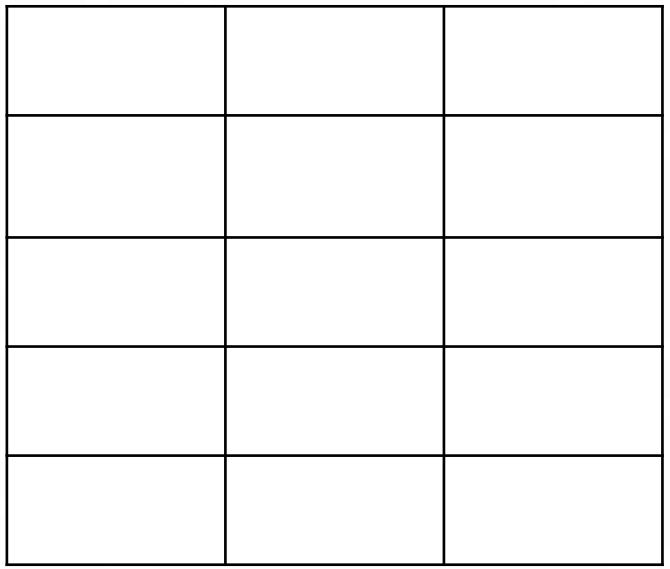

DataFrame

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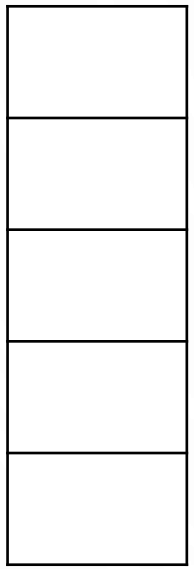

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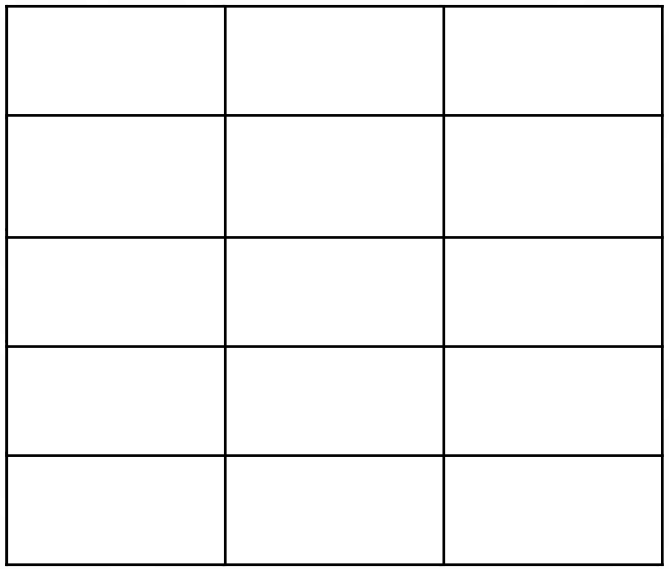

DataFrame

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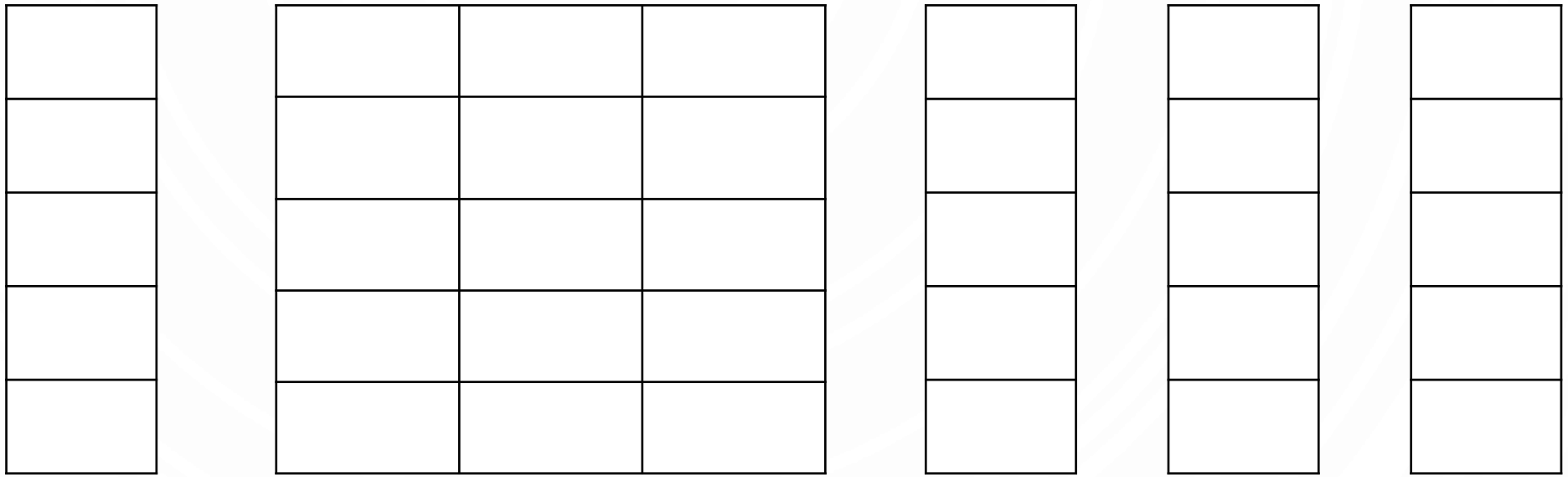

Series DataFrame

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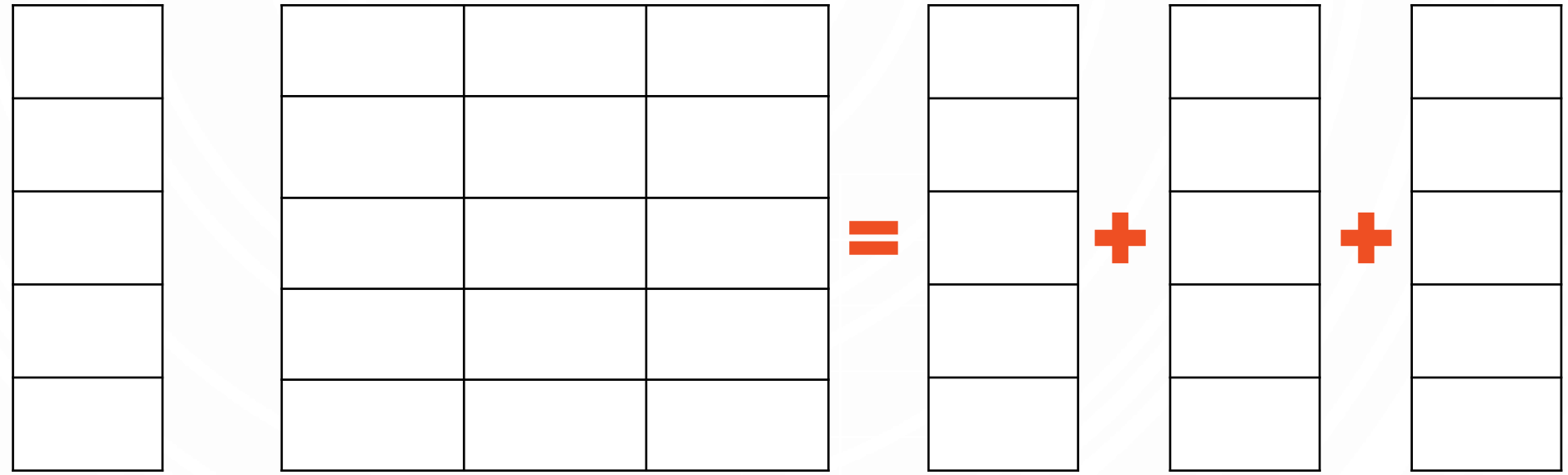

Series DataFrame

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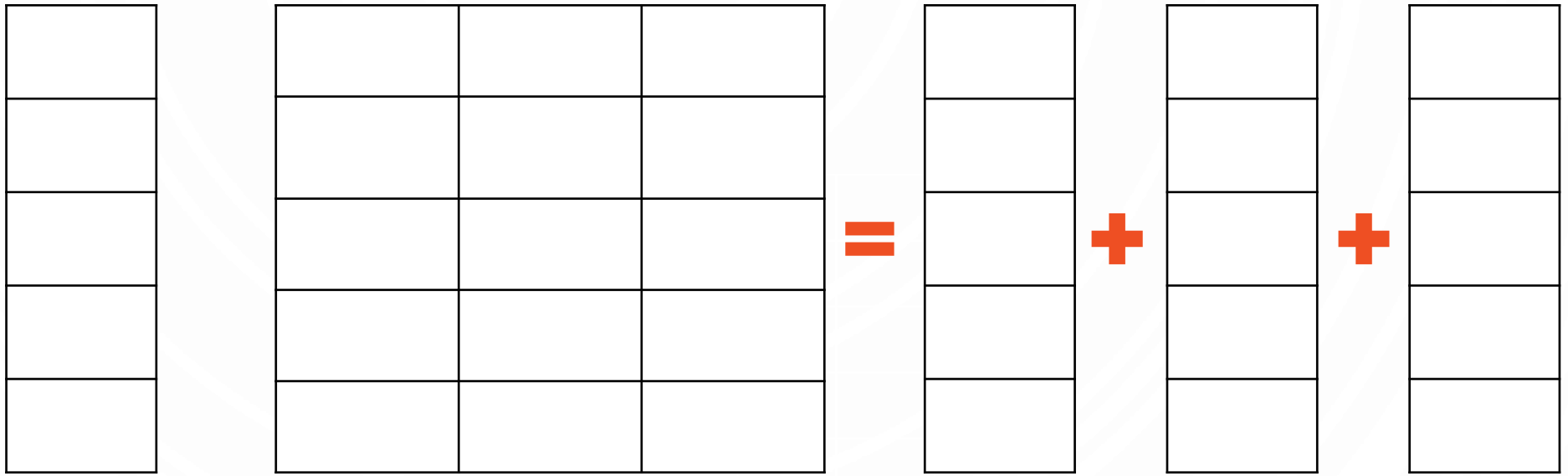
Any characteristic of a Series, is also applicable to the separate columns of a DataFrame.



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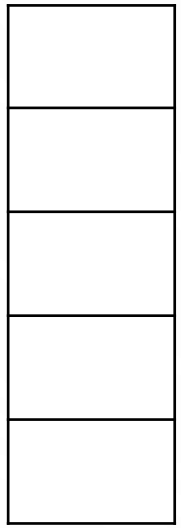

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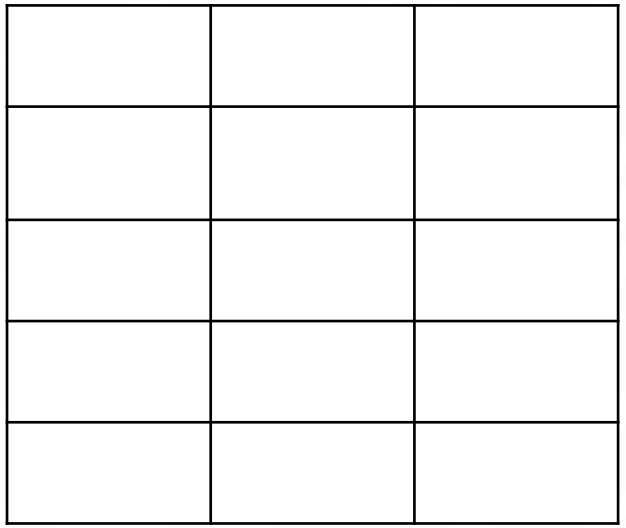

DataFrame

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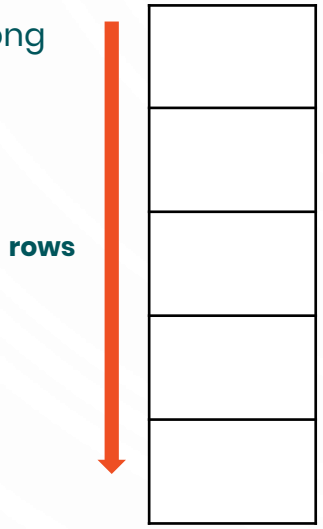
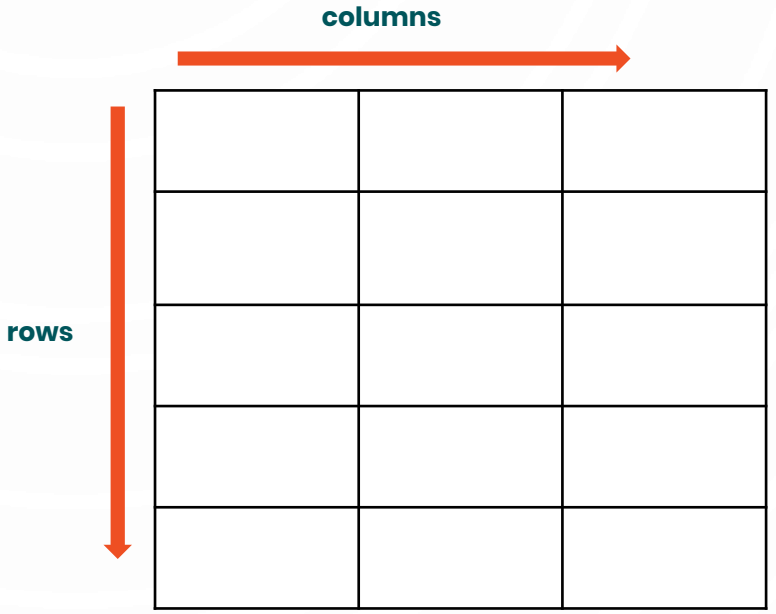
One-dimensional data structure

- contains values along **a single** axis (rows)



Series

Two-dimensional data structure



DataFrame

- contains values along **two** axes (rows and columns)
- represents a **tabular** structure
- it is the closest Python analogue to a standard two-dimensional dataset, or a spreadsheet
- can have both row and column **labels**

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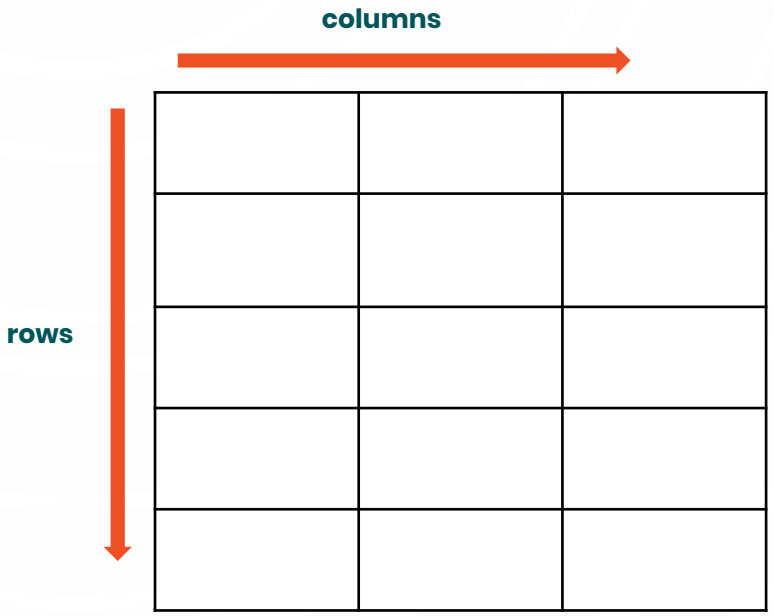
Two-dimensional
data structure



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DataFrame

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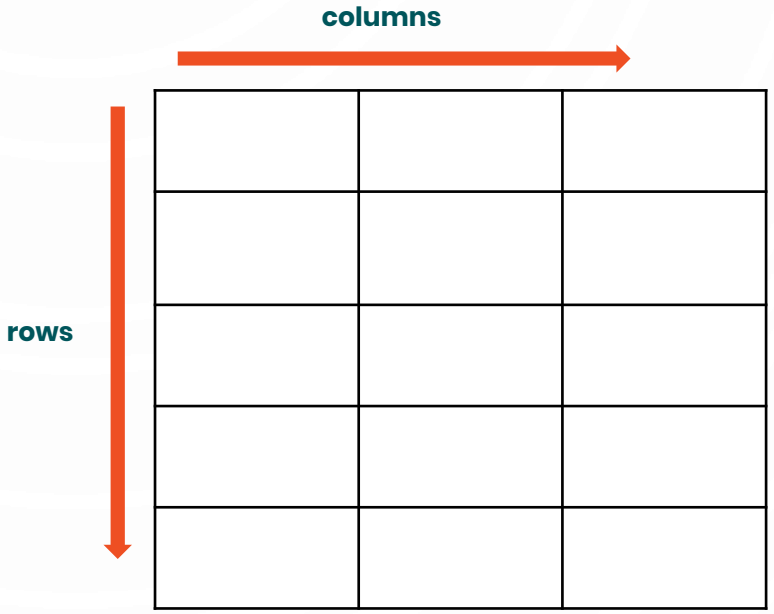
2-D Matrix = **Two-dimensional** NumPy array = **Two-dimensional** data structure



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2-D Matrix = **Two-dimensional** NumPy array = **Two-dimensional** data structure

	var 1	var 2	var 3
observation 1			
observation 2			
observation 3			
observation 4			
observation 5			

DataFrame

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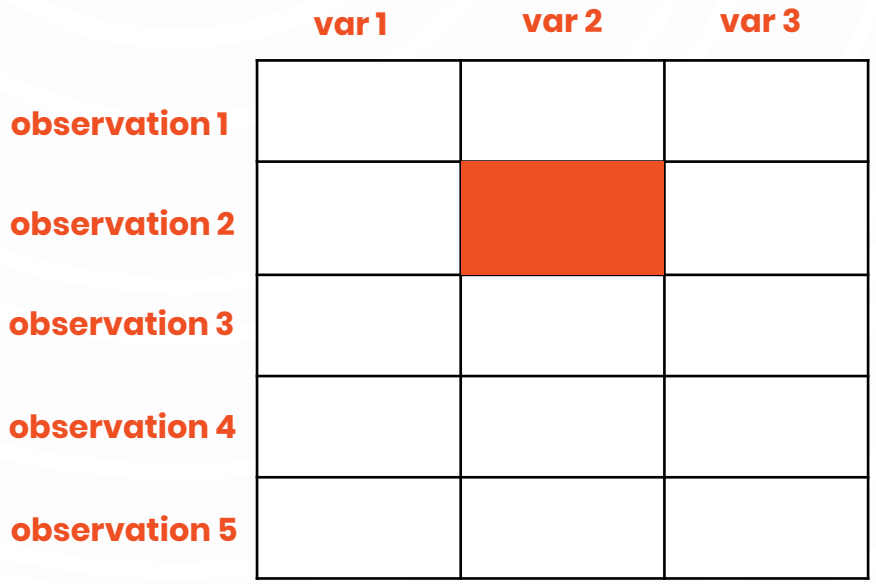

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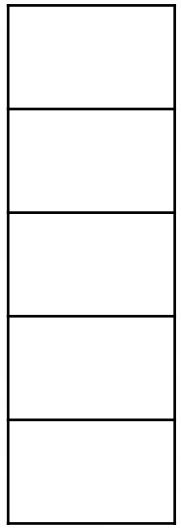

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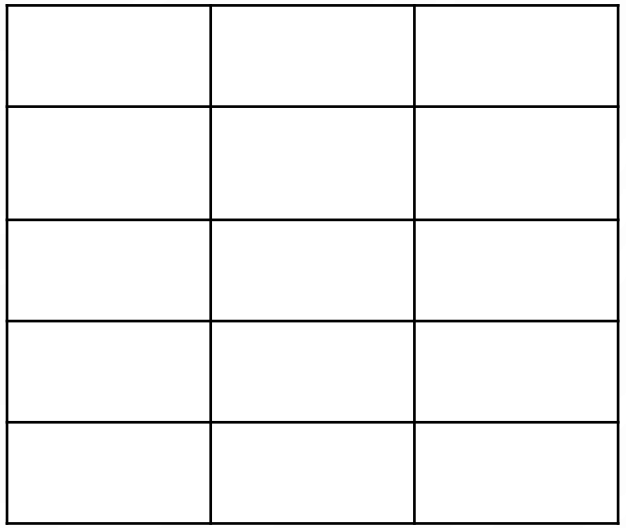

DataFrame

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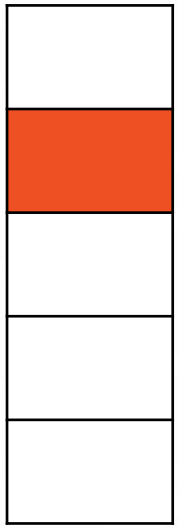
Single point
of reference

row index



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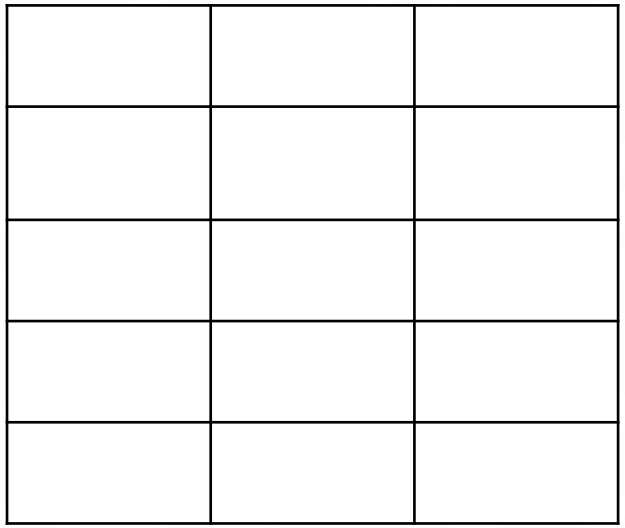

DataFrame

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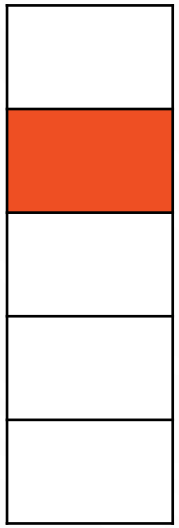

Series

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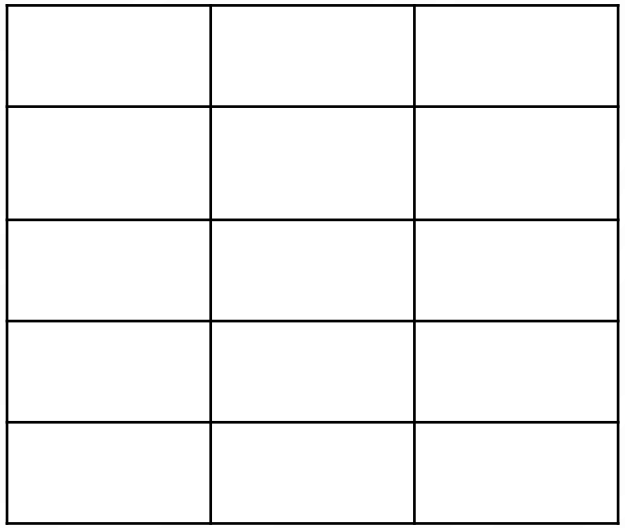

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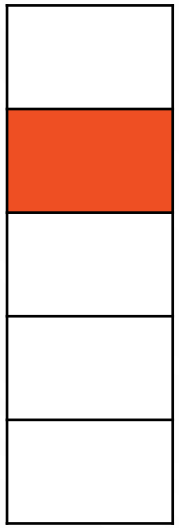
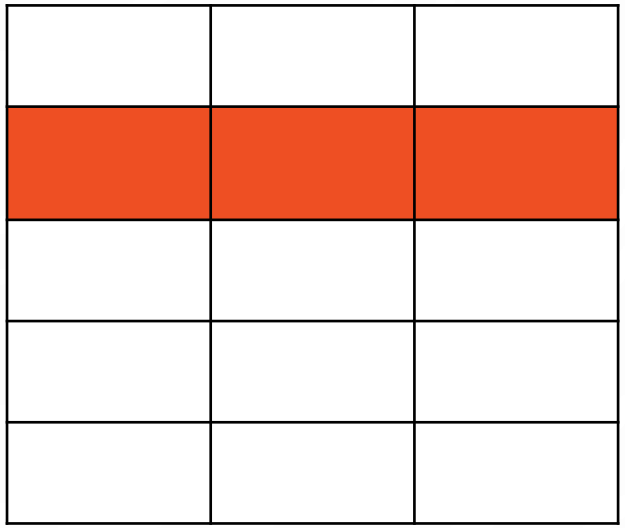


Series

Two points
of reference

column index

row index



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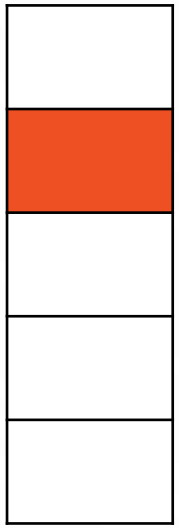

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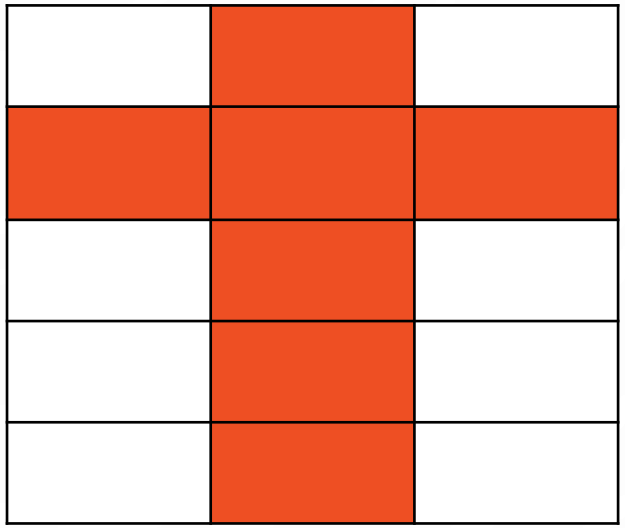

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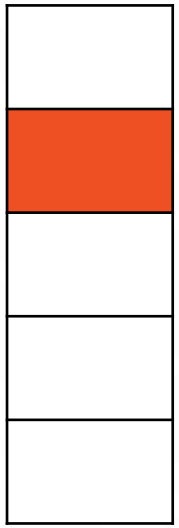

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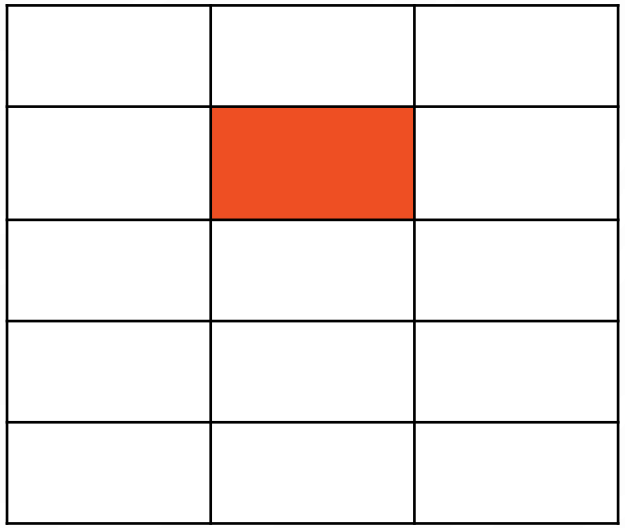

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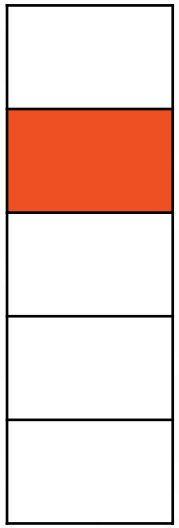

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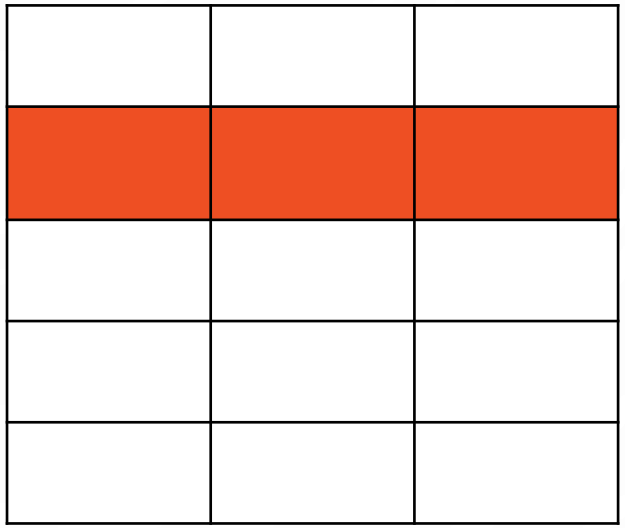

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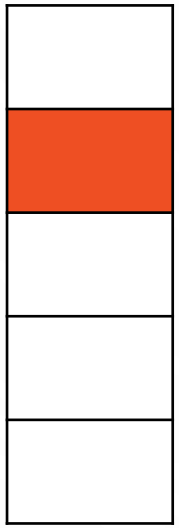

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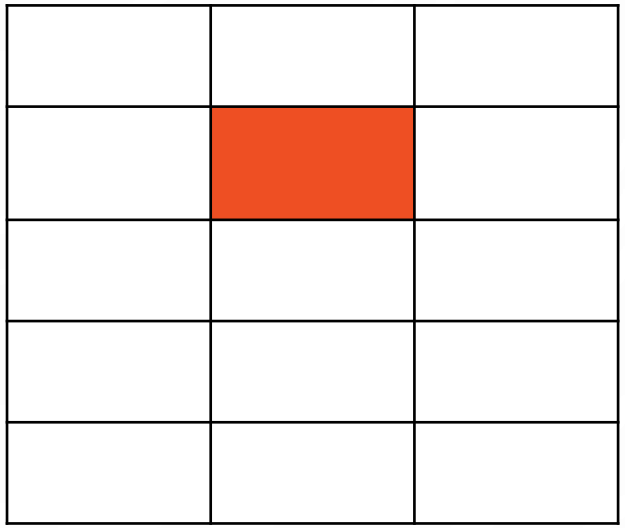

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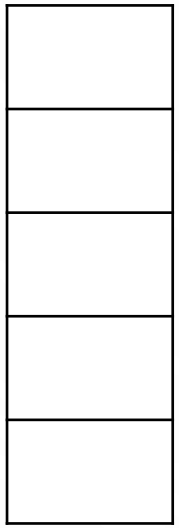

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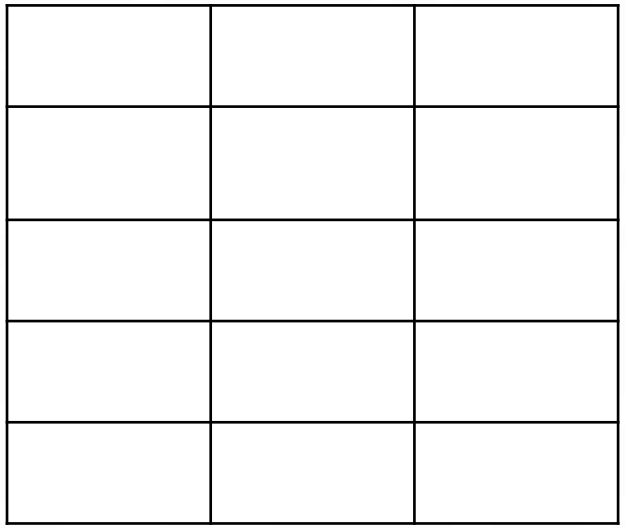

DataFrame

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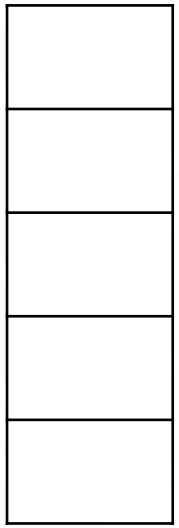
Series and DataFrames as Programming Objects

A Powerful Version of the Python List

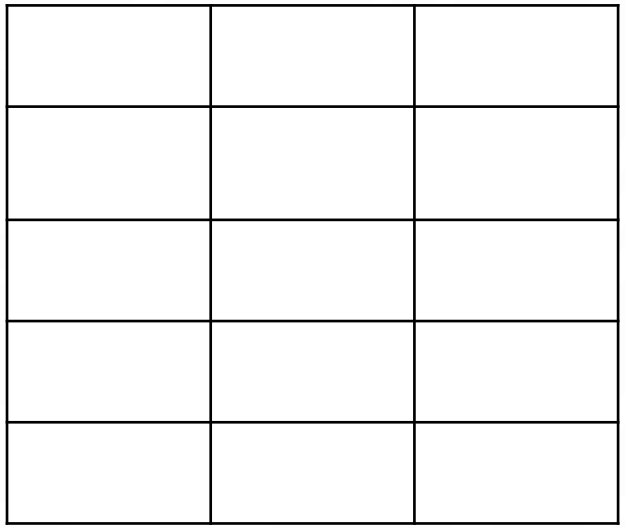
+ Python Dictionary Features

- Its indexing relates to **the keys of a dictionary**
- It also allows us to extract the desired parts of the given dataset more quickly and efficiently



Series

An Enhanced Python Dictionary



DataFrame

- We can provide a whole object that contains the values of an entire column **to the dictionary keys**
- Inherits the characteristics of the Dictionary class
- Plus a lot more features and functionalities

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