

Lecture #4 | C/C++: function, scope, array, C string

SE377 Introduction to Big Data Analysis and Visualization (2017)

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Topics for the following 2 week

- 9/18: Presentation of data analysis examples
- Read, manipulate and visualization of structured data with pandas and matplotlib
 - pandas: read and manipulate (or select) data we are interested
 - matplotlib/seaborn: visualize the given data
- Tidy data

Datatype of numpy array

- numpy array has data type (similar to typed languages such as C, C++, Java, ...) for improved performance
- When creating numpy array, dtype argument can be provided (e.g., float64, int64)
 - See the next page for more comprehensive list of data types provided in numpy
- For general objects (incl. variable length strings), object type can be used

List of dtype supported by numpy

Type	Type code	Description
int8, uint8	i1, u1	Signed/unsigned 8 bit integer
int16, uint16	i2, u2	Signed/unsigned 16 bit integer
int32 , uint32	i4, u4	Signed/unsigned 32 bit integer
int64 , uint64	i8, u8	Signed/unsigned 64 bit integer
float16	f2	16-bit floating point number
float32	f4 or f	32-bit floating point number
float64	f8 or d	64-bit floating point number
float128	f16 or g	128-bit floating point number
complex64, complex128, complex256	c8, c16, c32	64/128/256-bit complex number
bool	?	Boolean
object	O	python object
string_/unicode_	S/U	Fixed length string/unicode string. For example, string/unicode string with the length of 10 is represented by S10/U10

Pandas

- Easy-to-use data structures and data analysis tools
- Open source, BSD-licensed library
- Created by Wes McKinney in 2008
- c.f., very similar to dplyr package in R

pandas: Series

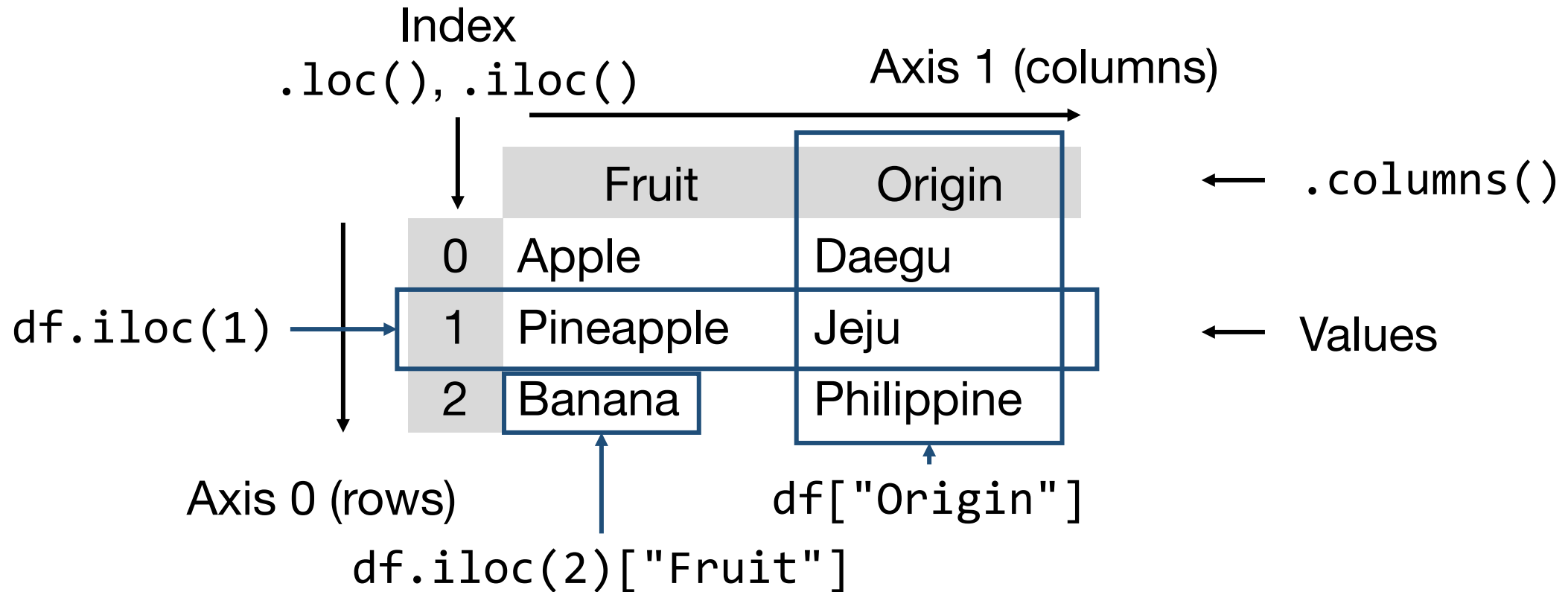
- Series: 1-dimensional data of ordered items with arbitrary index

The diagram illustrates the components of a pandas Series. It features a table with three rows. The first row has a header 'Fruit' in a grey-shaded cell, with an arrow pointing to it from the label 'Name'. The subsequent two rows contain the values 'Apple' and 'Banana', with an arrow pointing to them from the label 'Values'. To the left of the table, the word 'Index' is positioned above a downward-pointing arrow that indicates the index column. The index values '0', '1', and '2' are shown in a grey-shaded column to the left of the fruit names.

	Fruit	
0	Apple	
1	Pineapple	
2	Banana	

pandas: DataFrame

- DataFrame
 - 2-dimensional data of ordered items with arbitrary index and column names
 - Each column may have different datatypes



Reading List (choose whatever you like most)

- Reference: <https://pandas.pydata.org/pandas-docs/stable/index.html>
- 10 Minutes to pandas: <https://pandas.pydata.org/pandas-docs/stable/10min.html>
- python + numpy pandas
 - <https://www.slideshare.net/dahlmoon/pythonnumpy-pandas-1>
 - <https://www.slideshare.net/dahlmoon/pythonnumpy-pandas-2>
 - <https://www.slideshare.net/dahlmoon/pythonnumpy-pandas-3>
 - <https://www.slideshare.net/dahlmoon/pythonnumpy-pandas-4>
- pandas cookbook: <https://github.com/jvns/pandas-cookbook>
- And many other really good tutorials/documents!!!



ANY QUESTIONS?