2018 COMP20008 Workshop 1

Your Tutor

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Github: https://github.com/winnchow/2018-COMP20008

Agenda

Python programming:

Run Andaconda 3 > Jupyter Notebook

Pandas

- Series
- DataFrames
- Groupby

Discussion questions (if time allows)

Jupyter Notebook Python 3

1. Anaconda 3 -> Anaconda Prompt
   - cd <your working directory>
   - jupyter notebook
2. Anaconda 3 -> Jupyter Notebook

Python Data Analysis Library (Pandas)

Official Website

- https://pandas.pydata.org/

Documentation

- http://pandas.pydata.org/pandas-docs/stable/

API reference

- http://pandas.pydata.org/pandas-docs/stable/api.html

10 Minutes to pandas

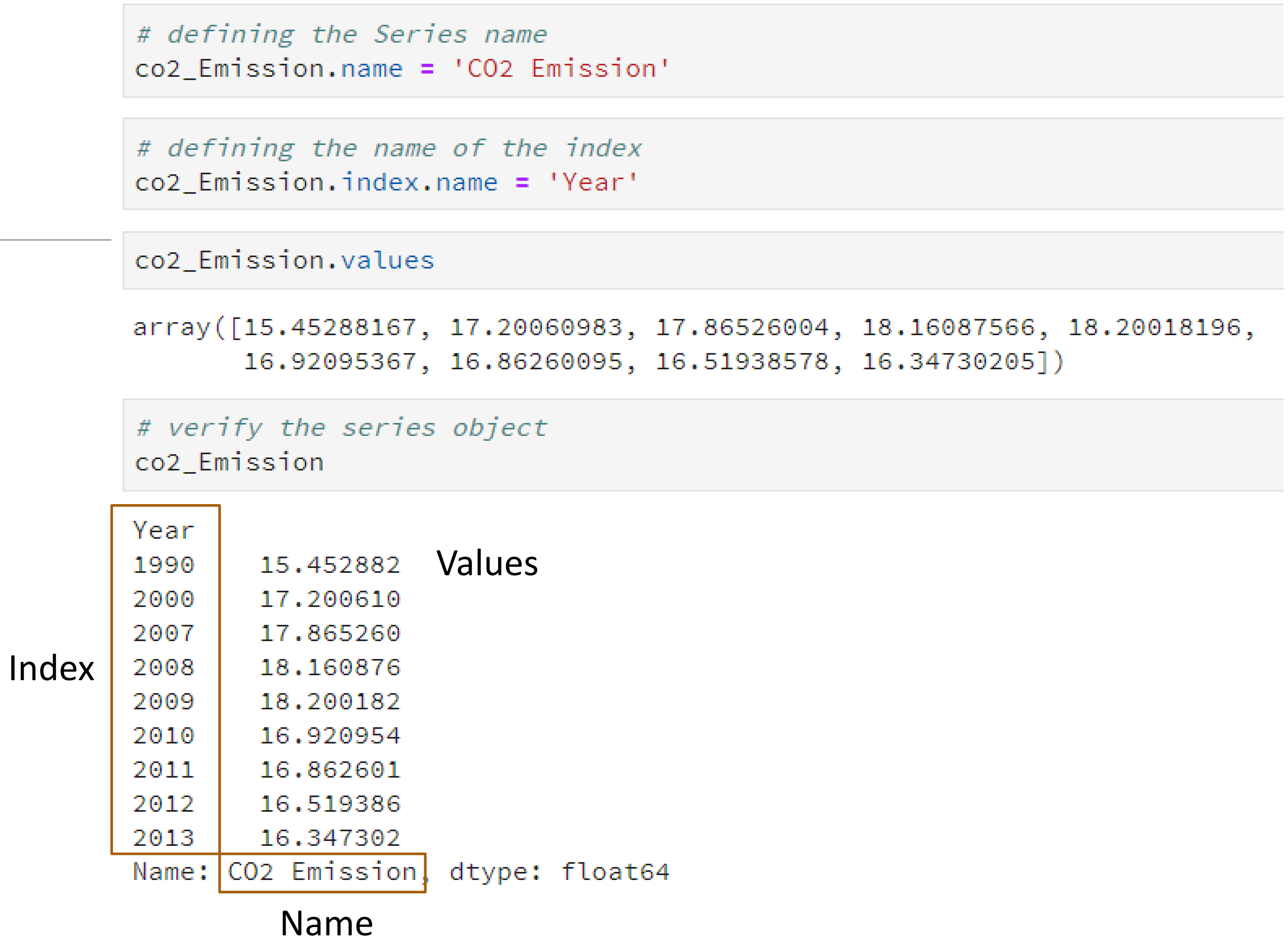
- http://pandas.pydata.org/pandas-docs/stable/10min.html#min

Pandas Cheat Sheet

- https://s3.amazonaws.com/assets.datacamp.com/blog_assets/PandasPythonForDataScience.pdf

Series

A array of values with labels (called index)



```
# defining the Series name
co2_Emission.name = 'CO2 Emission'
```

```
# defining the name of the index
co2_Emission.index.name = 'Year'
```

```
co2_Emission.values
```

```
array([15.45288167, 17.20060983, 17.86526004, 18.16087566, 18.20018196,
       16.92095367, 16.86260095, 16.51938578, 16.34730205])
```

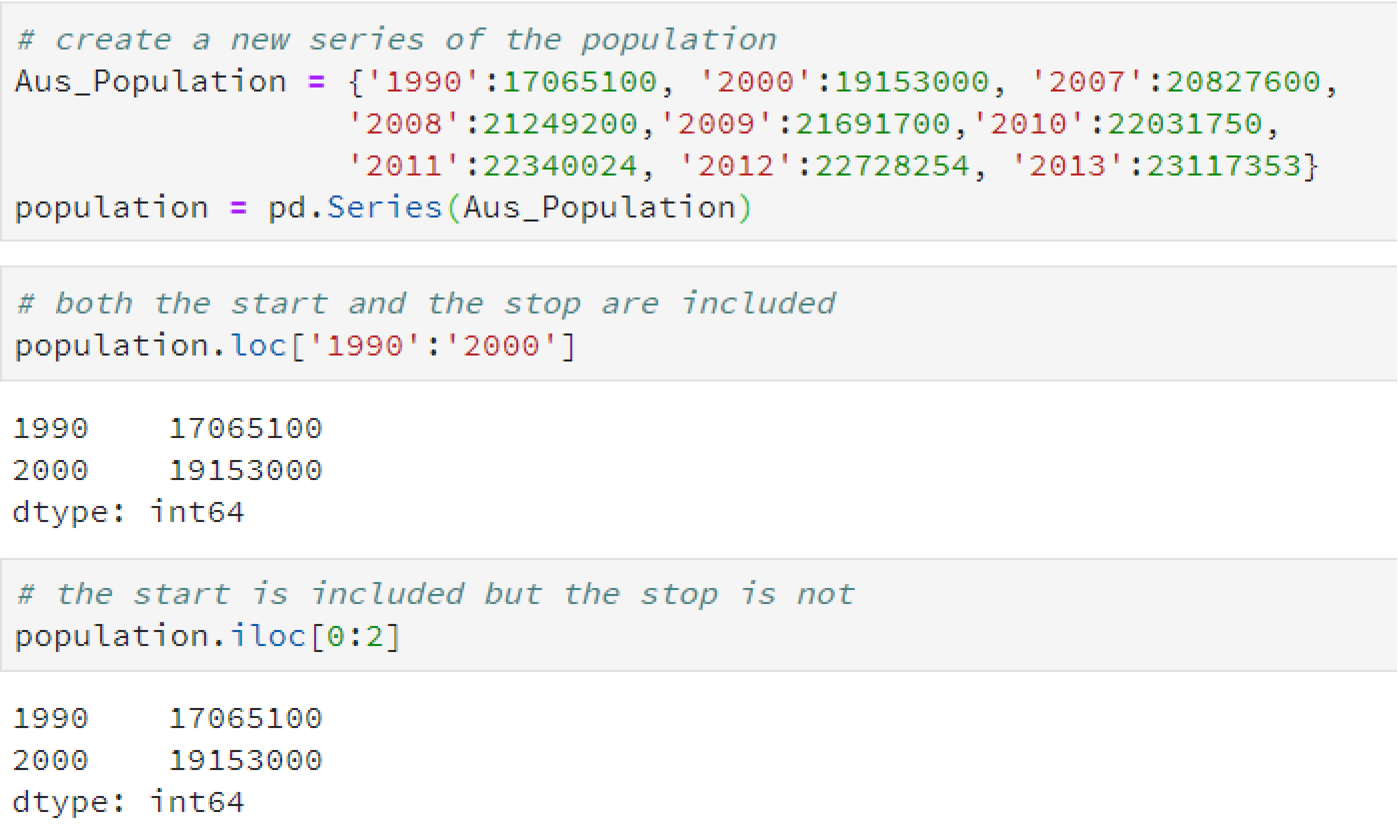
```
# verify the series object
co2_Emission
```

```
Year
1990    15.452882
2000    17.200610
2007    17.865260
2008    18.160876
2009    18.200182
2010    16.920954
2011    16.862601
2012    16.519386
2013    16.347302
Name: CO2 Emission, dtype: float64
```

Selection

.loc is primarily label based

.iloc is primarily integer position based



```
# create a new series of the population
Aus_Population = {'1990':17065100, '2000':19153000, '2007':20827600,
                  '2008':21249200,'2009':21691700,'2010':22031750,
                  '2011':22340024, '2012':22728254, '2013':23117353}
population = pd.Series(Aus_Population)
```

```
# both the start and the stop are included
population.loc['1990':'2000']
```

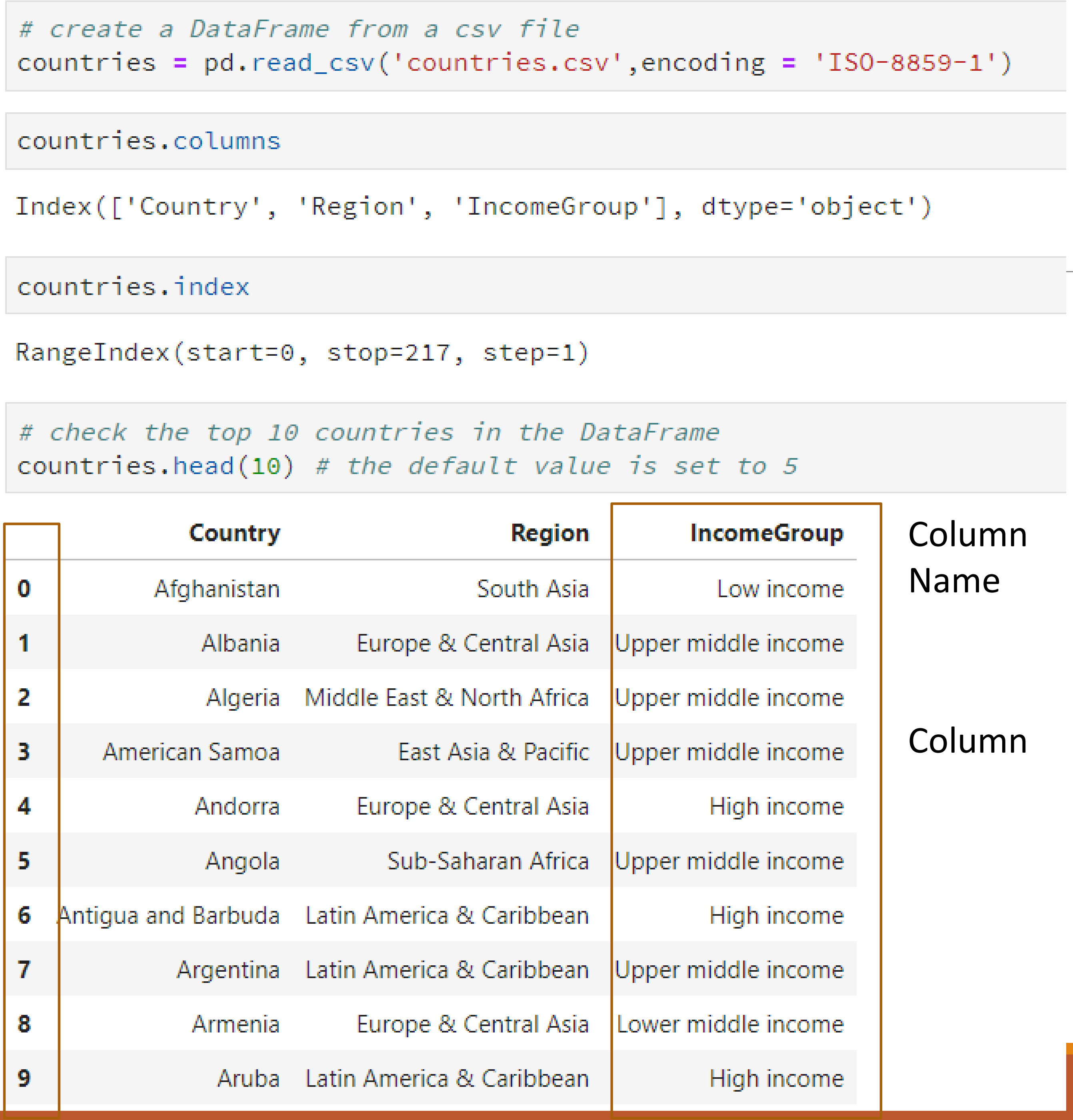
```
1990    17065100
2000    19153000
dtype: int64
```

```
# the start is included but the stop is not
population.iloc[0:2]
```

```
1990    17065100
2000    19153000
dtype: int64
```

DataFrame

Two-dimensional tabular data structure contains an ordered collection of columns



```
# create a DataFrame from a csv file
countries = pd.read_csv('countries.csv',encoding = 'ISO-8859-1')
```

```
countries.columns
```

```
Index(['Country', 'Region', 'IncomeGroup'], dtype='object')
```

```
countries.index
```

```
RangeIndex(start=0, stop=217, step=1)
```

```
# check the top 10 countries in the DataFrame
countries.head(10) # the default value is set to 5
```

	Country	Region	IncomeGroup
0	Afghanistan	South Asia	Low income
1	Albania	Europe & Central Asia	Upper middle income
2	Algeria	Middle East & North Africa	Upper middle income
3	American Samoa	East Asia & Pacific	Upper middle income
4	Andorra	Europe & Central Asia	High income
5	Angola	Sub-Saharan Africa	Upper middle income
6	Antigua and Barbuda	Latin America & Caribbean	High income
7	Argentina	Latin America & Caribbean	Upper middle income
8	Armenia	Europe & Central Asia	Lower middle income
9	Aruba	Latin America & Caribbean	High income

Column Name

Index

Column

Reference

Python for data analysis [electronic resource] / Wes McKinney (the creator of Pandas)

- https://eds-b-ebscohost-com.ezp.lib.unimelb.edu.au/eds/detail/detail?vid=4&sid=149fdfdf-6ea8-49ae-b82f-11dc053d9891%40pdc-v-sessmgr05&bdata=JnNpdGU9ZWRzLWxpdmUmc2NvcGU9c2l0ZQ%3d%3d#AN=melb.b6087937&db=cat00006a

Data Wrangling

Data Science

- https://cdn-images-1.medium.com/max/1000/1*mgXvzNcwfpnBawI6XTkVRg.png

Examples of Dirty Data

- https://www.youtube.com/watch?v=Z7ffLdRsftg

What is Big Data?

- https://www.sas.com/en_au/insights/big-data/what-is-big-data.html