Introduction to Data Science

Data Science Essentials

Goals for today

- Review last session coding tasks
- A little more matplotlib
- Combining DataFrames (concat/merge)
- Feature engineering
- Choropleths

Review last session coding tasks

week3_review notebook

More matplotlib:

matplotlib_styling notebook

Combining DataFrames

Concatenating two DataFrames:

pd.concat(*[<df1>, <df2>, <df3>]*) pass a ***list*** of dataframes to concatenate

df1

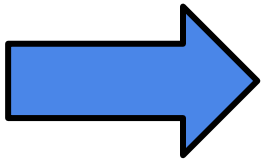
	A	B	C	D
0	A0	B0	C0	D0
1	A1	B1	C1	D1
2	A2	B2	C2	D2
3	A3	B3	C3	D3

df2

	A	B	C	D
4	A4	B4	C4	D4
5	A5	B5	C5	D5
6	A6	B6	C6	D6
7	A7	B7	C7	D7

df3

	A	B	C	D
8	A8	B8	C8	D8
9	A9	B9	C9	D9
10	A10	B10	C10	D10
11	A11	B11	C11	D11



Result

	A	B	C	D
0	A0	B0	C0	D0
1	A1	B1	C1	D1
2	A2	B2	C2	D2
3	A3	B3	C3	D3
4	A4	B4	C4	D4
5	A5	B5	C5	D5
6	A6	B6	C6	D6
7	A7	B7	C7	D7
8	A8	B8	C8	D8
9	A9	B9	C9	D9
10	A10	B10	C10	D10
11	A11	B11	C11	D11

- **Same columns**
- **Like pasting them together**

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Merging two DataFrames:

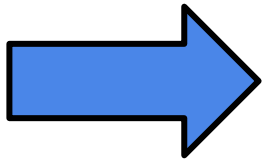
pd.merge(<df1>, <df2>, on = <col or list of cols to join on>, how = <join_type>*)*

left

	key	A	B
0	K0	A0	B0
1	K1	A1	B1
2	K2	A2	B2
3	K3	A3	B3

right

	key	C	D
0	K0	C0	D0
1	K1	C1	D1
2	K2	C2	D2
3	K3	C3	D3



Result

	key	A	B	C	D
0	K0	A0	B0	C0	D0
1	K1	A1	B1	C1	D1
2	K2	A2	B2	C2	D2
3	K3	A3	B3	C3	D3

- Need one or more “key” columns to join on
- Pastes matching rows together along the key column(s)

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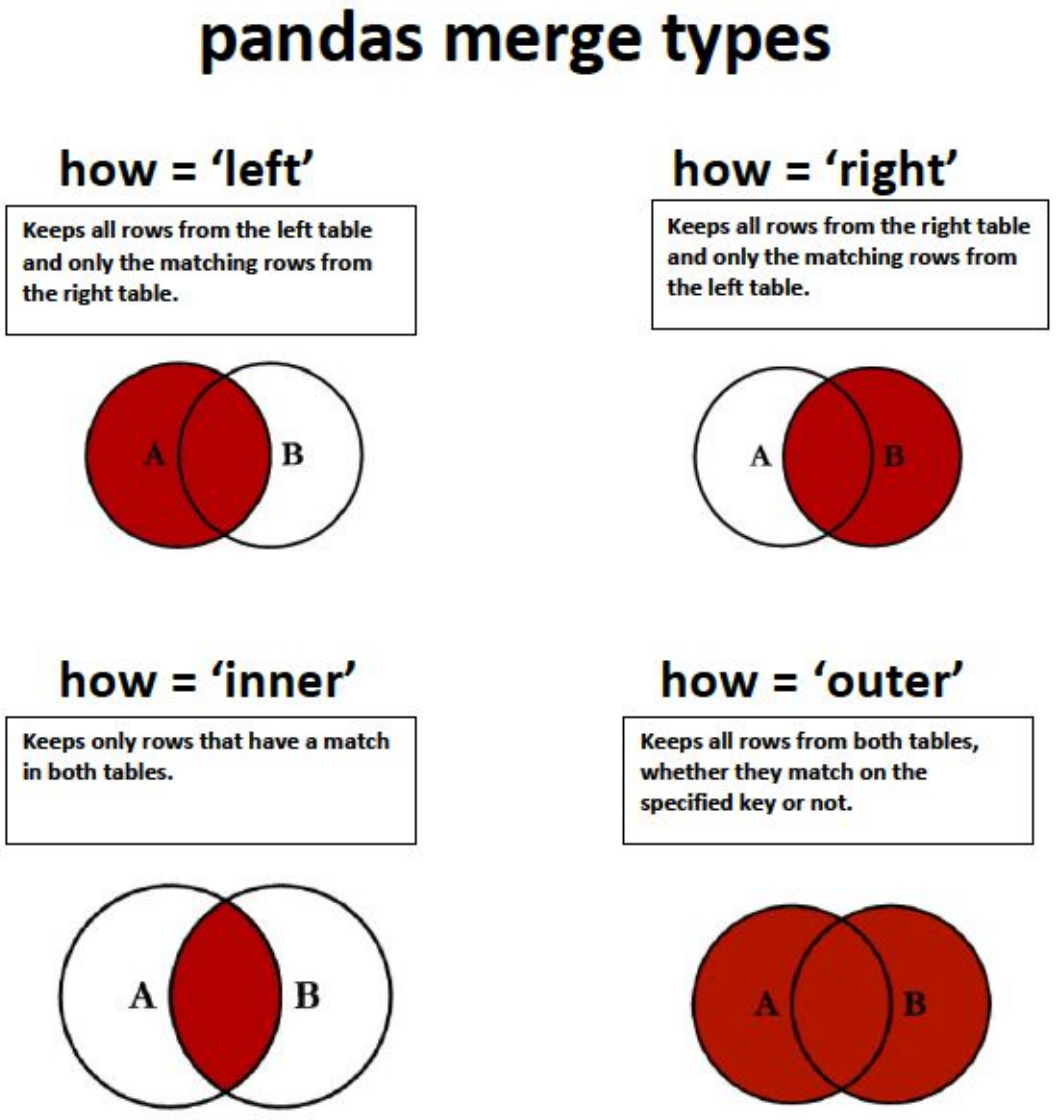
Merging two DataFrames:

pd.merge(<df1>, <df2>, on = <col or list of cols to join on>, how = <join_type>*)*



- One or more matching columns (keys)

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Feature Engineering

- Create more meaningful features
  - A statistic that compares the annual total cost of care by county to the county's average income (cost_income_ratio)
  - Others?
    - Average income per person (exemptions can be a proxy for person count)?

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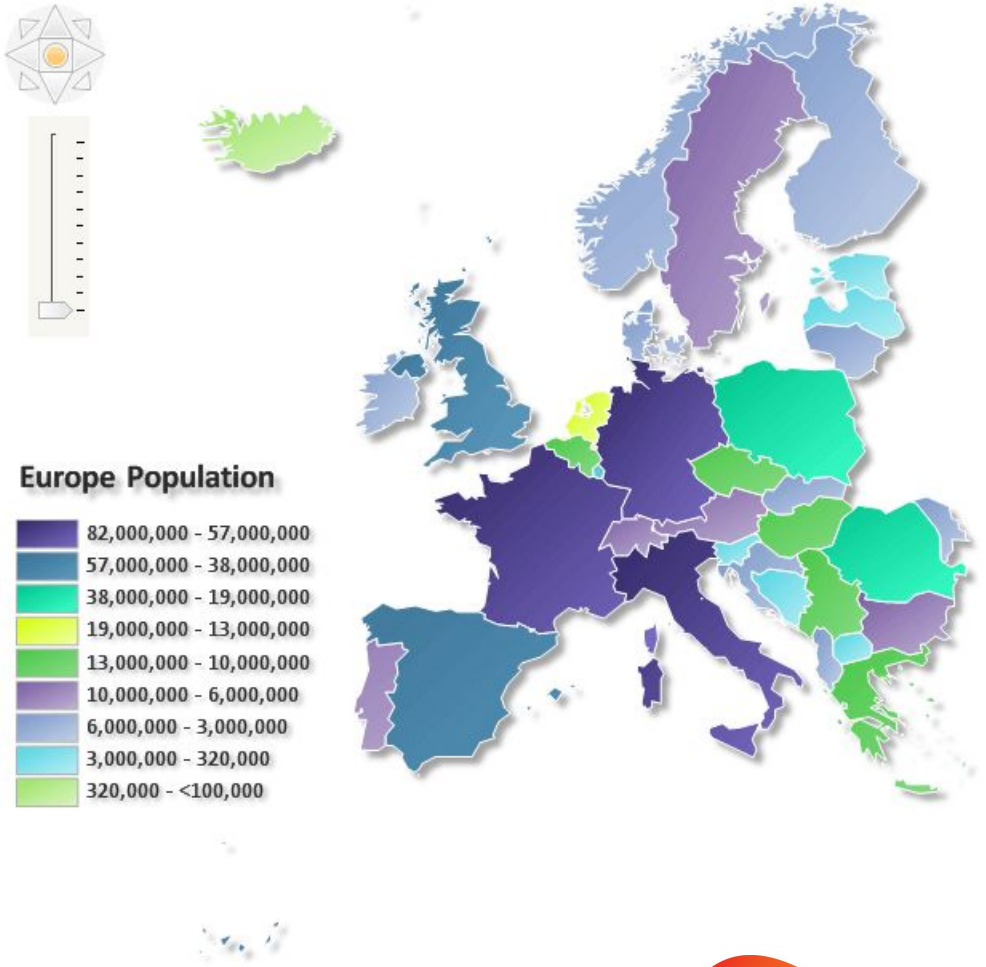
Choropleths

A choropleth is a map where areas are colored or shaded according to the value of some aggregate statistic for that area (eg. average income, population density, unemployment rate, etc.)

We will create choropleths in Python by using the *geopandas* library, which you will most likely need to install.

To install geopandas, open the Terminal (Mac) or Anaconda Prompt (Windows) and type

$ conda install geopandas



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Building a choropleth

Choropleth_Tutorial notebook

Questions?