Data Wrangling
with pandas Cheat Sheet
http://pandas.pydata.org

Pandas API Reference   Pandas User Guide

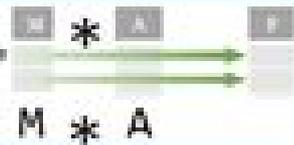## Tidy Data – A foundation for wrangling in pandas

In a tidy data set:

Each **variable** is saved in its own **column**

Each **observation** is saved in its own **row**

Tidy data complements pandas's **vectorized operations**. pandas will automatically preserve observations as you manipulate variables. No other format works as intuitively with pandas.

M * A

Creating DataFrames


```
df = pd.DataFrame(
        {"a" : [4, 5, 6],
         "b" : [7, 8, 9],
         "c" : [10, 11, 12]},
        index = [1, 2, 3])
```
Specify values for each column.

```
df = pd.DataFrame(
        [[4, 7, 10],
         [5, 8, 11],
         [6, 9, 12]],
        index=[1, 2, 3],
        columns=['a', 'b', 'c'])
```
Specify values for each row.


```
df = pd.DataFrame(
        {"a" : [4 ,5, 6],
         "b" : [7, 8, 9],
         "c" : [10, 11, 12]},
index = pd.MultiIndex.from_tuples(
        [('d', 1), ('d', 2),
         ('e', 2)], names=['n', 'v']))
```
Create DataFrame with a MultiIndex

Method Chaining

Most pandas methods return a DataFrame so that another pandas method can be applied to the result. This improves readability of code.
```
df = (pd.melt(df)
        .rename(columns={
                'variable' : 'var',
                'value' : 'val'})
        .query('val >= 200')
     )
```
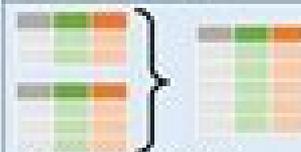
Reshaping Data – Change layout, sorting, reindexing, renaming

`pd.melt(df)`
Gather columns into rows.

`df.pivot(columns='var', values='val')`
Spread rows into columns.

`pd.concat([df1,df2])`
Append rows of DataFrames

`pd.concat([df1,df2], axis=1)`
Append columns of DataFrames

`df.sort_values('mpg')`
Order rows by values of a column (low to high).

`df.sort_values('mpg', ascending=False)`
Order rows by values of a column (high to low).

`df.rename(columns = {'y':'year'})`
Rename the columns of a DataFrame

`df.sort_index()`
Sort the index of a DataFrame

`df.reset_index()`
Reset index of DataFrame to row numbers, moving index to columns.

`df.drop(columns=['Length', 'Height'])`
Drop columns from DataFrame

Subset Observations - rows

`df[df.Length > 7]`
Extract rows that meet logical criteria.

`df.drop_duplicates()`
Remove duplicate rows (only considers columns).

`df.sample(frac=0.5)`
Randomly select fraction of rows.

`df.sample(n=10)` Randomly select n rows.

`df.nlargest(n, 'value')`
Select and order top n entries.

`df.nsmallest(n, 'value')`
Select and order bottom n entries.

`df.head(n)`
Select first n rows.

`df.tail(n)`
Select last n rows.

Subset Variables - columns

`df[['width', 'length', 'species']]`
Select multiple columns with specific names.

`df['width']` or `df.width`
Select single column with specific name.

`df.filter(regex='regex')`
Select columns whose name matches regular expression regex.

Using query

query() allows Boolean expressions for filtering rows.

`df.query('Length > 7')`

`df.query('Length > 7 and Width < 8')`

`df.query('Name.str.startswith("abc")', engine="python")`

Subsets - rows and columns

Use `df.loc[]` and `df.iloc[]` to select only rows, only columns or both.
Use `df.at[]` and `df.iat[]` to access a single value by row and column.
First index selects rows, second index columns.

`df.iloc[10:20]`
Select rows 10-20.

`df.iloc[:, [1, 2, 5]]`
Select columns in positions 1, 2 and 5 (first column is 0).

`df.loc[:, 'x2':'x4']`
Select all columns between x2 and x4 (inclusive).

`df.loc[df['a'] > 10, ['a', 'c']]`
Select rows meeting logical condition, and only the specific columns .

`df.iat[1, 2]` Access single value by index

`df.at[4, 'A']` Access single value by label

Logic in Python (and pandas)		
<	Less than	!=	Not equal to
>	Greater than	df.column.isin(values)	Group membership
==	Equals	pd.isnull(obj)	Is NaN
<=	Less than or equals	pd.notnull(obj)	Is not NaN
>=	Greater than or equals	&,|,~,^,df.any(),df.all()	Logical and, or, not, xor, any, all

regex (Regular Expressions) Examples	
'\.'	Matches strings containing a period '.'
'Length$'	Matches strings ending with word 'Length'
'^Sepal'	Matches strings beginning with the word 'Sepal'
'^x[1-5]$'	Matches strings beginning with 'x' and ending with 1,2,3,4,5
'^(?!Species$).*'	Matches strings except the string 'Species'

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Siddappa N.Byrareddy

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Table of Contents Gradpoint Cheat Sheet

1. Understanding the eBook Gradpoint Cheat Sheet
    - The Rise of Digital Reading Gradpoint Cheat Sheet
    - Advantages of eBooks Over Traditional Books
2. Identifying Gradpoint Cheat Sheet
    - Exploring Different Genres
    - Considering Fiction vs. Non-Fiction
    - Determining Your Reading Goals
3. Choosing the Right eBook Platform
    - Popular eBook Platforms
    - Features to Look for in an Gradpoint Cheat Sheet
    - User-Friendly Interface
4. Exploring eBook Recommendations from Gradpoint Cheat Sheet
    - Personalized Recommendations
    - Gradpoint Cheat Sheet User Reviews and Ratings
    - Gradpoint Cheat Sheet and Bestseller Lists
5. Accessing Gradpoint Cheat Sheet Free and Paid eBooks
    - Gradpoint Cheat Sheet Public Domain eBooks
    - Gradpoint Cheat Sheet eBook Subscription Services
    - Gradpoint Cheat Sheet Budget-Friendly Options
6. Navigating Gradpoint Cheat Sheet eBook Formats

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