Python Cheat Sheet

Python | Pandas

Data Analysis

Data Visualization

Artificial Corner

Python Basics Cheat Sheet

Here you will find all the Python core concepts you need to know before learning any third-party library.

Data Types

```
Integers (int): 1
Float (float): 1.2
String (str): "Hello World"
Boolean: True/False
List: [value1, value2]
Dictionary: {key1:value1, key2:value2, ...}
```

Numeric Operators

+	Addition
-	Subtraction
*	Multiplication
/	Division
**	Exponent
%	Modulus
//	Floor division

Comparison Operators

==	Equal to
!=	Different
>	Greater than
<	Less than
>=	Greater than or equal to
<=	Less than or equal to

String methods

```
string.upper(): converts to uppercase
string.lower(): converts to lowercase
string.title(): converts to title case
string.count('l'): counts how many times "l"
                   appears
string.find('h'): position of the "h" first
                  ocurrance
string.replace('o', 'u'): replaces "o" with "u"
```

Variables

Variable assignment:

```
message_1 = "I'm learning Python"
message_2 = "and it's fun!"
```

String concatenation (+ operator):

```
message_1 + ' ' + message_2
```

String concatenation (f-string):

```
f'{message_1} {message_2}'
```

List

Creating a list:

```
countries = ['United States', 'India',
             'China', 'Brazil']
```

Create an empty list:

```
my_list = []
```

Indexing:

```
>>> countries[0]
United States

>>> countries[3]
Brazil

>>> countries[-1]
Brazil
```

Slicing:

```
>>>countries[0:3]
['United States', 'India', 'China']

>>>countries[1:]
['India', 'China', 'Brazil']

>>>countries[:2]
['United States', 'India']
```

Adding elements to a list:

```
countries.append('Canada')
countries.insert(0,'Canada')
```

Nested list:

```
nested_list = [countries, countries_2]
```

Remove element:

```
countries.remove('United States')
countries.pop(0)#removes and returns value
del countries[0]
```

Creating a new list:

```
numbers = [4, 3, 10, 7, 1, 2]
```

Sorting a list:

```
>>> numbers.sort()
[1, 2, 3, 4, 7, 10]

>>> numbers.sort(reverse=True)
[10, 7, 4, 3, 2, 1]
```

Update value on a list:

```
>>> numbers[0] = 1000
>>> numbers
[1000, 7, 4, 3, 2, 1]
```

Copying a list:

```
new_list = countries[:]
new_list_2 = countries.copy()
```

Built-in Functions

Print an object:

```
print("Hello World")
```

Return the length of x:

```
len(x)
```

Return the minimum value:

```
min(x)
```

Return the maximum value:

```
max(x)
```

Returns a sequence of numbers:

```
range(x1,x2,n) # from x1 to x2
(increments by n)
```

Convert x to a string:

```
str(x)
```

Convert x to an integer/float:

```
int(x)
float(x)
```

Convert x to a list:

```
list(x)
```

Dictionary

Creating a dictionary:

```
my_data = {'name':'Frank', 'age':26}
```

Create an empty dictionary:

```
my_dict = {}
```

Get value of key "name":

```
>>> my_data["name"]
'Frank'
```

Get the keys:

```
>>> my_data.keys()
dict_keys(['name', 'age'])
```

Get the values:

```
>>> my_data.values()
dict_values(['Frank', 26])
```

Get the pair key-value:

```
>>> my_data.items()
dict_items([('name', 'Frank'), ('age', 26)])
```

Adding/updating items in a dictionary:

```
my_data['height']=1.7
my_data.update({'height':1.8,
          'languages':['English', 'Spanish']})
>>> my_data
{'name': 'Frank',
'age': 26,
'height': 1.8,
'languages': ['English', 'Spanish']}
```

Remove an item:

```
my_data.pop('height')
del my_data['languages']
my_data.clear()
```

Copying a dictionary:

```
new_dict = my_data.copy()
```

If Statement

Conditional test:

```
if <condition>:
    <code>
elif <condition>:
    <code>
...
else:
    <code>
```

Example:

```
if age>=18:
    print("You're an adult!")
```

Conditional test with list:

```
if <value> in <list>:
    <code>
```

Loops

For loop:

```
for <variable> in <list>:
    <code>
```

For loop and enumerate list elements:

```
for i, element in enumerate(<list>):
    <code>
```

For loop and obtain dictionary elements:

```
for key, value in my_dict.items():
    <code>
```

While loop:

```
while <condition>:
    <code>
```

Data Validation

Try-except:

```
try:
    <code>
except <error>:
    <code>
```

Loop control statement:

```
break: stops loop execution
continue: jumps to next iteration
pass: does nothing
```

Functions

Create a function:

```
def function(<params>):
    <code>
    return <data>
```

Modules

Import module:

```
import module
module.method()
```

OS module:

```
import os
os.getcwd()
os.listdir()
os.makedirs(<path>)
```

Special Characters

#	Comment
\n	New Line

Boolean Operators

and	logical AND
or	logical OR
not	logical NOT

Boolean Operators (Pandas)

&	logical AND
|	logical OR
~	logical NOT

```
Below are my guides, tutorials and
complete Data Science course:
- Medium Guides
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- Data Science Course (Udemy)
- Make Money Using Your Programming
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```

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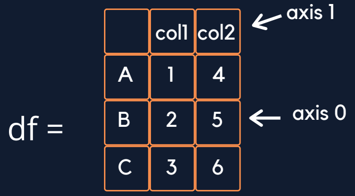
Pandas Cheat Sheet

Pandas provides data analysis tools for Python. All of the following code examples refer to the dataframe below.



	col1	col2
A	1	4
B	2	5
C	3	6

Getting Started

Import pandas:

```
import pandas as pd
```

Create a series:

```
s = pd.Series([1, 2, 3],
              index=['A', 'B', 'C'],
              name='col1')
```

Create a dataframe:

```
data = [[1, 4], [2, 5], [3, 6]]
index = ['A', 'B', 'C']
df = pd.DataFrame(data, index=index,
                  columns=['col1', 'col2'])
```

Read a csv file with pandas:

```
df = pd.read_csv('filename.csv')
```

Advanced parameters:

```
df = pd.read_csv('filename.csv', sep=',',
                 names=['col1', 'col2'],
                 index_col=0,
                 encoding='utf-8',
                 nrows=3)
```

Selecting rows and columns

Select single column:

```
df['col1']
```

Select multiple columns:

```
df[['col1', 'col2']]
```

Show first n rows:

```
df.head(2)
```

Show last n rows:

```
df.tail(2)
```

Select rows by index values:

```
df.loc['A'] df.loc[['A', 'B']]
```

Select rows by position:

```
df.iloc[1] df.iloc[1:]
```

Data wrangling

Filter by value:

```
df[df['col1'] > 1]
```

Sort by one column:

```
df.sort_values('col1')
```

Sort by columns:

```
df.sort_values(['col1', 'col2'],
               ascending=[False, True])
```

Identify duplicate rows:

```
df.duplicated()
```

Identify unique rows:

```
df['col1'].unique()
```

Swap rows and columns:

```
df = df.transpose()
df = df.T
```

Drop a column:

```
df = df.drop('col1', axis=1)
```

Clone a data frame:

```
clone = df.copy()
```

Concatenate multiple dataframes vertically:

```
df2 = df + 5 # new dataframe
pd.concat([df,df2])
```

Concatenate multiple dataframes horizontally:

```
df3 = pd.DataFrame([[7],[8], [9]],
                   index=['A','B', 'C'],
                   columns=['col3'])

pd.concat([df,df3], axis=1)
```

Only merge complete rows (INNER JOIN):

```
df.merge(df3)
```

Left column stays complete (LEFT OUTER JOIN):

```
df.merge(df3, how='left')
```

Right column stays complete (RIGHT OUTER JOIN):

```
df.merge(df3, how='right')
```

Preserve all values (OUTER JOIN):

```
df.merge(df3, how='outer')
```

Merge rows by index:

```
df.merge(df3,left_index=True,
         right_index=True)
```

Fill NaN values:

```
df.fillna(0)
```

Apply your own function:

```
def func(x):
    return 2**x
df.apply(func)
```

Arithmetics and statistics

Add to all values:

```
df + 10
```

Sum over columns:

```
df.sum()
```

Cumulative sum over columns:

```
df.cumsum()
```

Mean over columns:

```
df.mean()
```

Standard deviation over columns:

```
df.std()
```

Count unique values:

```
df['col1'].value_counts()
```

Summarize descriptive statistics:

```
df.describe()
```

Hierarchical indexing

Create hierarchical index:

```
df.stack()
```

Dissolve hierarchical index:

```
df.unstack()
```

Aggregation

Create group object:

```
g = df.groupby('col1')
```

Iterate over groups:

```
for i, group in g:
      print(i, group)
```

Aggregate groups:

```
g.sum()
g.prod()
g.mean()
g.std()
g.describe()
```

Select columns from groups:

```
g['col2'].sum()
g[['col2', 'col3']].sum()
```

Transform values:

```
import math
g.transform(math.log)
```

Apply a list function on each group:

```
def strsum(group):
 return ''.join([str(x) for x in group.value])

 g['col2'].apply(strsum)
```

```
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Data export

Data as NumPy array:

```
df.values
```

Save data as CSV file:

```
df.to_csv('output.csv', sep=",")
```

Format a dataframe as tabular string:

```
df.to_string()
```

Convert a dataframe to a dictionary:

```
df.to_dict()
```

Save a dataframe as an Excel table:

```
df.to_excel('output.xlsx')
```

Pivot and Pivot Table

Read csv file 1:

```
df_gdp = pd.read_csv('gdp.csv')
```

The pivot() method:

```
df_gdp.pivot(index="year",
             columns="country",
             values="gdppc")
```

Read csv file 2:

```
df_sales=pd.read_excel(
         'supermarket_sales.xlsx')
```

Make pivot table:

```
df_sales.pivot_table(index='Gender',
                     aggfunc='sum')
```

Make a pivot tables that says how much male and female spend in each category:

```
df_sales.pivot_table(index='Gender',
                     columns='Product line',
                     values='Total',
                     aggfunc='sum')
```

Visualization

The plots below are made with a dataframe with the shape of df_gdp (pivot() method)

Import matplotlib:

```
import matplotlib.pyplot as plt
```

Start a new diagram:

```
plt.figure()
```

Scatter plot:

```
df.plot(kind='scatter')
```

Bar plot:

```
df.plot(kind='bar',
        xlabel='data1',
        ylabel='data2')
```

Lineplot:

```
df.plot(kind='line',
        figsize=(8,4))
```

Boxplot:

```
df['col1'].plot(kind='box')
```

Histogram over one column:

```
df['col1'].plot(kind='hist',
                bins=3)
```

Piechart:

```
df.plot(kind='pie',
        y='col1',
        title='Population')
```

Set tick marks:

```
labels = ['A', 'B', 'C', 'D']
positions = [1, 2, 3, 4]
plt.xticks(positions, labels)
plt.yticks(positions, labels)
```

Label diagram and axes:

```
plt.title('Correlation')
plt.xlabel('Nunstück')
plt.ylabel('Slotermeyer')
```

Save most recent diagram:

```
plt.savefig('plot.png')
plt.savefig('plot.png',dpi=300)
plt.savefig('plot.svg')
```