Programming Help Sheet

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When facing a problem with your code, a library function, etc., to increase the chances of learning from your mistakes, the first thing you should do is to check the official documentation to see if you are doing things correctly (e.g., properly using the library function by passing the right kinds of arguments), then check more structured websites that contain general Python tutorials and read their explanations; afterwards, if you are still struggling check websites like StackOverflow (but beware: sometimes you can find there very specific solutions to the specific problems there, solutions that are too complicated and that you don't need, and the language on the website can become too technical). On this help sheet, you can find links to official documentation, helpful websites, and cheat sheets.

TOPIC	WHERE TO LOOK FOR HELP

General stuff about Python and Jupyter Notebook: documentations and tutorials	• Python 3.8 official documentation:
	  ○ https://docs.python.org/3.8/reference/index.html
	  ○ https://docs.python.org/3.8/library/index.html
	• Tutorials for Python and also for libraries:
	  ○ https://www.w3schools.com/python/default.asp
	  ■ Python reference: https://www.w3schools.com/python/python_reference.asp
	  ○ https://realpython.com/
	  ○ https://www.geeksforgeeks.org/python-programming-language/?ref=shm
	  ○ https://www.programiz.com/python-programming
	  ○ https://www.javatpoint.com/python-tutorial
	  ○ Official for Python 3.8: https://docs.python.org/3.8/tutorial/index.html
	• Jupyter Notebook
	  ○ General introduction:
	  ■ https://realpython.com/jupyter-notebook-introduction/
	  ■ https://www.dataquest.io/blog/jupyter-notebook-tutorial/
	  ○ Markdown stuff:
	  ■ https://medium.com/analyti

	cs-vidhya/the-ultimate-markdown-guide-for-jupyter-notebook-d5e5abf728fd ■ https://www.markdownguide.org/cheat-sheet/ ○ Official documentation: ■ https://docs.jupyter.org/en/latest/ ○ Cheat sheet: ■ https://www.ibm.com/docs/en/watson-studio-local/1.2.3?topic=notebooks-markdown-jupyter-cheatsheet • Basic libraries: ○ Numpy: ■ Official documentation: • https://numpy.org/doc/stable/index.html ■ Cheat sheet: • https://s3.amazonaws.com/assets.datacamp.com/blog_assets/Numpy_Python_Cheat_Sheet.pdf • Comprehensive cheat sheets for using Python for data science: ○ https://www.utc.fr/~jlaforet/Suppl/python-cheatsheets.pdf
Pandas for data manipulation	• Pandas: ○ Official documentation: ■ https://pandas.pydata.org/docs/ ○ Cheat sheet: ■ https://pandas.pydata.org/Pandas_Cheat_Sheet.pdf ○ Example of tutorial: ■ https://www.w3schools.com/python/pandas/default.asp
Scipy library for scientific computing	• Scipy: ○ Official documentation: ■ https://docs.scipy.org/doc/scipy/tutorial/index.html ○ Cheat Sheet: ■ http://datacamp-community-prod.s3.amazonaws.com/dfdb6d58-e044-4b38-bab3-5de0b825909b ○ Examples & Tutorial: ■ https://www.guru99.com/scipy-tutorial.html
Data transformations:	• The difference between standardization

normalization and standardization	and normalization: ○ https://www.statology.org/standardization-vs-normalization/#:~:text=A%20normalized%20dataset%20will%20always,the%20maximum%20and%20minimum%20values. ● Interesting table on the differences between normalization and standardization: ○ https://www.geeksforgeeks.org/normalization-vs-standardization/ ● Pandas Data Normalization ○ General Tutorial: ■ https://www.geeksforgeeks.org/data-normalization-with-pandas/#:~:text=Using%20The%20min%2Dmax%20feature,max()%20methods ○ Normalizing a column in pandas(ft. sklearn): ■ https://www.geeksforgeeks.org/normalize-a-column-in-pandas/?ref=lbp ● Standardizing Data in Pandas (ft. sklearn) ○ https://www.geeksforgeeks.org/how-to-standardize-data-in-a-pandas-dataframe/ ○ https://www.statology.org/standardize-data-python/
Exploratory Data Analysis (EDA): libraries, charts and good visualizations	● Matplotlib: ○ Official documentation: ■ https://matplotlib.org/stable/api/index ■ Special attention to matplotlib.pyplot: https://matplotlib.org/stable/api/_as_gen/matplotlib.pyplot.html ○ Cheat sheets: ■ https://matplotlib.org/cheatsheets/ ■ http://datacamp-community-prod.s3.amazonaws.com/e1a8f39d-71ad-4d13-9a6b-618fe1b8c9e9 ○ Example of tutorial: ■ https://www.w3schools.com/python/matplotlib_intro.asp ■ Tutorial for matplolib.pyplot: https://matplotlib.org/sta

	ble/tutorials/introductory/pyplot.html
	• Seaborn:
	  ○ Official documentation:
	  ■ https://seaborn.pydata.org/api.html
	  ○ Cheat sheet:
	  ■ https://s3.amazonaws.com/assets.datacamp.com/blog_assets/Python_Seaborn_Cheat_Sheet.pdf
	  ○ Example of tutorial:
	  ■ https://www.tutorialspoint.com/seaborn/index.htm
	• Pandas visualization:
	  ○ Cheat sheet:
	  ■ https://regenerativetoday.com/a-complete-cheat-sheet-for-data-visualization-in-pandas/
	• Description of data visualization plots:
	  ○ https://datavizcatalogue.com/
	• Tufte's website and some of his work:
	  ○ https://www.edwardtufte.com/bboard/q-and-a?topic_id=1
	• Examples of data visualization with Python (code included):
	  ○ https://www.geeksforgeeks.org/data-visualization-with-python/

Network analysis: libraries	• NetworkX
	  ○ Official documentation:
	  ■ https://networkx.org/documentation/stable/_downloads/networkx_reference.pdf
	  ○ Cheat Sheets & Examples
	  ■ https://cheatography.com/murenei/cheat-sheets/network-analysis-with-python-and-networkx/
	  ○ Example of tutorial:
	  ■ https://networkx.org/documentation/networkx-2.3/auto_examples/index.html
	  ■ https://bionerdnotes.wordpress.com/2019/08/14/plotting-graphs-with-python-networkx/
	  ■ https://www.geeksforgeeks.org/python-visualize-graphs-generated-in-networkx-using-matplotlib/
	• OSMnx

	○ Offical documentation: ■ https://osmnx.readthedocs.io/en/stable/osmnx.html ○ Example of tutorial: ■ https://geoffboeing.com/2016/11/osmnx-python-street-networks/ ■ https://python.plainenglish.io/osmnx-the-fastest-way-to-get-data-from-openstreetmaps-731419d4dc31
Creating and Navigating Virtual Environments	• Refer to virtual environments section on the website of the course.
pysal.lib for spatial statistical analysis	• pysal.lib: ○ Official documentation: ■ https://pysal.org/libpysal/api.html
Exploratory Spatial Data Analysis (ESDA): libraries and good visualization	• Pysal ESDA: ○ Official documentation: ■ https://pysal.org/packages/ ○ Example of tutorial: ■ https://pysal.org/esda/tutorial.html ■ http://darribas.org/gds_scipy16/ipynb_md/04_esda.html • GeoPandas explanation ○ Official documentation: ■ https://geopandas.org/en/stable/docs/reference.html ■ https://readthedocs.org/projects/geopandas-doc/downloads/pdf/latest/ ○ Example of tutorial: ■ https://geopandas.org/en/stable/docs/user_guide.html ■ https://geopandas.org/en/stable/gallery/index.html • Aesthetics of maps & Visualizing Geospatial data: ○ https://colorbrewer2.org/#type=sequential&scheme=BuGn&n=3 ○ https://towardsdatascience.com/visualizing-geospatial-data-in-python-e070374fe621 ○ http://darribas.org/gds_scipy16/ipynb_md/02_geovisualization.html(this uses pysal_viz as well)
Machine learning: libraries	• statsmodel:

	○ Official documentation: ■ https://www.statsmodels.org/stable/api.html ○ Example of tutorial: ■ https://www.statsmodels.org/stable/user-guide.html ■ https://www.statsmodels.org/stable/examples/index.html • scikit-learn: ○ Official documentation: ■ https://scikit-learn.org/stable/modules/classes.html ○ Cheat sheet: ■ https://www.utc.fr/~jlaforet/Suppl/python-cheatsheets.pdf (p. 6) ■ http://datacamp-community-prod.s3.amazonaws.com/eb807da5-dce5-4b97-a54d-74e89f14266b ○ Example of tutorial: ■ https://scikit-learn.org/stable/user_guide.html
Principal Components Analysis: explanations and tutorial	• Explanation of what it is: ○ https://programmathically.com/principal-components-analysis-explained-for-dummies/ ○ https://towardsdatascience.com/a-one-stop-shop-for-principal-component-analysis-5582fb7e0a9c (with links to other PCA content) • PCA in Python using scikit-learn (sklearn) with a good step-by-step example ○ https://www.datacamp.com/tutorial/principal-component-analysis-in-python
Interactive visualizations (extra stuff, not in the course)	• For the usual charts: ○ https://realpython.com/python-data-visualization-bokeh/ ○ https://www.geeksforgeeks.org/using-plotly-for-interactive-data-visualization-in-python/ • For maps: ○ https://www.mapbox.com/
And everything else	• General help websites: ○ https://stackoverflow.com/ • Website to check difference between texts (e.g., use it to compare code):

	○ https://www.diffchecker.com/ ● General stuff about data science: ○ https://towardsdatascience.com/ ○ https://medium.com/ ● Interesting notebooks about anything: ○ https://github.com/jupyter/jupyter/wiki