Python – figures workshop

Prior to the workshop:
- Install Python 3.7 or 3.8
- Install an IDE (PyCharm [preferred], Visual Studio or Spyder)

Workshop steps

Part 1: Setup
1. Create a new project called 'report-qcer-figures-workshop'
2. Set up virtualenv
3. Command: `pip install pypaper`
4. Command: `python -m pypaper.init_project`
5. Command: `python manage.py init qf`
6. Get everyone to file 'fw_scripts/research/fig_playground/figure_eg_1_basic_plot.py' into same location in their own project.
7. Run script and note that packages are missing and use:
    a. `pip install <package-name>` or
    b. Command: `pip install -r requirements.txt`
8. Share link to medium post about folder setup in README folder

Part 1: Basics
In figure_eg_1_basic_plot.py
9. Add a legend and axis labels
10. change the font
11. Add multiple lines with different colours
12. Add text to the figure `subplot.text(2, 3, 'some text')`
13. save the figure

Part 2: Deal with data
14. copy the file 'fw_scripts/build_databases/generate_basic_raw_data.py'
    a. Explain the use of __file__ to get name
    b. Explain kwargs in `np.savetxt`
    c. Explain `ap.MODULE_DATA_PATH`
15. copy the file 'fw_scripts/research/duration_study/figure_raw_data_w_pandas.py'
    a. Explain the thresholding and supports titles
16. copy the file 'fw_scripts/research/duration_study/figure_raw_data_w_numpy.py'
17. compare 'figure_raw_data_w_numpy.py' to 'figure_fit_raw_data_w_numpy.py'
    a. Show the polyfit command
    b. Show how to add equation to figure
    c. Explain the string formatting
18. Fig_paper_v0
    a. Show how to set xlimits
    b. Show how to write function to set them automatically

19. Figure_paper_v1
    a. Show problem with legend
    b. Show how engformat revamp_legend removes this
    c. Show how to look at functions in PyCharm (crtl + click)
20. Figure_paper_v2
    a. Show how to add axvspan
    b. Show how to add custom legend patch
21. Figure_paper_v3
    a. Add axis labels and tight_layout
    b. Explain GridSpec is an option
22. Figure_paper_v4 – explain why it is in 'outputs' folder
    a. Change font
    b. Use engformat xy
    c. Add the save and show options
    d. Explain the figure size and settings.py file
    e. Explain the additional latex insert option
23. Figure_paper_v5
    a. Show how to add multiple subplots, sharex option
    b. Explain bwplot
24. In terminal run `pip freeze -> requirements_20200915.txt`

Extras:
- Zorder
- Grid lines
- Change markers