Watershed Modelling Exercise 2

A repository for a conceptual hydrological model. (Exercise 2 Watershed Modelling, ETH Zurich)

Instructions set up Environemnt

1. Download the zip file `wat_bal_python.zip` and extract it.

2. Install python 3.7.6 (Required)Its Free!

   - To check that python is installed on your desktop:
     - For Mac open terminal and type `$ python3` (Mac comes with preinstalled python 2.7.6 but you still need to install python 3.7.6)
     - For Windows 10, open Windows Power Shell and then type Python

3. Install Visual Studio Code (Recommended)Its Free!

   - Visual Studio Code is an editor and will comes with autocomplete and syntax highlighting features
   - Any other editor should work as well but from here on the setup will be in Visual Studio Code
   - Download the version depending on your OS.

4. Setting up the project. Installing packages.

   - Open Terminal/Windows Power Shell
   - Install pipenv by running `$ pip3 install pipenv` in Terminal/Windows Power Shell
   - Open Visual Studio Code
   - A welcome screen will appear, in the left side bar select the Extension (icon with 4 squares)
   - Search Python. Select Python (Linting, Debugging,..)
   - Once it is installed open Explorer on the top left bar. (shift+ctrl+e)
   - Select Open Folder, Browse to the directory water_bal_python.
   - The folder should contain `Pipfile` and `Pipfile.lock`
   - Go to Terminal at the top and select new terminal
   - Terminal will open at the bottom, Run the command `$ pipenv install`
   - This step may take some time and the internet connection is required
   - Restart the VSCode. Now on the lef side of blue colored bottom bar you can see the python version adn in bracket name of the folder along with `pipenv`. `('wat_bal_python:pipenv')`

Instruction to run the scripts

- There are 5 scripts namely `model.py`, `plots.py`, `utils.py`, `run_opt.py`, `run_param_plot.py`, `run_sim.py` and two folders name `data` and `plots`
- All the required data is in the `data` folder
- All the plots will be created in the `plots` folder
- Two more files will be added namely `parameter.h5` and `gof.csv`
- `Parameter.h5` will have the list of parameters for different runs
- `gof.csv` will contain the goodness of fit values for observation and simulation
- Run the scripts in order
  - `run_opt.py` will optimize the model and save the value of parameters in Parameters.h5

- Number of runs `nruns` needs to be selected here. Roughly it takes 70-120 runs per iteration depending on the computer.
  - `run_param_plot.py` will generate the plots of the parameters
  - Seeing the histogram of parameters chose the value of the parameter and add the values to the script `run_sim.py`
  - Run `run_sim.py` to save the plots and gof values
  - Any change in the structure of the model needs to be made in `model.py`
  - For adding parameters to calibrate some changes also needs to be made in `run_opt.py` and `run_sim.py`