Introduction to Python, ISA, ULisboa

Assignment P4: haversine

To show in class November, 10, 2023

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In class, we discussed the function haversine from package haversine that calculates the distance (in km by default) between two points on Earth using their latitude and longitude.

The goal of the assignment is to test the function **myhaversine** and the auxiliary functions **mysqrt, mycos, myarcsin, mysin**  which are defined in files **myfunctions.py** and **myhaversine.py**.

To understand the code that defines myhaversine, you can look at this link on [Wikipedia](https://en.wikipedia.org/wiki/Haversine_formula). The code is correct, but is relies on approximations of functions sine, cosine, sqrt (square root) and arcsin (inverse sine function).

The main goal is to test is **myhaversine** computes distances between any locations on Earth within 100 m of the distance returned by the function **haversine** from package haversine.

The auxiliary functions that also need to be tested individually are:

* mysqrt. The input is a number and the output is 0 if the input is less than 0 or the approximate value of the square root of the input otherwise
* myarcsin. The input is a number and the output is -90 if the input is less than -1, 90 if the input is larger than 1, or the approximate value of the angle (in degrees) y =arcsin(x)
* mysin. The input is a number (angle in degrees) and the output is an approximation of the sine of that angle
* mycos. The input is a number (angle in degrees) and the output is an approximation of the cosine of that angle

All of those functions have some parameter that allows to improve their precision.

Tasks:

1. Create file test\_haversine.py that will be executed in the terminal with **pytest test\_haversine.py** or with **python -m pytest test\_haversine.py** to test all five functions **myhaversine**,  **mysqrt, mycos, myarcsin, mysin** individually;
2. Adjust parameters so that your test on **myhaversine** (it should compute distances between any locations on Earth within 100 m of the distance returned by the function **haversine** from package haversine) is successful;
3. The group should collaborate in GitHub. All interactions from group member should be available on the file’s history. Commit messages should be