Writeup

Description of the Airfoil class

The provided airfoil.py contains actual implementation of the Airfoil class, which represent the geometry and the pressure distribution of a particular airfoil (abstraction idea). An Airfoil object contains 5 class variables and 7 class functions:

a) Class variables:

   1) x: a list of x coordinates describing the airfoil geometry
   2) y: a list of y coordinates describing the airfoil geometry
   3) name: the name of the current airfoil
   4) alphas: a list of the given angles of attack($\alpha's$)
   5) pressure_coeff_list: a dictionary of the Cp's provided corresponding to different angles and attacks of the airfoil

b) Class functions:

   The class functions are designed that each function has its own particular functionality and could be reused in loops, by which means also protects the data used in the functions being overwritten (encapsulation idea).

The Airfoil object is initiated and used in the main program, which could be executed using the following command:

python main.py <airfoil data path>

Each Airfoil object requires a command line input <airfoil data path>, which is an existing directory contains xy.dat and at least one data file corresponding to the pressure coefficients of a fixed alpha value named as alpha*.dat.

If <airfoil data path> is not a working directory, or the directory does not contain xy.dat, or the directory does not have at least one alpha*.dat, one will see a direct output in the terminal with the corresponding error message and the program aborts.