TPOP PRACTICAL

FILES & EXCEPTIONS

PRACTICAL 05 – Level 2

In this practical, we will be using files to read and store data. Once you are familiar with using text file from the level 1 practical, download the file Data.zip from the module webpage and extract all the files.

<u>**Question 1:**</u> *How rainy could it be?*

For this exercise, you will need to use the function `open` to open a file. To know more about the function, use `help(open)` on the Python shell, search on the web or look at the lecture notes. You will need to use the method `readlines()` or `readline()` from the `file` object (to know more use `help(file)`). Finally the `split()` method from the `str` type could be handy.

The European precipitations data for the last century is stored in a file named: `<precipitations-europe.txt>`. The format of the data is as follow:

- The first line is a comment and should be ignored

- The remaining lines are the data. On each line is stored the year of the record, followed by the precipitation for that year (in millimetres). The two fields are separated by a comma `","`.

In this exercise we want to calculate the average precipitation in the last century, as well as the minimum (resp. maximum) precipitation with the corresponding year.

1. If you are unsure on how to proceed, write a script to display each line in the file.

2. Write a script to display the min, max, and average.

3. Write three methods, `min_Precipitation(…)`, `max_Precipitation(…)`, `average_Precipitation(…)`, which should return the expected values as specified in the requirements. What parameter(s) if any should be passed? What should be the returned values?

4. Test your program with the files `<precipitations-NAmerica.txt>`, and `<precipitations-world.txt>`. Compare your results with your peers.

Question 2: *Putting it altogether.*

In the previous exercise, we have been looking at three files storing corresponding data, e.g. precipitations in different part of the world. Your job is to create a single file that collates the data from all three files. For simplicity, we assume that all files contain the complete set of records, e.g. the same years appear in all three files and appears only once per file.

1. Write a script that reads all three files and creates a new file precipitations_records.txt where each rows contains the year, followed by the European data, then the North American data and finally the world data. Each data should be separated by a comma. To start with, we do not care if the years are in order or not. Once you manage to create the file, try to improve your script so the years are stored in increasing order.
Hint: you should think about the data structure you will be using to store the information when reading the three files. Try to think by yourself first, and then discuss your solution with a fellow student. You can ask one of the PTA or me to check your idea.

2. Write a function `collatePrecipitationFile(fileNames,outputFile)` that does the same thing as in (1). The function should collate the data from all the files in the list `fileNames` (note, the `fileNames` is a list of string) and save the collated data into the file named `outputFile` (note outputFile is a string representing the name of the file).

Question 3: *Hard.*

For this exercise, we will be using the file `aberporth_meteorological_data.txt`. Your job is to read the data from the file, calculate the number of days of air frost (af), the total amount of rain (mm), and the total amount of sunshine (hours) for each year. You must save your calculations in a Comma Separated file (.csv), where the rows are the data for each year, and the columns is the calculation for each attributes.

Try to open the file using MS Excel to see if you saved the data correctly.