CS 2401 – Elementary data structures and algorithms

Spring 2023

Lab 1

Due Date: Sunday- January 29, 2023 – end of day.

Objective: The goal of this assignment is to practice file reading, input processing, and working with arrays.

Background: We are given an input text file that contains average wind speed and average monthly rainfall in El Paso for a given year.

Assignment: The input file, input.txt, will have 12 lines, one line for each month. Each line will have three columns, tab-separated: the index of the month starting at 1 (1 is January, 2 is February, etc.), the average windspeed (mph: miles per hour) of the month, and the average rainfall (in inch) of that month. Your program should read the data from the file, store the data in an array, and display the following information:

- The average windspeed for that year.
- How many months of that year had more than the average windspeed?
    - What are the indices of those months (e.g., 5, 6)?
    - Based on the indices, what are the names of those months (e.g., 5 would be May)?
- The average rainfall for that year.
- How many months of that year had more than the average rainfall?
    - What are the indices of those months?
    - Based on the indices, what are the names of those months?

Note that the order of the month starts from one but the index of an array starts from zero.

Your program should use a try-catch block properly to handle file reading.

Test cases:

Test cases are used to test the correctness and robustness of the program. Provide two test cases showing the program can compute the required information correctly (e.g., average rainfall). Test cases can also include unusual scenarios such as incorrect filename, missing file, or incorrect format of data.

While writing the test cases, provide a case number, sample input for that case, and expected output from the program. Also, give a brief description of what criteria the test case is checking. Write these cases in a txt file. Your program is expected to pass these two test cases.

Sample input file:

```
1       8.3     0.3
2       9.2     0.3
3       10.2    0.2
4       10.9    0.2
5       10.1    0.3
6       8.7     0.5
7       7.5     1.3
8       6.9     1.5
9       7.6     1.1
10      8       0.6
11      8.2     0.4
12      8.1     0.5
```

Sample output:

TODO

Deliverables: You are expected to submit two files in Blackboard:

(i) Lab1_Lastname.java --- the java file of your program.
(ii) Lab1_Testcases_Lastname.txt --- the test cases for your program.

Grading Criteria:

- [10 points] Program compiles and runs.
- [10 points] The program is indented correctly.
- [10 points] The program is documented properly.
- [5 points] The program uses correct variable types.
- [5 points] The program uses meaningful variable names.
- [50 points] The program has a correct logic and generates correct output.
- [10 points] 2 test cases

- Late submission: [**-10**] points for every 24 hours after the deadline.

If you need any clarification, please ask your TA for further details.