EECS12 Assignment 3
Fall 2021

Problem:
In this assignment, you write a program that handles a list of strings. Your program performs some processes to extract some information from the input list to produce the output list. Your program should do the following:

1. It first asks the user for the file name to be opened by your program.
2. If your program cannot find the input file which user has specified, it should print the following line in the output file and exit:
   `Cannot find the input file.`
3. If your program finds the input file, it opens the file which is assumed to have a full name of some students along with their majors on each line. Some students' names consist of a first name and a last name while some other students may have multiple middle names in addition to a first name and a last name. Some students study one major while others may study multiple majors. In the input file, the names and majors are separated by a semi-colon (" ; "). For example, in a line of input file, it may be written:

   "John Dow ; Electrical Engineering ; Computer Engineering"
4. Your program then generates labels for students based on their majors. The label associated with each major is a number written below:
   Electrical Engineering: 1
   Computer Engineering: 2
   Mechanical Engineering: 3
   Civil Engineering: 4
   Other majors: 0
5. The program then writes each student's full name and the label associated with the student's major(s) in the format of "John Dow 1 2" to an output file. Furthermore, at the end of the output file, the number of students who study one of the four majors Electrical Engineering, Computer Engineering, Mechanical Engineering and Civil Engineering should be written in the following format:

   ```
   The number of Electrical Engineering students: 17
   The number of Computer Engineering students: 18
   The number of Mechanical Engineering students: 18
   The number of Civil Engineering students: 20
   ```

   The output file should be named as "x-out.txt" where x is the name of the input file. For example, if the name of the input file is "names1.txt", the output file should be named as "names1-out.txt".

For example, if in the input file, it is written that "Roha Boa Jun Aca ; Civil Engineering", in the output file it should be written "Roha Boa Jun Aca 4". As another example, if in the input file it is written "Roha Boa Jun Aca ; Civil Engineering ; Physics ; Electrical Engineering", in the output file it should be written "Roha Boa Jun Aca 4 0 1".

Note that if in the input file, it is written “Roha Boa Jun Aca ; Civil Engineering ; Physics ; Electrical Engineering”, the output “Roha Boa Jun Aca ; 4 ; 0 ; 1” is incorrect since semicolons are not removed. Furthermore, note that the order of majors’ labels in the output file should be exactly the same as the order of major names in the input file. As an example, the output “Roha Boa Jun Aca 0 4 1” is incorrect since the order of major labels in the output is not the same as the order of major names in the input. Moreover, the full name of students should be printed in the output. For example, outputs “Roha Aca 4 0 1”, “Roha Boa Aca 4 0 1” and “Roha Boa Jun 4 0 1” are incorrect.

Note that when your program cannot find the input file, it should produce the output file in which it is written “Cannot find the input file.” For example, when the input file name is names0.txt while there is not any file named as names0.txt, your program should produce the output file named as names0-out.txt in which it is written “Cannot find the input file.”

Submission:

Please submit your homework Python source file, with a file name “hw3.py”.

Grading Criteria (out of 20 points):

- Program submitted but cannot run. (1)
- Program generates correct output when the input file cannot be found. (1)
- Correctly opens a file, reads the data in the file and creates an output file with the correct name. (1)
- Correctly keeps the full name in the list. (5)
- Correctly produces label(s) for each name and writes it correctly in the file. (8)
- Correctly produces the number of students who study Electrical Engineering, Computer Engineering, Mechanical Engineering and Civil Engineering. Note that producing the correct number for each major worth 1 point. (4)

You can test your program on ‘names1.txt’ and compare your output file with ‘names1-out.txt’.