spec.md

Introduction to Programming

Assignment: Task 4

You should only attempt this task if you have completed the other parts of the assignment easily and want an extra challenge. It is possible to pass the module very well without attempting this final task!

The Problem

In this task you will develop a program that will process the results of some sporting event where four teams are competing in a small league. It could be a group at an event such as the recent football Euros, but you are welcome to base it on any similar sport (a group at the rugby world cup, the netball world cup, ice hockey ...).

Whatever sport, we will assume that the rules are as follows:

- Teams play each other once.
- Teams are awarded three points for winning, one for a draw, and none for losing.
- Teams score goals (points) in each game, and the difference between the number scored and the number conceded is calculated.
- The final table is based on the number on "win/loss" points, with the "difference" used to separate otherwise equal teams.

This should all be familiar to anyone who follows a sport (which is good, because it is quite difficult to explain).

Your program should read a file containing the results of matches, and display the final league table.

The file contains one line per match, presented as CSV. For example, a file from this year's Rugby Union Six Nations would contain lines such as:

```
Italy,10,Ireland,48
Scotland,24,Wales,25
Wales,40,England,24
```

To keep things simple, you may want to provide a separate file that contains the names of the competing teams, one per line:

```
England
Ireland
Wales
Scotland
Italy
```

(It is obviously possible to program this task without the second file, probably easiest by scanning the result file twice. This is actually what the version generating the sample output below is doing.)

Implementation

Implement a solution using classes. There are a bunch of ways to do this. The solution generating the output below uses just one class to represent the team in the league, but you could use an additional class to represent a result. Arguably the league itself should be a class. Your call.

It is safe to assume that the files exist, and that there is complete and consistent data present.

Note: Rugby fans will know that there are additional rules for bonus points in the Six Nations. These have not been implemented below (so the same code would work with other sports). You are welcome to implement them should you want to make a more realistic solution.

Examples

The following output uses data from the 2021 Rugby Union Six Nations. As noted above, the rules have been simplified. This version has an optional command-line parameter providing the name of the competition.

Teams File

```
England
France
Ireland
Italy
Scotland
Wales
```

Results File

```
Italy,10,France,50
England,6,Scotland,11
Wales,21,Ireland,16
England,41,Italy,18
Scotland,24,Wales,25
Ireland,13,France,15
Italy,10,Ireland,48
Wales,40,England,24
Italy,7,Wales,48
England,23,France,20
Scotland,24,Ireland,27
Scotland,52,Italy,10
Ireland,32,England,18
France,32,Wales,30
France,23,Scotland,27
```

Sample Output: No Command-line Argument

```
tony@ceridwen ~/s/p/l/Task4$ ./league_table.py
            P  W  D  L   F   A Diff Pts
Wales       5  4  0  1 164 103   61  12
Ireland     5  3  0  2 136  88   48   9
Scotland    5  3  0  2 138  91   47   9
France      5  3  0  2 140 103   37   9
England     5  2  0  3 112 121   -9   6
Italy       5  0  0  5  55 239 -184   0
```

Sample Output: Command-line Argument

```
tony@ceridwen ~/s/p/l/Task4$ ./league_table.py "Six Nations 2021"

Six Nations 2021
================

            P  W  D  L   F   A Diff Pts
Wales       5  4  0  1 164 103   61  12
Ireland     5  3  0  2 136  88   48   9
Scotland    5  3  0  2 138  91   47   9
France      5  3  0  2 140 103   37   9
England     5  2  0  3 112 121   -9   6
Italy       5  0  0  5  55 239 -184   0
```

Finally, here is the *same code* processing the results from England's group at the 2020 Euros. Notice that it works out how teams are ordered when points and goal difference are the same (it does it on goals scored).

```
tony@ceridwen ~/s/p/l/Task4$ cat teams.txt
Croatia
Czech Rep
England
```

```
Scotland

tony@ceridwen ~/s/p/l/Task4$ cat results.txt
England,1,Croatia,0
Scotland,0,Czech Rep,2
Croatia,1,Czech Rep,1
England,0,Scotland,0
Croatia,3,Scotland,1
Czech Rep,0,England,1

tony@ceridwen ~/s/p/l/Task4$ ./league_table.py "Euro 2020 Group D"

Euro 2020 Group D
=================

            P  W  D  L   F   A Diff Pts
England     3  2  1  0   2   0    2   7
Croatia     3  1  1  1   4   3    1   4
Czech Rep   3  1  1  1   3   2    1   4
Scotland    3  0  1  2   1   5   -4   1
```