Computer Science II — Homework 2 — Olympic Medals

This assignment is due Thursday, February 1 at 11:59:59pm and is worth 75 points toward your homework grade. Lecture 4 is particularly important to this homework problem. In solving this homework you may use any C++ construct or algorithm you wish from Lectures 1-4, but not beyond. In particular, you must create and use one or more C++ classes. Because of this, you will have multiple source code files, and you must submit them as a single zip file. Please see the course web page for instructions. As part of your zip file, you must also include a `readme.txt` file containing your answers to several questions. A template for this file, including the questions will be posted on the course website.

The problem is to compute statistics on the medals won by the different countries in an Olympic competition. The input will come from a text file containing the winners of the various events. The results should be output to a file as well. The input file will contain one line of input per event, with each event specified by seven input strings on the line. For example, the input line

```
100-meters  Gatlin USA Obikwelu Portugal Greene USA
```

indicates that competitor Gatlin, from the USA, won the gold medal (first place) in the 100 meters, Obikwelu, from Portugal, won the silver medal (second place) and Greene, from the USA, won the bronze medal (third place). All event names, competitor names and country names will be single strings, as read by the input stream operator for `std::string`. There will be no mistakes in the input. Event names will not be repeated. There will never be two individuals with the same name from the same country. For example, there can be another Owens, this time from Canada, but there can not be different Owens from USA.

Your output should be to a text file as well. The first part of your output should be the list of countries that won at least one medal, sorted by the order of the total number of medals won. The country winning the most medals should be first. For each country, output the name, the number of gold, silver and bronze medals, and the total number of medals. Do not worrry about nice formatting, but instead, separate each output on a line by a single space. If two countries the same number of medals, then the country winning the most gold medals should be output earlier. If two countries have the same number of medals and the same number of gold medals, then the country having more silver medals should be output earlier. Remaining ties (which imply the two countries won the same number of each type of medal), should be broken by outputting the country with the lexicographically-earlier name first.

The second part of your output — to the same file, but separated by a blank line — should list the countries in lexicographic order followed by the lexicographically-ordered names of the individual athletes who won medals. There should be one athlete name per line and this name should be followed by the number of medals s/he won. In order to make the output easier to read, indent the athlete names by two spaces. See the example on the course web page.

In summary, your program should run with two command-line arguments:

```
olympics event-results.txt medal-summary.txt
```

Several notes:

- Think through the information that you need to represent, how you are going to represent it, and how you are going to access it.

- Try to avoid putting any file input or output inside your classes. This is good practice in class design.

- If you ever pass stream object (`ofstream`, `ifstream`, etc.) to a function, you MUST (!) pass it by reference. If you do not, your program will crash sometime after the function you passed it to ends. If you never use the stream object again, your program will crash at the very end.