CS 150-01 Assignment 1: Marathon Time Converter

Date assigned: Monday, September 8, 2003
Date due: Monday, September 15, 2003
Total points: 40

You've just been hired by the city of Forest Grove to write a computer program to help them with their annual marathon. The marathon was last week, but they're throwing a party for the runners next week. They want to have a nice computer display and allow the runners to compare their times with the winning time. Also, they want the runners to be able to see their time in hours, minutes and seconds. The runners' times were given to them in total seconds.

They provide you with the winning time: 15030 seconds. They want the display to look like this (with a sample input given in bold):

```
Hello runner.  Please enter your name: Shereen
Hello Shereen!
The winning time for the marathon was 15030 seconds.
Please enter your time in seconds: 18532

Shereen: your time is 5 hours, 8 minutes and 52 seconds.
It's 0 hours, 58 minutes and 22 seconds slower than the
winning time.

Congratulations on finishing the race!!
```

You need to do the following for this assignment:
1. **Problem Analysis:** Write out the data requirements and formulas needed for the program. This is the type of analyses we've done in class. Identify the input and output variables and their corresponding data types. Identify the formulas you will need and if there are any constants in the formula you need to define in your program.
2. **Algorithm:** Write out the steps that you'll need to do complete the program. Be as detailed as possible. It will help you write the program.
3. **Program Implementation**: Write the C++ code and compile it. Make sure to include as much documentation as possible.
4. **Testing:** Test your program on as many different inputs as possible and document the results of your testing.

What you need to turn in:
1. **Turn in a hard copy of your documentation (problem analysis, algorithm and testing results to me in class on the day that it's due).** Feel free to use a computer to do this part of the assignment, but you're allowed to use just pencil and paper, too.
2. **Place the project folder in the CS150-01 drop box. You must submit the whole project folder and not just the project file or the cpp file.** Name your project <**PUNetID-A1**>. For example, my project would be called <khoj0332-A1>.

Note: You may only use C++ programming concepts covered in Chapters 1 -2 of your book. Do not use any more advanced concepts we will cover this week and next or any other programming concepts that you have had experience with.

Reminder: This is due at the beginning of class on Monday, Sept. 15. Your assignment will be considered late if they are turned in after 1:00 pm on Sept. 15. **START EARLY.**