Lab 04: Temperature Conversion Functions

CSci 515 Spring 2015

2015-01-23

Dates:

Due: In Lab, Wednesday February 11, by 4:10 pm (lab end time)

Objectives

- Write functions in C that take 1 or more parameters and return a result.
- Learn about breaking up a larger problem into smaller sub-parts.
- Create simple functions that use an input parameter.
- Learn how to return results using the return values from a function.
- Practice with input and output.

Description

In this lab we will write two simple functions. The functions will take a single parameter as input, and return a single value as their result. You are to write functions that convert temperatures on the Fahrenheit scale into the Celsius scale, and vice verse.

The formula for converting a temperature from Fahrenheit to Celsius is given by:

$$C = (F - 32) \cdot \frac{5}{9}$$

And to convert in the other direction, from Celsius to Fahrenheit:

$$F = C \cdot \frac{9}{5} + 32$$

```
This program finds all of the perfect numbers in the range from 1 to N.
Up to what value of N should I search for perfect numbers: 100
6 is a perfect number
28 is a perfect number
```

NOTE: Now that our programs have more functions than just the `main()` function the use of the function headers becomes meaningful. Make sure that all of your functions (`main`, `findPerfectNumbers`, `isPerfectNumber`) have function headers before them that document the purpose of the functions, and the input values and return value of the function.

Lab Submission

An eCollege dropbox has been created for this lab. You should upload your version of the lab by the end of lab time to the eCollege dropbox named `Lab 04 Perfect Numbers`. Work submitted by the end of lab will be considered, but after the lab ends you may no longer submit work, so make sure you submit your best effort by the lab end time in order to receive credit.

Requirements and Grading Rubrics

Program Execution, Output and Functional Requirements

1. Your program must compile, run and produce some sort of output to be graded. 0 if not satisfied.
2. 40+ pts. Your program must have the 2 required named functions, that accept the required input parameters and return the required values (if any).
3. 30+ pts. Your algorithm for determining if a number is perfect in the `isPerfectNumber()` function must work correctly.
4. 30+ pts. Likewise the `findPerfectNumbers()` function must work, and produce the output as shown for the assignment.

Program Style

Your programs must conform to the style and formatting guidelines given for this course. The following is a list of the guidelines that are required for the lab to be submitted this week.

1. The file header for the file with your name and program information and the function header for your main function must be present, and filled out correctly.

2. A function header must be present for all functions you define. You must document the purpose, input parameters and return values of all functions.

3. You must indent your code correctly and have no embedded tabs in your source code. (Don't forget about the Visual Studio Format Selection command).

4. You must not have any statements that are hacks in order to keep your terminal from closing when your program exits.

5. You must have a single space before and after each binary operator.

6. You must have a single blank line after the end of your declaration of variables at the top of a function, before the first code statement.

7. You must have a single blank space after , and ; operators used as a separator in lists of variables, parameters or other control structures.

8. You must have opening { and closing } for control statement blocks on their own line, indented correctly for the level of the control statement block.

Failure to conform to any of these formatting and programming practice guidelines for this lab will result in at least 1/3 of the points (33) for the assignment being removed. Failure to follow other class/textbook programming guidelines may result in a loss of points, especially for those programming practices given in our Deitel textbook that have been in our required reading so far.