

# CSE 5A

## Introduction to Programming I (C)

### Homework 2

Read Chapters 4 & 5

Due: Friday, October 12 by 6:00pm

All programming assignments must be done **INDIVIDUALLY** by all members of the class. Start early to ensure you have enough time to submit your program before the deadline.

All assignments will be automatically collected from your computer account at precisely 6:00 pm on the due date shown above. These due dates and the time will be rigidly applied. An assignment that is not in place at 6:00pm on the due date will not be collected and therefore will not be graded, receiving a score of 0. If you have any questions/problems with the turn-in, see one of the tutors, TA, or the instructor.

All your programs must be neat and legible. Indent and comment your programs as shown in the text and as described in class. Make sure to thoroughly understand the assignment before you start on it. It is a good idea to verify your understanding of the problem with the tutors, TA, or instructor. For maximum credit, read and follow the style rules given in the **CSE 5A Program Grading** document (<http://www.gregmiranda.com/wp-content/uploads/2018/08/CSE-5A-Program-Grading.pdf>).

#### Getting Started

In the lab, log into the Windows computer using your cs5af account (not your UCSD account).

Using Visual Studio 2017, create a new project (File->New->Project...) and select the Visual C++ Empty Project. Change the **Name** of the project to HW2 (note the uppercase HW2). Change the **Location** of the project to your cs5af Home Directory (the Documents folder of your cs5af account). After changing the name and the location, click on the OK button.

In the Solutions Explorer window, create a new file by right clicking on the HW2 solution and selecting Add->New Item... from the context menu. Next, select C++ File (.cpp). Change the **Name** of the file to hw2.c. You do not need to change the location, it should default to your HW2 folder inside the HW2 project (Documents\HW2\HW2\). After changing the name, click the Add button. Make sure to save everything (File->Save All).

Link to a video for creating a new project and source file: <http://www.gregmiranda.com/cse5a-new-project>

Feel free to ask the tutors on duty in the lab for help.

#### Program Description

Homework 2 (hw2.c) will be a simple program to convert a set of temperatures to Fahrenheit to Celsius and vice versa. All conversion variables should be of type double. The program will also have user input (**scanf()**), conditional (**if-else**), and looping (**for** loop).

Example execution of the program (user input is in **bold**):

## Temperature Conversions

How many temperature conversions would you like to perform? **3**

[#1] Enter the temperature you want to convert: **100**

Is this a Fahrenheit or Celsius temperature? [F / C]: **F**

100.00 degrees F = 37.78 degrees C

[#2] Enter the temperature you want to convert: **32.5**

Is this a Fahrenheit or Celsius temperature? [F / C]: **f**

32.50 degrees F = 0.28 degrees C

[#3] Enter the temperature you want to convert: **-20**

Is this a Fahrenheit or Celsius temperature? [F / C]: **C**

-20.00 degrees C = -4.00 degrees F

Press ENTER to quit!

The program will first ask the user how many temperature conversions to perform. Then, with each temperature conversion, output the loop/iteration number (conversion #1, #2, etc.) with a prompt for the user to enter the temperature to convert, whether the entered temperature is Fahrenheit or Celsius, and the converted temperature.

**Note:** the user can enter either upper-case '**F**' or lower-case '**f**' to indicate Fahrenheit and upper-case '**C**' or lower-case '**c**' to indicate Celsius. If the user enters anything else, ignore the answer, and ask the user the same question again.

Use the formulas below to perform the conversions:

$C = (F - 32.0) / 1.8$  - to convert a Fahrenheit temperature to Celsius

$F = C * 1.8 + 32.0$  - to convert a Celsius temperature to Fahrenheit

Use the `printf()` format specifier **%8.2lf** to output all of your **double** floating point variables with 2 places of precision to the right of the decimal point and a total width of 8 characters that are right-justified.

Whenever you get input with `scanf()`, be sure to deal with the newline character appropriately. Whenever you read a value of any type with `scanf()`, insert a `getchar()` as the next statement to absorb the newline character.

```
scanf( "%c", &ch );
getchar(); /* Eat the newline char. */
```

```
scanf( "%lf", &temperature );
getchar(); /* Eat the newline char. */
```

No hardcoding of the values above in the code. For example, you cannot use the constant value of **1.8** or **32.0** anywhere in your program other than as a symbolic constant using `#define`. You must use variables and constants throughout the program and your `printf()` statements, not constant numbers.

Make sure you have your name and cs5af account number in the header comment of h2.c.

Note: replace "XX" in the Login: "cs5afXX" with your unique login name.

```
/*
 * Name: Jane-Joe Student
 * Login: cs5afXX
 * Date: Month Day, Year
 * File: hw2.c
```

\* Sources of Help:

\* **General description of the program ...**

\*/

```
#pragma warning(disable:4996)           //Disable security warnings
#include <stdio.h>
```

Make sure to include the #pragma warning line after the program header or your program will not compile in Visual Studio.

Comment your program like the last program (and the Program Grading guide). Make sure to use meaningful comments.

More sample executions:

----- Test Execution -----

Temperature Conversions

How many temperature conversions would you like to perform? **4**

[#1] Enter the temperature you want to convert: **1000**

Is this a Fahrenheit or Celsius temperature? [F / C]: **g**

Is this a Fahrenheit or Celsius temperature? [F / C]: **t**

Is this a Fahrenheit or Celsius temperature? [F / C]: **f**

1000.00 degrees F = 537.78 degrees C

[#2] Enter the temperature you want to convert: **-200**

Is this a Fahrenheit or Celsius temperature? [F / C]: **C**

-200.00 degrees C = -328.00 degrees F

[#3] Enter the temperature you want to convert: **78**

Is this a Fahrenheit or Celsius temperature? [F / C]: **F**

78.00 degrees F = 25.56 degrees C

[#4] Enter the temperature you want to convert: **-1**

Is this a Fahrenheit or Celsius temperature? [F / C]: **b**

Is this a Fahrenheit or Celsius temperature? [F / C]: **c**

-1.00 degrees C = 30.20 degrees F

Press ENTER to quit!

----- Test Execution -----

Temperature Conversions

How many temperature conversions would you like to perform? **0**

Press ENTER to quit!

You can download an example executable for Homework 2 from the following link:

<http://www.gregmiranda.com/cse5a-hw2-sample>

**Verify you saved your work in the cs5af HOME directory.**