

YOUR NAME: _____ DATE: _____

LAST FOUR DIGITS OF YOUR UF-ID: ____ ____ ____ ____ Please Print Clearly (Block Letters)

Date Assigned: 18 January 2013 IN CLASS

Date Due: 01 February 2013 E-SUBMISSION of Parts II and III

This homework assignment must be completed by you alone. You may not copy from others, and you may not copy code from the Internet, textbook, or other sources.

However, you may study with others or read your textbook to determine general solutions. Then you must complete the problems as your own work, not copying others' work.

Questions about this homework should be addressed to your TA first. You can find your TA's email at the class website: <http://www.cise.ufl.edu/~mssz/JavaNM/TA-hours.html>

This homework has three parts: (I) Vocabulary Questions, (II) Regular Program, (III) Advanced Program. There is no penalty for guessing.

Part I. Vocabulary Questions

[10 points total]

Vocabulary: (terms you need to know to discuss the subject intelligently) – Define the following terms using 1-3 sentences (and a diagram, if needed): **[2 points each]**

- a. Flow of control
- b. Precondition loop
- c. Class (in Java language)
- d. Postcondition loop
- e. Object (in Java language)

Carefully print or write (legibly) these vocabulary words and their definitions on a paper that you hand in at the beginning of class on the due date. Your paper *must* have in the upper right-hand corner: (i) "COP2800-S13-HW1", (ii) your name, and (iii) last four digits of your UFID.

Part II. Regular Program

[20 points total]

TASK: Create a Java Program that converts temperature values from degrees C to degrees F, and vice versa.

PROGRAMMING PROCEDURE:

- (1) Use the following code as the basis for making a Java *Class* called **TemperatureConverter**, with method **C2F**. Note that comments are in **green typeface**, and reserved keywords are in **bold blue typeface**, and **bold red typeface** shows where you should insert your name and code. The text that you will output to the screen is shown in **brown typeface**.
- (2) Enter the code as shown in the example below ("Line#" denotes the statement number).

- (3) Save your code in file "TemperatureConverter.java" (save frequently to avoid work loss), then compile using the Java tools that you downloaded to your laptop computer. Make sure it runs.

JavaCodeLine#

```
1  /**
2   * Conversion between temperatures in Celsius and Fahrenheit
3   * Uses conversion formulas from the Wikipedia entry:
4   * http://en.wikipedia.org/wiki/Temperature_conversion_formulas
5   * COP2800, Spring 2013 -- Student: <Your Name Goes Here>
6   * Date: 18-Jan-2013
7   */
8  public class TemperatureConverter {
9      public TemperatureConverter()
10     {
11     }
12     // Method to convert from degrees Celsius to degrees Fahrenheit
13     public static float C2F(float degC)
14     {
15         float degF;
16         degF = degC * 9/5 + 32;
17         return degF;
18     }
19     // Method to convert from degrees Fahrenheit to degrees Celsius
20     ... Please program method F2C using this line and next four lines
21     ...
22     ...
23     ...
24     ...
25     // Main method demonstrating usage of above methods
26     public static void main(String[] args)
27     {
28         System.out.print("91 degrees Celsius in Fahrenheit is: ");
29         System.out.println(C2F(91));
30         System.out.print("98.6 degrees Fahrenheit in Celsius is: ");
31         System.out.println(F2C(98.6));
32         //Test the accuracy of your program by combining the two methods
33         System.out.print("27.937 degrees Celsius using F2C(C2F(T)) is: ");
34         System.out.println( F2C( C2F(27.937) ) );
35         // Be polite when you end your program
36         System.out.print("Goodbye. ");
37     }
38 }
```

After you have entered, compiled, and tested the given code (minus lines 20-24, which you may leave blank for purposes of testing), then do the following:

- (4) Create the method *F2C* in Lines 20-24, **using the following equation:**

$$\text{degC} = (\text{degF} - 32) * 5/9;$$

which is the standard formula for Celsius to Fahrenheit temperature conversion.

- (5) Compile your code and run it.
- (6) Submit your code electronically with your solution to Part III, as described below.

Part III. Advanced Program

[40 points total]

Programming with Java Classes and Objects. Perform the following steps:

- (1) Create two subclasses of *TemperatureConverter*, and a Test class, as described below.

Superclass: *TemperatureConverter*

Subclass 1: *F2C* with method *convert* that has the functionality of method *F2C* in Part II

Subclass 2: *C2F* with method *convert* that has the functionality of method *C2F* in Part II

Class: *Test* with a method *main* that implements the same functionality as the *main* method from Part II, using the *convert* method of the subclasses.

- (2) For the Test class keep the method *main* that you used in Part II, for testing of your code. But you might want to change the way the procedures *F2C* and *C2F* are invoked... [Hint: Remember how we invoked `class.method` in the “HelloWorld” class during our first week of this course.]
- (3) Document your code fully (as in the example in Part II). Compile your code and get it running.

Electronic Submission of Parts II and III. Put all files you created in Parts II and III in a single ZIP file. Your ZIP file should contain *TemperatureConverter.java*, *F2C.java*, *C2F.java*, and *Test.java*. Submit this ZIP file electronically per the instructions at:

<http://www.cise.ufl.edu/~wchapman/COP2800/submit>

Grading: Code does not compile or run	= 0 points.
Code compiles but does not run	= < 20 percent of points.
Code runs but wrong results	= 21 to 50 percent of points.
Code runs with correct results but no documentation (e.g., green comments in Part II)	= 51 to 70 percent of points.
Code compiles and runs, correct results, documentation present	= 71 to 100 percent of points.

