Homework #7

Bubble, Bubble, Toil and Bubble Sort an Array of Strings

Due: November 8 by 11:59:59 PM **Assigned:** November 1

Write a C++ program which will prompt the user to enter some words and then sort the words in alphabetical order and display them. There is an extra credit option for this assignment.

Requirements:

- Name the source file for your program **program7.cpp**.
- Store the words entered by the user in an array of strings (each element of the array is of type `string`).
- The maximum number of words for which the program needs to work must be set using the following constant (a global constant at the top of the program):
  `const int NUM_WORDS = 10;`
  Then, throughout the program wherever this size is needed, the constant must be used rather than a literal number.
- You can assume that each word entered by the user will not contain any spaces, so the words can be read in using "`cin >>`".
- The program must stop prompting for further input if the maximum number of words is reached, or if the user enters "0" as one of the words. If the user enters "0" to end the input sequence, then the "0" must **not** be counted as one of the words sorted and later displayed.
- Sorting of the words must be done using the *Bubble Sort* method, implemented in a function with this prototype:
  `void bubbleSort(string words[], int num);`
  This function must sort the first `num` strings of the `words` array from "smallest" to "largest" as determined by either the `compare` function (for any strings, whether of letters or not), or using the `<` operator
  Don't do anything special to account for upper- or lower-case letters – all upper-case letters will be considered as coming before all lower-case letters (this is known as lexicographic sorting).
- For Extra Credit, see the extra credit section
- A sample run of your program should look like:

```
Enter a word: dog
Enter a word: Dogs
Enter a word: beaver
Enter a word: Cat
```

```
Enter a word: Mouse
Enter a word: rabbit
Enter a word: 0

Your sorted list is: Cat Dogs Mouse beaver dog rabbit
```

Extra Credit:

- To score up to ~106% (3 extra credit points) on this assignment, sort the list in true alphabetical order
- This means that the upper-case and lower-case versions of a letter should be treated as if they are equals
- A sample run of your program should look like:

```
Enter a word: dog
Enter a word: Dogs
Enter a word: beaver
Enter a word: Cat
Enter a word: Mouse
Enter a word: rabbit
Enter a word: 0

Your sorted list is: beaver Cat dog Dogs Mouse rabbit
```

Hints:

- Be sure to track how many words were entered by the user and sort the correct number of words.
- Here is some pseudocode for Bubble Sort (from `https://en.wikipedia.org/wiki/Bubble_sort`):

```
procedure bubbleSort( A : list of sortable items )
n = length(A)
repeat
    swapped = false
    for i = 1 to n-1 inclusive do
        /* if this pair is out of order */
        if A[i-1] > A[i] then
            /* swap them and remember something changed */
            swap( A[i-1], A[i] )
            swapped = true
        end if
    end for
until not swapped
end procedure
```

- For the Extra Credit, remember that if the words being compared are all lower-case or all upper-case, lexicographic order is the same as alphabetic order

Reminders:

- Be sure that your program includes your name, ID, description, etc. as shown in the General Homework Requirements Handout
- Use good style including indentation, comments, etc. Part of the grade will be for style and quality.
- Carefully test your program.
- You are welcome to write your program at home. If you do, be sure to compile and test it in the lab before submitting it.

How to submit your program:

- Submit the file `program3.cpp` electronically using the following terminal command:
  For the 12:30 lecture section:
  `~cs211a/bin/handin 7 program7.cpp`

  For the 5:35 lecture section:
  `~cs211b/bin/handin 7 program7.cpp`