CS2050 Fall 2017
Homework 4
Due: Tuesday, Sept 26, 2017

This fourth assignment will be to test and time two sorts, Bubble Sort and the built-in sort in Java.

Requirements:
- Ask the user to enter the file name. Do not hard-code the file name into the program.
- Bubble sort is a separate method in the program. Pass the array from your main program into Bubble sort, and Bubble sort returns the sorted array.
- The input file is lines of plain text - read in the file, put each word into the array. There will be duplicates - do not remove the duplicates but do remove the special characters. There are all sorts of special characters such as comma, period, semi-colon, dash, asterisks, etc. Do not include the special characters.
- Once this array has been created and the entire file read, duplicate the file.
- Use Bubble sort on the first file, use the built-in Java sort on the second file.
- Time ONLY the individual sorts, and execution time separately using the two files. The goal is to see the difference between the worst case and the best case sorts.

Input:
The input file is in my github repo under the name :
`github.com/blanchecohen/TEST/HW4.txt`

Output:
No need to output to a file, unless you want more practice.
The output to the console should look like this:

```
Filename: name of file to be sorted
Number of words: number of words (even the duplicates!) in the file
Wall clock:
    Bubble sort:    xxx
    Internal sort:  xxx

CPU time:
    Bubble sort:    xxx
    Internal sort:  xxx
```

Suggestions & Notes:
- Details on clock time:
  `http://www.oracle.com/technetwork/articles/java/jf14-date-time-2125367.html`
  `https://docs.oracle.com/javase/8/docs/api/java/time/package-summary.html`

- Details on CPU time:
  `https://docs.oracle.com/javase/8/docs/api/java/lang/Runtime.html`
  `http://memorynotfound.com/calculating-elapsed-time-java/`
  `https://docs.oracle.com/javase/8/docs/api/java/lang/System.html#nanoTime--`

- More information on sorts - you create the compareTo method:
  `https://docs.oracle.com/javase/8/docs/api/java/util/ArrayList.html`
  `http://www.topjavatutorial.com/java-8/java-8-sort-arraylist-using-list-sort-method/`

- Use the Step by Step process from HW 1
- Create the class files and with stubs for each method. Compile and verify at each step the program works. Design and build incrementally. Once you have something working, go on to the next method. Don't try to do everything at once.
- The only user involvement is in `HW4.java`
- Avoid hard-coding when possible
- Remember, only **HW4.java** will contain the **main()** method.

To Turn In:
Upload to your github account all Java files for this program.