60-141
Intro to Algorithms & Programming II Winter 2014

Lab #9: C Structures and Pointers
(Due at the end of the lab period or beginning of the next)

Objective: In this Lab you will redo the same task you did in Lab 8, except that instead of using array index (subscripts) to access the elements of an array of structure, this time you will use a pointer to structure approach.

Work to do:
Write a C program called "Lab9.c" to accomplish the following:

Outside of main()

1. Define a C structure named `myWord` with the following members:
   a. `char Word[21] ;`
   b. `int Length ;`

Inside of main()

2. Declare an array named `WordList` of type `myWord` with size 20.

3. Declare a pointer `ptrWordList` of type `myWord` pointer, and initialize it with the address of `WordList`. From this point onward, you will only use `ptrWordList` to access the array `WordList`.

4. Declare a string as follows:
   `char myString[] = "the cat in the hat jumped over the lazy fox";`

5. Use library function `strtok()` to extract each word from `myString` and store it in the `WordList`. (Assume space is the only delimiter separating the words).

6. Use the library function `strlen()` to find the length of each word and store the value in the member `Length`.

   Note: To access the `Word` array inside an element in `WordList` array using `ptrWordList`, use the "arrow" operator. [If you prefer, you could maintain an integer variable to keep record of the number of words extracted].

7. Print the contents of the `WordList` array using `ptrWordList`.

8. Sort the array, using `ptrWordList`, in alphabetical order. (Hint: use a simple *bubble sort* algorithm and use the library function `strcmp()` to compare two words.)

9. Print the contents of the now sorted array using `ptrWordList`.

Note: you should test your program with different `myString` values, including an empty string.

EVALUATION:
You need to show your instructor the complete programs at the end of this lab, or at the beginning of your next lab. The marks you will receive for this lab are made of two parts: Lab work marks 8 and **attendance marks 2**. **Total 10 marks**.

Lab Work Mark: You will be evaluated based on your solutions for the problems based on the following scheme:

0 mark = No work done.
2 mark = Incomplete code / does not compile, with no/invalid documentation
4 marks = Complete running program with no/invalid documentation
6 marks = Incomplete code / does not compile, with proper documentation
8 marks = Complete running program with proper documentation

IMPORTANT:
ASK QUESTIONS IF YOU GET STUCK, BUT DO YOUR OWN CODE. ANY CODE SUSPECTED TO BE SIMILAR TO ANOTHER SUBMISSION WILL CAUSE BOTH SUBMISSIONS TO RECEIVE A ZERO MARK ON ALL LABS AND BE REPORTED FOR PLAGIARISM