CS1050 – Lab 10
Fall 2024

Concepts to Practice
- Pointers
- Strings
- Arrays of Strings
- Testing

Submission Information
Submit this assignment by following the instructions given by your TA. SUBMIT ONLY the .c file (no a.out or executable file is required). All of the lab assignments must be submitted before the end of the lab using the lab code given by the TA.

Use the following submit command:

mucsmake <class> <assignment_type> <filename>

For example:

mucsmake 1050 lab10 lab10.c

Description
For the lab assignment, you will implement a program that takes pre-defined arrays of string literals and sorts them alphabetically using Bubble Sort. You can use the slides or the book if you don't remember how Bubble Sort works.

To get started on this lab, type the following while logged in to hellbender.rnet.missouri.edu:

cs1050start lab10

This command will create a directory called lab10. Go into that directory ("cd lab10") and get a list of the files there ("ls -la"). Notice that there is a file called lab10.c. You can start editing this file to do your lab.

Functions You Must Write
You may write any functions you wish to implement this program, but you have to at least write the two functions I "stubbed out" for you:

- void PrintStrings(char * * strings, int count); // You can use your prelab for this if you did it
- void BubbleSortStrings (char ** strings, int count, int fAscending);

Note: Ignore the fAscending parameter if you are not in the honors section. For the regular section, always sort everything in ascending order regardless of the value of this parameter.

The Catch

Yep. Same catch as the prelab. **You cannot use the index operator []**. That is, the only uses of the square brackets [] in the program are to be the declarations of the testing arrays in main(). You cannot use the square brackets [] at all other than what is already provided to you in main().

Hints

- If a prototype has “char ** s” as a parameter, this is the same to the compiler as “char * s[]”. That is, you can think of the parameter as an array of character pointers.
- On Hellbender, you can type in “man strcmp” and it will give you information about the strcmp() function. You can use this function by including string.h. The function is useful to compare two strings.

Honors Extension

For the honors extension, do as requested above, but also make your BubbleSort() function capable of sorting in ascending or descending order.

Non-honors Sample Output

```
jimr@CENGR-BMVNN34:/home/jimr/CS1050/FS2024/labs/wip/lab10>compile lab10.c
jimr@CENGR-BMVNN34:/home/jimr/CS1050/FS2024/labs/wip/lab10>./a.out
Original dogs:
        Murphy
        Cisco
        Bandit
        Poncho
        Cuddles
        Frisky
        Vicki

Sorted dogs
        Bandit
        Cisco
        Cuddles
        Frisky
        Murphy
        Poncho
        Vicki

Original heroes:
        Spiderman
        Captain America
        Wolverine
        Cyclops
        Iron Man
        Black Widow
        Hulk
        Collosus
        Nightcrawler
        Storm
        Thunderbird
        Sunfire

Sorted heroes
        Black Widow
        Captain America
        Collosus
        Cyclops
        Hulk
        Iron Man
        Nightcrawler
        Spiderman
        Storm
        Sunfire
        Thunderbird
        Wolverine

Original dummy:
        two
```

```
        one

Should not have changed
        two
        one

Still should not have changed
        two
        one

Finally changed
        one
        two

**** Honors only ****
Sorted descending dogs
        Bandit
        Cisco
        Cuddles
        Frisky
        Murphy
        Poncho
        Vicki

Sorted descending heroes
        Black Widow
        Captain America
        Collosus
        Cyclops
        Hulk
        Iron Man
        Nightcrawler
        Spiderman
        Storm
        Sunfire
        Thunderbird
        Wolverine

**********
```

Honors Sample Output

```
jimr@CENGR-BMVNN34:/home/jimr/CS1050/FS2024/labs/wip/lab10>compile -DHONORS lab10.c
jimr@CENGR-BMVNN34:/home/jimr/CS1050/FS2024/labs/wip/lab10>./a.out
Original dogs:
        Murphy
        Cisco
        Bandit
        Poncho
        Cuddles
        Frisky
        Vicki

Sorted dogs
        Bandit
        Cisco
        Cuddles
        Frisky
        Murphy
        Poncho
        Vicki

Original heroes:
        Spiderman
        Captain America
        Wolverine
        Cyclops
        Iron Man
        Black Widow
        Hulk
        Collosus
        Nightcrawler
        Storm
        Thunderbird
        Sunfire

Sorted heroes
        Black Widow
        Captain America
        Collosus
        Cyclops
        Hulk
        Iron Man
        Nightcrawler
        Spiderman
        Storm
        Sunfire
        Thunderbird
        Wolverine

Original dummy:
        two
        one

Should not have changed
```

```
        two
        one

Still should not have changed
        two
        one

Finally changed
        one
        two

**** Honors only ****
Sorted descending dogs
        Vicki
        Poncho
        Murphy
        Frisky
        Cuddles
        Cisco
        Bandit

Sorted descending heroes
        Wolverine
        Thunderbird
        Sunfire
        Storm
        Spiderman
        Nightcrawler
        Iron Man
        Hulk
        Cyclops
        Collosus
        Captain America
        Black Widow

**********
```

Guidelines for Grading Lab 10
40 Points Possible

General

If your program does not compile or produce any input/output (I/O) because most of the source code is commented out then your lab will receive a grade of ZERO POINTS. Further, if your program does not actually follow the specifications, but merely prints out lines that make it appear to follow the specifications, you will receive a grade of ZERO POINTS. For partial credit your C program must not only compile but also produce some valid I/O that meets the lab specifications.

You program is expected to have a comment header at the top that includes your name, pawprint, the course you are taking, and the lab that you are solved (e.g., "Lab 10"). Your code should be nicely indented. You may not use any global variables. **You will lose up to 20 points if you do not meet these basic requirements**.

Non-honors Rubric

Automatic zero: If you use the square bracket [] operator, other than the provided uses in main(), you get an automatic zero.
5 points: The original (unsorted) dogs and heroes arrays are printed correctly.
10 points: The dogs array is correctly sorted ascending and printed.
10 points: The heroes array is correctly sorted ascending and printed.
5 points: The dummy array is not sorted when claimed zero length (but this can't be hard-coded)
5 points: The dummy array is not sorted when claimed one length (but this can't be hard-code)
5 points: The dummy array is finally sorted ascending and printed.

Honors Rubric

Automatic zero: If you use the square bracket [] operator, other than the provided uses in main(), you get an automatic zero.
5 points: The original (unsorted) dogs and heroes arrays are printed correctly.
5 points: The dogs array is correctly sorted ascending and printed.
5 points: The heroes array is correctly sorted ascending and printed.
5 points: The dummy array is not sorted when claimed zero length (but this can't be hard-coded)
5 points: The dummy array is not sorted when claimed one length (but this can't be hard-code)
5 points: The dummy array is finally sorted ascending and printed.
5 points: The dogs array is correctly sorted descending and printed.
5 points: The heroes array is correctly sorted descending and printed.