

COP3502H – Spring 2012
Problem Solving Day
Recursive String Manipulation

Due 2/3 11:55pm on Webcourses

Problem Part 1:

A sentence is called dancing if its first letter is uppercase and the case of each subsequent letter is the opposite of the previous letter. Spaces should be ignored when determining the case of a letter. For example, “C pRo GrAmMiNg” is a dancing sentence because the first letter ‘C’ is uppercase, the second letter ‘p’ is lowercase, the third letter ‘R’ is uppercase, etc., and the spaces are ignored.

You will be given a string *sentence*. Turn the *sentence* into a *dancing* sentence by changing the cases of the letters where necessary. All the spaces in the original *sentence* must be preserved. You must create a **recursive** solution.

Problem Part 2:

After you have created the dancing sentence, write a **recursive** sorting function to sort the characters in the string *sentence*. Since we haven’t covered sorting yet, here is an idea for sorting:

- The function will contain a for loop to loop through all of the characters in the string and find the index that contains the maximum character.
- Swap the maximum character into the last (nth) position in the string.
- Recursively call the function on the first n-1 characters.
- So if you were to sort the string “SARAH”, after each recursive function call you would have: “HARAS”, “HAARS”, “AAHRS”, “AAHRS”.

Constraints:

- *sentence* will contain between 1 and 50 characters, inclusive.
- Each character in sentence will be a letter (‘A’-‘Z’, ‘a’-‘z’) or a space (‘ ’).
- *sentence* will contain at least one letter (‘A’-‘Z’, ‘a’-‘z’).

Suggested Resources: string.h, ctype.h

Deliverables:

StringManip.c
sentence.in
sentence.out

Input File Format:

Your program should read from a file sentence.in. The file will contain lines of strings to be converted to dancing strings and then sorted.

Example Input File Format:

```
C Pro Gramming
blahblahblah
This is a dancing sentence
This is a dancing sentence
aaaaaaaaa
z
```

Output File Format: The output file will contain:

#) dancing string
sorted string

Example Output File Format:

```
1) C PrO GrAmMiNg
   ACGMNOPgimrr

2) BlAhBlAhBlAh
   AAABBBhhhlll

3) ThIs Is A DaNcInG SeNtEnCe
   ACDEGIIINNStaceehnsst

4) ThIs Is A DaNcInG SeNtEnCe
   ACDEGIIINNStaceehnsst

5) AaAaAaAaAa
   AAAAAaaaaa

6) Z
   z
```