Calc
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Computer Architecture

In this assignment, you will practice programming with C pointers and using dynamic memory. Manipulation of dynamic memory and the pointer construct are two defining characteristics of the C language. They are powerful tools but can be fiddly to work with. For your first assignment, you will get a little practice working with both. You will write a rather simple program to sort words given in a single input string.

Your code will take a single, long input string that contains all words to be sorted, break them out into individual strings, sort them, and output them one per line in descending alphabetical order..

How pointersorter.c works:

Input:
./a.out “<input string separated by chars/numbers/swag>”

Commentary:

The program stores words in a hashtable as tokens, with each hashtable index corresponding to a specific letter of the 52 (upper and lower-case) alphabet. It automatically sorts the words just by inserting them into their respective indices, and then runs sort() to sort them again.

The beauty of the program is that it can organize any sized string, due to the O(n) + O(1) efficiency of the hashtable implementation. The original implementation threw all of the words into a linked list and tried to perform an O(n^2) sorting algorithm, but I scrapped that when I presented with the hashtable implementation.

Testcases:

(TEST 1)

$ ./a.out "A a bB bb Aa"

expected:

A
Aa
a
bB
bb

output:

A
Aa
a
bB
bb

(TEST 2)

$ ./a.out "BUT^ONLY_THE#AVATAR%CAN MASTER ALL FOUR ELEMENTS"

expected:

ALL
AVATAR
BUT
CAN
ELEMENTS
FOUR
MASTER
ONLY
THE

output:

ALL
AVATAR

BUT
CAN
ELEMENTS
FOUR
MASTER
ONLY
THE

(TEST 3)

$ ./a.out "Aand aAnd aand AAnd"

expected:

AAnd
Aand
aAnd
aand

output:

AAnd
Aand
aAnd
aand

(TEST 4)

$ ./a.out "thing stuff otherstuff blarp"

expected:

blarp
otherstuff
stuff
thing

output:
blarp
otherstuff
stuff
thing

(TEST 5)

$ ./a.out "thing1stuff3otherstuff,blarp"

expected:

blarp
otherstuff
stuff
thing

output:

blarp
otherstuff
stuff
thing