CS 214 — Spring 2021 > ↱ 📄 Assignments

Assignments

> Assignment has been submitted on Feb 22, 2021 3:15 am

Title
   Assignment 2
Due
Feb 23, 2021 10:00 pm
Number of resubmissions allowed
Unlimited
Accept Resubmission Until
Feb 24, 2021 4:00 am
Status
Submitted Feb 22, 2021 3:15 am
History
Mon Feb 22 03:15:54 EST 2021 Xiaowei Zhang (xz561) submitted

Instructions

Download arraylist.c and arraylist.h.

1. (3 points) Extend arraylist by adding a function al_insert:

```
int al_insert(arraylist_t *list, int index, int item);
```

al_insert(l,i,n) adds a new item n into the list l at index i. Any items at or after index i in the list will be moved forward one space.

If i exceeds the current number of entries in the list, then i will become the new final element of the list. Any newly created entries between the previous last entry and i are not initialized and will contain undetermined values.

If data is not long enough to contain the new list, then either double its length or extend its length to include index i, whichever is longer.

That is,

```
al_init(&A, 10);        // create with length 10
al_insert(&A, 10, 0);  // increases length to 20
al_insert(&A, 90, 0);  // increases length to 91
// only the indicies 10 and 90 are initialized
```

`al_insert` returns 0 if it successfully added the item to the list and 1 if it encounters an error, such as being unable to allocate memory.

Attach your modified copies of arraylist.h and arraylist.c.

2. (6 points) Using arraylist as an model, create a library for string buffers (an array list containing characters). Rename the types and functions as appropriate (e.g., "arraylist" becomes "strbuf"). Include functions corresponding to all the functions in arraylist, including `al_insert`. Ensure that the string held in `data` is null-terminated.

Add the following function:

```
    int sb_concat(strbuf_t *sb, char *str);
```

`sb_concat` adds the string str to the end of the string held in sb. Assume that str is a null-terminated C string. Return 0 if successful, and 1 otherwise.

Note that `sb_append`, `sb_insert`, and `sb_concat` will share similar code to extend the length of the data. Consider putting this code in a separate helper function.

Attach strbuf.h and strbuf.c.

3. (3 points) Consider the behavior of the following code fragments

```
// 1
char *buffer;
...
for (i = 0; i < N; ++i) {
    strcat(buffer, input[i]);
}


// 2
strbuf_t *buffer;
...
for (i = 0; i < N; ++i) {
    sb_concat(buffer, input[i]);
}
```
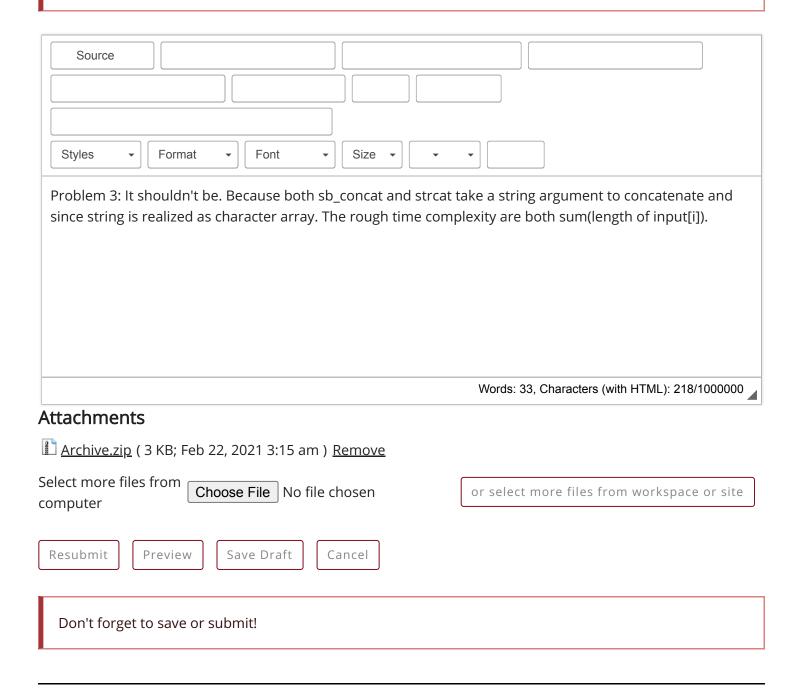
Assume that sufficient memory has been allocated in both cases, that input contains at least N elements, and that all strings are null-terminated. Will there be any notable differences in the performance of these code fragments?

Enter your answer in the text box, or attach a text file.

Submission

Assignment Text

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Source			

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Problem 3: It shouldn't be. Because both sb_concat and strcat take a string argument to concatenate and since string is realized as character array. The rough time complexity are both sum(length of input[i]).

Words: 33, Characters (with HTML): 218/1000000

Attachments

📄 Archive.zip (3 KB; Feb 22, 2021 3:15 am) Remove

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