CS 211 Lab 3

Strings

Winter 2021

Today we are going to practice manipulating *strings.*

Getting Started

The starter code is available at ~cs211/lab/lab03.tgz, so you can extract it into your current working directory with the command

```
% tar -xkvf ~cs211/lab/lab03.tgz
```

Your current working directory should now contain a subdirectory called lab03.

Writing the code

Navigate to your lab03 directory and open up src/lab3.c in Emacs:

```
% emacs src/lab3.c
```

Notice that there is already some skeletons of functions and some code in *main()* here.

Now open src/lab3_funs.c. Note that comments explaining functionality are placed in src/lab3_funs.h.

*const char *str_chr(const char *s, char c)*

First, find the function called *str_chr*. We are going to use this function to determine if the character `c` exists in the string `s`, and if so, where. If you remember from class, we have a few ways of iterating, most notably `while` which is what you will use for this function.

Notice that *str_chr* is going to return a `const char *`.

While loops

As we learned in class, a `while` loop has the following syntax:

```
while (<expr>) {
    // Looping through code here
    // Until <expr> is false
}
```

Note that in while loops we usually will use a boolean expression for <expr> (an expression which returns `true` or `false`.)

Use a while loop inside our *str_chr* in order to see if `c` is ever equal to any one of the charcters in `s`. Make sure to use a `return` statement to return the `char *` if we find it (or a `NULL` if nothing is found). The

Remember that we have the `++` operator to help us.

returned `char *` should point to the first instance of the character in the string.

Once you think that your function works as intended, save and and try compiling and running it. If you remember from last week, we used the *make* command in order to turn our C file into machine code. Run:

C-x C-s to save

```
% make lab3
```

Remember, make works as follows: `% make [target]`. Target is usually the name of the executable file that will be built by the make command.

If everything works, if we list the files in `.`, we should now see a file called lab3. Enter the command

```
% ./lab3
```

See if your value looks right! If it doesn't, don't worry, Rome wasn't built in a day. Try and see what went wrong. Play around with the value of s and c to see how it affects the result.

Error messages may look scary, but in reality, they're there to help you! Not intimidate you!

*bool is_prefix_of(const char *haystack, const char *needle)*

Once we have everything working with our *str_chr*, let's move on to a similar function called *is_prefix_of*. This function is similar to *str_chr* in that it loops through a string to find something, but the difference here is that we are looking for a substring - not just a character. Also, the substring needs to be positioned at the start of the test string. Since both of the inputs are "strings" (`char *`), you will need to check that not only one character matches in the substring (needle), but that every character matches. Return true if the first characters of haystack entirely match needle.

Notice that *is_prefix_of* is going to return a `bool`.

Once you are done, make and run your file. See if your function properly identifies prefixes. If not, no worries, go back and try again!

*const char *str_str(const char* haystack, const char *needle)*

Once the function *is_prefix_of* is working, write a new function *str_str* that uses *is_prefix_of* to determine if a word exists anywhere in another word. To check if the search word (needle) is in the haystack, first check to see if it is a prefix of haystack. If needle is not the prefix to haystack, try to see if needle is the prefix of everything but the first letter of haystack. This loop will effectively check for the subword needle in every possible position inside haystack. Return a pointer to the start of the first instance of needle in haystack if you find it, and NULL if you don't.

Make and run lab3, and see if *str_str* works the way that you intended. Hopefully everything works! If not, as usual, go back and try and find what went wrong and update your code.