CIS2107
Computer Systems & Low-Level Programming

Lab09. String Library

Lab 9: String Library

- Upload tar/zip file to Canvas
  - Test on **`cis-linux2`** server !!!!

- Comments at top of the file:
  - Name, Date, Course
  - Homework number (Lab 8 String Library)
  - Statement of problem

Warning !!

Cannot use `string.h` library functions!

Please name your driver program `strtester.c`

Requirements

ORGANIZATION: create a directory

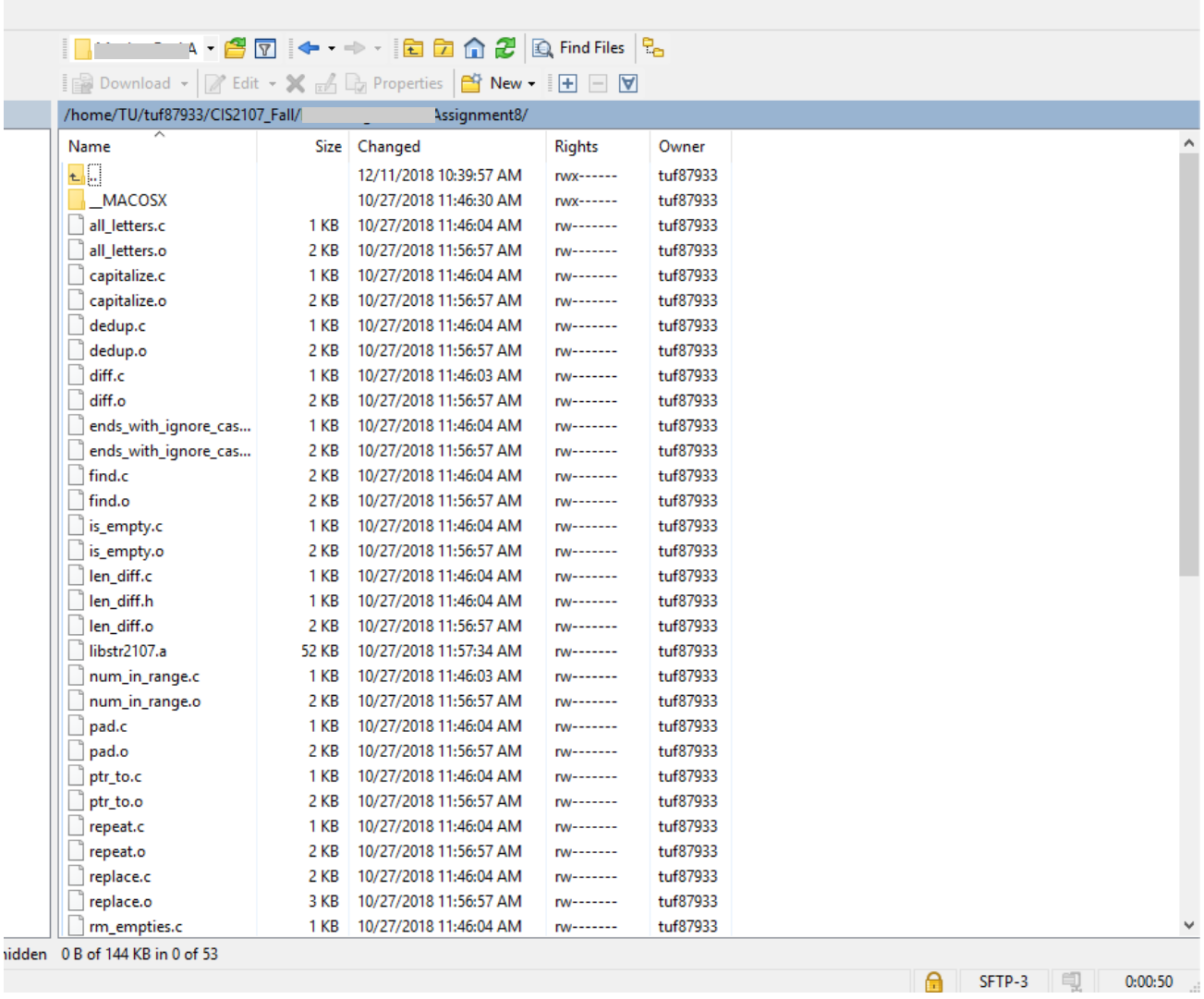
- `.c` **files:** one for each function in the library **AND** a test program [24 TOTAL]
- `.h` **file:** contains declarations for each file, #included in each of the c files [ONE TOTAL]
- `.a` **file:** library file [ONE TOTAL]

Important Commands

```
//compile all c files without linking - creates your executables!
gcc -c *.c

//create library file

ar rcs libstr2107.a *.o

//compile test program and link it with library

gcc -o strtester strtester.c -L. -lstr2107

./strtester
```

NOTE: `libstr2107` and `-lstr2107` are intentionally different

Example Directory



Example header file

/home/TU/tuf87933/CIS2107_Fall/Beck/[redacted]Assignment8/string.h - tuf87933@cis-linux2.temple.edu - Editor - WinSCP

Encoding ▾ Color ▾

```
#ifndef string_h
#define string_h

int all_letters(char *s);
int num_in_range(char *s1, char b, char t);
int diff(char *s1, char *s2);
void shorten(char *s, int new_len);
int len_diff(char *s1, char *s2);
void rm_left_space(char *s);
void rm_right_space(char *s);
void rm_space(char *s);
int find(char *h, char *n);
char *ptr_to(char *h, char *n);
int is_empty(char *s);
char *str_zip(char *s1, char *s2);
void capitalize(char *s);
int strcmp_ign_case(char *s1, char *s2);
void take_last(char *s, int n);
char *dedup(char *s);
char *pad(char *s, int d);
int ends_with_ignore_case(char *s, char *suff);
char *repeat(char *s, int x, char sep);
char *replace(char *s, char *pat, char *rep);
char *str_connect(char **strs, int n, char c);
void rm_empties(char **words);
char **str_chop_all(char *s, char c);

#endif /* string_h */
```

Example driver program

/home/TU/tuf87933/CIS2107_Fall/Beck/MeghanBeckAssignment8/tests.c - tuf87933@cis-linux2.temple.edu - Editor - WinSCP

Encoding ▾ Color ▾

```c
#include "string.h"
#include <stdio.h>
#include <ctype.h>

int main(void){

    puts("Test for all_letters");
    char *s = "hello";
    char *s1 = "sir";
    int all_letters_ = all_letters(s);
    if (all_letters_) {
        printf("String:%s\n", s);
        puts("All characters in string were letters\n");
    }else {
        puts("All characters in string were not letters\n");
    }

    puts("Test for num_in_range");
    int num_in_range_ = num_in_range(s, 'a', 'h');
    printf("The String:%s\n", s);
    printf("The range %c-%c", 'a', 'h');
    printf("%s %d %s\n\n", "There are", num_in_range_, "letters in the range");

    puts("Test for diff");
    int diff_ = diff(s, s1);
    printf("The Strings: %s, %s\n", s, s1);
    printf("%s %d %s\n\n", "The strings differ in", diff_, "ways");

    puts("Test for shorten");
    puts("Before:");
    printf("%s\n", s);
    puts("After:");
    char word[] = "hello";
    shorten(word, 3);
    printf("%s\n\n", word);

    puts("Test for len_diff");
    int len_diff_ = len_diff(s, s1);
    printf("The Strings: %s, %s\n", s, s1);
    printf("%s %d\n\n", "The strings differ in length by", len_diff_);

    puts("Test for rm left space");
```

Line: 1/202 | Column: 1 | Character: 35 (0x23) | Encoding: 1252 (ANSI - La

Example c file

/home/TU/tuf87933/CIS2107_Fall/Beck/MeghanBeckAssignment8/find.c - tuf87933@cis-linux2.temple.edu - Editor - WinSCP

Encoding ▾ Color ▾

```
#include "string.h"
#include <stdio.h>

int find(char *h, char *n) {
    int len_n, len_h;
    for(len_n = 0; *(n+len_n)!= '\0'; len_n++);
    for(len_h = 0; *(h+len_h)!= '\0'; len_h++);

    if (len_n > len_h) {
        return -1;
    }
    int count_n;
    int test[len_n];
    for (count_n = 0; count_n < count_n; count_n++) {
        test[count_n] = -1;
    }

    int h_counter, n_counter;
    h_counter = 0;
    n_counter = 0;

    int toRet = 0;



    while(*(h+h_counter) != '\0') {
        if (*(h+h_counter) == *n) {
            toRet = h_counter;
            while((*(n+n_counter) != '\0') && (*(h+h_counter) != '\0')) {
                if(*(n+n_counter) == *(h+h_counter)) {
                    test[n_counter] = 1;
                }
                else {
                    break;
                }
                n_counter++;
                h_counter++;
            }
            int sum_n = 0;
            for (n_counter = 0; n_counter < len_n; n_counter++) {
                sum_n += test[n_counter];
```

Line: 1/56 | Column: 1 | Character: 35 (0x23) | Encoding: 1252 (ANSI - La

1. int all_letters(char *s)

- Input: “Hello World”
  - Returns: 1

- Input: “He11o World”
  - Returns: 0

2. num_in_range(char *s1, char b, char t)

- Input: “Yellow” ‘f’ ‘m’
  - Returns: 2

3. diff(char *s1, char *s2)

- Input: “Book” “Back”
  - Returns: 2

4. void shorten(char *s, int new_len)

- Input: “Hello World” 5
  - Returns: “Hello”
- Input: “Hello World” 20
  - Returns: “Hello World”

5. int len_diff(char *s1, char *s2)

- Input: “Philadelphia” “Hello”
  - Returns: 7

5. void rm_left_space(char *s)

- Input: “ Hello”
  - Returns: “Hello”

6. void rm_right_space(char *s)

- Input: “Hello ”
  - Returns: “Hello”

8. void rm_space(char *s)

- Input: “ Hello ”
  - Returns: “Hello”

9. int find(char *h, char *n)

- Input: “Hello ” “l”
  - Returns: 2

- Input: “Hello” “q”
  - Returns: -1

10. char *ptr_to(char *h, char *n)

- Input: “Hello ” “l”
  - Returns: pointer to l
- Input: “Hello” “q”
  - Returns: NULL

11. is_empty(char *s)

- Input: “ ”
  - Returns: 1

- Input: “Hello”
  - Returns: 0

12. str_zip(char *s1, char *s2)

- Input: “Temple” “Hello”
  - Returns: “THeemlplloe”

13. void capitalize(char *s)

- Input: “hello world”
  - Returns: “Hello World”

14. int strcmp_ign_case(char *s1, char *s2)

- Input: "hello" "goodbye"
  - Returns: 1

- Input: "Hello" "hello"
  - Returns: 0

15. void take_last(char *s, int n)

- Input: "hello" 3
  - Returns: "llo"

- Input: "hello" 6
  - Returns: "hello"

16. dedup(char *s)

- Input: “hello”
  - Returns: “helo”

17. pad(char *s, int d)

- Input: “hello” 6
  - Returns: “hello ”

- Input: “hello” 5
  - Returns: “hello”

18. ends_with_ignore_case(char *s, char *suff)

- Input: “Coding” “ing”
  - Returns: 1

- Input: “Coding” “ed”
  - Returns: 0

19. char *repeat(char *s, int x, char sep)

- Input: “hello” 3 ‘-’
  - Returns: “hello-hello-hello”

20. char *replace(char *s, char *pat, char *rep)

- Input: “Steph is the X” “X” “best”
  - Returns: “Steph is the best”

21. char *str_connect(char **strs, int n, char c)

- **Input:** “Hello world Hello world” 4 ‘-’
  - **Returns:** “Hello-world-Hello-world”

22. void rm_empties(char **words)

- Input: “Hello” “World” “ ” “ ” “Steph”
  - Returns: Hello World Steph

23. char **str_chop_all(char *s, char c)

- Input: “Hello/world/hello/world” ‘/’
  - Returns: Hello, world, hello, world

Checklist

- Do I have **`23 separate c files`** that each contain a single function?
- Do I have **`a c file`** that is the **`driver program`**?
- Do I have **`a header file`**?
- Does my program compile and run on the **`cis-linux2`** server?