String Manipulation

Documentation

Implementation file: falcone_stringman.h

```
#ifndef FALCONE_STRINGMAN_H
#define FALCONE_STRINGMAN_H

// Function prototypes for string manipulation functions
/**
 * @brief Reverses the order of characters in a string.
 * @param str The character array to be reversed (in-place modification).
 * @post The characters in `str` will be reversed.
 */
void reverseString(char str[]);

/**
 * @brief Converts all lowercase letters in a string to uppercase.
 * @param str The character array to be converted (in-place modification).
 * @post All lowercase letters in `str` will be converted to uppercase.
 */
void toUppercase(char str[]);

/**
 * @brief Converts all uppercase letters in a string to lowercase.
 * @param str The character array to be converted (in-place modification).
 * @post All uppercase letters in `str` will be converted to lowercase.
 */
void toLowercase(char str[]);

/**
 * @brief Calculates the length of a null-terminated string.
 * @param str The null-terminated character array.
 * @return The number of characters in `str` excluding the null terminator.
 */
int stringLength(char str[]);

#endif // #ifndef FALCONE_STRINGMAN_H
```

Implementation file: falcone_implementation.c

```
#include "falcone_stringman.h"

// Function definition for reverseString
/**
 * @brief Reverses the order of characters in a string.
 * @param str The character array to be reversed (in-place modification).
 * @post The characters in `str` will be reversed.
 */
void reverseString(char str[]) {
  int length = strlen(str);
  int i;
  char temp;

  // Swap characters from both ends of the string
  for (i = 0; i < length / 2; i++) {
    temp = str[i];
    str[i] = str[length - i - 1];
    str[length - i - 1] = temp;
  }
}

// Function definition for toUppercase
/**
 * @brief Converts all lowercase letters in a string to uppercase.
 * @param str The character array to be converted (in-place modification).
 * @post All lowercase letters in `str` will be converted to uppercase.
 */
void toUppercase(char str[]) {
  int i = 0;
  while (str[i] != '\0') {
    if (str[i] >= 'a' && str[i] <= 'z') {
      str[i] = str[i] - 'a' + 'A';
    }
    i++;
  }
}

// Function definition for toLowercase
/**
 * @brief Converts all uppercase letters in a string to lowercase.
 * @param str The character array to be converted (in-place modification).
 * @post All uppercase letters in `str` will be converted to lowercase.
 */
void toLowercase(char str[]) {
  int i = 0;
  while (str[i] != '\0') {
    if (str[i] >= 'A' && str[i] <= 'Z') {
      str[i] = str[i] - 'A' + 'a';
```

```
    }
    i++;
  }
}

// Function definition for stringLength
/**
 * @brief Calculates the length of a null-terminated string.
 * @param str The null-terminated character array.
 * @return The number of characters in `str` excluding the null terminator.
 */
int stringLength(char str[]) {
  int length = 0;
  while (str[length] != '\0') {
    length++;
  }
  return length;
}
```

Test file: falcone_test.c

```
#include <stdio.h> // Standard input/output library (printf, scanf_s)

#include "falcone_stringman.h" // Header for string manipulation functions (reverseString,
toUppercase, toLowercase, stringLength)

int main() {
  // Get user input (max 100 characters)
  char input[100];
  printf("Enter a string: ");
  if (scanf_s("%99[^\n]", input, 100) != 1) {
    printf("Error reading input.\n");
    return 1;
  }

  // Create a copy to avoid modifying original input
  char original[100];
  strcpy(original, input);

  // Print original string
  printf("Original String: %s\n", original);

  // Reverse the string
  reverseString(input);
  printf("Reversed: %s\n", input);

  // Convert to uppercase (modifies original copy)
  toUppercase(original);
  printf("Uppercase: %s\n", original);

  // Convert to lowercase (modifies original copy)
  toLowercase(original);
  printf("Lowercase: %s\n", original);

  // Calculate and print length
  int len = stringLength(original);
  printf("Length: %d\n", len);

  return 0;
}
```