

Notes for Programming in C Lab Session #2

October 7, 2024

1 Introduction

The purpose of this lab session is primarily to ease you into programming in C, by writing a small example program.

2 Overview

In the first lecture, we saw how to reverse a whole string using a for loop. That is, given a variable `s` holding the string:

```
"University of Cambridge!"
```

we were able to modify the string so that it had the contents:

```
"!egdirbmaC fo ytisrevinU"
```

In this lab session, you will write a function that does not reverse the *whole* string, but instead reverses *each word* within the string. So instead, you will seek to modify the original string so that its contents are:

```
"ytisrevinU fo egdirbmaC!"
```

Moreover, in the second recorded lecture, we saw how to define C functions. So you will do this by implementing a small library of functions whose prototypes and specifications are given in `revwords.h`, and whose implementation should go in `revwords.c`.

3 Instructions

1. Download the `lab2.tar.gz` file from the class website.
2. Extract the file using the command `tar xvzf lab2.tar.gz`.
3. This will create a `lab2/` directory. Change into this directory using the `cd` command.
4. In this directory, there will be files `lab2.c`, `revwords.h`, and `revwords.c`.
5. There will also be a file `Makefile`, which is a build script which can be invoked with the command `make`. It will automatically invoke the compiler and build the `lab2` executable.
6. Run the `lab2` executable, and see if your program works.

4 The Functions to Implement

```
void reverse_substring(char ss[], int start, int end)
```

`reverse_substring(ss, start, end)` function takes a string `ss`, and two integer indices `start` and `end` identifying the start and end of a substring of `ss`. The function may assume that `start` and `end` are both valid indices into the string.

```
int find_next_start(char ss[], int len, int i)
```

`find_next_start(ss, len, i)` takes a string `ss` of length `len`, and an index `i` (which must be strictly less than `len`). It then returns the index `k` which is the starting position of the next word beginning at position `i` or later. If no such index exists, then it should return `-1`.

```
int find_next_end(char ss[], int len, int i)
```

`find_next_end(ss, len, i)` takes a string `ss` of length `len`, and an index `i` (which must be strictly less than `len`). It returns the first index `k` past the end of the word starting at `i`.

```
void reverse_words(char ss[])
```

`reverse_words(ss)` takes a string `ss`, and reverses all of the words in it. Here, a "word" is defined as a contiguous sequence of alphabetic characters.

(Revised DJG, October 2020).