Programming Assignment #3

This short assignment will give you more practice with arrays, functions, and iteration. It will also help you to use pointers with arrays. The program is simple: To determine whether or not an array of characters represents a palindrome. A palindrome is a phrase that can be spelled the same forward and backwards. Here are some examples:

Not a tub, but a ton   Rats live on no evil star
Madam, I'm Adam   I prefer pi
Rise to vote, sir   Gary knits a stinky rag
Go hang a salami, I'm a lasagna hog   Nate bit a Tibetan
A nut for a jar of tuna   Sleep on no peels

In general, you skip any characters that are not letters. For this assignment, we won't have any spaces or punctuation in the phrases to worry about. We'll simply have character arrays like these:

> abcdcba
> 123454321
> madamImadam
> notatubbutaton
> gohangasalamiimalasagnahog

There are two simple functions that you need to write to complete the assignment.

Function	Description
`int is_palindrome1(const char phrase[], int length)`	Given an array of characters, determine if it's a palindrome **using array subscripting**. Returns 1 (true) if the phrase is a palindrome and 0 if not.
`int is_palindrome2(const char *phrase, int length)`	Given an array of characters, determine if it's a palindrome **using pointers**. Returns 1 (true) if the phrase is a palindrome and 0 if not.

Both functions do the same thing, but in different ways. The first one will use array subscripting much like the previous assignment. The second function will not use subscripting in any way. **This means that there will be no subscript operators (the square brackets `[]`) present in the second file, whatsoever, not even in a comment. If a subscript operator is present, it's an automatic zero, no questions asked.** Please re-read the last sentence. Now, read it again.

Example output from the testing program:

```
Testing #1: a is a palindrome
Testing #2: a is a palindrome

Testing #1: ab is not a palindrome
Testing #2: ab is not a palindrome

Testing #1: aa is a palindrome
Testing #2: aa is a palindrome

Testing #1: abcdcba is a palindrome
Testing #2: abcdcba is a palindrome

Testing #1: madamImadam is a palindrome
Testing #2: madamImadam is a palindrome

Testing #1: madamIamadam is not a palindrome
Testing #2: madamIamadam is not a palindrome
```

Details

You are given a file called **driver.c**, which includes the main function with several test cases for you to use. There are two functions prototyped in that file, one for each of the functions you are to write. As always, you must implement both of theses functions *exactly as prototyped.* You will implement each of these functions in their own file. The first function will be placed in a file named **palindrome1.c**. The second function will be placed in a file named **palindrome2.c**. A sample command line to compile this assignment looks like this:

```
gcc -O -Wall -Wextra -ansi -pedantic driver.c palindrome1.c palindrome2.c -o pal
```

This will compile and link all three files and produce an executable file named **pal.exe** (on Windows) or **pal** (on Linux and Mac OS X). Please make sure that you spell the filenames correctly. The first command line switch above is the capital letter 'O', not a zero.

This assignment will not require you to include any header files in your code, so you cannot include anything. All of the code that you write must be in the two files mentioned above since you will not be turning in driver.c. **REPEAT**: **You will not turn in driver.c**, so any changes you make to driver.c will not be seen by me. Also: **NEVER PUT A main( ) FUNCTION IN YOUR FILE. EVER.** (Unless instructed to do so...)

Both of the functions will be doing some sort of looping. You can use either a **for** loop, **while** loop, or **do** loop.

What to submit

You must submit the two C files (**palindrome1.c** and **palindrome2.c**) in a single .zip file to the appropriate upload page.

Refer to the web page for this assignment for any additional details on how to submit this assignment. **Do not submit any other files than the ones listed.**

Make sure your name and other info is on all documents.

If you want to challenge yourself or just want more practice writing programs, you can do this:

After you have completely finished the assignment and submitted it, you can modify it to handle the palindromes that have punctuation and mixed-case letters. For example:

> Madam, I'm Adam.
> Rise to vote, sir.
> Go hang a salami, I'm a lasagna hog.

However, **DO NOT** submit this version to the server. This is strictly for your own practice and enjoyment! Again, **DO NOT** submit this "advanced" version to the submission server.