

CmpE 101

Fall 2009

Programming Assignment 1

Due date: 3 Sept. 2009

Our first programming assignment has to do with ROT13 encoding. ROT13 is an example of a simple substitution cipher called a *Caesar cipher* (because it was supposedly used by Julius Caesar 2000 years ago). The site <http://starbase.trincoll.edu/~crypto/historical/caesar.html> will tell you more about Caesar ciphers. (You might want to start with the introduction at <http://starbase.trincoll.edu/~crypto/historical/intro.html> .)

A definition of ROT13 can be found at at <http://en.wikipedia.org/wiki/ROT13> . Here's another typical definition you find in FAQs:

rot13 /rot ther'teen/ /n.,v./ [Usenet: from `rotate alphabet 13 places'] The simple Caesar-cypher encryption that replaces each English letter with the one 13 places forward or back along the alphabet, so that "The butler did it!" becomes "Gur ohgyre qvq vg!" Most Usenet news reading and posting programs include a rot13 feature. It is used to enclose the text in a sealed wrapper that the reader must choose to open -- e.g., for posting things that might offend some readers, or spoilers. A major advantage of rot13 over rot(N) for other N is that it is self-inverse, so the same code can be used for encoding and decoding.

In other words, the advantage of using ROT13 rather than ROTn where $n \neq 13$ is that since there are 26 letters in the alphabet, $n = 13$ is the only value that can use the same algorithm for encoding and decoding.

- Here is a page where you can try out ROT13: <http://rot13.de/> .

Now you understand what ROT13 is, and you have a way to get correct examples of ROT13 encoding. What should your code do?

What your code should do

1. Your code should ask the user to enter a file name from the keyboard.
2. Your code should open the file, read it character by character and output each character to the screen in ROT13 encoding.
3. When you get to the end of the file you should output the number of characters read on a new line, and then stop.
4. If the file did not open correctly, you should print an appropriate message and then exit. You need to test for this.
5. Assume that the input file contains just text (the kind that you get when you create a file using **Notepad**). Don't worry about what happens with non-text files.

Hints

1. There are really two different parts to this problem. One is how to read from a file, the second is how to do ROT13 encoding. Solve one problem at a time.
2. Start with how to read a file. The first version of the code you should write should just output the text without changing it. (Examine the use of `getline`.)
3. Once you've got that figured out, you can do the ROT13 encoding part. To make sure you don't mess up the part that you already have figured out, you should implement the encoding as a function call. Obviously the function will take a character as an input and return a character.
4. If the character is not in the range a-z or A-Z, the function should just return the input character unmodified.