Math 3300 Programming Assignment 8

Instructions: Work on the following programs and submit your source codes to me via Blackboard. It may be completed in small groups (of up to 5).

1. Write a program which sorts a list of words alphabetically. Your program will read from a file containing a list of words (one word on each line). Your program will sort these words alphabetically, and store the sorted list in a new file. You shouldn't make any assumptions about the words in the file (i.e. capitalization, number of words, etc.)

2. A *Caesar cipher* is a simple way to encode a message. The method for encoding is to simply shift every letter. Each Caesar cipher has a "key", which is the letter corresponding to the letter 'a'. For example, with a Caesar cipher with key 'f', we have the following:

decoded	a	b	c	d	e	f	g	h	i	j	k	l	m
encoded	f	g	h	i	j	k	l	m	n	o	p	q	r

decoded	n	o	p	q	r	s	t	u	v	w	x	y	z
encoded	s	t	u	v	w	x	y	z	a	b	c	d	e

So a becomes f, b becomes g, c becomes h, ..., x becomes c, y becomes d, and z becomes e. Changing the letters in this way is called "encoding", and changing back is called "decoding."

With a key of 'f', the message, "This assignment is due on a Monday." is encoded as: "Ymnx fxxnlsrjsy nx izj ts f Rtsifd."

You are to write a program, which can encode messages (meaning taking a message and applying a Caesar cipher) or decode messages (taking the coded message and reversing the cipher to obtain the original message). Your program will read an encoded or decoded message from a file, then write the appropriate encoded or decode message to a different file.

Requirements:

(a) Create the following menu:

Enter the letter corresponding to your choice:
A. Encode a file.
B. Decode a file.
C. Quit the program.

The user should be able to enter 'a' or 'A' to encode a file, 'b' or 'B' to decode a file, and 'c' or 'C' to quit the program. Any other input

should be recognized as invalid, and the user should be given the opportunity to enter a correct choice without restarting the program.

(b) The user should be able to enter any filename for the encoded/decoded file, and any filename for the created file.

(c) Your program should check to make sure that each file has opened successfully, and you should give the user the option to overwrite any existing file.

(d) The user should be able to enter any upper case or lower case letter for the key. Any other key should be considered invalid, and the user should be given the opportunity to enter a correct key without restarting the program.

(e) When encoding or decoding, upper case letters should be changed to uppercase letters, lower case letters should be changed to lower case letters, any other character should be left unaffected.

For example, with a key of 'f' or 'F': ABCdef123.(* should be changed to: FGHijk123.(*

(f) Your program will have to read the input file one character at a time. You should create an encoding function which returns an encoded character and a decoding function which returns a decoded character corresponding to the read character.

(g) It may be useful to create an array of lower case letters and upper case letters, and possibly some other arrays. The isalpha(), isupper(), toupper(), tolower() string methods might be useful.