Lab 4 – Caesar Cipher

75 possible points

Goal:

Since you are now familiar with sub routines (procedures) lets use them to create a cipher.

Encryption and Decryption

You want to be able to hang out with the cool kids that use the Caesar Cipher (http://en.wikipedia.org/wiki/Caesar_cipher) to tell jokes on the internet so you decide to write a program to help you convert jokes into and out of any Caesar Cipher format (ROT-13 is an example of one). Your task is:

   a. Create a 2x200 array. You will be able to store one string in normal text mode and the encrypted string for it.
   b. Print a prompt that asks to either encrypt or decrypt a string.
   c. Print a prompt that ask the user for a number between 1 and 25 or 'x' to quit.
   d. Print a prompt that asks for the string to encrypt or decrypt.
   e. Using either row major or column major form store the string entered into your 2D array in row 0.
   f. Either encrypt or decrypt the string entered and store it into your 2D array in row 1.
   g. Print out your 2D array.
   h. Repeat.

You need to also make a flowchart for this program.

The Caesar Cipher Algorithm

The Caesar Cipher is an encoding method that works like this (example is for a shift amount of 13, which is a ROT-13).

if (character is in alphabet)
{

      if (character is in top half of alphabet [A-M|a-m])
      character = character + 13;
      else (character is in bottom half [N-Z|n-z])
      character = character – 13;

}
print (character);

Notes:

- Non-alphabetic characters such as numbers (1,2,3), punctuation (,.?!), and other weird stuff (&#$[}\|, etc) should not be altered before output. That is to say, if I enter '@', I should get '@' back.
- To get some test input do an internet search for "rot13 jokes", this will be for Caesar Cipher's of 13 only though.

- You can also search the internet for other Caesar Cipher examples.

Requirements

You are required to use a 2D array structure with either **Row Major** or **Column Major** ordering that was covered in class. Be sure to put which one you use in your README and in your code comments. You need to make use of a few sub routines:

- Encrypt: It takes a character and a cipher as an input and returns the encrypted value
- Decrypt: It takes an encrypted character and a cipher and returns the decrypted value
- Print Array: It prints the 2D array out
- Store: Takes coordinates (Ri, Ci) and byte of data and stores into the 2D array
- Load: Takes coordinates (Ri, Ci) and loads a byte of data from the 2D array

The Encrypt, Decrypt, and Print Array sub routines will call the Store and Load sub routines.

Example of possible output for Part B:

Hello, welcome to my Caesar Cipher program
Do you want to (E)ncrypt or D(ecrypt) or e(X)it?
> D
What is the cipher (1-25)?
> 13
What is the string (up to 200 characters)?
> Fpubby vf sha!!
Here is your string and the decrypted result
<Encrypted> Fpubby vf sha!!
<Decrypted> School is fun!!
> Do you want to (E)ncrypt or D(ecrypt) or e(x)it?
> X
Goodbye!!

See the grading template for information on the points possible for the extra credit.

Files to Submit:

- **Lab5.asm**
- **Flow chart shown to TA/Tutor**
- **Lab report**

Check-off:

You must demonstrate this lab to the TA/tutor, either before submission or after submission. To be considered on time you must have submitted everything by the due date.