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Seongwoo Choi

scho29@ucsc.edu

CMPE - 012

#1368039

M/W 2:00PM - 4:00PM

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Title:

Caesar Cipher

Purpose:

The purpose of this lab is use LC-3 program on Windows operating system and create a Caesar cipher program, which allows an user to write down a string and then the program encrypts the code and then prints the encrypted code back to the user. For decryption, when the user enters the decrypted string, the program solves the decrypted string and prints back the string that the user can understand. This lab has many steps to create, so it requires to create a flowchart to program the assignment. I used Assembly language to program, debug and compile the application for this lab assignment.

Algorithm and Other Data:

For algorithm to create this specific program on LC-3 in Windows operating system environment, I had to understand how Caesar cipher works, so I browsed the web to understand what it is. The idea of the Caesar cipher is that the user needs to input a string into the program and the program chooses each Alphabetical character from user's string and then converts each of them into another letter to create a new line of code. The algorithm that we used to create a Caesar cipher program is that we implemented a 400 array into the program. Each time the program recalls this array and splits into two 200 arrays. After that, the program understands that each array contain Alphabets in uppercase and another 200 array in lowercase. For Cipher, Cipher is the user input that indicates which stack a pointer of array should select the letter inside the array.

Algorithm: A to (26 - cipher)
 input + cipher
 remainder to Z
 input - (26 - cipher)

This algorithm shows how the program runs when the user chooses cipher number. Cipher number is the answer of the user that indicates on which location that the pointer needed to stop

to select decrypted code. For remainder to Z and input $-(26 - \text{cipher})$ indicates if an user wrote a string that is in the end of alphabetical order. For instance if the user chooses 5 as a Cipher, then the user chose W in its string, then the program should understand that W in the 23rd location of the Alphabetical order. So, this algorithm allows the program to create a loop that goes back to Alphabetical order.

What went wrong and what were the challenges?

As I was working the assignment, I faced many frustration since this lab needed to implement algorithm into the code. However, it was very hard to implement algorithm into the code because the LC-3 was not familiar environment that I used to work on. Compared to any other high level programming languages, implementing the algorithm to solve the encryption and the decryption of strings were very challenging. However, TA's told me how algorithm works and they helped me a lot with the coding itself. Still, I had a long time to work on the programming for a long time and I could not get help from TA's during the holiday, so it was a bit upsetting.

Conclusion:

Encryption and decryption take a lot of time to program for this lab assignment, but I think the lab 7 allowed us to understand how to implement algorithm so that encryption and decryption work properly on the environment of LC-3. This took a lot of consideration since the LC-3 environment was totally different from what I was used to program on other programming languages.