**CS 10 - Assignment 3: Cipher Single**

**Collaboration Policy**

We encourage collaboration on various activities such as lab, codelab, and textbook exercises. However, **no collaboration between students is allowed on the programming assignments**. Please be sure to read and understand our full policy at: [Full Collaboration Policy](https://docs.google.com/document/d/1WyzL3qvKLrC1UCRf178b_wYWQmEZlhDObFNFb79U63I/edit?usp=sharing)

**Submission Instructions**

Submit to [R’Sub](https://galah.cs.ucr.edu) testing, feedback and grading.

**Assignment Specifications**

Decryption and encryption is a very useful activity to hide messages or data. Encryption is utilized to store passwords, store user information and in many other means when the sender does not want the message to be easily readable to anyone other than the intended reader.

**Your Assignment**

You must write a program to encrypt the first character of a word. The word will be entered by the user. Additionally, the user will enter a string value to be utilized as a translation map when determining how to translate the character.

**Alphabetic Positions**

Positions start at zero. If the letter is 'a' then the position of the letter within the alphabet is 0 and if the letter is 'c' the position is 2 and so on through 'z'.

**Algorithm**

* Acquire the translation map
  + If keyword default is entered, utilize the default map.
    - default map: "zyxwvutsrqponmlkjihgfedcba"
  + Validate the size of the map (26 characters)
* Acquire the word to encrypt, validate encryption is possible.
  + Validate whether the first character in the word can be encrypted
    - The first character must be a lowercase letter
* Perform encryption
  + Encryption: Convert the first character in the word to a character in the map
    - Get the character from the word
    - Calculate the character's alphabetic position
    - Replace the character in the word with the character in the map at the calculated position.

**Hints/Tips**

* Implement the algorithm in the specified order.
* If you get to an error point, immediately exit the program (within main just return 0;)
* Use only a single map variable, assigning a proper value based the value of user input.

**Encryption Example**

If your translation map is "9876543210abcdefghijklmnop" and your word is "about", your task is to convert the first character. Thus, you need to convert the 'a' to '9' resulting in "9bout". The conversion comes from 'a' being the first letter (position 0) in the alphabet, so the character gets converted to the first character (position 0) in the map, '9'.

**Output Requirements**

* Output results should utilize one of the following key phrases:
  + Error
  + Encrypted word

**Potential Errors**

* invalid translation map size.
* encryption cannot be performed.

**Example Runs** (User input has been **bolded and underlined** to help differentiate typed input from program output.)

$ g++ encrypt.cpp

$ run a.out

What is the translation map (type 'default' to use default): **default**

What is the single word to translate: **hello**

Encrypted word: sello

$

$ run a.out

What is the translation map (type 'default' to use default): **fghjkl**

Error: invalid translation map size.

$