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Homework #3

**Problem Statement:**

The goals of the programming assignment, homework #3, was to read in a message that is to be decrypted or encrypted based on the user input. The user enters the secret key which determines the position change in the algorithm for the cypher which is calculated in the program in the Encrypt and Decrypt functions. Normal inputs to the program are four characters for the message, a prime number for the secret key and another character to determine whether to encrypt or decrypt. It creates output of a new message in the form of 4 characters. It required error handling to capitalize the 4 characters, ensure the integer entered is a prime number and to test that an E or a D was entered for the de/encryption. My partner and I went a step further and read in a string instead of characters, and convert the first four placements of the string into characters and test those.

**Design:**

We used a string data structure to read in the message and converted them to characters and we used another character to store the value for de/encryption. We used an integer to store the prime number secret key and finally we used 4 additional characters to store the converted message in. We used the given algorithm to encrypt or decrypt the characters and used a basic algorithm testing for prime. The given algorithm had no cons and pro because it was given. There were no cons in the algorithm and it had an important pro because of its simplicity.

**Implementation:**

Our implementation process was to work at a steady pace and section off the areas that were required. We started by placing comments on what was required of us and then slowly working out each section until it compiled. Our development timeline was rather quick, with minor adjustments on error processing and the do while loop.

**Testing:**

We tested this program by using correct inputs that were used in the prompt to ensure it was working correctly and with other simple examples that we solved on paper. Special cases we tested included incorrect inputs, like too many characters (of which we solved by accepting the characters but not using them) or not prime numbers in which the program just prompts again.

**Conclusions:**

The programming project was a success. We wouldn’t change anything in my coding process differently in the future. The project took less than two hours to code the entire thing including the algorithm process and then an additional hour for tweaks to improve simplicity and error correction.

**Typescript:**

Script started on Mon 23 Feb 2015 08:10:12 PM CST

]0;csce\_user@cscuser-VirtualBox: ~csce\_user@cscuser-VirtualBox:~$ cd csce/hw3

]0;csce\_user@cscuser-VirtualBox: ~/csce/hw3csce\_user@cscuser-VirtualBox:~/csce/hw3$ g++ -Wall hw3advanced.cpp -o hw3a.exe

]0;csce\_user@cscuser-VirtualBox: ~/csce/hw3csce\_user@cscuser-VirtualBox:~/csce/hw3$ ./hw3a.exe

Please enter four alphabetical characters: kTul

Please enter a prime number: 7

Please choose whether you would like to (D)ecrypt or (E)ncrypt: e

We are going to encrypt your message, KTUL, using the secret key of 7.

Your new message is DMNE. Thank you.

]0;csce\_user@cscuser-VirtualBox: ~/csce/hw3csce\_user@cscuser-VirtualBox:~/csce/hw3$ ./hw3a.exe

Please enter four alphabetical characters: DOUM

Please enter a prime number: 7

Please choose whether you would like to (D)ecrypt or (E)ncrypt: D

We are going to decrypt your message, DOUM, using the secret key of 7.

Your new message is KVBT. Thank you.

]0;csce\_user@cscuser-VirtualBox: ~/csce/hw3csce\_user@cscuser-VirtualBox:~/csce/hw3$ ./hw3a.exe

Please enter four alphabetical characters: 7ahwx

Incorrect input. Please try again.

Please enter four alphabetical characters: &lkans302KSn9823lkzn.\*

Incorrect input. Please try again.

Please enter four alphabetical characters: asfaaAAaAaa#239

Please enter a prime number: 5

Please choose whether you would like to (D)ecrypt or (E)ncrypt: E

We are going to encrypt your message, AAAA, using the secret key of 5.

Your new message is VVVV. Thank you.

]0;csce\_user@cscuser-VirtualBox: ~/csce/hw3csce\_user@cscuser-VirtualBox:~/csce/hw3$ ./hw3a.exe

Please enter four alphabetical characters: zzzz

Please enter a prime number: 12

That's not a prime number. Try again.

Please enter a prime number: 20

That's not a prime number. Try again.

Please enter a prime number: 121

That's not a prime number. Try again.

Please enter a prime number: 49

That's not a prime number. Try again.

Please enter a prime number: 0

That's not a prime number. Try again.

Please enter a prime number: 1

That's not a prime number. Try again.

Please enter a prime number: 37

Please choose whether you would like to (D)ecrypt or (E)ncrypt: d

We are going to decrypt your message, ZZZZ, using the secret key of 37.

Your new message is KKKK. Thank you.

]0;csce\_user@cscuser-VirtualBox: ~/csce/hw3csce\_user@cscuser-VirtualBox:~/csce/hw3$ exit

Script done on Mon 23 Feb 2015 08:12:22 PM CST