Alpha Displacement Cypher. 50 POINTS

"Ante diem qvatrvm Kalendas Ivlianvs MMDCCLXVII (2767) AUC."

("Before the 4th day of the first part of July in the Year of the Founding

of the City 2767....")

Soldiers of Rome! We march!

We will create a utility which has been used in real life. We're going

to march north with Iulius Caesar in the company of the Tenth Legion,

and go among the wild Picts. The Peace of the Empire is unknown there.

We will be insuring that the First Man in Rome can communicate with the

Senate and lead us home again. If the Gauls break our communications,

they will ambush us, our eagles will adorn some barbarian's hut, and we

will not see the City again.

When you've done this program, you'll be able to decrypt the

speech our centurian gave us as we formed up before the ships

at the Pax de Calais before the Channel crossing:

Vjgug rgqrng ctg dctdctkcpu. Kpuvgcf qh ftkpmkpi ykpg cpf eqqmkpi

ykvj qkn, vjga ftkpm dggt cpf eqqm kp dwvvgt. Vjga yqtujkr uvtcpig

iqfu cpf tkfg jqtugu qxgt wpuecttgf ncpf kpuvgcf qh dwknfkpi tqcfu cpf

ftkxkpi ejctkqvu cpf ectvu. Vjga mggr pq uncxgu cpf fqp'v mpqy vq dwknf

eqnnqugc vq ycvej dnqqf urqtvu. Vjga nkuvgp vq vjgkt yqogp, cpf jcxg

c uauvgo qh ncy (Dtgjcp) yjkej ku oqtg gswkvcdng vjcp vjg ncy qh Tqog.

Vjga fkr ycvgt htqo htgg hnqykpi uvtgcou kpuvgcf qh qdvckpkpi kv vjtqwij

ngcf rkrgu. Yg owuv dtkpi vjgo vjg dnguukpiu qh Tqocp Ekxknkbcvkqp cpf

vjg tqng qh c uwdlwicvgf rgqrng.

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The caesar N utility takes a stream of characters in one

at a time. If they're alphabetic, they are moved forward

N places in the alphabet, and rotate around at the end.

You must read the COMMAND LINE\* for the "shift" value. It will be in

argv[1]...

Example: a.out 23

(the 23 is passed into the executing program as the CString ['2''3''\0']

...which is an array of chars. Convert the array of chars to an

int with int atoi(char \*) ; (On Buffy, you can run: man atoi).

So "hello" becomes "uryyb'. And "uryyb' becomes "hello" when it's

caesar 13'd.

The program should keep track of whether the input char was lower or

upper case. If input is not alphabetic, it should just pass through.

Start with a waterpump:

#include <iostream>

using namespace std ;

int main()

{

int c ;

int shift = atoi(argv[1]) ; // get the command-line parm

c = cin.get() ;

while ( ! cin.eof() )

{

cout.put(c) ;

c = cin.get() ;

}

}

Consider:

isalpha()

isupper()

"a char is just a small int"

+=

%=

Read: http://209.129.16.61/~hhaller/data/cisc192/modules/ascii.txt

Remember: we are using Unicode/ASCII character coding. An 'a' is a 97.

So just saying a += 26 ; a %= 26 isn't the solution. Mastering

various encoding scemes is something programmers love: we talk about

good ones, and come up with better ones after hours.

You have all the programming tools you need to code this in C++ right now.

Everything else is just thinking.

POSSIBLE PSEUDOCODE:

get a char

while not end of input:

change char so it's 0-25

shift it

"normalize" it so it's still 0-25

change char back to a letter

print it

get next char

end while

If you're really a hacker, preserve the upper- or lower-case of the input.

Think it over.

If you just don't know where to start, I recommend breakfast.

caesar 13 < text

As a member of the Glorious Tenth, the eyes of Rome are on you.

SPQR! Deciums et Ultimus! Omnia vincit!

\* The Command Line is how we issue commands to Unix or Windows

by typing them in a terminal window. The course materials

are at:

http://209.129.16.61/~hhaller/data/cisc192/modules/command\_line\_arguments

Read: asst.txt.ADDENDUM.txt

/\*-----------------------------------------------------------------

\* caesarshift.cpp - alphabetic shift

\* 20 lines of code including case and error handling.

-----------------------------------------------------------------\*/

#include <iostream>

#include <cstdlib>

using namespace std ;

int main (int argc, char \*argv[], char \*\*env)

{

if (argc != 2) {cerr << "shift n < input\n" ; return(-1) ; }

int shift = abs(atoi(argv[1])) ;// some users will prefix a hyphen '-'

int c = cin.get() ;

bool upper ;

while (!cin.eof()) {

if (isalpha(c)) {

if (isupper(c)) upper = true ; else upper = false ;

c = tolower(c) ;

c -= 'a' ; // convert c to its position in alphabet

c += shift ; // add shift to c

c %= 26 ; // make c stay between 0 and 25

c = 'a' + c ; // make c a character again

if (upper)

c = toupper(c) ;

}

cout.put(c) ;

c = cin.get() ;

}

}