Homework 1

Question 1:

Decoded Cipher:

**wishingeveryoneagreatfallsemester**

For this problem, since it is stated to by a encoded using a shift, I wrote a C program that adds one to every character in stored by the character array, then printed the resulting string and the shift onto the console. I ensured that I didn’t go past the ascii value for “z” since that will generate characters outside of the alphabet.

The shift that was used was a shift of **+8**

Question 2:

Decoded Cipher:

**shiftisrelativelyeasytobreakandallowsstudentstogetusedtothecyclicnatureofmod**

For this question, I used the exact same approach as Question 1.

The shift that was used was a shift of **+21**

Question 3:

Decoded Cipher:

**igotbillstopayandchildrenwhoneedclothesiknowtheresfishouttherebutwheregodonlyknowstheysaythesewatersarentwhattheyusedtobebutigotpeoplebackonlandwhocountonme**

For this question, I brute forced values, and , that when multiplied give the value of 1 modular 26 (modular inverses). Then for each of these, I tried values of a constant k from 0 to 26, subtracting from the original decoded character.

The Final character that gets resulted is using the formula , where x is the decoded character’s alphabetical position, k is the constant that is being subtracted, and j is the 2nd value of the modular inverse pair . I ensured that no values would go over the range of ‘a’ through ‘z’ and added a constant value of 26 to ensure that for low values of , would not be negative.

The two integers used were and

Question 4:

Using the keys and , here is my message

**zehvjvajtrcgfpspguhetavcwutsvoppujtaepcdhtrwtsnspovcnaevj**