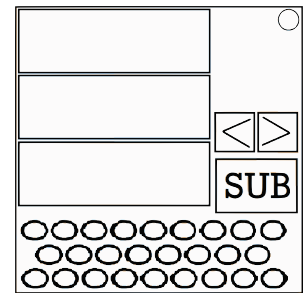# On the Subject of The Orange Cipher

Orange you glad to decipher me.

On the module, you will see 3 screens, a keyboard, 2 arrows, and a submit button that displays the current page you're on.

Pressing the right arrow takes you to the next page. Pressing the left arrow takes you to the previous page. There is a total of 2 pages.

On page 1, the top screen shows a 6 letter encrypted word, the middle screen shows 1 or more letter(s), the bottom screen shows a encrypted string. If the encypted word has any Js, replace them with the letter(s) in reading order. After you do all 3 steps, change the letter(s) back into a J.

On page 2, the top screen shows another encrypted string, the middle screen shows a word, the bottom screen shows a number.

Follow the mechanics down below to decrypt your word:

Step 1: ADFGX Cipher

First thing we need to do is to decipher the 2 encrypted strings shown on the bottom screen on page 1 and the top screen on page 2. Combine the 2 strings into one word.

Next take the word on the middle screen on page 2 and write the entire encrypted string underneath this keyword so that it has the same number of columns as the number of letters in the keyword, forming rows.

Rearrage the columns so that the keyword's letters are in alphabetical order, moving the column of letters underneath each letter with it. If there are duplicate letters in the keyword, put the duplicate letters in reading order. Then read the entire string top to bottom, left to right.

After getting your new encrypted string, we need to create a matrix.

To do so, take the keyword, replace any Js with Is, and remove any duplicates.

Take the entire alphabet (not including the J) and remove any letters that is shown in the keyword.

If the last digit of the serial number is even, place the alphabet at the end of the keyword. Otherwise, place the alphabet at the beginning of the keyword.

Take the 25 length string and arrange it into a 5x5 matrix of letters. For now on, this will be called Matrix A.

Write ADFGX on the top and the left of Matrix A. Split the enciphered text into pairs and use them as a row/col pair to get a new letter from Matrix A.

You should now have a deciphered word, this will be used as a keyword for step 3 so hang on to it for now.

Step 2: Bazeries Cipher

For this step, you will need 2 matrices. For the first matrix, which will be called Matrix B, is already created here:

A	F	L	Q	V
B	G	M	R	W
C	H	N	S	X
D	I	O	T	Y
E	K	P	U	Z

The second matrix, Matrix C, will need to be created by using the number in the bottom screen of page 2.

Turn the number into the word, excluding any ands. Ex: 6925 -> SIX THOUSAND NINE HUNDRED TWENTY FIVE. This will be the keyword to use for Matrix C.

Turn any Js into Is, remove all spaces and duplicates. Take the entire alphabet (not including the J) and remove any letters that is shown in the keyword.

If the second digit of the serial number is odd, place the alphabet at the end of the keyword. Otherwise, place the alphabet at the beginning of the keyword.

Take the 25 length string and arrange it into a 5x5 matrix of letters, creating Matrix C.

With the encrypted word from the top screen of page 1, divide it into subgroups of X letters where X equals the sum of the numbers from the bottom screen of page 2, modulo 4, plus 2. Ex: 6 + 9 + 2 + 5 = 22 % 4 = 2 + 2 = 4, QWERTY = QWER|TY

For each subgroup, reverse the letters inside of it. Ex: QWER|TY -> REWQ|YT

For each letter, find the letter in Matrix C, then take the same row/col you found it and use that as the row/col for Matrix B to get a new letter.

The resulting letters forms your new enciphered word.

Step 3: Foursquare Cipher

As the step suggests, it requires 4 matrices. Matrix A, B, C that was used for steps 1 and 2 will bed used here. Matrix D will be created by using the keyword you decrypted in step 1.

Turn any Js in the keyword into Is and remove any duplicates. Take the entire alphabet (not including the J) and remove any letters that is shown in the keyword.

If the first digit of the serial number is even, place the alphabet at the end of the keyword. Otherwise, place the alphabet at the beginning of the keyword.

Take the 25 length string and arrange it into a 5x5 matrix of letters, creating Matrix D.

Take the 4 matrices and form a 2x2 grid of them:

<pre>
                A | B

                C | D
</pre>

Split the encrypted word into letter pairs. For each pair do the following:

- Find the 1st letter in Matrix B. Find the 2nd letter in Matrix C.
- Take the 1st letter's row and the 2nd letter's column to get the 1st deciphered letter in Matrix A.
- Take the 1st letter's column and the 2nd letter's row to get the 2nd deciphered letter in Matrix D.

Remember to replace any letters that were Js initially to a J to get your deciphered word.

Once you finally have your decrypted word, you can submit it. Once you start typing, all the screens will go black and the bottom screen will show what you are typing.

To clear it, just click one of the arrows. This goes to one of the pages and clears any input you put in. It will not let you go over 6 letters on input.

Once you are satisfied with your input, press the button labeled "SUB" to submit your answer. On a strike, the module will go back to the first page of the module, but it does not regenerate.