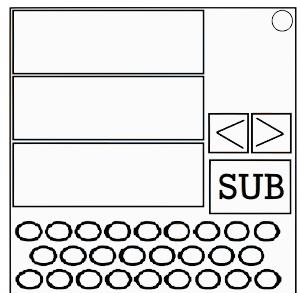


On the Subject of the White Cipher

White as the driven snow, this cipher knows no bounds to give defusers a hard time.

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 a number.

On page 2, the top and middle screen shows an 8 letter key.

Follow the mechanics down below to decrypt your word:

Step 1: Base Caesar Cipher

For this, you're going to need the encrypted word on the top screen, and the number on the middle screen, both from page 1.

The number in the middle screen was used to shift the letters of the encrypted word. However the number is not in base 10.

To figure out which base the number is in, take the sum of the alphanumeric positions of the letters of the encrypted word ($A = 1, B = 2, \dots, Z = 26$). Then modulo 8 the sum (subtract 8 to the sum until the number is between 0 – 7), then add 2. The resulting number is the base of the number.

To convert the number to base 10, follow the steps below:

- 1: Above each of the digits in your number (middle screen), list the power of the base that the digit represents. Start at 0 on the right and increment by 1 as you go left for each digit.
- 2: Multiply each digit by the power of the base.
- 3: Add all the numbers together to get your base 10 number.

After converting the number to base 10, add the number to each letter of the encrypted word using its alphanumeric position ($A = 1, B = 2 \dots Z = 26$), modulo 26, and convert the number back to a letter to get a new encrypted word.

Example

Encrypted word: DSIHDG

Number: 1104

$$\text{Base: } 4 + 19 + 9 + 8 + 4 + 7 = 51 \% 8 = 3 + 2 = 5$$

$$\begin{aligned}
 & 5^3 \ 5^2 \ 5^1 \ 5^0 \\
 & 1 \ 1 \ 0 \ 4 \\
 & 5^3 * 1 = 125 \\
 & 5^2 * 1 = 25 \\
 & 5^1 * 0 = 0 \\
 & 5^0 * 4 = 4 \\
 & 125 + 25 + 0 + 4 = 154
 \end{aligned}$$

(Do this to make it easier for you): $154 \% 26 = 24$

$$\begin{aligned}
 D &= 4 + 24 = 28 \% 26 = 2 = B \\
 S &= 19 + 24 = 43 \% 26 = 17 = Q \\
 I &= 9 + 24 = 33 \% 26 = 7 = G \\
 H &= 8 + 24 = 32 \% 26 = 6 = F \\
 D &= 4 + 24 = 28 \% 26 = 2 = B \\
 G &= 7 + 24 = 31 \% 26 = 5 = E
 \end{aligned}$$

Step 2: Grille Transposition

For this, you will need the 8 letter keys from the top and middle screen on page 2.

Catenate the 2 keys with the top screen going first, then turn it into a 4x4 matrix of letters.

Then using the grid below, rotate it 90 degrees clockwise an X number of times, where X is the number of ports.

X			
			X
	X		X

Take off the letters from the 4x4 matrix you made at the same position of the Xs on the grid. Make sure you take them off in reading order. Then rotate the grid 90 degrees clockwise.

Do this 3 more times to get your decrypted key.

Example

Top Screen: RPXNWKDL
 Mid Screen: YAFOCSEU
 # of Ports: 3

R	P	X	N	I		X	X	
W	K	D	L	I				
Y	A	F	O	I			X	
C	S	E	U	I	X			

PXFC

R			N	I	X			
W	K	D	L	I				X
Y	A		O	I		X		X
	S	E	U	I				

PXFC-RLAO

			N	I				X
W	K	D		I		X		
Y				I				
	S	E	U	I		X	X	

PXFC-RLAO-NKSE

				I				
W		D		I	X		X	
Y				I	X			
			U	I				X

Decrypted Key: PXFCRLAONKSEWDYU

Step 3: Sean Cipher

Welcome to Sean Cipher, where the ciphers are made up and the points don't matter.

For this, you're going to need the encrypted word you got from step 1, and the 16 letter key you got from step 2.

Take the key and remove any duplicate letters from it, removing all 2nd and more occurrences. Next, take the entire alphabet and remove all the letters that are shown in the key.

If the number of lit indicators is even, put the alphabet at the end of the key. Otherwise, place it in front of the key.

Split the 26 letter key into 2 13 letter keys and place the 2nd half under the 1st half. This will now be called "THE SEAN SHIFTER".

For each letter of the encrypted word, do the following:

- Find the letter of the encrypted word in THE SEAN SHIFTER and replace with the letter above/below.
- Take the last letter of the top half of THE SEAN SHIFTER and place it at the front of the top half.
- Swap the first letter of the top half with the first letter of the bottom half of THE SEAN SHIFTER.
- Take the first letter of the bottom half of THE SEAN SHIFTER and place it at the back of the bottom half.

After that you should now have your decrypted word.

Example

Encrypted Word: BQGFBE

Key: BGHIJMQTVZPXFCLRAONKSEWDYU (Lit is odd)

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

B → C

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

Q → E

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

G → N

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

F → T

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

B → E

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

E → R

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.