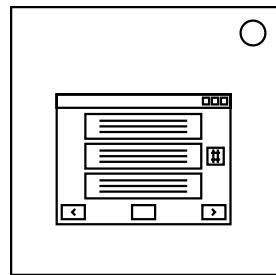


## On the Subject of Synapse Cipher

*Hmm... Well this looks quite familiar.*

The module consists of a window with three displays, a page counter on the right, two arrow buttons to go to the previous or next page, and a button to go into submission mode.



To disarm the module, decrypt a word using the following four steps:

### Step 1: Superposition Cipher

Take the encrypted word on the top screen of page 1, and keyword on the top screen of page 2. Remove any duplicate letters in the keyword while keeping the 1st occurrence. Take the entire alphabet and remove all the letters shown in the keyword.

If the number of ports is prime, put the alphabet at the end of the keyword. Otherwise, put the alphabet in front of the keyword.

Using the constructed alphabet, labeled C, keywords on the middle and bottom screens of page 2 as A and B respectively, perform the following procedure for each letter in the encrypted word:

- Start from the Xth letter of A. Count how many steps it takes to reach the Xth letter of B, wrapping around if necessary.
- Count this many letters from the Xth encrypted letter in the same direction from the last step to obtain the Xth decrypted letter in C, wrapping around if necessary.

**Example: Superposition Cipher**

The number of ports isn't prime

Page 2 Top screen keyword: DASHING

Page 2 Middle screen keyword: OBSESS

Page 2 Bottom screen keyword: KNOTTY

Encrypted word: QUDMQA

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

O → K, Q → M

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

B → N, U → R

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

S → O, D → L

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

E → T, M → Y

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

S → T, Q → C

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

S → Y, A → X

Decrypted word: MRLYCX

## Step 2: Logical Ternary Manipulation Cipher

Take the result from step 1 and convert each of these letters into their alphabetic positions (A1Z26). Convert these numbers into ternary, padding leading 0s if there aren't exactly 3 digits. Then take the binary strings displayed on page 3.

If the last digit of the serial number shares parity with the first digit of the serial number, XOR the first 3 bits of those strings, then XNOR the last 3. Otherwise XNOR the first 3 bits of those strings, then XOR the last 3.

Concatenate the results into 1 binary string. Using those bits, perform modifications to each of the 3-digit ternary values as such:

- If the Xth digit of the resulting binary is a 1, increment each ternary digit of the Xth ternary value by 1, wrapping around to 0. **DO NOT CARRY DIGITS.**
- Otherwise, don't modify the ternary digits.

If after incrementing, any 3-digit ternaries are 000, increment all the digits in 000 by 1 again.

Convert these new ternary digits back to decimal, then use these numbers as alphabetic positions to get the resulting letters, again using A1Z26.

### Example: Logical Ternary Manipulation Cipher

Binary strings displayed: 110001, 101110

Edgework: First and Last digits of serial no. share parity.

Result from step 1: MRLYCX

M	R	L	Y	C	X
111	200	110	221	010	220

110 XOR 101 = 011, 001 XNOR 110 = 000 Concatenated binary: 011000

0	1	1	0	0	0
111	200	110	221	010	220
111	011	221	221	010	220

Result after converting: MDYYCX

### Step 3: Double Square Rotation Cipher

Page 4 consists of 3 keywords ordered from top to bottom.

From the 1st keyword, change all "J"s into "I"s, then remove duplicate letters. Then take the alphabet, excluding "J" and the letters of 1st keyword.

If ENA Cipher is present or the sum of the base-36 digits of the serial number is odd, place the alphabet at the end of the 1st keyword. Otherwise, place it in front of the 1st keyword.

From the 2nd keyword, change all "J"s into "I"s, then remove duplicate letters. Then take the alphabet, excluding "J" and the letters of the 2nd keyword.

If Holographic Memory is present or the sum of the digits in the serial number is even, place the alphabet at the end of the 2nd keyword. Otherwise, place it in front of the 2nd keyword.

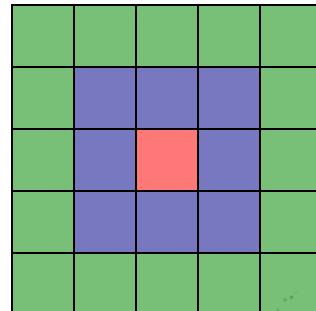
Arrange the 2 constructed keystreams into 2  $5 \times 5$  squares. Obtain the alphabetic positions of each letter in the 3rd keyword (A1Z26), and modulo this by 10.

From step 2, if any of the letters obtained are "J", change them to the letters displayed on the middle screen of page 1 in the same position. Convert these back to "J" upon finishing this step.

Starting on the first square, and alternating between the two square, take each letter and number obtained from before, and perform the following procedure, using the diagram as a reference for counting within the given region:

1. Find the Xth letter in the provided square.
2. If the letter obtained is at the center of the square, do not modify that letter. Otherwise, count Y times clockwise around the given region, from where the letter is at, Y being the Xth number for this step. This will result in the Xth decrypted letter.

All counts must stay within the same region as the letter that was started on. Do not change regions when counting! I.E. From the diagram, do not go from the green region to blue or blue to red, and vice versa.



**Example: Double Square Rotation Cipher**

Page 4 Top screen keyword: DEVOTION

Page 4 Middle screen keyword: BUB

Page 4 Bottom screen keyword: HASSLE

Encrypted word: MDYYCX

Constructed Squares:

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

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

Alphabetic positions of each letter in bottom screen keyword, mod 10: 8, 1, 9, 9,  
2, 5

M, CW 8 -&gt; M

D, CW 1 -&gt; I

Y, CW 9 -&gt; R

Y, CW 9 -&gt; A

C, CW 2 -&gt; G

X, CW 5 -&gt; E

Decrypted word: MIRAGE

### Step 4: Color Encryption & Submission

After obtaining the decrypted word, convert each letter to its alphabetic position, modulo 4, plus 2, then reverse the entire sequence.

For each letter in the decrypted word, convert its alphabetical position into the base corresponding to the digit in the same position of the number sequence without leading zeros. Convert each digit of the resulting sequence into colors using the following table below:

0	Green
1	Red
2	Blue
3	Yellow
4	Jade

This will be the answer to submit.

After clicking the middle button, the module will go into submission mode, where you will be able to input your colors. If at any point you want to go back to the main window, click on the X button on the top-right side of the window to get back to the main window.

If there's a mistake while inputting, you can click on the backspace button to delete the previous input. Once satisfied with your answer, click SUBMIT to submit your answer.

The module will solve if the input is correct. Otherwise, the module will strike, reset your input, and put you back to the main menu. The information given from the main menu will never reset.