

Timed question:

WHEN YOU HAVE GOT AN ELEPHANT BY THE HIND LEGS AND HE IS TRYING TO RUN AWAY, IT'S BEST TO LET HIM RUN.

CBSG TLD BIXS ULE IG SPSVBIGE NT EBS BZGA PSUH IGA  
 WHEN YOU HAVE GOT AN ELEPHANT BY THE HIND LEGS AND  
 BS ZH EYTZGU EL YDG ICIT, ZE'H NSHE EL PSE BZJ YDG.  
 HE IS TRYING TO RUN AWAY, IT'S BEST TO LET HIM RUN.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	
Frequency	2	7	2	3	9		8	4	6	1		4		2		3		9	4	3	1		1	3	5	2	
Replacement	D	H	W	U	T	K	N	S	A	M	Q	O	J	B	F	L	X	Z	E	Y	G	P	C	V	R	I	D

1) Everything in this world has a hidden meaning.

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

Here's how we get the answer. Since we are given that

$$E(4) \rightarrow O(14)$$

$$V(21) \rightarrow V(21)$$

From this we know:

$$(a \times 4 + b) \bmod 26 = 14$$

$$(a \times 21 + b) \bmod 26 = 21$$

Looking at the formulas we see that it is easiest to subtract the second from the first.

$$\begin{array}{r} (a \times 21 + b) \bmod 26 = 21 \\ -(a \times 4 + b) \bmod 26 = 14 \\ \hline a \times 17 \bmod 26 = 7 \end{array}$$

Since  $7 \div 17 = 0.411$  we have to look for another value.  $7 + 26 = 33$ .  $33 \div 17 = 1.9411$ , and we keep going..  $33 + 26 = 59$ .  $59 \div 17 = 3.471$ ,  $59 + 26 = 85$ .  $85 \div 17 = 5$  Now that we know that  $a = 5$

Popping that back into any of the formulas (we pick the first one because it is the lowest multiplier)

$$(5 \times 4 + b) \bmod 26 = 14$$

$$(20 + b) \bmod 26 = 14$$

We can then subtract 20 from both sides

$$(20 + b) \bmod 26 - 20 = (14 - 20) \bmod 26$$

$$b \bmod 26 = -6 \bmod 26$$

$$b \bmod 26 = 20 \bmod 26$$

And we see that  $b = 20$ . However, we only know a few of the letters in the cipher:

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

Our first step is to encode the common letters **ETAOIN** to see what they would map to. Note that we already know the mapping for E so we don't have to do that one.

E (4)	→	4 × 5 + 20	40	→	O (14)
T (19)	→	19 × 5 + 20	115	→	L (11)
A (0)	→	0 × 5 + 20	20	→	U (20)
O (14)	→	14 × 5 + 20	90	→	M (12)
I (8)	→	8 × 5 + 20	60	→	I (8)
N (13)	→	13 × 5 + 20	85	→	H (7)

Filling in the letters we found (OLUMIH) we get a bit more of the answer

O	V	O	B	K	L	D	I	H	Y	I	H	L	D	I	G	A	M	B	X	J	D	U	G	U	D	I	J	J	O	H	C	O	U	H	I	H	Y
E	V	E			T		I	N		I	N	T		I		O				A	A			I			E	N		E	A	N	I	N			

This doesn't give us enough to solve it quickly do we just take the next 5 letters **SRHLD**.

S (18)	→	18 × 5 + 20	110	→	G (6)
R (17)	→	17 × 5 + 20	105	→	B (1)
H (7)	→	7 × 5 + 20	55	→	D (3)
L (11)	→	11 × 5 + 20	75	→	X (23)
D (3)	→	3 × 5 + 20	35	→	J (9)

We know the reverse mapping of 5 more letters (GBDXJ) which we can fill in

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

This gives us a pretty good idea, and we are pretty sure K is Y, Y is G, A is W and C is M so we just test them out.

Y (24)	→	24 × 5 + 20	140	→	K (10)
G (6)	→	6 × 5 + 20	50	→	Y (24)
W (22)	→	22 × 5 + 20	130	→	A (0)
M (12)	→	12 × 5 + 20	80	→	C (2)

Our guess is confirmed and filling in for these 4 more letters (KYAC) gives us the final answer:

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

2) It is the mark of an educated mind to be able to entertain a thought without accepting it.

**VCVBC UNXQA IKTQJ NODSQ CNOXV JOCKR NQRMN CKNJC**

**ITIST HEMAR KOFAN EDUCA TEDMI NDTOB EABLE TOENT**

**NACQV JQCUK DPUCL VCUKD CQSSN YCVJP VC**

**ERTAI NATHO UGHTW ITHOU TACCE PTING IT**

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
Frequency	2	1	13	3					1	5	5	1	1	8	3	2	7	2	3	1	4	7		2	1	
Replacement	R	S	T	U	V	X	Y	Z	K	N	O	W	L	E	D	G	A	B	C	F	H	I	J	M	P	Q

3) Nobody gets to live life backward. Look ahead, that is where your future lies. In this case, v stands for A and ^ stands for B. You can tell this by either counting the number and seeing which there are more of or noticing that there are several groups of ^^^^ which must be the letter A. Also pay attention to the fact that the groups of 5 don't start on each line cleanly.

v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v  
**ABBA ABBA AAAA ABBA AAAB BABBA AABBA AABAA BAABA BAAA**  
**N O B O D Y G E T S**

^ ^v^v v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v  
**B BAABA ABBA ABABA ABAAA BAABB AABAA ABABA ABAAA AABAB AAB**  
**T O L I/J U/V E L I/J F E**

vv v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v  
**AA AAAA AAAAA AAABA ABAAB BABAA AAAAA BAAAA AAABB ABABA AB**  
**B A C K W A R D L**

^v^v v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v  
**BAB ABBA ABAAB AAAAA AABBB AABAA AAAAA AAABB BAABA AABBB A**  
**O O K A H E A D T H**

v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v  
**AAA BAABA ABAAA BAAAB BABAA AABBB AABAA BAAAA AABAA BABBA**  
**A T I/J S W H E R E Y**

v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v v^v^v  
**ABBA BAABB BAAAA AABAB BAABB BAABA BAABB BAAAA AABAA ABAB**  
**O U/V R F U/V T U/V R E L**

v v^v^v v^v^v v^v^v  
**A ABAAA AABAA BAAAB**  
**I/J E S**

4) OO CV MO YH XN XZ VX RN

Here's how you get the answer (remember you add one Z at the end to make it a group of two letters).

$$\begin{pmatrix} F & R \\ 0 & Z \end{pmatrix} \cdot \begin{pmatrix} C \\ 0 \end{pmatrix} \equiv \begin{pmatrix} 5 & 17 \\ 14 & 25 \end{pmatrix} \cdot \begin{pmatrix} 2 \\ 14 \end{pmatrix} \equiv \begin{pmatrix} 5 \cdot 2 + 17 \cdot 14 \\ 14 \cdot 2 + 25 \cdot 14 \end{pmatrix} \equiv \begin{pmatrix} 248 \\ 378 \end{pmatrix} \equiv \begin{pmatrix} 14 \\ 14 \end{pmatrix} \pmod{26} \equiv \begin{pmatrix} 0 \\ 0 \end{pmatrix}$$

$$\begin{pmatrix} F & R \\ 0 & Z \end{pmatrix} \cdot \begin{pmatrix} L \\ D \end{pmatrix} \equiv \begin{pmatrix} 5 & 17 \\ 14 & 25 \end{pmatrix} \cdot \begin{pmatrix} 11 \\ 3 \end{pmatrix} \equiv \begin{pmatrix} 5 \cdot 11 + 17 \cdot 3 \\ 14 \cdot 11 + 25 \cdot 3 \end{pmatrix} \equiv \begin{pmatrix} 106 \\ 229 \end{pmatrix} \equiv \begin{pmatrix} 2 \\ 21 \end{pmatrix} \pmod{26} \equiv \begin{pmatrix} C \\ V \end{pmatrix}$$

$$\begin{pmatrix} F & R \\ O & Z \end{pmatrix} \cdot \begin{pmatrix} W \\ I \end{pmatrix} \equiv \begin{pmatrix} 5 & 17 \\ 14 & 25 \end{pmatrix} \cdot \begin{pmatrix} 22 \\ 8 \end{pmatrix} \equiv \begin{pmatrix} 5 \cdot 22 + 17 \cdot 8 \\ 14 \cdot 22 + 25 \cdot 8 \end{pmatrix} \equiv \begin{pmatrix} 246 \\ 508 \end{pmatrix} \equiv \begin{pmatrix} 12 \\ 14 \end{pmatrix} \pmod{26} \equiv \begin{pmatrix} M \\ O \end{pmatrix}$$

$$\begin{pmatrix} F & R \\ O & Z \end{pmatrix} \cdot \begin{pmatrix} N \\ T \end{pmatrix} \equiv \begin{pmatrix} 5 & 17 \\ 14 & 25 \end{pmatrix} \cdot \begin{pmatrix} 13 \\ 19 \end{pmatrix} \equiv \begin{pmatrix} 5 \cdot 13 + 17 \cdot 19 \\ 14 \cdot 13 + 25 \cdot 19 \end{pmatrix} \equiv \begin{pmatrix} 388 \\ 657 \end{pmatrix} \equiv \begin{pmatrix} 24 \\ 7 \end{pmatrix} \pmod{26} \equiv \begin{pmatrix} Y \\ H \end{pmatrix}$$

$$\begin{pmatrix} F & R \\ O & Z \end{pmatrix} \cdot \begin{pmatrix} E \\ R \end{pmatrix} \equiv \begin{pmatrix} 5 & 17 \\ 14 & 25 \end{pmatrix} \cdot \begin{pmatrix} 4 \\ 17 \end{pmatrix} \equiv \begin{pmatrix} 5 \cdot 4 + 17 \cdot 17 \\ 14 \cdot 4 + 25 \cdot 17 \end{pmatrix} \equiv \begin{pmatrix} 309 \\ 481 \end{pmatrix} \equiv \begin{pmatrix} 23 \\ 13 \end{pmatrix} \pmod{26} \equiv \begin{pmatrix} X \\ N \end{pmatrix}$$

$$\begin{pmatrix} F & R \\ O & Z \end{pmatrix} \cdot \begin{pmatrix} S \\ T \end{pmatrix} \equiv \begin{pmatrix} 5 & 17 \\ 14 & 25 \end{pmatrix} \cdot \begin{pmatrix} 18 \\ 19 \end{pmatrix} \equiv \begin{pmatrix} 5 \cdot 18 + 17 \cdot 19 \\ 14 \cdot 18 + 25 \cdot 19 \end{pmatrix} \equiv \begin{pmatrix} 413 \\ 727 \end{pmatrix} \equiv \begin{pmatrix} 23 \\ 25 \end{pmatrix} \pmod{26} \equiv \begin{pmatrix} X \\ Z \end{pmatrix}$$

$$\begin{pmatrix} F & R \\ O & Z \end{pmatrix} \cdot \begin{pmatrix} O \\ R \end{pmatrix} \equiv \begin{pmatrix} 5 & 17 \\ 14 & 25 \end{pmatrix} \cdot \begin{pmatrix} 14 \\ 17 \end{pmatrix} \equiv \begin{pmatrix} 5 \cdot 14 + 17 \cdot 17 \\ 14 \cdot 14 + 25 \cdot 17 \end{pmatrix} \equiv \begin{pmatrix} 359 \\ 621 \end{pmatrix} \equiv \begin{pmatrix} 21 \\ 23 \end{pmatrix} \pmod{26} \equiv \begin{pmatrix} V \\ X \end{pmatrix}$$

$$\begin{pmatrix} F & R \\ O & Z \end{pmatrix} \cdot \begin{pmatrix} M \\ Z \end{pmatrix} \equiv \begin{pmatrix} 5 & 17 \\ 14 & 25 \end{pmatrix} \cdot \begin{pmatrix} 12 \\ 25 \end{pmatrix} \equiv \begin{pmatrix} 5 \cdot 12 + 17 \cdot 25 \\ 14 \cdot 12 + 25 \cdot 25 \end{pmatrix} \equiv \begin{pmatrix} 485 \\ 793 \end{pmatrix} \equiv \begin{pmatrix} 17 \\ 13 \end{pmatrix} \pmod{26} \equiv \begin{pmatrix} R \\ N \end{pmatrix}$$

5) LA CIENCIA ES EL GRAN ANTÍDOTO CONTRA EL VENENO DEL ENTUSIASMO Y LA SUPERSTICIÓN.

(Translation;

Science is the great antidote against the poison of enthusiasm and superstition.)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	Ñ	O	P	Q	R	S	T	U	V	W	X	Y	Z	
<b>Frequency</b>	1	4		3		6	5		5	7			2	2		8	5	1					1	1	6	1		9
<b>Replacement</b>	P	C		R		O	S		T	A			U	D		N	L	V					M	G	I	Y	E	