**VIGENERE CIPHER**

* Vigenere Cipher is an example of polyalphabetic cipher

 ***plaintext***

 **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**

 **A 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**

 **B 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 A**

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

 **Z Z 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**

* Examples:
	+ Encrypt the message: ***I love you life*** using keyword **PETYA**

**Plaintext: ILOVE YOULI FE**

**Keyword: PETYA PETYA PE**

**Ciphertext: XPHTE NSNJI UI**

* Decrypt the message KSMEH ZBBLK SMEMP OGAJX SEJCS FLZSY

that was encrypted by ***VIGENERE CIPHER*** with a keyword RELATIONS.

 **Keyword: RELATIONS RELATIONS RELATIONS REL**

 **Ciphertext: KSMEHZBBL KSMEMPOGA JXSEJCSFL ZSY**

 **Plaintext: TOBEORNOT TOBETHATI STHEQUEST ION**

* **General Formula:**

Plaintext: P0P1…..Pn-1 – The length of the plaintext is n

Key: k0…km-1 – The length of the key is m

To encrypt:

Ci = (Pi + ki%m) % 26

To decrypt:

Pi = (Ci - ki%m) % 26

* Example using Vector Form

Numeric values of English Alphabet

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Letter and Numeric Value | A 0 | B 1 | C 2 | D 3 | E 4 | F 5 | G 6 | H 7 | I 8  |  J 9 | K 10 | L 11 | M 12 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Letter and Numeric Value | N 13 | O 14 | P 15 | Q 16 | R 17 | S 18 | T 19 | U 20 | V 21 | W 22 | X 23 | Y 24 | Z 25 |

Plaintext: hereishowitworks

Key: (21, 4, 2, 19, 14, 17) (in letters: vector)

To find a Ciphertext

h e r e i s h o w i t w o r k s

21 4 2 19 14 17 21 4 2 19 14 17 21 4 2 19

C I T X W J C S Y B H N J V M L