**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