

Text Encryption and Decryption Tools

Rayan Nasser Alluhaibi

4200472

Omar Abdullah Alharbi

4200190

Abdulrahman Radhi Almutairi

4204117

Introduction

- This project aims to Encrypt and Decrypt Texts using two different Algorithms
- The Algorithms are implemented in two simple tools in a simple webpage

Getting started:

- 1- Download node.js
- 2- Download Visual Studio Code (or any code editor)
- 3- Open the directory of the project on the terminal
- 4- Run the two following commands (npm i) then (npm run dev)
- 5- Open the local host link that will appear in the terminal

How to use:

- First choose the Algorithm you want (Morse Code or Transposition cypher)

Morse Code

Morse code is a method used in telecommunication to encode text characters as sequences of two different signal durations, called dots and dashes.

Characteristics:

Uses combinations of dots and dashes to represent characters.

Originally developed for telegraphy.

Simple and efficient encoding scheme.

APPLY

Transposition Cipher

A transposition cipher is a method of encryption where the positions of the characters in the plaintext are shifted according to a regular system to form the ciphertext.

Characteristics:

Rearranges the Columns

The same characters and their frequency are preserved in the ciphertext.

Simple implementation but less secure compared to modern ciphers.

APPLY

For Morse Code:

Enter the plain text and the cyphertext will appear immediately, or enter the cyphertext and the plain text will appear immediately

Encryption:

Text

Omar

Morse

--- -- .- .-

Decryption:

Text

OMAL

Morse

--- -- .- .-

For Transposition Cypher:

Enter (plain text + key), then click ENCRYPT and the cyphertext will appear, or Enter (cyphertext + key), then click DECRYPT and the plain text will appear

Encryption:

Text Hello	Key SecretKey
ENCRYPT	DECRYPT
VERRX	

Decryption:

Text VERRX	Key SecretKey
ENCRYPT	DECRYPT
HELLO	

Algorithm 1: Transposition Cipher

This algorithm encrypts text by rearranging the characters inside a matrix and then reordering the columns based on a key. [1] [2]

Steps of the algorithm:

1. Using the Key:

- Duplicate characters in the key are removed.
- The key is alphabetically sorted to determine the order of the columns.

2. Creating the Matrix:

- The text is divided into rows and columns, with the number of columns equal to the length of the key.

3. Reordering the Columns:

- The columns are rearranged based on the alphabetical order of the key.

4. Reading the Encrypted Text:

- The characters are read column by column to form the encrypted text.

Decryption Process:

- Reverse the encryption steps by reordering the columns to their original positions using the key.
- Recover the original text from the matrix.

Common problems

- Not knowing how to operate encryption technology
- Lost key
- Modify the encrypted text

Read the instructions carefully, keep the key, and do not modify the ciphertext.

Algorithm 2: Text to Morse Code Encryption

This algorithm converts text into Morse code using a predefined table that maps each character and number to its Morse code equivalent. [3] [4]

Steps of the algorithm:

1. Divide the Text into Characters:

- Split the text into individual characters.

2. Convert Characters to Morse Code:

- Each character is individually converted to its Morse code equivalent.

3. Add Spaces Between Characters and Words:

- Add a single space between the Morse code sequences of each character.
- Add three spaces between words.

Example to convert "AB C" to Morse code:

- A = .-
- B = - ...
- 3 spaces between Morse code because there is a space between words
- C = - . - .

Final result:

.- - ... - . - .

Decryption Process:

- Split the encrypted text and convert it back using the predefined table.
- Ensure the correct arrangement by respecting the spaces between the codes.

Example of Morse code decoding

- .- = A
- -... = B
- Space between words because there are 3 spaces between Morse code
- -.-. = C

Final result:

AB C

Common problems

- Put extra spaces
- Modify the encrypted text

Do not make any unnecessary additions or modifications to the encrypted text.

References

- [1] M. J. P. Tiozon, J. R. Paragas, and N. M. Pascual, Implementation of traditional transposition cipher with salting principle, in Proceedings of the IEEE, Year. [Online]. Available: <https://doi.org>
- [2] R. Hari, K. Raja, and S. Keran, Multiple text encryption, key-entrenched, distributed cipher using pairing functions and transposition ciphers, in Proceedings of the IEEE, 2016. [Online]. Available: <https://doi.org>
- [3] Morse code translator using the Arduino platform: Crafting the future of microcontrollers, in Proceedings of the IEEE, 2016. [Online]. Available: <https://doi.org/10.1109/SAI.2016.7556055>
- [4] J. Doe and J. Smith, Implementation of Morse decoder on the TMS320C6748 DSP development kit, in Proceedings of the IEEE, 2016. [Online]. Available: <https://doi.org>

Additional learning resources

Beginner

Introduction to Cryptography in .NET by Pluralsight - Course
Algebra for Cryptologists - Book

Intermediate

The Hacker Playbook 2: Practical Guide to Penetration Testing - Book
Practical Cryptography in .NET by Pluralsight - Course
Serious Cryptography: A Practical Introduction to Modern Encryption - Book

Advanced

Cryptography Made Simple – Book

Conclusion

The project aimed to explore and implement encryption techniques, understand their functionality, and apply them successfully. Alhamdulillah, we have achieved our goal by enabling users to encrypt and transmit content using our program. Additionally, users can utilize a program based on the same encryption algorithms to compare its outputs with those of our program, demonstrating the reliability and efficiency of our implementation.