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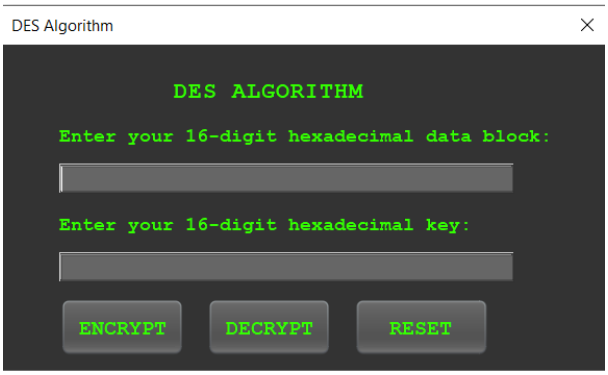
Project Report

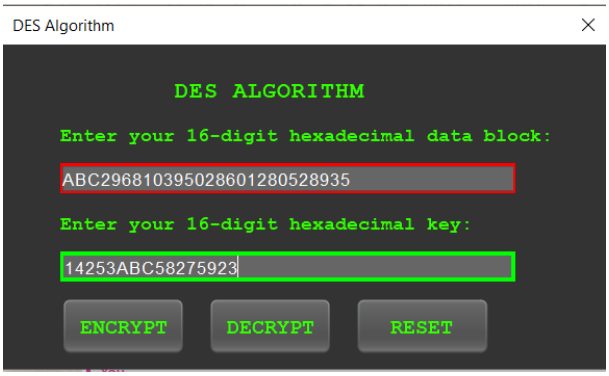
Graphical User Interface:

We designed a GUI for DES encryption/decryption using Swing and Java.

The main page contains a field for the entry of the 16-digit (64-bit) hexadecimal plaintext/ciphertext and another field for the entry of the 16-digit (64-bit) hexadecimal key. When the correct size of the plaintext/ciphertext or key is input, the respective field turns green. Otherwise, it turns red. Then, the user has 3 options: encrypt, decrypt, or reset.

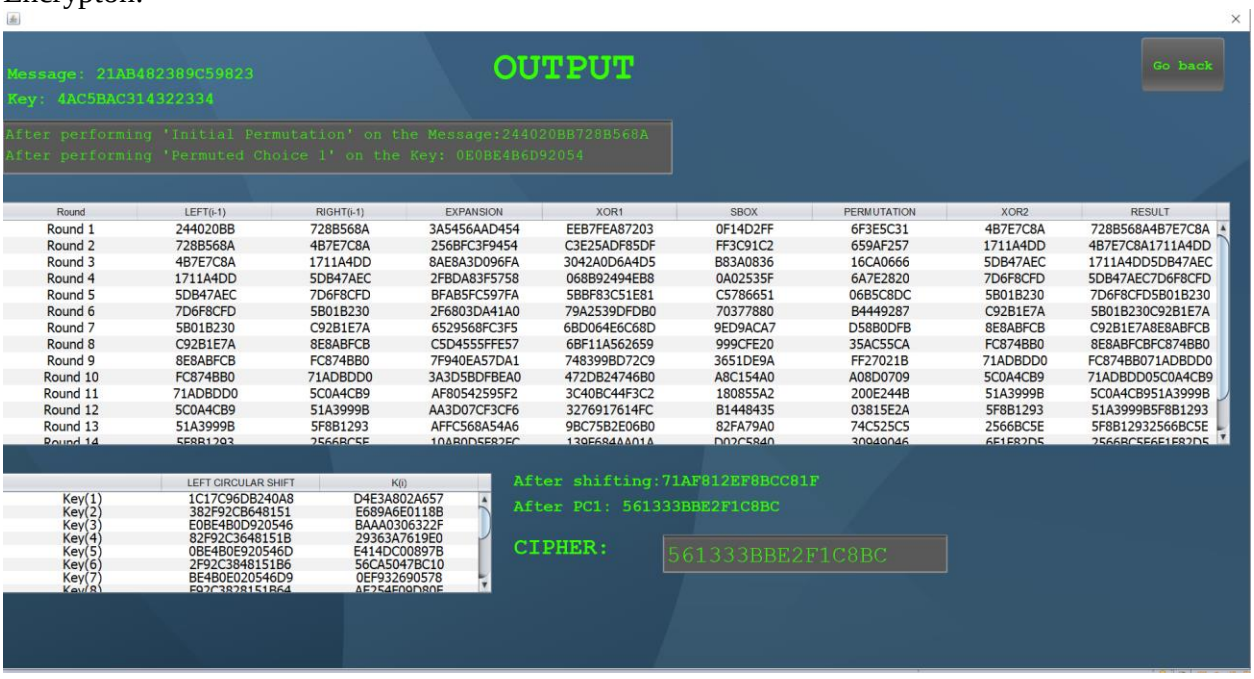
If the user has entered a plaintext with a key, he/she must click on encrypt to get the ciphertext. On the other hand, if the user enters a ciphertext with the key, he/she must click on decrypt to get the plaintext. The reset button clears the plaintext/ciphertext and key fields, allowing the user to change his/her input.



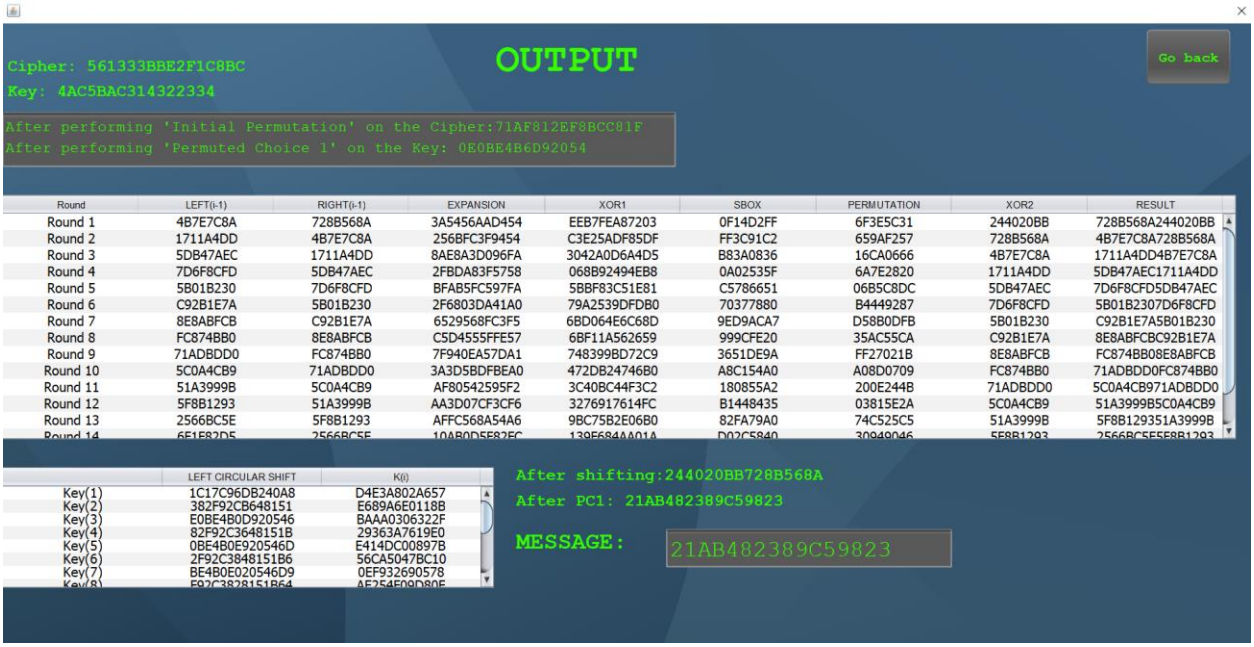


When the user clicks on either encrypt or decrypt, the main page closes, and the results page appears.

Encrypton:

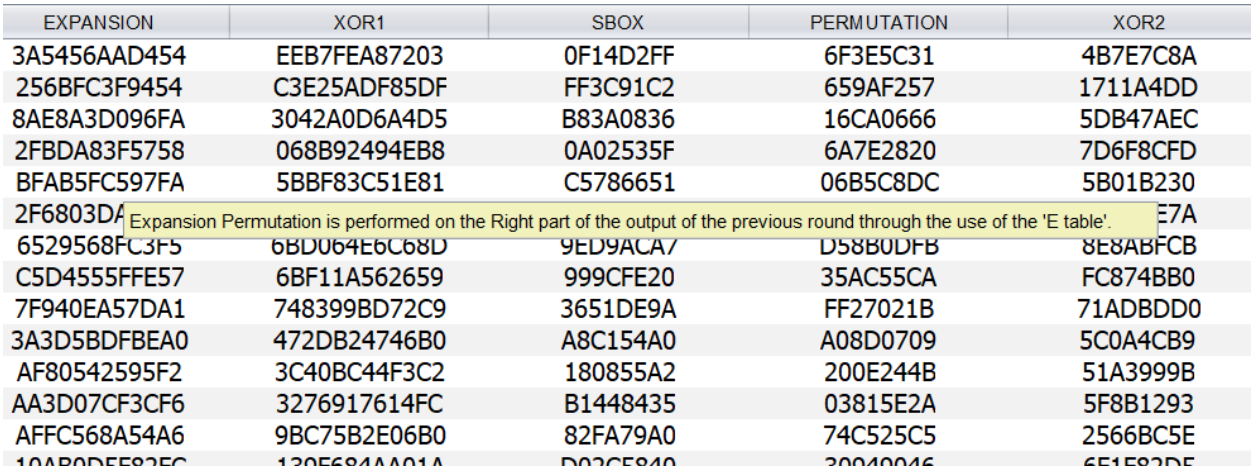


Decryption:



The results page displays every step of the encryption/decryption at every round of the process, and finally displays the ciphertext/plaintext. So, our interface shows the result of the message after each step in the encryption/decryption process at each and every round.

In addition to that, there is a “go back” button on the top right of the results page, so that when clicked, it takes the user back to the main page so that he/she inputs new plaintext/ciphertext and key for encryption/decryption.



When hovering with the mouse over the elements of the table, the user gets a description of what the specific operation does.

Error Handling:

When the plaintext/ciphertext and key input match the required size, their respective fields turns green, indicating to the user that he/she has input the right length of key and plaintext/ciphertext.

However, if the user decides to click on encrypt/decrypt when the input is not of the right size, a dialog appears, indicating that the user has entered an invalid input.

Task Division:

For this project, we met and worked as a group on Zoom. Designing an interface was new to us, so we each did our research individually, then combined our knowledge into an interface when we met virtually. The DES encryption/decryption code was available online, but the hard part was linking our interface to the code.

Link to our demo video:

https://www.youtube.com/watch?v=AydjFDb15xQ

Acknowledgments:

We would like to thank Dr. Issa and Dr. Chehab for their continuous support and hard work. They were always available to answer our questions and help us through the process of developing the GUI.

References:

https://www.geeksforgeeks.org/data-encryption-standard-des-set-1/