Mini-Project Report On

Image Encryption and Decryption Using Core Java

Under the Course

"Java Programming Lab" (CI-313)

Third Year B.Tech. (CS & IT)

Submitted by

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Under the Guidance of

Prof. A. B. Patil

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Rajarambapu Institute of Technology, Rajaramnagar

(An Autonomous Institute Affiliated to Shivaji University, Kolhapur)

CERTIFICATE

This is to certify that below mentioned students of T. Y. B.Tech. (CS & IT) have successfully completed the project entitled ***"Image Encryption and Decryption using Core Java"*** under the course "Java Programming Lab" (CI-313). The content of this report, in full or in parts, have not been submitted to any other institution or university for the award of any degree.

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Prof. A. B. Patil,
Course in-charge,
Java Programming Lab (CI-313).

Place : R.I.T., Rajaramnagar.
Date : 08-10-2021.

DECLARATION

We, the undersigned, the students of T. Y. B. Tech. (Computer Science and Information technology) hereby declare that the project entitled ***"Image Encryption and Decryption using Core Java."*** under the course "Java Programming Lab" (CI-313) is a genuine work conducted by us through practical on–site observations, and the data collected by us is true to the extent of our awareness.

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GUI – Graphical User Interface

1. Introduction

Nowadays, information security is becoming more important in data storage and transmission. Images are widely used in different- different processes. Therefore, the security of images from unauthorized uses is very important. So, image encryption plays a crucial role in the field of information hiding.

1.1 Motivation

Encryption is the process through which data is encoded so that it remains hidden from or inaccessible to unauthorized users. It helps protect private information, sensitive data, and can enhance the security of communication between client apps and servers. In essence, when your data is encrypted, even if an unauthorized person or entity gains access to it, they will not be able to read it.

1.2 Problem Statement

To encrypt and decrypt images using Core Java.

1.3 Project Objectives

- To apply the concept of cryptography for image encryption and decryption.
- To execute a java program to encrypt and decrypt images.
- To study algorithm for encryption and decryption.

2. Background and Literature Review

2.1 Image Encryption and Decryption

- In cryptography, ***encryption*** is the process of encoding information. This process converts the original representation of the information, known as plaintext, into an alternative form known as ciphertext.
- Ideally, only authorized parties can decipher a ciphertext back to plaintext and access the original information. Encryption does not itself prevent interference but denies the intelligible content to a would-be interceptor.
- For technical reasons, an encryption scheme usually uses a pseudo-random encryption key generated by an algorithm.
- An authorized recipient can easily decrypt the message with the key provided by the originator to recipients but not to unauthorized users.
- Encryption has long been used by militaries and governments to facilitate secret communication. It is now commonly used in protecting information within many kinds of civilian systems.
- Encryption is also used to protect data in transit, for example data being transferred via networks (e.g. the Internet, e-commerce), mobile telephones, wireless microphones, wireless intercom systems, Bluetooth devices and bank automatic teller machines.
- There have been numerous reports of data in transit being intercepted in recent years. Data should also be encrypted when transmitted across networks in order to protect against eavesdropping of network traffic by unauthorized users.
- ***Decryption*** is a process that transforms encrypted information into its original format. To do this, parties to a private conversation use an encryption scheme, called an algorithm, and the keys to encrypt and decrypt messages.
- Message recipients decrypt the information back into its original, readable format.

3. Image Encryption and Decryption using Core Java

Encryption is the process of converting information or data into a secrete code, especially to prevent unauthorized access. In this case, we are following the same method. For encryption, an image is converted into a byte array using XOR operation on each value of an array and store it into byte. After performing the operation, it can be noted that the image gets encrypted and it gets converted into an unsupported format.

3.1 GUI Component

- JFrame is in built class used for making GUI and comes under java.swing package.
- For creating button in GUI , JButton class is created.
- JTextfield is a class used to creating a text field in GUI.
- To choose the file for encryption or decryption, JFileChooser class is created.
- To display a dialog box with text message JOptionPane is used.
- All above classes are come under java.swing package.
- In java.awt package, Font and Flowlayout classes are created to set font and to arrange components respectively.
- File class is created for operating file or to locate directory which comes under the java.io package.
- In java.io package FileInputStream and FileOutputStream these classes are created to read and write the file respectively.
- For conversion of pixels into byte and vise-versa , Long and Byte classes are created under the java.lang package.

3.2 Encryption Algorithm

The following are the sequence of steps used to encrypt images.
Input: Original image, random numbers generated using LFG
Output: encrypted image
Step 1: Input the original image and input the block size (N).
Step 2: Original image is divided into blocks of size N*N pixels
Step 3: Generate Random numbers using LFG
Step 4: Shuffle the block of images using Random numbers.
Step 5: Perform XOR operation between pixel data of the image in each block and the random numbers generated by using LFG.
Step 6: Store the encrypted image.

4. Results and Discussion

4.1 Results

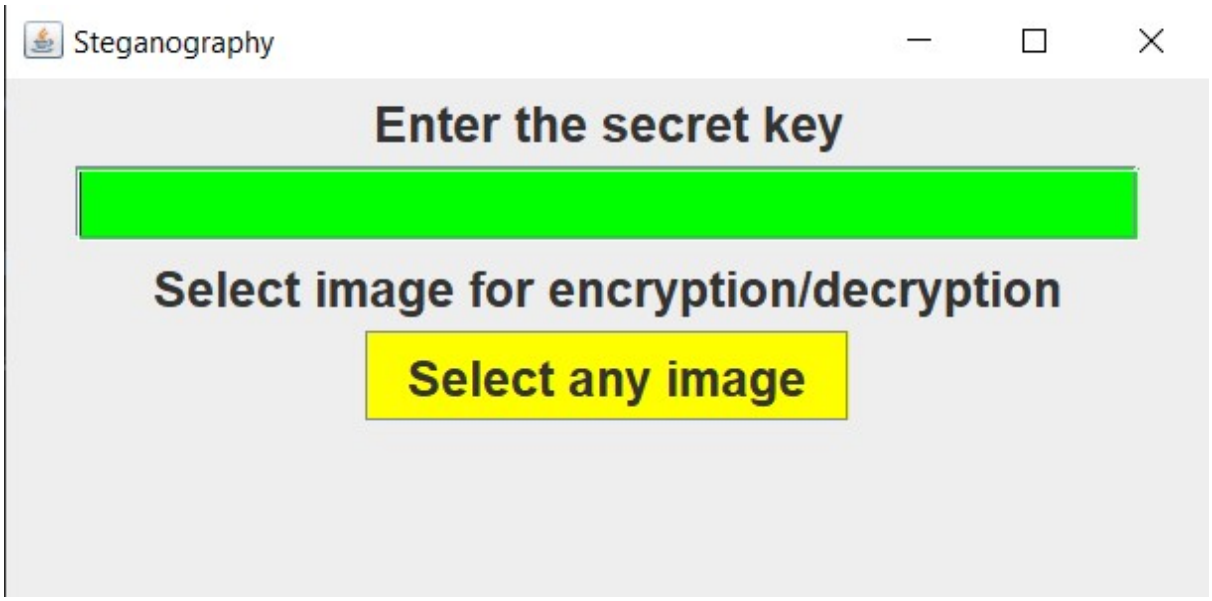

Fig 1: GUI

Fig 2: After entering key

Fig 3: Image before encryption

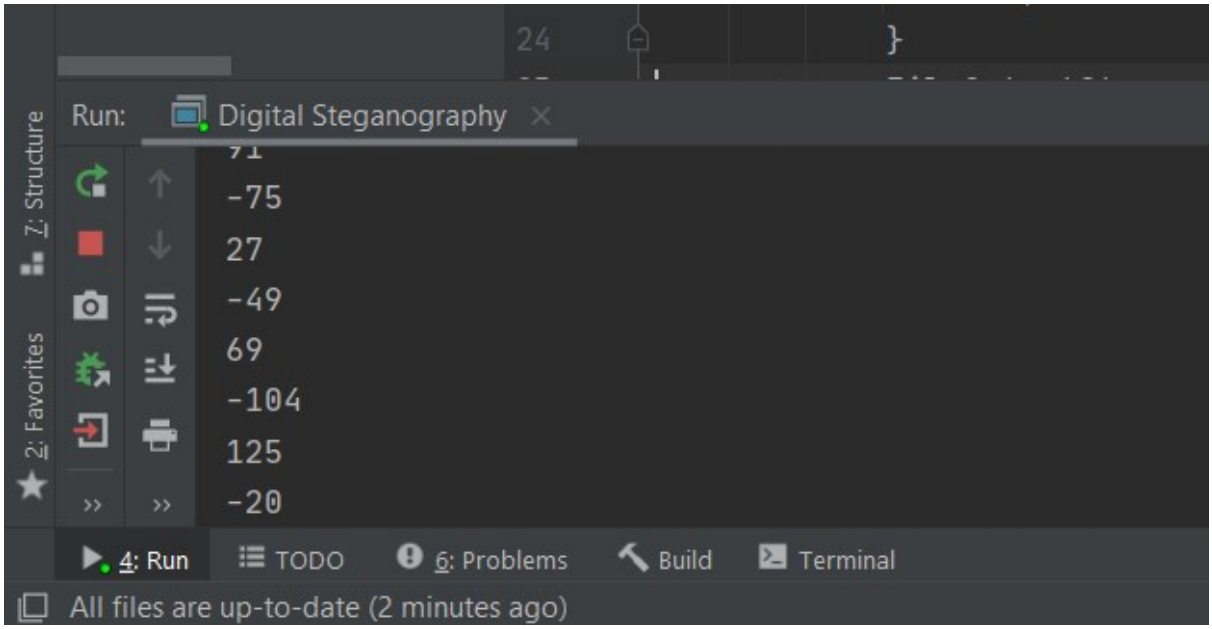

Fig 4: Conversion of Image into byte code (encryption process)

Fig 5: Dialog box after completion of encryption process

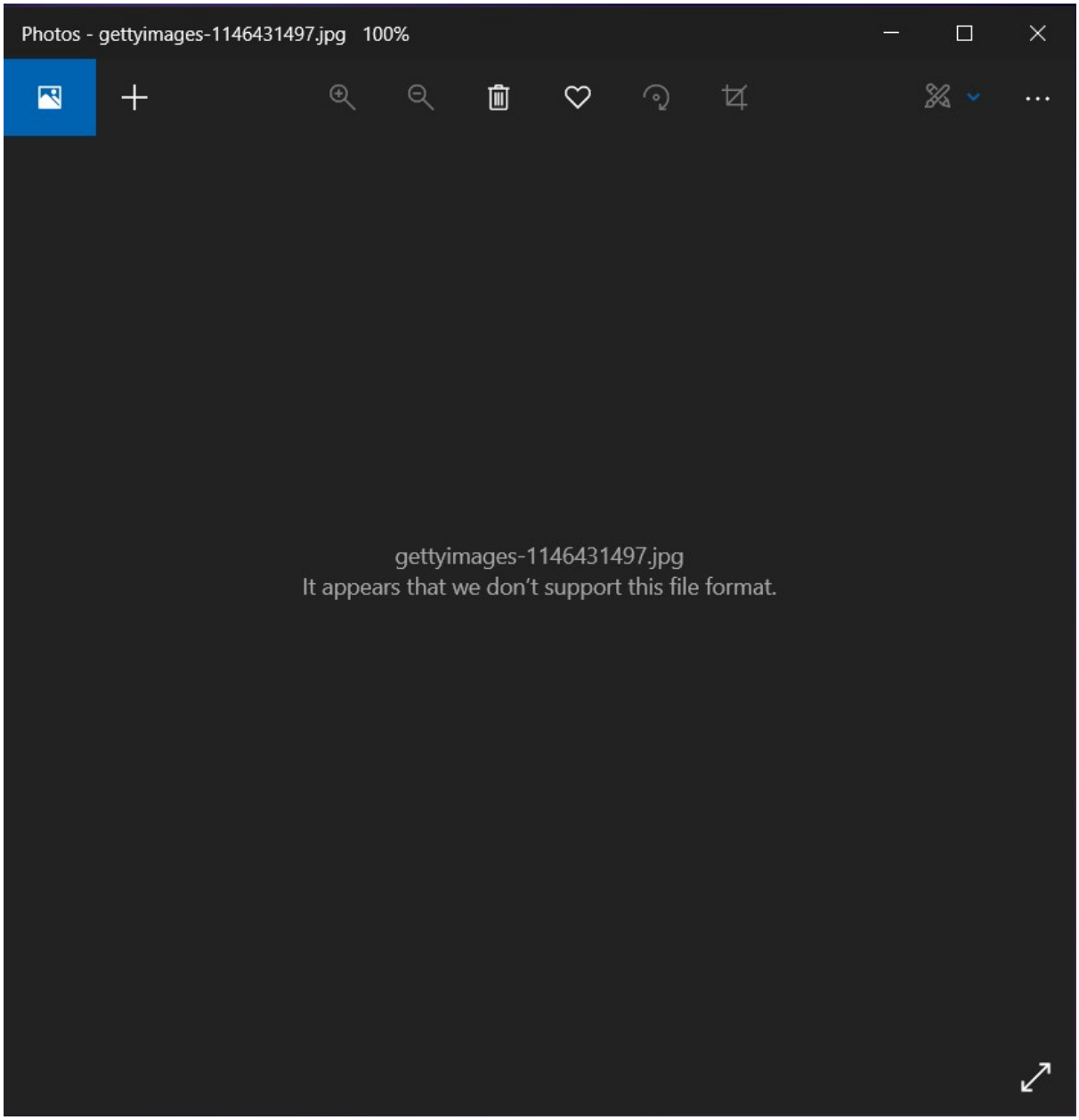

Fig 6: Image after encryption

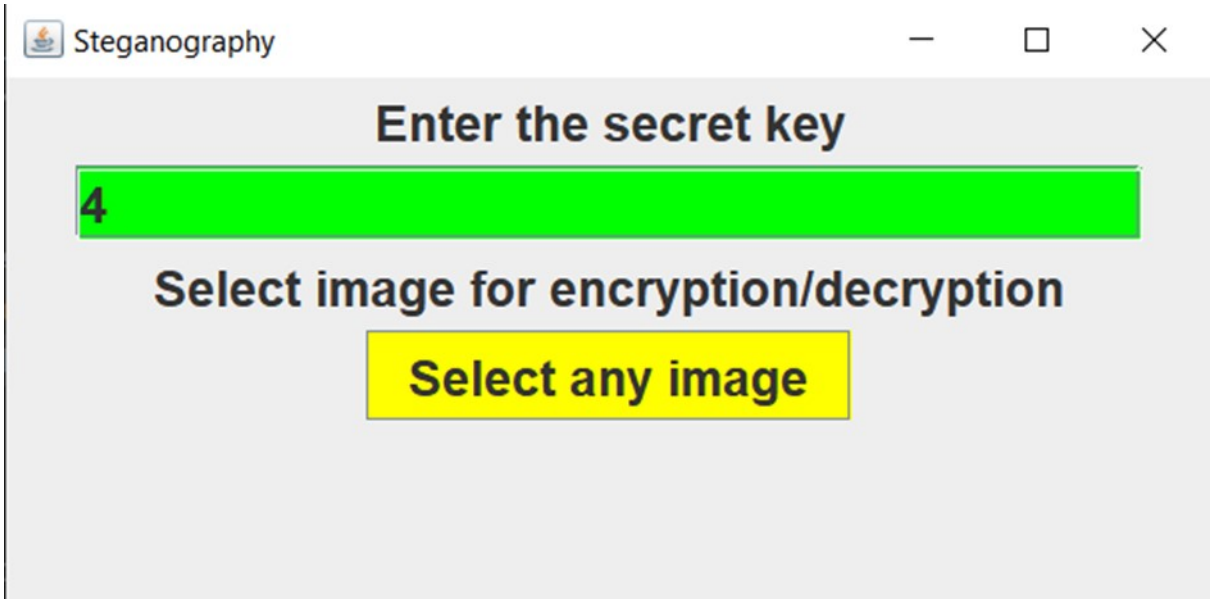

Fig 7: After entering the same key used for encryption to decrypt the image

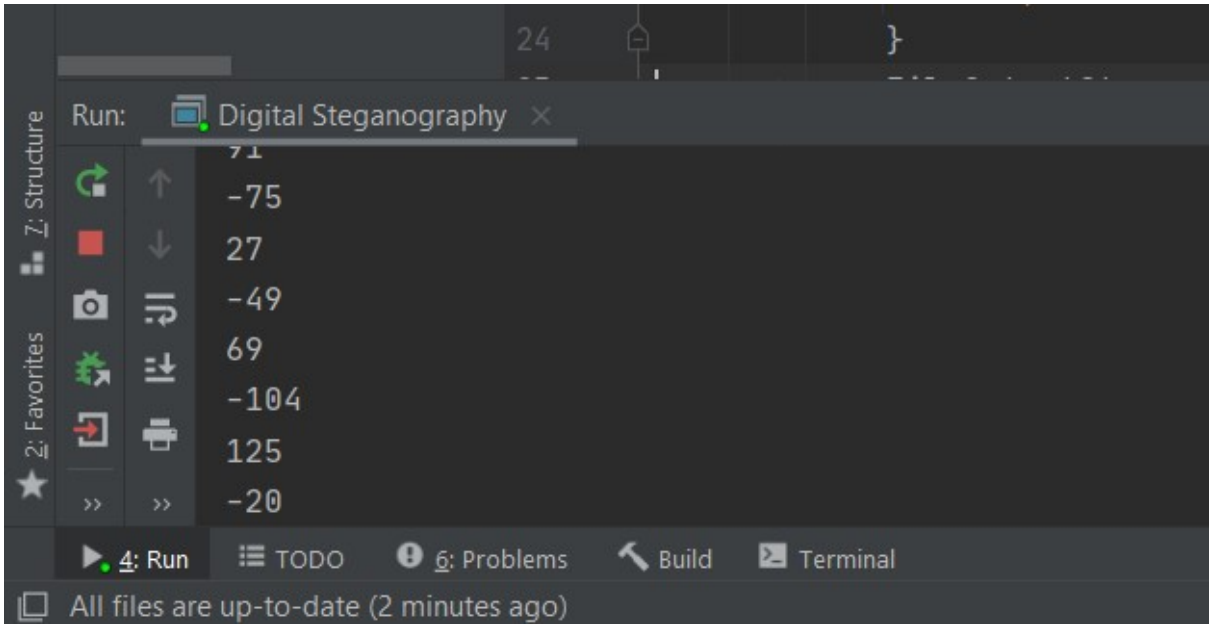

Fig 8: Conversion of byte code into image (Decryption process)

Fig 9: Dialog box after decryption process

Fig 10: Image after decryption

4.2 Conclusion

- From this project we were able to understand the concept of encryption and decryption.
- We were also able to apply these concepts for encrypting and decrypting images.
- We were able to execute java program for encryption and decryption using Core Java.

4.2 References

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