TED UNIVERSITY

CMPE325: Information Security and Cryptography

RSA – Bob and Alice

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1. Introduction

In this assignment, it focuses on integrating the RSA algorithm and the classic version of this problem, the encrypted messaging between Bob and Alice.

2. Detail Section

Assume Alice requests that her friends encrypt their email communications before sending them to her. An email message is merely a very large number since computers encode text as long numbers (01 for "A," 02 for "B," and so on). Electronic communications are frequently encrypted and subsequently decrypted using the RSA Encryption Scheme.

3. ASSUMPTIONS

3.1 For Alice

When you do this conversion, you find the public key. Firstly, you should choose two prime numbers. Then you should calculate the product n = P.Q. After that, you should calculate m = (p−1).(q −1). Then, you choose numbers E and d so that E.d has a remainder of 1 when divided by M. Finally, you should publish her public key (n,e). So, we can reach the public key.

3.2 For Bob

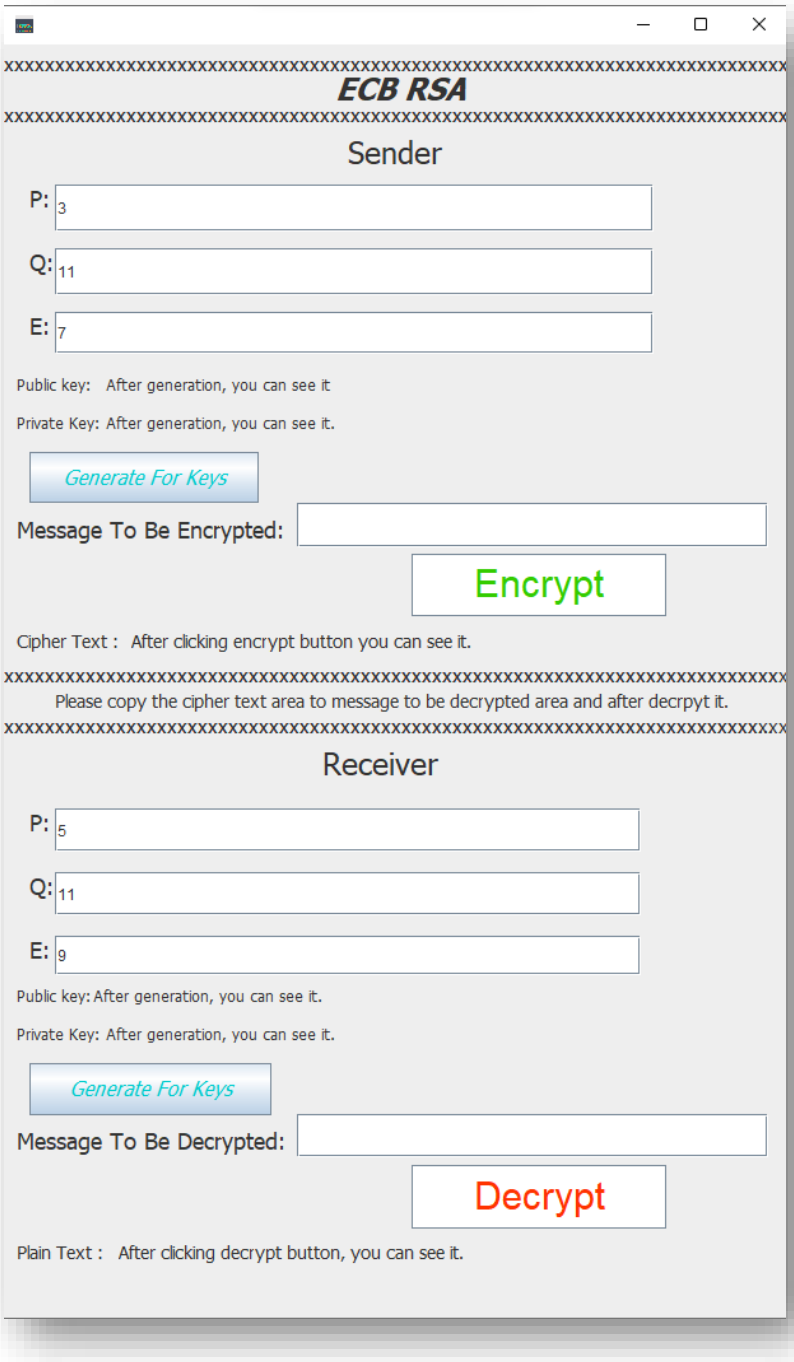
Firstly, you should find Alice's public key (n,e). then you should find the remainder C when M^e is divided by n. Finally, you should Send ciphertext C to Alice. In this way, we can reach the result.

3.2.1 For Alice

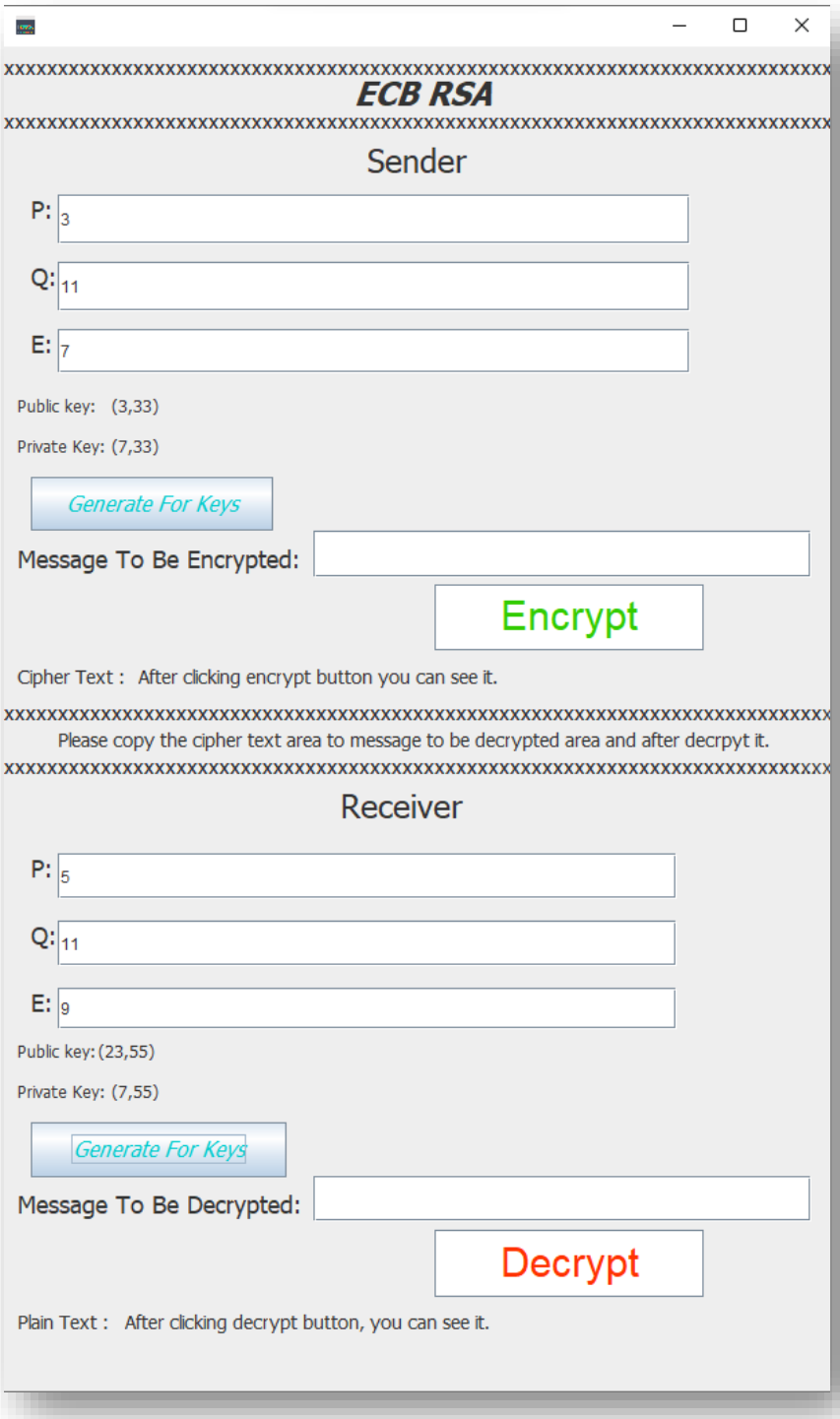
After these operations, you should use her private key (n,d). After this, you should find remainder R when C^d is divided by n. Finally, R matches the message M that Bob wanted to send to Alice! Eventually, we can complete the encryption process.

As a result, after these stages are done, the keys are revealed, and we do the encryption process accordingly.

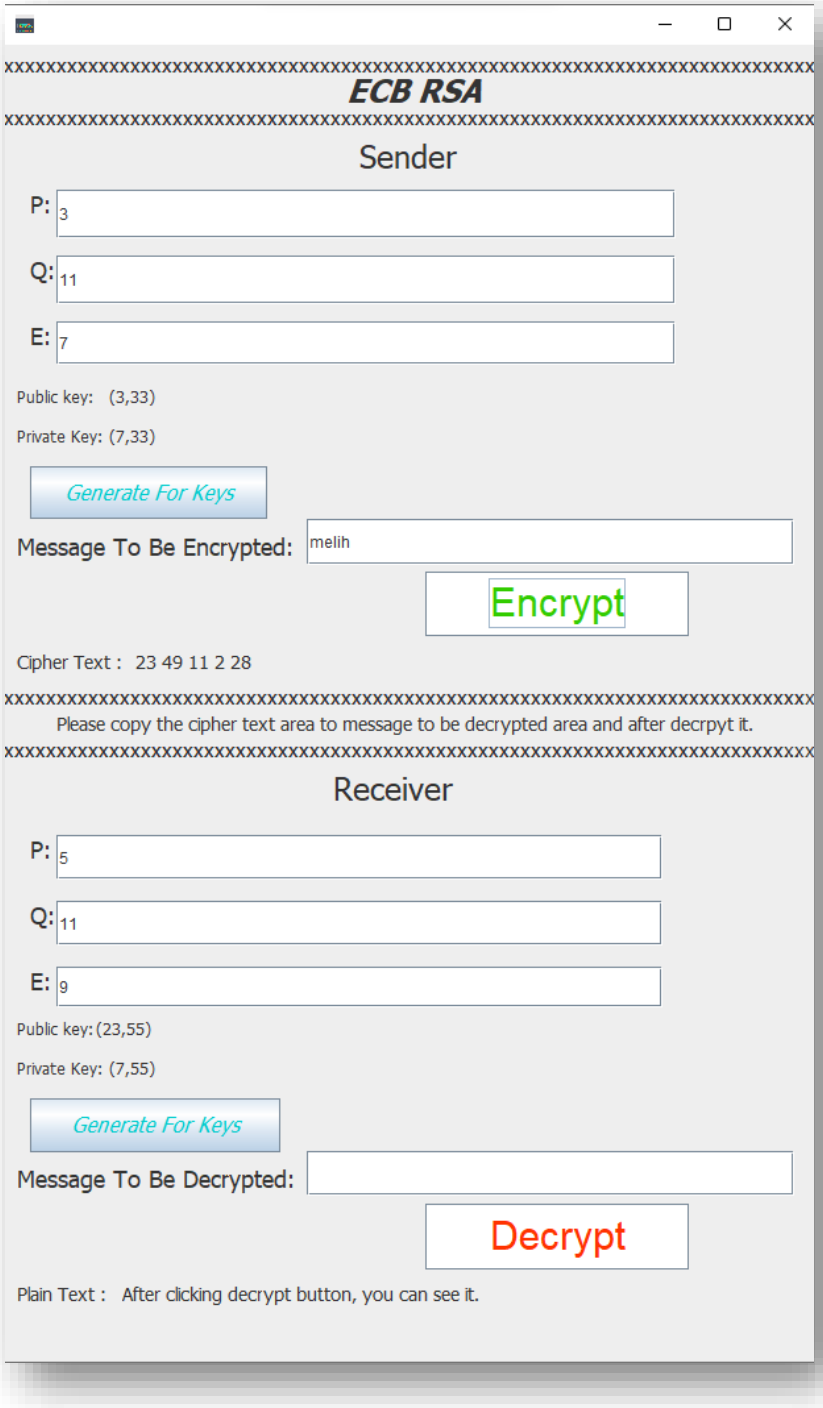
4. How to Run this Code



First, we enter the necessary data and press the 'Generate for Keys' button. We can do this for both parties at the same time. At this stage, our public and private keys appear.

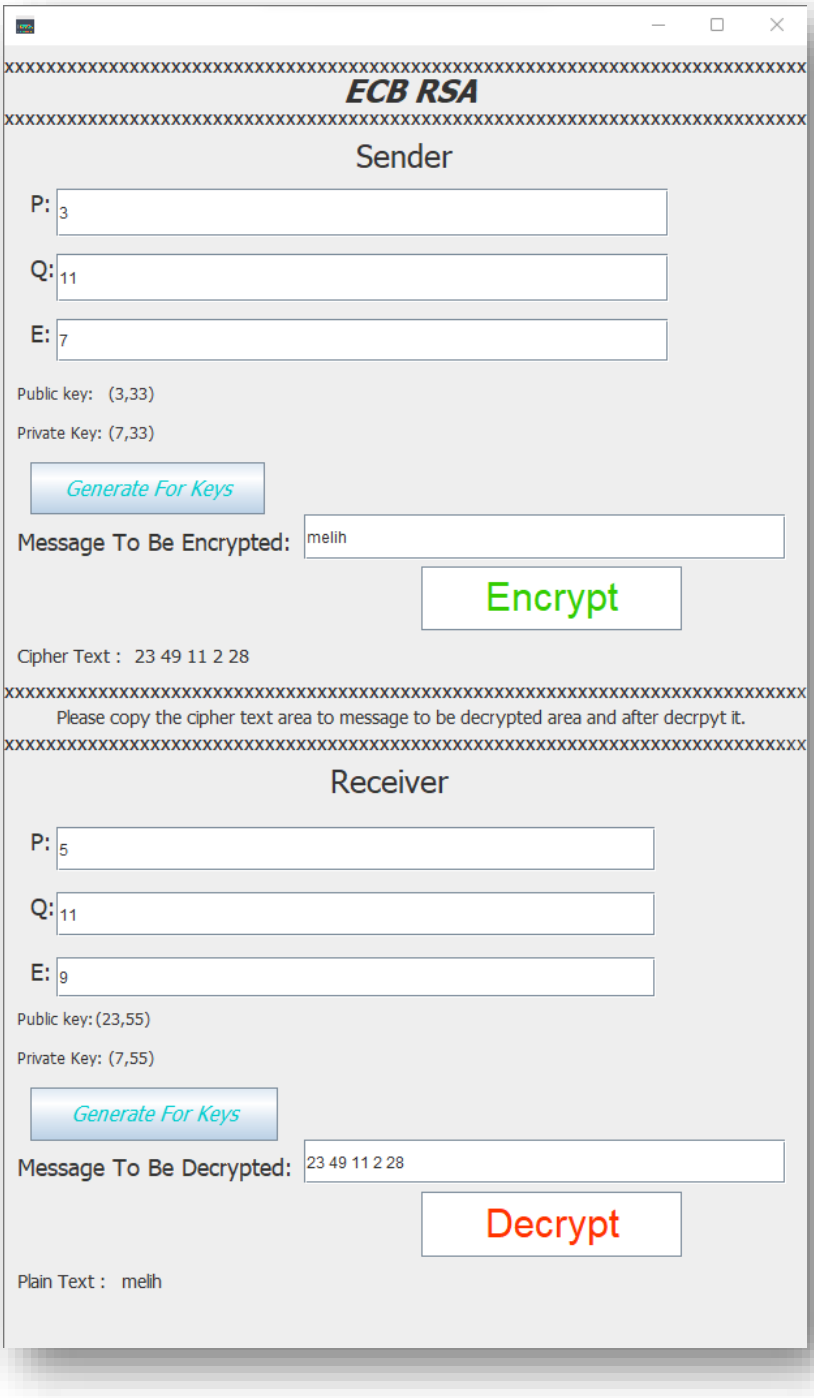


As seen in the example, when the 'Generate for Keys' button was pressed, the keys were revealed.



After this stage, we enter the message to be encrypted and press the 'Encrypt' button and the necessary numbers appear.

These numbers, which are seen in the cipher text, will be used for the decryption process below.



Then we enter the numbers we obtained in the cipher text into the 'Message to Be Decrypted' section and get the normal form of the message. The process is completed at this stage.

At this stage, the program achieved its goal.