**Instructions**

**How to run the program ?**

1. Open the .sln file located inside of the folder
2. After the project loads in Visual Studio, click debug at the top of the screen
3. Select “Start without debugging”
4. A new console window will appear with the menu
5. Alternatively, you can press ctrl+f5

**How do I use the menu ?**

1. Run the project
2. A menu will appear on your screen
3. Select one of 5 options by entering the co-responding number
4. The program will ask you to enter value. Input the requested value from your keyboard to advance the menu
5. After entering the requested values, the program will calculate the output and display it onscreen

**How do I exit the program ?**

1. Select option 5 on the menu
2. You can also x out of the window

**What do I do if I get an exception error ?**

1. Press the red x button in the top right corner of the console window
2. Run the program again, making sure you don’t press enter without submitting an integer value

**How do I use the program ?**

Once you run the program, the menu will appear on screen. The program will ask you to enter an option from the keyboard. These are the following options:

1. **Find greatest common factors of a number**

The program will display the following message:

*Please enter a number to be factorised:*

Once the user enters an integer value, the program will calculate the factors, from smallest to largest and display the following message:

*The factors of number x are: a, b, c, d (*etc)

The program will then return to the main menu.

1. **Extended Euclidean algorithm**

The program will display the following message:

*Input number a:*

Once the user enters an integer value for a, the program will display another message:

Input number b:

Once the user enters an integer value for b, the program will now calculate the gcd of the two numbers and display the following message:

*gcd(a , b) = x,* (where x is the gcd)

The program will then return to the main menu.

1. **RSA Encryption**

The program will display the following message:

*Please enter the plaintext:*

Once the user enters an integer value for the plaintext, the following message will display:

*Please enter the encryption key exponent:*

Once the user enters an integer value for the key exponent, the following message will display:

*RSA modulus:*

*Please enter p (Primes only):*

Once the user enters a prime integer value for p, the following message will display:

*Please enter q (Primes only):*

Once the user enters a prime integer value for q, the program will calculate the ciphertext and display the following message:

*The cipherText is: x, (where x is the cipher text)*

The program will then return to the main menu.

1. **RSA Decryption**

The program will display the following message:

*Please enter the cipherText:*

Once the user enters an integer value for the cipherText, the following message will display:

*Please enter the decryption key exponent:*

Once the user enters an integer value for the decryption key exponent, the following message will display:

*Please enter the RSA modulus:*

Once the user enters an integer value for the RSA modulus, the program will calculate the plaintext and the following message will display:

*The plainText is: x, (where x is the plaintext)*

The program will then return to the main menu.