**Name**

**Advanced Programming in Java**

**Lab Exercise 9/27/2023**

**Part I**

1. A company wants to transmit data over the telephone lines but is concerned that their lines may be tapped. All of the data is transmitted in 4-digit integers. You are to write a program that will encrypt its data so it can be transmitted more securely. Your application should read a four-digit integer entered by the user and encrypt it as follows: Replace each digit by the remainder of the calculation “the sum of each digit plus 7 divided by 10”. (i.e. newDigit = (originalDigit) + 7 % 10). Then swap the first digit with the third and the second digit with the fourth. Finally, display the integer. Use the following template:

// Program encrypts a four-digit number.

import java.awt.\*;

import javax.swing.JOptionPane;

public class Encrypt

{

// main method begins execution of Java application

public static void main( String args[] )

{

int number; // original number

int digit1; // first digit

int digit2; // second digit

int digit3; // third digit

int digit4; // fourth digit

int encryptedNumber; // encrypted number

// enter four digit number to be encrypted

String inputNumber =

JOptionPane.showInputDialog( "Enter a four digit number: " );

number = Integer.parseInt( inputNumber );

// encrypt

/\* Write code here that will encrypt every digit of the 4-digit number \*/

/\* Write code here that swaps the digits to produce the encrypted number \*/

/\* Write code here to display the encrypted number in a message dialog \*/

System.exit( 0 );

} // end method main

} // end class Encrypt

1. Now write a program that will decrypt the number encrypted in problem 1. Use the following template:

import java.awt.\*;

import javax.swing.JOptionPane;

public class Decrypt

{

// method main begins execution of Java application

public static void main( String args[] )

{

int number; // encrypted number

int digit1; // first digit

int digit2; // second digit

int digit3; // third digit

int digit4; // fourth digit

int decryptedNumber; // decrypted number

// enter four digit number to be decrypted

number = Integer.parseInt( JOptionPane.showInputDialog(

"Enter a four digit number: " ) );

// decrypt

/\* Write code here that obtains the individual digits of the

four-digit number and decrypt them \*/

/\* Write code here that assembles the decrypted digits

into the decrypted number \*/

/\* Write code here to display the decrypted number in a message dialog \*/

System.exit( 0 );

} // end method main

} // end class decrypt

**Part II**

Develop your own encryption algorithm for transmitting a four digit number and build a Crypto class that contains an encrypt method as well as a decrypt method. In addition to your source code place a paragraph comment in your source to explain how your algorithm works.

When you have completed these programs, submit your documented source code.