**Programming Extensions**

Your work should be submitted as an EAD

1. Add a menu Item
There’s almost always a question of this form…
Add option “X” that when selected prints the first line of “Never going to give you up” by Rick Astley.
2. Validate GetTextFromUser
Does this need validating at input? Or at the point of using the text for encryption/decryption?
3. Validate GetKeyForCaeserCipher [likely to be in the exam!]
TypeCheck (integer)
Range Check (not more than 25? Not less than -25) AND NOT Zero

### Brute force find Caesar Key

Create a subroutine that outputs the plaintext for all 25 Caesar Keys.

### Frequency Analysis

Create a sub routine that outputs the frequency of each of the characters in the cypher text

1. Steganography Encryption
Really hard to automate BUT… take a large piece of text (get the first chapter of a book from Gutenberg) using letters from that text write the following message “The birds are ready to fly”.

The encrypted message should simply be the numbers that you need to jump to read each letter in the text.

### Steganography brute force decrypt

Try all the values of n below 20 for all the starting positions below 20 and output all the results.

1. Steganography Stepped N

Create a function Step(N) which jumps through the letters in the diary based on an arithmetic series. There is a message hidden which is revealed by a non-linear series of jumps.

5 Display plaintext in the railfence grid?

 Sub DisplayRailFence(ByVal Plaintext As String, ByVal SizeOfRailFence As Integer)

 Dim NoOfColumns As Integer

 Dim NoOfRows As Integer

 Dim NoOfPlaintextCharacters As Integer

 Dim NoOfPlaintextCharactersProcessed As Integer=0

 Dim i As Integer

 Dim j As Integer

 Dim LastFullRowNo As Integer

 NoOfPlaintextCharacters = Plaintext.Length

 NoOfRows = SizeOfRailFence

 NoOfColumns = NoOfPlaintextCharacters \ SizeOfRailFence

 If NoOfPlaintextCharacters Mod SizeOfRailFence <> 0 Then

 NoOfColumns = NoOfColumns + 1

 End If

 '===========================Put characters into 2d array=================================

 Dim RailFenceGrid(NoOfColumns, NoOfRows) As Char

 For i = 1 To NoOfColumns

 j = 1

 Do

 RailFenceGrid(i, j) = Plaintext(NoOfPlaintextCharactersProcessed)

 j = j + 1

 NoOfPlaintextCharactersProcessed = NoOfPlaintextCharactersProcessed + 1

 Loop Until j > NoOfRows Or NoOfPlaintextCharactersProcessed = NoOfPlaintextCharacters

 Next

 '===========================Display Array=================================

 For j = 1 To NoOfRows

 For i = 1 To NoOfColumns

 Console.Write(RailFenceGrid(i, j))

 Next

 Console.WriteLine()

 Next

 Console.ReadLine()

 End Sub

6 Stegenography Encrption Solution

Looks like a dead cert…
Get the PlainText ; For each character in plaintext; Add N randomcharacters
see

 Case "o"

 N = GetValueForN()

 Ciphertext = AddNcharactersSteganography(Plaintext, N)

 DisplayCiphertext(Ciphertext)

Function AddNcharactersSteganography(ByVal PlainText As String, ByVal n As Integer) As String

 Dim HiddenMessage As String = ""

 For i = 0 To PlainText.Length - 1

 HiddenMessage = HiddenMessage + PlainText(i)

 For j = 1 To n

 HiddenMessage = HiddenMessage + GetRandomCharcter()

 Next

 Next

 AddNcharactersSteganography = HiddenMessage

 End Function

 Function GetRandomCharcter() As Char ' with roughly 1/5th chance of a space

 Dim AsciiCode As Integer

 'create a random number between 65 (A) and 90 (Z)

 AsciiCode = Math.Ceiling((Rnd() \* (95 - 65)) + 65)

 If AsciiCode >= 65 And AsciiCode <= 90 Then

 GetRandomCharcter = Chr(AsciiCode)

 Else

 GetRandomCharcter = Chr(32) 'this is the LineSpace character

 End If

 End Function