UseCaesarCipher(…) and ApplyShiftToASCIICodeForCharacter(…) Dry-Run Tasks

Function ApplyShiftToASCIICodeForCharacter(ByVal ASCIICode As Integer, ByVal AmountToShift As Integer) As Integer

 Dim NewASCIICode As Integer

 Dim TypeOfCharacter As String

 TypeOfCharacter = GetTypeOfCharacter(ASCIICode)

 If TypeOfCharacter <> "Other" Then

 If TypeOfCharacter = "Upper" Then

 NewASCIICode = ((26 + ASCIICode - Asc("A") + AmountToShift) Mod 26) + Asc("A")

 Else

 NewASCIICode = ((26 + ASCIICode - Asc("a") + AmountToShift) Mod 26) + Asc("a")

 End If

 Else

 NewASCIICode = ASCIICode

 End If

 ApplyShiftToASCIICodeForCharacter = NewASCIICode

 End Function

Get the type of character

If Character is not (A-Z or a-z) then no shift applied

If Character is upper then NewAsciiCode = ((AsciiCode-64+Shift) MOD 26)+64

If Character is lower then NewAsciiCode = ((AsciiCode-97+Shift) MOD 26)+97
Return NewAsciiCode

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| BYE ZEBRAIf we simply added 10 to the numbers associated with letters

|  |  |  |
| --- | --- | --- |
| Orig | num | +10 |
| B | 2 | 12 |
| Y | 25 | 35 |
| E | 5 | 15 |
|  |  |  |
| Z | 26 | 36 |
| E | 5 | 15 |
| B | 2 | 12 |
| R | 18 | 28 |
| A | 1 | 11 |
|  |  |  |

We get some numbers that don’t make sense! There is no character 36! | BYE ZEBRASimply adding 10 to the ascii

|  |  |  |  |
| --- | --- | --- | --- |
|  | Ascii | +10 |  |
| B | 66 | 56 | 8 |
| Y | 89 | 99 | c |
| E | 69 | 79 | O |
|  | 32 | 42 | \* |
| Z | 90 | 100 | d  |
| E | 69 | 79 | O |
| B | 66 | 76 | L |
| R | 82 | 92 | \ |
| A | 65 | 75 | K |

OK using ASCII we now have a character for every number. Still not right | But That’s NOT how the Caesar cipher works looking at the characters using ONLY numbers 1 to 26

|  |  |  |  |
| --- | --- | --- | --- |
| Orig | num | +10 | new |
| B | 2 | 12 | L |
| Y | 25 | 9 | I |
| E | 5 | 15 | O |
|  |  |  |  |
| Z | 26 | 10 | J |
| E | 5 | 15 | O |
| B | 2 | 12 | L |
| R | 18 | 2 | B |
| A | 1 | 11 | K |
|  |  |  |  |

Looping round so 26+1 =1 etc.. is the right idea | So using the Ascii codes A-Z is the range 65-90

|  |  |  |  |
| --- | --- | --- | --- |
| Orig | num | +10 | new |
| B | 2 | 12 | L |
| Y | 25 | 9 | I |
| E | 5 | 15 | O |
|  |  |  |  |
| Z | 26 | 10 | J |
| E | 5 | 15 | O |
| B | 2 | 12 | L |
| R | 18 | 2 | B |
| A | 1 | 11 | K |
|  |  |  |  |

Mathematically only using the numbers 1 to 26 seems hard at first. Until we remember the trusty MOD operator ☺ |

 The MOD operator returns the remainder of any division:

|  |  |  |  |
| --- | --- | --- | --- |
| 1. 10 MOD 3 =
 | 1 | 1. 9 MOD 3
 | 0 |
| 1. 11 MOD 3 =
 | 2 | 1. 17 MOD 6
 | 5 |
| 1. 19 MOD 5 =
 | 4 | 1. 78 MOD 26
 | 0 |
| 1. 60 MOD 26 =
 | 8 | 1. 75 MOD 26
 | 23 |

Right let’s think about how do we mathematically shift the number 26 to become 1 (Z shifting 1 to become A)

26 + 1 = 27

27 MOD 26 = 1 (27/26 = 1r1) (WOW THAT WAS EASY!!!)

Lets do Y shifting 9 to become H (25 shifting 9 to become 8)

25 + 9 = 34

34 MOD 26 = 8 (34/26 = 1r8) (looks like it works ☺)

Unfortunately the asciicodes for A-Z are 65🡪90, but If we subtract 64 from any A->Z ascii code we will end up with 1->26

Lets do Z shifting 1 to become A (90 + 1 = 65)

90-64 = 26

26+1 =27

27 MOD 26 = 1

1 + 64 =65 (the character code for an A)

NewAsciiCode = (((AsciiCode – 64) + AmountToShift) MOD 26)+64

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 End If

 Else

 NewASCIICode = ASCIICode

 End If

 ApplyShiftToASCIICodeForCharacter = NewASCIICode

 End Function

Function UseCaesarCipher(ByVal OriginalText As String, ByVal AmountToShift As Integer) As String

 Dim ChangedText As String

 Dim Count As Integer

 Dim ASCIICode As Integer

 ChangedText = ""

 For Count = 0 To OriginalText.Length - 1

 ASCIICode = Asc(OriginalText(Count))

 ASCIICode = ApplyShiftToASCIICodeForCharacter(ASCIICode, AmountToShift)

 ChangedText = ChangedText & Chr(ASCIICode)

 Next

 UseCaesarCipher = ChangedText

 End Function

OriginalText = “XRAY”

AmountToShift = 15

OriginalText.Length = \_\_\_

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Count | OriginalText(Count)) | AsciiCode | Chr(ASCIICode) | ChangedText |
| 0 |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| 1 |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| 2 |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| 3 |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |