**Level 1: Basic ASCII Coding**

1. Research the "ASCII Code"
   1. Explain what ASCII stands for.

ASCII stands for the American Standard Code for Information Interchange.

* 1. Explain how to convert a letter into an ASCII coded number

There is an ASCII conversion chart that lists what coded numbers are what letters. Using this chart, you can reverse lookup a letter and see what it is in ASCII coded numbers.

* 1. Explain how to de-code an ASCII number into a letter.

To de-code an ASCII number into a letter, you can use an ASCII conversion chart. Find the number on the chart (under the decimal column) and follow it to the character column to see what the number represents.

1. Open a new Python Repl and run the sample program provided at the end of this module.
   1. Briefly summarize what the "asciiCodes" list does

The “asciiCodes” list lists all the characters that can be coded and de-coded by the program.

* 1. Briefly summarize what the "textCoder" function does

The “textCoder” function codes the specified textChar into a three digit number padded with zeroes.

* 1. Briefly summarize what the "textDeCoder" function does

The “textDeCoder” function helps the program decode a code.

* 1. Briefly summarize what the main program code does

The main program code asks the user to enter a password to code, codes the password, asks if there’s a password to de-code, and decodes it. It can also return to coding a password when it asks to decode something.

1. Explain the main limitation of the program.

The main limitation of the program is that it can only code and de-code 4 letters; A, B, C and D.

**Level 2: Extending The Program**

1. Modify the sample program to do the following (Still using the ASCII code):
   1. Code all of the uppercase and lower case letters
   2. Code the digits 0 to 9
   3. Code at least 5 special characters (e.g. "1?$%&")
2. Verify that your program works for ***coding*** a message containing all of the basic and special characters.
   1. Provide a sample of your program output below.

*Enter a password to code.*

*password: abcdefghijklmnopqrstuvwxyz1234567890 ?!;,*

*Coded string is: 097 098 099 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 049 050 051 052 053 054 055 056 057 048 032 063 033 059 044*

1. Verify that your program works for ***de-coding*** a message containing all of the basic and special characters.
   1. Provide a sample of your program output below.

*Enter a coded password to decode*

*(or return to use the Coded string)*

*Code: 097 098 099 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 049 050 051 052 053 054 055 056 057 048 032 063 033 059 044*

*DeCoded string is: abcdefghijklmnopqrstuvwxyz1234567890 ?!;,*

1. List your program modifications below:

(This begins at Line 12 and ends at Line 15; I added all the uppercase and lowercase letters, all digits and commonly used special characters)

asciiCodes = [("A",65),("B",66),("C",67),("D",68),("E",69),("F",70),("G",71),("H",72),("I",73),("J",74),("K",75),("L",76),("M",77),("N",78),("O",79),("P",80),("Q",81),("R",82),("S",83),("T",84),("U",85),("V",86),("W",87),("X",88),("Y",89),("Z",90),]

asciiCodes += [("a",97),("b",98),("c",99),("d",100),("e",101),("f",102),("g",103),("h",104),("i",105),("j",106),("k",107),("l",108),("m",109),("n",110),("o",111),("p",112),("q",113),("r",114),("s",115),("t",116),("u",117),("v",118),("w",119),("x",120),("y",121),("z",122),]

asciiCodes += [("0",48),("1",49),("2",50),("3",51),("4",52),("5",53),("6",54),("7",55),("8",56),("9",57),]

asciiCodes += [(" ",32),("!",33),("?",63),(";", 59),(",",44)]

**Level 3: Creating A Secret Code**

1. Modify the sample program to create your own secret code that is different from the ASCII code:
   1. Work with a partner to create a secret code that codes letters and characters into different letters and characters.
   2. Your program should be able to create a coded message that   
      you can give to your partner
   3. Your program should be able to de-code a coded message that   
      you get from your partner
2. Provide a sample of your program output below.
   1. Show how your program codes a secret message

*Enter a password to code.*

*password: Pale summer moonlight shimmers on the ocean floor. An octopus, unaware that dawn will bring capture, rests within a trap, dreaming fleeting dreams…*

*Coded string is: 077 120 105 098 029 112 114 106 106 098 111 029 106 108 108 107 105 102 100 101 113 029 112 101 102 106 106 098 111 112 029 108 107 029 113 101 098 029 108 122 098 120 107 029 099 105 108 108 111 043 029 088 107 029 108 122 113 108 109 114 112 041 029 114 107 120 116 120 111 098 029 113 101 120 113 029 097 120 116 107 029 116 102 105 105 029 121 111 102 107 100 029* 122 *120 109 113 114 111 098 041 029 111 098 112 113 112 029 116 102 113 101 102 107 029 120 029 113 111 120 109 041 029 097 111 098 120 106 102 107 100 029 099 105 098 098 113 102 107 100 029 097 111 098 120 106 112 000*

* 1. Show how your program de-codes a secret message

*Code: 077 120 105 098 029 112 114 106 106 098 111 029 106 108 108 107 105 102 100 101 113 029 112 101 102 106 106 098 111 112 029 108 107 029 113 101 098 029 108 122 098 120 107 029 099 105 108 108 111 043 029 088 107 029 108 122 113 108 109 114 112 041 029 114 107 120 116 120 111 098 029 113 101 120 113 029 097 120 116 107 029 116 102 105 105 029 121 111 102 107 100 029 122 120 109 113 114 111 098 041 029 111 098 112 113 112 029 116 102 113 101 102 107 029 120 029 113 111 120 109 041 029 097 111 098 120 106 102 107 100 029 099 105 098 098 113 102 107 100 029 097 111 098 120 106 112 000*

*DeCoded string is: Pale summer moonlight shimmers on the ocean floor. An octopus, unaware that dawn will bring capture, rests within a trap, dreaming fleeting dreams…*

1. List your program modifications below:

We used the Caesar Cipher to substitute our numbers. This is a type of substitution cipher in which each letter in the plaintext is 'shifted' a certain number of places down the alphabet. We shifted each character down 3 spaces on the Ascii code list; for example, “A” would take “X”’s number, which is 88. “B” would take “Y”’s number, which is 89, and so on.

asciiCodes = [("A",88),("B",89),("C",90),("D",65),("E",66),("F",67),("G",68),("H",69),("I",70),("J",71),("K",72),("L",73),("M",74),("N",75),("O",76),("P",77),("Q",78),("R",79),("S",80),("T",81),("U",82),("V",83),("W",84),("X",85),("Y",86),("Z",87),]

asciiCodes += [("a",120),("b",121),("c",122),("d",97),("e",98),("f",99),("g",100),("h",101),("i",102),("j",103),("k",104),("l",105),("m",106),("n",107),("o",108),("p",109),("q",110),("r",111),("s",112),("t",113),("u",114),("v",115),("w",116),("x",117),("y",118),("z",119),]

asciiCodes += [("0",55),("1",56),("2",57),("3",48),("4",49),("5",50),("6",51),("7",52),("8",53),("9",54),]

asciiCodes += [(" ",29),("!",30),("?",60),(";",56),(",",41)]

**Appendix: Sample Program**

"""

This program is currently immited to converting only the

characters "ABCD" and "abcd". The "asciiCodes" list can be easily

extended to include more letters and special characters.

This program currently uses the ASCII codes for converting text.

You can easily create your own secret code by changing the numbers

in the "asciiCodes" list.

"""

asciiCodes = [("A",65),("B",66),("C",67),("D",68)]

asciiCodes += [("a",97),("b",98),("c",99),("d",100)]

# This function codes the specified textChar into a

# three digit number padded with zeroes

def textCoder(textChar) :

for textCode in asciiCodes :

if (textCode[0] == textChar) :

return format(textCode[1],'03')

return "000"

def textDeCoder (codedChar) :

if (codedChar == "") or (codedChar == "000") :

return " "

for textCode in asciiCodes :

if (textCode[1] == int(codedChar)) :

return textCode[0]

return " "

# MAIN PROGRAM CODE STARTS HERE

print("Enter a password to code.")

textIn = input("password: ")

codeOut = ""

for textChar in textIn :

codedChar = textCoder(textChar)

codeOut = codeOut + codedChar + " "

#print("char: ",textChar," ASCII Coded char: ", codedChar)

print("Coded string is: ",codeOut)

print(" ")

print("Enter a coded password to decode")

print("(or return to use the Coded string)")

codeIn = input("Code: ")

if codeIn == "" :

codeIn = codeOut

codeList = codeIn.split(" ")

textOut = ""

for codedChar in codeList :

if (codedChar != "") :

textChar = textDeCoder(codedChar)

textOut += textChar

#print("ASCII Coded char: ", codedChar," decoded char: ",textChar)

print("DeCoded string is: ",textOut)