**Level 1: Basic ASCII Coding**

1. Research the "ASCII Code"
   1. Explain what ASCII stands for.
      * ASCII stands for ‘American Standard Code for Information Interchange’
   2. Explain how to convert a letter into an ASCII coded number
      * A letter can be converted to ASCII coded number by using a chart which tells the converter which code corresponds to what letter.
   3. Explain how to de-code an ASCII number into a letter
      * An ASCII number can be decoded into a letter by looking at the chart of codes and using the letter corresponding to the code. When a series of 3- digit ASCII codes is converted to letters, they can create words or full messages.
2. 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

This list tells the program what code to use for each character.

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

This function takes an input and converts it into a code based upon the list. If the inputted letter is not in the list, the program returns ‘000’.

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

This function takes in the coded message and converts it into numbers using the list as a reference.

* 1. Briefly summarize what the main program code does

The main program takes in user input, runs the ‘textCoder’ function on every single letter in the input, prints the coded message and then asks the user if they want to decode a different message or the same message.

1. Explain the main limitation of the program.

The limitation of this program is that it only knows how to convert characters that are present in the conversion list. That list only has a few letters built into it, which means that the program lacks the ability to convert characters that are not in the list. Instead, it will just code the unknown characters as ‘000’, which will then decode to nothing.

**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 the secret message: Raul is on his phone! He must be stopped before his dad goes !@#$% on him.

Coded string is: 082 097 117 108 032 105 115 032 111 110 032 104 105 115 032 112 104 111 110 101 033 032 072 101 032 109 117 115 116 032 098 101 032 115 116 111 112 112 101 100 032 098 101 102 111 114 101 032 104 105 115 032 100 097 100 032 103 111 101 115 032 033 064 035 036 037 032 111 110 032 104 105 109 046

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: 082 097 117 108 032 105 115 032 111 110 032 104 105 115 032 112 104 111 110 101 033 032 072 101 032 109 117 115 116 032 098 101 032 115 116 111 112 112 101 100 032 098 101 102 111 114 101 032 104 105 115 032 100 097 100 032 103 111 101 115 032 033 064 035 036 037 032 111 110 032 104 105 109 046

DeCoded string is: Raul is on his phone! He must be stopped before his dad goes !@#$% on him.

1. List your program modifications below:

asciiCodes = [(' ', 32), ('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), ('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), ('.', 46), (',', 44), ('!', 33), ('@', 64), ('#', 35), ('`', 96), ('~', 126), ('$', 36), ('%', 37), ('^', 94), ('&', 38), ('\*', 42), ('-', 45), ('=', 61), ('+', 43), ('\_', 95), ('/', 47), ('?', 63), ('**\\**', 92), ('|', 124), ('1', 49), ('2', 50), ('3', 51), ('4', 52), ('5', 53), ('6', 54), ('7', 55), ('8', 56), ('9', 57), ('0', 48)]

*# 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*

textIn = input("Enter the secret message: ")

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)

**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.

Enter the secret message: This is a test of the level 3 program!

Coded string is: zj&dC&dCbCyqdyCnaCyjqCZq3qZCBCepnTpb#4

Enter a coded password to decode

(or return to use the Coded string)

Code:

DeCoded string is: This is a test of the level 3 program!

1. List your program modifications below:

scramblesCodes = [(' ', 'C'), ('a', 'b'), ('b', 'N'), ('c', '.'), ('d', 'S'), ('e', 'q'), ('f', 'a'), ('g', 'T'), ('h', 'j'), ('i', '&'), ('j', 't'), ('k', '\*'), ('l', 'Z'), ('m', '#'), ('n', 'W'), ('o', 'n'), ('p', 'e'), ('q', 'O'), ('r', 'p'), ('s', 'd'), ('t', 'y'), ('u', 'D'), ('v', '3'), ('w', 'g'), ('x', '^'), ('y', 'V'), ('z', '('), ('A', '0'), ('B', '1'), ('C', 'P'), ('D', '2'), ('E', '/'), ('F', 'A'), ('G', '@'), ('H', 's'), ('I', 'v'), ('J', 'U'), ('K', '%'), ('L', 'F'), ('M', 'l'), ('N', 'E'), ('O', '`'), ('P', '+'), ('Q', 'w'), ('R', 'R'), ('S', ' '), ('T', 'z'), ('U', '6'), ('V', '\_'), ('W', '~'), ('X', 'x'), ('Y', '8'), ('Z', '7'), ('.', 'c'), (',', 'G'), ('!', '4'), ('@', '$'), ('#', 'o'), ('`', 'm'), ('~', '5'), ('$', 'i'), ('%', 'k'), ('^', 'L'), ('&', '!'), ('\*', ','), ('-', 'M'), ('+', 'f'), ('\_', 'X'), ('/', '**\\**'), ('?', '?'), ('**\\**', 'J'), ('|', 'h'), ('1', '-'), ('2', '|'), ('3', 'B'), ('4', 'K'), ('5', ')'), ('6', '9'), ('7', 'u'), ('8', 'I'), ('9', 'H'), ('0', 'r'), (')', 'Q'), ('(', 'Y')]

**def** **textCoder**(textChar) :

**for** textCode **in** scramblesCodes :

**if** (textCode[**0**] == textChar) :

**return** textCode[**1**]

**def** **textdecoder**(Chara):

**for** code **in** scramblesCodes:

**if** code[**1**] == Chara:

**return** code[**0**]

textIn = input("Enter the secret message: ")

codeOut = ""

**for** textChar **in** textIn :

codedChar = textCoder(textChar)

codeOut = codeOut + str(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

textOut = ''

**for** letter **in** codeIn:

decoded = textdecoder(letter)

textOut = textOut + decoded

print("DeCoded string is: ",textOut)

**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)