**Level 1: Basic ASCII Coding**

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

American Standard Code for Information Interchange

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

The lowercase alphabet starts at 97 and then increases by one each time. For example 98 would be b. The uppercase alphabet starts at 65 then increases by one at each time. For example 65 would be A.

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

The alphabet starts at 65 and increases from there. For example L would be 76, l would be 108.

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

It has a list ASCII numbers and its values.

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

It puts letters into numbers.

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

It puts numbers into letters.

* 1. Briefly summarize what the main program code does  
     It creates a password and decodes words. For example cab is 99 97 98.

1. Explain the main limitation of the program.

It can only use 4 letters no more than that.

**Level 2: Extending The Program**

1. Modify the sample program to do the following (Still using the ASCII code):

Code all of the uppercase and lower case letters

1. 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)]
2. 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)]

Code the digits 0 to 9

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

Code at least 5 special characters (e.g. "1?$%&")

1. asciiCodes = [("!",33),("@",64),("#",35),("&",38), "%",37)

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.

1. 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)]
2. 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)]
3. asciiCodes = [("0",48),( "1",49),( "2",50),( "3",51),( "4",52),( "5",53),( "6",54),( "7",55),( "8",56),( "9",57)]
4. asciiCodes = [("!",33),("@",64),("#",35),("&",38), "%",37)
5. 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.

Sahaj!&8 083 097 104 097 106 033 038 056

1. List your program modifications below:

* Complete alphabet for both lower and upper case ascii
* 5 special characters coded into ascii
* Numbers 0-9 also coded

**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.

7. asciiCodes +=[("a",”b”),("b",”v”),("c",”g”),("d",”q”),("e",”k”),("f",”m”)("g",”n”),("h",”a”),("i",d),("j",z),("k",c),("l",w),("m",s),("n",e),("o",o),("p", y),("q", f),("r", j), ("s", x), ("t", h),("u", t),("v" ,l),("w",119),("x", u),("y", i),("z", r)]

* 1. Your program should be able to create a coded message that   
     you can give to your partner
  2. Your program should be able to de-code a coded message that   
     you get from your partner

1. Provide a sample of your program output below.
   1. Show how your program codes a secret message
   2. Show how your program de-codes a secret message

A substitution code has been used to be able to code a secret message which can also be decoded by using this program

asciiCodes = [("A","B"),("B","V"),("C","G"),("D","Q"),("E","K"),("F","M"),("G","N"),("H","A"),("I","D"),("J","Z"),("K","C"),("L","W"),("M","S"),("N","E"),("O","O"),("P","Y"),("Q","F"),("R","J"),("S","X"),("T","H"),("U","T"),("V","L"),("W","P"),("X","U"),("Y","I"),("Z","R")]

asciiCodes += [("a","b"),("b","v"),("c",'g'),("d","q"),("e","k"),("f","m"),("g","n"),("h","a"),("i","d"),("j","z"),("k","c"),("l","w"),("m","s"),("n","e"),("o","o"),("p","y"),("q","f"),("r","j"),("s","x"),("t","h"),("u","t"),("v","l"),("w","p"),("x","u"),("y","i"),("z","r")]

asciiCodes += [("0","0"),("1","1"),("2","2"),("3","3"),("4","4"),("5","5"),("6","6"),("7","7"),("8","8"),("9","9")]

asciiCodes += [(" "," "),("!","!"),("#","#"),("$","$"),("%","%"),("/","/")]

# 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],'')

return "000"

def textDeCoder (codedChar) :

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

return ""

for textCode in asciiCodes :

if (textCode[1] == codedChar) :

return textCode[0]

return ""

# MAIN PROGRAM CODE STARTS HERE

print("Enter a message to code.")

textIn = input("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)

3. List your program modifications below:

The modifications were:

Used substitution code instead of ascii code

#LINE 11 - return format(textCode[1],'03') <-- on this part of the code ‘03’ was deleted making it

return format(textCode[1],'')

#LINE 18 - if (textCode[1] == int(codedChar)) :

This was changed to if (textCode[1] == codedChar) :

^^^ without the int

**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.

"""

1. 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)]
2. 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)]
3. asciiCodes = [("0",48),( "1",49),( "2",50),( "3",51),( "4",52),( "5",53),( "6",54),( "7",55),( "8",56),( "9",57)]
4. asciiCodes = [("!",33),("@",64),("#",35),("&",38), "%",37)

# 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)