**Level 1: Red Pill, Blue Pill**

**Decode the following message:**

Ymnx nx dtzw qfxy hmfshj. Fkyjw ymnx, ymjwj nx st yzwsnsl gfhp.

Dtz yfpj ymj gqzj unqq—ymj xytwd jsix, dtz bfpj zu ns dtzw gji fsi gjqnjaj bmfyjajw dtz bfsy yt gjqnjaj.

Dtz yfpj ymj wji unqq—dtz xyfd ns Btsijwqfsi, fsi N xmtb dtz mtb ijju ymj wfggny mtqj ltjx.

Wjrjrgjw: fqq N'r tkkjwnsl nx ymj ywzym. Stymnsl rtwj.

Hint #1: The code is a simple letter shift cypher

Hint #2: <http://practicalcryptography.com/ciphers/simple-substitution-cipher/>

* What single letter is always capitalized?

I

* Identify the 2 letter words and use the “frequency analysis” tables

Is and To

* Identify the most common letters and use the “frequency analysis” tables
* E and T

Final Hint / Solution:

* <https://www.youtube.com/watch?v=ytftrd6rxps>

Final Question:

* What is the shift amount? How many letters is the coded message shifted by?

The shift amount is 5. This is the key(A is F, B is G, C is H, and so on):

FGHIJKLMNOPQRSTUVWXYZABCDE

**Write the Decoded Message below:**

THIS IS YOUR LAST CHANCE. AFTER THIS, THERE IS NO TURNING BACK. YOU TAKE THE BLUE PILL--THE STORY ENDS, YOU WAKE UP IN YOUR BED AND BELIEVE WHATEVER YOU WANT TO BELIEVE. YOU TAKE THE RED PILL--YOU STAY IN WONDERLAND, AND I SHOW YOU HOW DEEP THE RABBIT HOLE GOES. REMEMBER: ALL I'M OFFERING IS THE TRUTH. NOTHING MORE.

**Level 2: ASCII Code**

1. What does the ASCII acronym stand for?

ASCII stands for American Standard Code for Information Interchange.

1. What is ASCII code used for?

ASCII is used for a standard for encoding text documents on computers. It is used to turn characters and letters from the alphabet to binary. This is done so that the computers can use them. Binary helps the computer in better understanding characters and letters and then the computers can work more efficiently.

1. Why can’t computers just use the letters we type or the letters used by humans when we write things down?  
   Computers only understand numbers and not letters. So, if letters are inputted, the computer won’t understand what you are trying to say.
2. How do computers communicate with people who speak different languages and use different alphabets? What is used instead of the ASCII code table?

If the computer is using only ASCII, then it can only communicate with people who know how to use the English alphabet only. Extended ASCII is used because it offers characters of most languages around the world.

1. Write a Python program that uses the ord() function to convert some text letters into ASCII code numbers. Print the numbers to the console screen. Provide your program listing below.

value=ord("a")

value1=ord("A")

print(value)

print(value1)

1. Write a Python program that uses the chr() function to convert some ASCII code numbers into text letters. Print the letters to the console screen. Provide your program listing below.

print(chr(72))

print(chr(105))

**Level 3: Coding Program**

Work with a partner to create a program to encrypt and decrypt messages using a numerical code.

1. To encrypt the message your program should do the following:
   1. Read a message contained in a text file
   2. Convert the text characters (letters in the words) in the text file to ASCII numbers using the ord() function
   3. Modify the ASCII numbers using a mathematical function (e.g. addition or multiplication)
   4. Write the modified ASCII numbers to a binary file
   5. The binary file is your encrypted message
2. To decrypt your message your program should do the following:
   1. Read the encrypted message contained in the binary file
   2. Convert the modified numbers to ASCII numbers using a reverse mathematical function (e.g. subtraction or division)
   3. Convert the ASCII numbers to text characters using the chr() functions
   4. Write the text characters to a text file
   5. The text file is your decrypted file.
3. Demo your program to Mr. Nestor
4. Provide a listing of the following:
   1. Your encryption program

def Encryption(Message,EncryptedObject):

Message = open(Message,'r')

Message\_Read = Message.read()

number = 0

EncryptedFile = open(EncryptedObject,'ab')

while True:

messageORD = ord(Message\_Read[number])

ENCRYPT = messageORD\*2-19

byteAdded = bytearray(b'\x00')

byteAdded[0] = ENCRYPT

print(Message\_Read[number], messageORD, ENCRYPT)

EncryptedFile.write(byteAdded)

number = number+1

if number > 38:

break;

EncryptedFile.close

Message.close

Encryption('R/CodedMessage.txt','R/Encrypted.bin')

* 1. Your decryption program

def Decrytion(EncryptedObject,DecoddedMessage):

EncryptedFile = open(EncryptedObject,'rb')

Decodded = open(DecoddedMessage, 'a')

Anumber = 0

encryptedObject = EncryptedFile.read()

while True:

NeedTOdecrypt = encryptedObject[Anumber]

Decrypted = int((NeedTOdecrypt+19)/2)

MessageDecrypted = chr(Decrypted)

Decodded.write(MessageDecrypted)

print(encryptedObject[Anumber],NeedTOdecrypt,Decrypted, MessageDecrypted)

Anumber = Anumber+1

if Anumber > 38:

break;

EncryptedFile.close()

Decodded.close()

Decrytion('R/Encrypted.bin','R/Decodded.txt')

* 1. The contents of your original message text file

Hello, Good Morning!

What is Your name?

* 1. A dump of the contents of your binary encrypted file

b'}\xb7\xc5\xc5\xcbE-{\xcb\xcb\xb5-\x87\xcb\xd1\xc9\xbf\xc9\xbb/\x01\x9b\xbd\xaf\xd5-\xbf\xd3-\x9f\xcb\xd7\xd1-\xc9\xaf\xc7\xb7k'

* 1. The contents of your decrypted message text file

Hello, Good Morning!

What is Your name?