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'''
Homework Number: 1
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'''

import os.path
from cryptBreak import *
from BitVector import *
PassPhrase = "Hopes and dreams of a million years"
BLOCKSIZE = 16
numbytes = BLOCKSIZE//8

if __name__ == '__main__':
    bruteForce()

def bruteForce():
    allPValues = tuple(range(0, 2 ** 16))
    for key in allPValues:
        plain = cryptBreak('encrypted.txt', key)
        if "Mark Twain" in plain:
            print("Encryption Broken!")
            print("Key: ",key)
            print("Message: ",plain)
            if os.path.isfile('decrypted.txt'):
                FILEOUT = open('decrypted.txt', 'w') # (d)
                FILEOUT.write(plain) # (e)
                FILEOUT.close()
            else:
                print("File decrypted.txt does not exist")
            break

def cryptBreak(ciphertextFile, key):
    FILEIN = open(ciphertextFile) # (J)
    encrypted_bv = BitVector(hexstring=FILEIN.read())
    bv_iv = BitVector(bitlist=[0] * BLOCKSIZE) # (F)
    for i in range(0, len(PassPhrase) // numbytes): # (G)
        textstr = PassPhrase[i * numbytes:(i + 1) * numbytes] # (H)
        bv_iv ^= BitVector(textstring=textstr) # (I)
    key_bv = BitVector(bitlist=[0] * BLOCKSIZE) # (P)
    key_bv = BitVector(intVal=key, size=16)
    msg_decrypted_bv = BitVector(size=0) # (T)
    previous_decrypted_block = bv_iv # (U)
    for i in range(0, len(encrypted_bv) // BLOCKSIZE): # (V)
        bv = encrypted_bv[i * BLOCKSIZE:(i + 1) * BLOCKSIZE] # (W)
        temp = bv.deep_copy() # (X)
        bv ^= previous_decrypted_block # (Y)
        previous_decrypted_block = temp # (Z)
        bv ^= key_bv # (a)
        msg_decrypted_bv += bv # (b)
    outputtext = msg_decrypted_bv.get_text_from_bitvector() # (c)
    return outputtext

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