For HW1 we have created a program that uses brute force attack to find the right key. The Brute Force attack will check through 2^16 key spaces. We checked through range(0,2^16) and then changed to a bit vector, used the decryption method given in DecryptForFun.py and checked whether the string "Mark Twain" appeared in the file.

```
import os.path
from cryptBreak import *
if __name__ == '__main__':
    allPValues = tuple(range(0, 2**16))
    def bruteForce():
        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
```

```
'''
Homework Number:   1
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Due Date: 01/23/20
'''

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

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
```

Encryption Broken!
Key: 25202
Message: It is my belief that nearly any invented quotation, played with confidence, stands a good chance to deceive

It is my belief that nearly any invented quotation, played with confidence, stands a good chance to deceive.

- Mark Twain