Encryption Decryption Lab Report

The encryption function looks like this:
The input word and key will be switched into ASCII code minus 65, added to each other, mod by 26 plus 65 to get the ASCII code for the cipher text, and then switched into the actual word.

```
def encryption():
    text = input("what is the plain text?  ")
    #upper case the text and split into list of char then ASCII code, then
number code for our case.
    textlist = [*text.upper()]
    textnumlist = list(map(lambda x:ord(x)-65,textlist))

    #prepare the key into number list
    key = input("What is the key for encryption? ")
    keylist = [*key.upper()]
    keynumlist = list(map(lambda x:ord(x)-65,keylist))

    #encryption the number list of cipher text
    codenumlist = []
    for i in range(len(textnumlist)):
        keypos = i%len(key)
        codenumlist.append(textnumlist[i]+keynumlist[keypos])
        codenumlist = list(map(lambda x:x%26,codenumlist))

    #get the ascii list of cyphertext, and convert into textlist, then
combine
    ciphertext = ''.join(list(map(lambda x: chr(x),list(map(lambda
x:x+65,codenumlist)))))
    return print("The encrypted text is: "+ ciphertext)
```

And the encryption process will look like this:

```
In [3]: encryption()
        what is the plain text?  EthanlikeCS
        What is the key for encryption? Sky
        The encrypted text is: WDFSXJAUCUC
```

For hacking, the code is too long so presented in a separate PDF and jupyter notebook file.

The first decryption finds one potential key which is KS, and the sentence would be:" Caesar's wife must be above suspicion". The entire process takes 3.72 seconds and the checking with the dictionary process takes 3.69s.

The second decryption finds one potential key which is KEY, and the sentence would be:" FORTUNE WHICH HAS A GREAT DEAL OF POWER IN OTHER MATTERS BUT ESPECIALLY IN WAR CAN BRING ABOUT GREAT CHANGES IN A SITUATION THROUGH VERY SLIGHT FORCES." The entire process takes 96.65 seconds and the checking with the dictionary process takes 96.55s.

The third decryption finds one potential key which is IWKD, and the sentence would be: "EXPERIENCE IS THE TEACHER OF ALL THINGS." The entire process takes 2558 seconds and the checking with the dictionary process takes 2555s.

In my brutal force method, the time increases with a ratio of 30x. 99% of the time is spent in checking all generated cipher texts with the dictionary. Further optimization would focus on how to speed up the process of checking with new design other than check each cipher text with each word in the dictionary.