

Cryptography module, Exercises 1 (unassessed) - Answers

Answer - 1:

Listing 1 contains python code to brute-force the given cipher-text "AVUEVLETSEISBNACBOOLEOBTILBDLCOBOOE".

Listing 1: ex1.1.py

```
from math import ceil

def encode(msg, key):
    cipher = ""
    for rails in range(0, key):
        for char in range(rails, len(msg), key):
            cipher += msg[char]
    return cipher

def decode(cipher, key):
    msg = ""
    count = ceil(len(cipher)/key)
    for rails in range(0, count):
        for c in range(rails, len(cipher), count):
            msg += cipher[c]
    return msg

def crack_cipher(cipher):
    for key in range(1, len(cipher)):
        print(decode(cipher, key))

cipher = "AVUEVLETSEISBNACBOOLEOBTILBDLCOBOOE"

crack_cipher(cipher)
```

Listing 2 contains the output of the python code in **Listing 1** containing the message, "ALICELOVESBOBBUTBOBDOESNOTLOVEALICE" shown in the bold.

Listing 2: output of ex1.1.py

```
AVUEVLETSEISBNACBOOLEOBTILBDLCOBOOE
AOVLUEEOVBLETILSBEDILSCBONBAOCOBEO
ABIVNLUABECDVBLOCEOOTLBSEOEOIBEST
AEODVILLUSECEBOOVNBBLATOECIOTBLESOB
ATAOLVSCBCUEBTOEIOIBVSOLOLBLBOENEDE
AEBOIOVTNLLBUSAEBOEECODOVIBBLELSOTC
ALICELOVESBOBBUTBOBDOESNOTLOVEALICE
ALICELOVESBOBBUTBOBDOESNOTLOVEALICE
AVSBBEILOVLENOOLCOUEIAOBBOEETSCLTDB
AVSBBEILOVLENOOLCOUEIAOBBOEETSCLTDB
AVSBBEILOVLENOOLCOUEIAOBBOEETSCLTDB
AEEEBCCOIIDOOVVTINBLBLBEULSSAOETBCO
AEEEBCCOIIDOOVVTINBLBLBEULSSAOETBCO
AEEEBCCOIIDOOVVTINBLBLBEULSSAOETBCO
AEEEBCCOIIDOOVVTINBLBLBEULSSAOETBCO
AEEEBCCOIIDOOVVTINBLBLBEULSSAOETBCO
AEEEBCCOIIDOOVVTINBLBLBEULSSAOETBCO
AUVESIBABOEIBIBLOOEVELTESNCOLOTILDCBO
```

```

AUVESIBABOEBIBLOOEVELTESNCOLOTILDCBO
AUVESIBABOEBIBLOOEVELTESNCOLOTILDCBO
AUVESIBABOEBIBLOOEVELTESNCOLOTILDCBO
AUVESIBABOEBIBLOOEVELTESNCOLOTILDCBO
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AUVESIBABOEBIBLOOEVELTESNCOLOTILDCBO
AUVESIBABOEBIBLOOEVELTESNCOLOTILDCBO

```

Answer - 2:

Listing 3 contains the python code to perform encryption and decryption using the block cipher scheme mentioned in the question.

Listing 3: ex1.2.py

```

ROUNDS = 2

def key_function(K, i):
    return K + 75 * (i % 256)

def F(Ki, Pi):
    return 127 * Ki + (Pi % 256)

def encrypt(msg, key):
    Li = msg[0]
    Ri = msg[1]
    temp = 0
    for i in range(0, ROUNDS):
        Ki = key_function(key, i)
        temp = Li ^ F(Ki, Ri)
        Li = Ri
        Ri = temp
    return [Ri, Li]

def decrypt(cipher, key):
    Li = cipher[1]
    Ri = cipher[0]
    temp = 0
    for i in range(ROUNDS, 0, -1):
        Ki = key_function(key, (i - 1))
        temp = Ri ^ F(Ki, Li)
        Ri = Li
        Li = temp
    return [Li, Ri]

print(encrypt([86, 83], 89))

```

Listing 4 contains the output of the python code in **Listing 3** containing the encrypted cipher-text.

Listing 4: output of ex1.2.py

[20955, 11308]
