COMP1002 Assessment 2

Nov 9th , 2021

Q1

a) If the $chr(ord(p_i) + ord(k_j) - 2 * ord('a'))$ is bigger than 26, then mod 26 is needed for the proper Unicode to convert to the defined Unicode range. If the Unicode character is given outside of your Python definition, then there will be a TypeError displayed. For example, if there's no mod 26, p_i ='q', k_j ='o', $(\text{ord}(\text{p}_i) + \text{ord}(\text{k}_j) - 2 * \text{ord}(\text{'a'}) = 30$, which is bigger than 26, there will be a TypeError displayed here.

b) Input: p and k Output: c

Set C as an empty list

Slicing a string of p and k to two lists of characters as P and K

If p is longer than k,

Then $j = i$ mod len(k)

Generate a new list for Key(k), K1

Repeat

Calculate $c_i = \text{str}\left(\left(\text{ord}(\text{p}_i) + \text{ord}(\text{k}_j) - 2 * \text{ord}(\text{'a'})\right) \text{mod} 26 + \text{ord}(\text{'a'})\right)$

Add the new p_i generated into the list P

Convert list P to a string p.

Write down string p

c) Input: c and k Output: p

Set P as an empty list

Slicing a string of c and k to two lists of characters as C and K

Set $x = ord(c_i) + \text{ord}(\text{'a'}) - ord(k_j)$

If c is longer than k,

Then $j = i$ mod len(c)

Generate a new list for Key(k), K1

Repeat

Calculate x

If $ord(pi) + ord(kj) - 2 * ord('a') > 26$,

then $x = x - 26$

Else,

then $x = x$

Convert x to the small character p_i.

Add the new p_i generated into the list P

Convert list P to a string p.

Write down string p

Q2

a)

Input: M and N Output: the total moving distance of the coins

Code every square tile from 1 to m.

Set x is the number of sqaure tile that coins should move to.

Set $D = 0$ as the total moving distance of the coin.

Repeat

Calculate $d = |n_i - x|$

Add d into D.

Write down the distance D.

b) $D = \sum_{i=1}^{n} |n_i - x|$

Input: M and N Output: the smallest total moving distance of the coins

If n is an odd number,

Then $D = \frac{(n-1)^2}{2}$

Else

Then $D = \frac{n^2}{2}$