Problem 514: Freedom Trail

Problem Information

Difficulty: Hard
Acceptance Rate: 59.15%
Paid Only: No
Tags: String, Dynamic Programming, Depth-First Search, Breadth-First Search

Problem Description

In the video game Fallout 4, the quest **" Road to Freedom"** requires players to reach a metal dial called the **" Freedom Trail Ring"** and use the dial to spell a specific keyword to open the door.

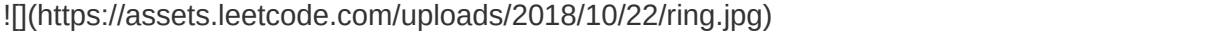
Given a string `ring` that represents the code engraved on the outer ring and another string `key` that represents the keyword that needs to be spelled, return _the minimum number of steps to spell all the characters in the keyword_.

Initially, the first character of the ring is aligned at the `"12:00"` direction. You should spell all the characters in `key` one by one by rotating `ring` clockwise or anticlockwise to make each character of the string key aligned at the `"12:00"` direction and then by pressing the center button.

At the stage of rotating the ring to spell the key character `key[i]`:

1. You can rotate the ring clockwise or anticlockwise by one place, which counts as **one step**. The final purpose of the rotation is to align one of `ring`'s characters at the `"12:00"` direction, where this character must equal `key[i]`. 2. If the character `key[i]` has been aligned at the `"12:00"` direction, press the center button to spell, which also counts as **one step**. After the pressing, you could begin to spell the next character in the key (next stage). Otherwise, you have finished all the spelling.

Example 1:



Input: ring = "godding", key = "gd" **Output:** 4 **Explanation:** For the first key character 'g', since it is already in place, we just need 1 step to spell this character. For the second key character 'd', we need to rotate the ring "godding" anticlockwise by two steps to make it become "ddinggo". Also, we need 1 more step for spelling. So the final output is 4.

Example 2:

Input: ring = "godding", key = "godding" **Output:** 13

Constraints:

* `1 <= ring.length, key.length <= 100` * `ring` and `key` consist of only lower case English letters. * It is guaranteed that `key` could always be spelled by rotating `ring`.

Code Snippets

C++:

```
class Solution {
public:
int findRotateSteps(string ring, string key) {

}
};
```

Java:

```
class Solution {
public int findRotateSteps(String ring, String key) {

}
}
```

Python3:

```
class Solution:
def findRotateSteps(self, ring: str, key: str) -> int:
```