Problem 1320: Minimum Distance to Type a Word Using Two Fingers

Problem Information

Difficulty: Hard
Acceptance Rate: 59.31%
Paid Only: No
Tags: String, Dynamic Programming

Problem Description

You have a keyboard layout as shown above in the **X-Y** plane, where each English uppercase letter is located at some coordinate.

* For example, the letter `'A'` is located at coordinate `(0, 0)`, the letter `'B'` is located at coordinate `(0, 1)`, the letter `'P'` is located at coordinate `(2, 3)` and the letter `'Z'` is located at coordinate `(4, 1)`.

Given the string `word`, return _the minimum total**distance** to type such string using only two fingers_.

The **distance** between coordinates `(x1, y1)` and `(x2, y2)` is `|x1 - x2| + |y1 - y2|`.

Note that the initial positions of your two fingers are considered free so do not count towards your total distance, also your two fingers do not have to start at the first letter or the first two letters.

Example 1:

Input: word = "CAKE" **Output:** 3 **Explanation:** Using two fingers, one optimal way to type "CAKE" is: Finger 1 on letter 'C' -> cost = 0 Finger 1 on letter 'A' -> cost = Distance from letter 'C' to letter 'A' = 2 Finger 2 on letter 'K' -> cost = 0 Finger 2 on letter 'E' -> cost = Distance from letter 'K' to letter 'E' = 1 Total distance = 3

Example 2:

Input: word = "HAPPY" **Output:** 6 **Explanation:** Using two fingers, one optimal way to type "HAPPY" is: Finger 1 on letter 'H' -> cost = 0 Finger 1 on letter 'A' -> cost = Distance from letter 'H' to letter 'A' = 2 Finger 2 on letter 'P' -> cost = 0 Finger 2 on letter 'P' -> cost = Distance from letter 'P' to letter 'P' = 0 Finger 1 on letter 'Y' -> cost = Distance from letter 'A' to letter 'Y' = 4 Total distance = 6

Constraints:

* `2 <= word.length <= 300` * `word` consists of uppercase English letters.

Code Snippets

C++:

```
class Solution {
public:
int minimumDistance(string word) {

}
};
```

Java:

```
class Solution {
public int minimumDistance(String word) {

}
}
```

Python3:

```
class Solution:
def minimumDistance(self, word: str) -> int:
```