Problem 3639: Minimum Time to Activate String

Problem Information

Difficulty: Medium
Acceptance Rate: 44.49%
Paid Only: No
Tags: Array, Binary Search

Problem Description

You are given a string `s` of length `n` and an integer array `order`, where `order` is a **permutation** of the numbers in the range `[0, n - 1]`.

Starting from time `t = 0`, replace the character at index `order[t]` in `s` with `'*'` at each time step.

A **substring** is **valid** if it contains **at least** one `'*'`.

A string is **active** if the total number of **valid** substrings is greater than or equal to `k`.

Return the **minimum** time `t` at which the string `s` becomes **active**. If it is impossible, return -1.

Example 1:

Input: s = "abc", order = [1,0,2], k = 2

Output: 0

Explanation:

`t` | `order[t]` | Modified `s` | Valid Substrings | Count | Active (Count >= k) ---|---|---|---|---|--- 0 | 1 | `"a*c"` | `'*'`, `"a*"`, `"*c"`, `"a*c"` | 4 | Yes The string `s` becomes active at `t = 0`. Thus, the answer is 0.

Example 2:

Input: s = "cat", order = [0,2,1], k = 6

Output: 2

Explanation:

`t`	`order[t]`	Modified `s`	Valid Substrings	Count	Active (Count >= k)
0	0	`"*at"`	`"*"`, `"*a"`, `"*at"`	3	No
1	2	`"*a*"`	`"*"`, `"*a"`, `"*a*"`, `"a*"`, `"*"`	5	No
2	1	`"***"`	All substrings (contain `'*'`)	6	Yes

The string `s` becomes active at `t = 2`. Thus, the answer is 2.

Example 3:

Input: s = "xy", order = [0,1], k = 4

Output: -1

Explanation:

Even after all replacements, it is impossible to obtain `k = 4` valid substrings. Thus, the answer is -1.

Constraints:

* `1 <= n == s.length <= 105` * `order.length == n` * `0 <= order[i] <= n - 1` * `s` consists of lowercase English letters. * `order` is a permutation of integers from 0 to `n - 1`. * `1 <= k <= 109`

Code Snippets

C++:

```cpp
class Solution {
public:
int minTime(string s, vector<int>& order, int k) {

}
};
```

Java:

```java
class Solution {
public int minTime(String s, int[] order, int k) {


}
}
```

Python3:

```python
class Solution:
def minTime(self, s: str, order: List[int], k: int) -> int:
```