3016. Minimum Number of Pushes to Type Word II

You are given a string `word` containing lowercase English letters.

Telephone keypads have keys mapped with **distinct** collections of lowercase English letters, which can be used to form words by pushing them. For example, the key `2` is mapped with `["a","b","c"]`, we need to push the key one time to type `"a"`, two times to type `"b"`, and three times to type `"c"` .

It is allowed to remap the keys numbered `2` to `9` to **distinct** collections of letters. The keys can be remapped to **any** amount of letters, but each letter **must** be mapped to **exactly** one key. You need to find the **minimum** number of times the keys will be pushed to type the string `word`.

Return *the **minimum** number of pushes needed to type* `word` *after remapping the keys*.

An example mapping of letters to keys on a telephone keypad is given below. Note that `1`, `*`, `#`, and `0` do **not** map to any letters.

Example 1:

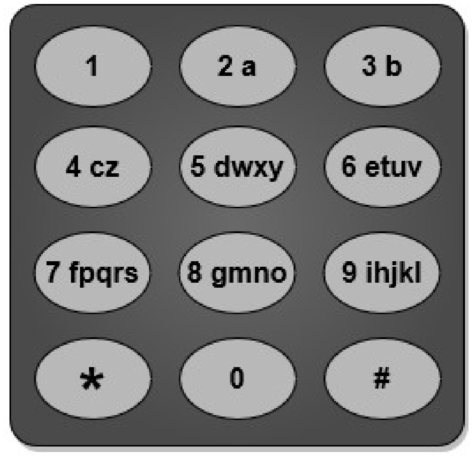
```
Input: word = "abcde"
Output: 5
Explanation: The remapped keypad given in
the image provides the minimum cost.
"a" -> one push on key 2
"b" -> one push on key 3
"c" -> one push on key 4
"d" -> one push on key 5
"e" -> one push on key 6
Total cost is 1 + 1 + 1 + 1 + 1 = 5.
It can be shown that no other mapping can
provide a lower cost.
```

Example 2:

```
Input: word = "xyzxyzxyzxyz"
Output: 12
Explanation: The remapped keypad given in
the image provides the minimum cost.
"x" -> one push on key 2
"y" -> one push on key 3
"z" -> one push on key 4
Total cost is 1 * 4 + 1 * 4 + 1 * 4 = 12
It can be shown that no other mapping can
provide a lower cost.
Note that the key 9 is not mapped to any
letter: it is not necessary to map
letters to every key, but to map all the
letters.
```

Example 3:

```
Input: word = "aabbccddeeffgghhiiiiii"
Output: 24
Explanation: The remapped keypad given in
the image provides the minimum cost.
"a" -> one push on key 2
"b" -> one push on key 3
"c" -> one push on key 4
"d" -> one push on key 5
"e" -> one push on key 6
"f" -> one push on key 7
"g" -> one push on key 8
"h" -> two pushes on key 9
"i" -> one push on key 9
Total cost is 1 * 2 + 1 * 2 + 1 * 2 + 1 *
2 + 1 * 2 + 1 * 2 + 1 * 2 + 2 * 2 + 6 * 1
= 24.
It can be shown that no other mapping can
provide a lower cost.
```



Constraints:

- `1 <= word.length <= 10`5
- `word` consists of lowercase English letters.

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```
/*
 counting+Max heap
    n: word's length
    Time complexity: O(n+26log26+26)=O(n)
    Space complexity: O(26+26)=O(1)
*/

class Solution {
public:
    int minimumPushes(std::string word) {
        int freq[26]={0};
        for(auto& c: word) freq[c-'a']++;

        std::priority_queue<int> max_heap;
        for(int i=0;i<26;++i){
            if(freq[i]!=0) max_heap.push(freq[i]);
        }

        int key=1,ans=0,mul=1;
        while(!max_heap.empty()){
            int f=max_heap.top();
            max_heap.pop();

            ans+=mul*f;

            if(key%8==0) mul++;

            key++;
        }

        return ans;

    }
};
```