389. Find the Difference

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You are given two strings `s` and `t`.

String `t` is generated by random shuffling string `s` and then add one more letter at a random position.

Return the letter that was added to `t`.

Example 1:

```
Input: s = "abcd", t = "abcde"
Output: "e"
Explanation: 'e' is the letter that was added.
```

Example 2:

```
Input: s = "", t = "y"
Output: "y"
```

Constraints:

- `0 <= s.length <= 1000`
- `t.length == s.length + 1`
- `s` and `t` consist of lowercase English letters.

s: a b c d t: "b c a e d"

o/p ⇒ e

1st approach → sort the string

then compare

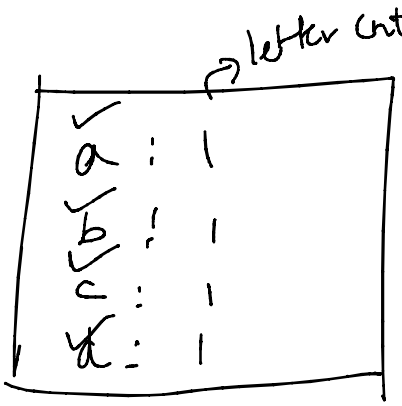
→ a b c d

→ a b c d (e) → extra one so return

T.C ⇒ (nlogn)

2nd ⇒ HashMap

s: abcd t: bcaed



Compare

e is not there so extra

T.C ⇒ O(N) S.C ⇒ O(N)

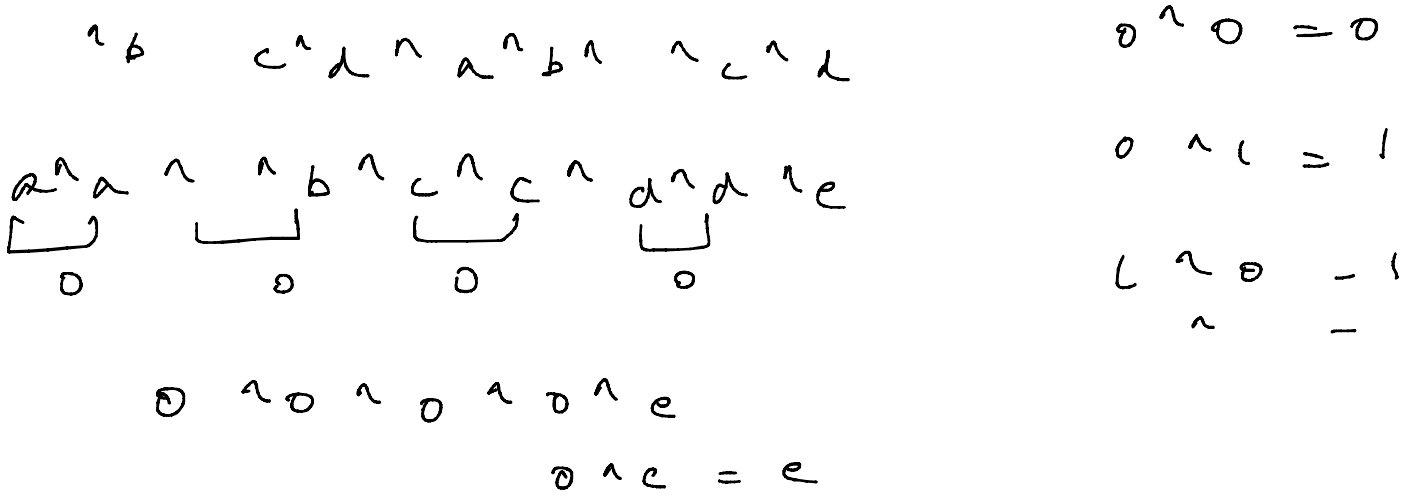
(3) XOR

s: abcd t: "abecd"

take XOR of s and t

XOR

a ^ a = 0



```
class Solution {
    public char findTheDifference(String s, String t) {

        int a = s.length();
        int b = t.length();

        if(a == 0){
            return t.charAt(0);
        } else {
            char[] l = s.toCharArray();
            char[] h = t.toCharArray();

            Arrays.sort(l);
            Arrays.sort(h);

            for(int i = 0; i < a; i++){
                if(l[i] != h[i]){
                    return h[i];
                }
            }
            return h[b - 1];
```

3. XOR

T.C => O(N)

S.C => O(1)

```
class Solution {
    public char findTheDifference(String s, String t){
        s = s + t;
        char xor = s.charAt(0);

        for(int i=1; i<s.length(); i++)
        {
            xor = (char)(xor ^ s.charAt(i));
        }

    return xor;
    }
}
```