

Problem 3081: Replace Question Marks in String to Minimize Its Value

Problem Information

Difficulty: **Medium**

Acceptance Rate: 0.00%

Paid Only: No

Problem Description

You are given a string

s

.

$s[i]$

is either a lowercase English letter or

'?'

.

For a string

t

having length

m

containing

only

lowercase English letters, we define the function

$\text{cost}(i)$

for an index

i

as the number of characters

equal

to

$t[i]$

that appeared before it, i.e. in the range

$[0, i - 1]$

.

The

value

of

t

is the

sum

of

$\text{cost}(i)$

for all indices

i

.

For example, for the string

$t = \text{"aab"}$

:

$\text{cost}(0) = 0$

$\text{cost}(1) = 1$

$\text{cost}(2) = 0$

Hence, the value of

"aab"

is

$0 + 1 + 0 = 1$

.

Your task is to

replace all

occurrences of

'?'

in

s

with any lowercase English letter so that the

value

of

s

is

minimized

.

Return

a string denoting the modified string with replaced occurrences of

'?'

. If there are multiple strings resulting in the

minimum value

, return the

lexicographically smallest

one.

Example 1:

Input:

s = "???"

Output:

"abc"

Explanation:

In this example, we can replace the occurrences of

'?'

to make

s

equal to

"abc"

.

For

"abc"

,

$\text{cost}(0) = 0$

,

$\text{cost}(1) = 0$

, and

$\text{cost}(2) = 0$

.

The value of

"abc"

is

0

.

Some other modifications of

s

that have a value of

0

are

"cba"

,

"abz"

, and,

"hey"

.

Among all of them, we choose the lexicographically smallest.

Example 2:

Input:

s = "a?a?"

Output:

"abac"

Explanation:

In this example, the occurrences of

'?'

can be replaced to make

s

equal to

"abac"

.

For

"abac"

,

$\text{cost}(0) = 0$

,

$\text{cost}(1) = 0$

,

$\text{cost}(2) = 1$

, and

$\text{cost}(3) = 0$

.

The value of

"abac"

is

1

.

Constraints:

$1 \leq s.length \leq 10$

5

s[i]

is either a lowercase English letter or

'?'

.

Code Snippets

C++:

```
class Solution {  
public:  
    string minimizeStringValue(string s) {  
  
    }  
};
```

Java:

```
class Solution {  
    public String minimizeStringValue(String s) {
```



```
}  
}
```

Python3:

```
class Solution:  
    def minimizeStringValue(self, s: str) -> str:
```

Python:

```
class Solution(object):  
    def minimizeStringValue(self, s):  
        """  
        :type s: str  
        :rtype: str  
        """
```

JavaScript:

```
/**  
 * @param {string} s  
 * @return {string}  
 */  
var minimizeStringValue = function(s) {  
  
};
```

TypeScript:

```
function minimizeStringValue(s: string): string {  
  
};
```

C#:

```
public class Solution {  
    public string MinimizeStringValue(string s) {  
  
    }  
}
```

C:

```
char* minimizeStringValue(char* s) {  
  
}
```

Go:

```
func minimizeStringValue(s string) string {  
  
}
```

Kotlin:

```
class Solution {  
    fun minimizeStringValue(s: String): String {  
  
    }  
}
```

Swift:

```
class Solution {  
    func minimizeStringValue(_ s: String) -> String {  
  
    }  
}
```

Rust:

```
impl Solution {  
    pub fn minimize_string_value(s: String) -> String {  
  
    }  
}
```

Ruby:

```
# @param {String} s  
# @return {String}  
def minimize_string_value(s)  
  
end
```

PHP:

```
class Solution {  
  
    /**  
     * @param String $s  
     * @return String  
     */  
    function minimizeStringValue($s) {  
  
    }  
}
```

Dart:

```
class Solution {  
    String minimizeStringValue(String s) {  
  
    }  
}
```

Scala:

```
object Solution {  
    def minimizeStringValue(s: String): String = {  
  
    }  
}
```

Elixir:

```
defmodule Solution do  
    @spec minimize_string_value(s :: String.t) :: String.t  
    def minimize_string_value(s) do  
  
    end  
end
```

Erlang:

```
-spec minimize_string_value(S :: unicode:unicode_binary()) ->  
    unicode:unicode_binary().  
minimize_string_value(S) ->
```

```
.
```

Racket:

```
(define/contract (minimize-string-value s)
  (-> string? string?)
)
```

Solutions

C++ Solution:

```
/*
 * Problem: Replace Question Marks in String to Minimize Its Value
 * Difficulty: Medium
 * Tags: string, graph, greedy, hash, sort, queue, heap
 *
 * Approach: String manipulation with hash map or two pointers
 * Time Complexity: O(n) or O(n log n)
 * Space Complexity: O(n) for hash map
 */

class Solution {
public:
    string minimizeStringValue(string s) {

    }

};
```

Java Solution:

```
/**
 * Problem: Replace Question Marks in String to Minimize Its Value
 * Difficulty: Medium
 * Tags: string, graph, greedy, hash, sort, queue, heap
 *
 * Approach: String manipulation with hash map or two pointers
 * Time Complexity: O(n) or O(n log n)
 * Space Complexity: O(n) for hash map
 */
```

```

class Solution {
public String minimizeStringValue(String s) {

}

}

```

Python3 Solution:

```

"""
Problem: Replace Question Marks in String to Minimize Its Value
Difficulty: Medium
Tags: string, graph, greedy, hash, sort, queue, heap

Approach: String manipulation with hash map or two pointers
Time Complexity: O(n) or O(n log n)
Space Complexity: O(n) for hash map
"""

class Solution:
def minimizeStringValue(self, s: str) -> str:
# TODO: Implement optimized solution
pass

```

Python Solution:

```

class Solution(object):
def minimizeStringValue(self, s):
"""
:type s: str
:rtype: str
"""

```

JavaScript Solution:

```

/**
 * Problem: Replace Question Marks in String to Minimize Its Value
 * Difficulty: Medium
 * Tags: string, graph, greedy, hash, sort, queue, heap
 *
 * Approach: String manipulation with hash map or two pointers

```

```

* Time Complexity: O(n) or O(n log n)
* Space Complexity: O(n) for hash map
*/

/**
* @param {string} s
* @return {string}
*/
var minimizeStringValue = function(s) {

};

```

TypeScript Solution:

```

/**
* Problem: Replace Question Marks in String to Minimize Its Value
* Difficulty: Medium
* Tags: string, graph, greedy, hash, sort, queue, heap
*
* Approach: String manipulation with hash map or two pointers
* Time Complexity: O(n) or O(n log n)
* Space Complexity: O(n) for hash map
*/

function minimizeStringValue(s: string): string {

};

```

C# Solution:

```

/*
* Problem: Replace Question Marks in String to Minimize Its Value
* Difficulty: Medium
* Tags: string, graph, greedy, hash, sort, queue, heap
*
* Approach: String manipulation with hash map or two pointers
* Time Complexity: O(n) or O(n log n)
* Space Complexity: O(n) for hash map
*/

public class Solution {

```

```

public string MinimizeStringValue(string s) {

}

}

```

C Solution:

```

/*
 * Problem: Replace Question Marks in String to Minimize Its Value
 * Difficulty: Medium
 * Tags: string, graph, greedy, hash, sort, queue, heap
 *
 * Approach: String manipulation with hash map or two pointers
 * Time Complexity: O(n) or O(n log n)
 * Space Complexity: O(n) for hash map
 */

char* minimizeStringValue(char* s) {

}

```

Go Solution:

```

// Problem: Replace Question Marks in String to Minimize Its Value
// Difficulty: Medium
// Tags: string, graph, greedy, hash, sort, queue, heap
//
// Approach: String manipulation with hash map or two pointers
// Time Complexity: O(n) or O(n log n)
// Space Complexity: O(n) for hash map

func minimizeStringValue(s string) string {

}

```

Kotlin Solution:

```

class Solution {
    fun minimizeStringValue(s: String): String {

}

```

```
}
```

Swift Solution:

```
class Solution {  
    func minimizeStringValue(_ s: String) -> String {  
  
    }  
}
```

Rust Solution:

```
// Problem: Replace Question Marks in String to Minimize Its Value  
// Difficulty: Medium  
// Tags: string, graph, greedy, hash, sort, queue, heap  
//  
// Approach: String manipulation with hash map or two pointers  
// Time Complexity: O(n) or O(n log n)  
// Space Complexity: O(n) for hash map  
  
impl Solution {  
    pub fn minimize_string_value(s: String) -> String {  
  
    }  
}
```

Ruby Solution:

```
# @param {String} s  
# @return {String}  
def minimize_string_value(s)  
  
end
```

PHP Solution:

```
class Solution {  
  
    /**  
     * @param String $s  
     * @return String  
     */  
}
```



```

*/
function minimizeStringValue($s) {

}

}

```

Dart Solution:

```

class Solution {
  String minimizeStringValue(String s) {

  }
}

```

Scala Solution:

```

object Solution {
  def minimizeStringValue(s: String): String = {

  }
}

```

Elixir Solution:

```

defmodule Solution do
  @spec minimize_string_value(s :: String.t) :: String.t
  def minimize_string_value(s) do

  end
end

```

Erlang Solution:

```

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  unicode:unicode_binary().
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