String matching where one string contains wildcard characters

Given two strings where first string may contain wild card characters and second string is a normal string. Write a function that returns true if the two strings match. The following are allowed wild card characters in first string.

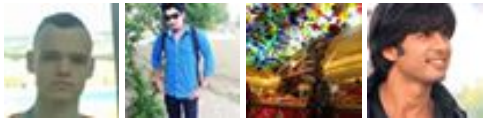
```
* --> Matches with 0 or more instances of any character or set of characters.
? --> Matches with any one character.
```

For example, “g*ks” matches with “geeks” match. And string “ge?ks*” matches with “geeksforgeeks” (note ‘*’ at the end of first string). But “g*k” doesn’t match with “gee” as character ‘k’ is not present in second string.

```
// A C program to match wild card characters
#include <stdio.h>
#include <stdbool.h>

// The main function that checks if two given strings match. The first
// string may contain wildcard characters
bool match(char *first, char * second)
{
    // If we reach at the end of both strings, we are done
    if (*first == '\0' && *second == '\0')
        return true;

    // Make sure that the characters after '*' are present in second s
    // This function assumes that the first string will not contain tw
    // consecutive '*'
    if (*first == '*' && *(first+1) != '\0' && *second == '\0')
        return false;
```

```
    // If the first string contains '?', or current characters of both
    // strings match
    if (*first == '?' || *first == *second)
        return match(first+1, second+1);

    // If there is *, then there are two possibilities
    // a) We consider current character of second string
    // b) We ignore current character of second string.
    if (*first == '*')
        return match(first+1, second) || match(first, second+1);
    return false;
}

// A function to run test cases
void test(char *first, char *second)
{  match(first, second)? puts("Yes"): puts("No"); }

// Driver program to test above functions
int main()
{
    test("g*ks", "geeks"); // Yes
    test("ge?ks*", "geeksforgeeks"); // Yes
    test("g*k", "gee");  // No because 'k' is not in second
    test("*pqrs", "pqrst"); // No because 't' is not in first
    test("abc*bcd", "abcdhghgbcd"); // Yes
    test("abc*c?d", "abcd"); // No because second must have 2 instance
    test("*c*d", "abcd"); // Yes
    test("*?c*d", "abcd"); // Yes
    return 0;
}
```

Output:

```
Yes
Yes
No
No
Yes
No
Yes
Yes
```

Exercise

1) In the above solution, all non-wild characters of first string must be there is second string and

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all characters of second string must match with either a normal character or wildcard character of first string. Extend the above solution to work like other pattern searching solutions where the first string is pattern and second string is text and we should print all occurrences of first string in second.

2) Write a pattern searching function where the meaning of '?' is same, but '*' means 0 or more occurrences of the character just before '*'. For example, if first string is 'a*b', then it matches with 'aaab', but doesn't match with 'abb'.

This article is compiled by Vishal Chaudhary and reviewed by GeeksforGeeks team. Please write comments if you find anything incorrect, or you want to share more information about the topic discussed above.

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