

Q9. Edit Distance (50 marks)

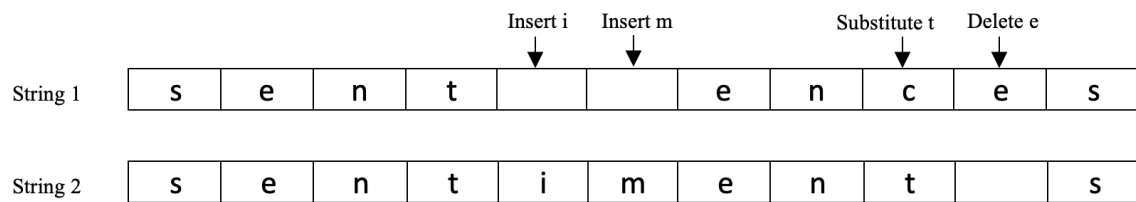
Consider two English words. The **edit distance** between the two words is defined as the minimum number of changes to be made in order to transform one word to the other word. The changes may include substitution(s), deletion(s), and/or insertion(s).

For example, if the two words are “sentences” and “sentiments”. With reference to Figure Q9, in order to transform the word “sentences” to the word “sentiments”, one will need to

- (i) substitute the “c” at the third last position with a “t” (i.e., one substitution);
- (ii) delete the “e” at the second last position (i.e., one deletion), and
- (iii) insert an “i” and an “m”, respectively (i.e., two insertions), as shown in the Figure.

Thus, the edit distance between “sentences” and “sentiments” is $1+1+2 = 4$.

Please note that the cases of the letters can be ignored.



Number of Substitution(s): 1

Number of Deletion(s): 1

Number of Insertion(s): 2

Edit Distance: $1+1+2 = 4$

Figure Q9. The edit distance between “sentences” and “sentiments”

Write a programme to**Input:**

Two words.

Output:

The edit distance, d between the two words.

试题 9. 编辑距离 (50 分)

考虑两个英文单词。这两个单词之间的**编辑距离** (edit distance) 可定义为将其中一个单词转换为另一个单词所需进行的最小更改次数。更改可能包括替换、删除和/或插入。例如，如果两个单词是“sentences”和“sentiments”。参考图 Q9，为了将单词 “sentences” 转换为单词 “sentiments”，您需要：

- (i) 将倒数第三个位置的 “c” 替换为 “t” (即 1 个替换) ；
 - (ii) 删除倒数第二个位置的 “e” (即 1 个删除) ；
 - (iii) 分别插入 “i” 和 “m” (即 2 个插入) ， 如图中所示。
- 因此，“sentences”和“sentiments”之间的编辑距离是 $1+1+2=4$ 。
请注意，字母的大小写可以忽略。

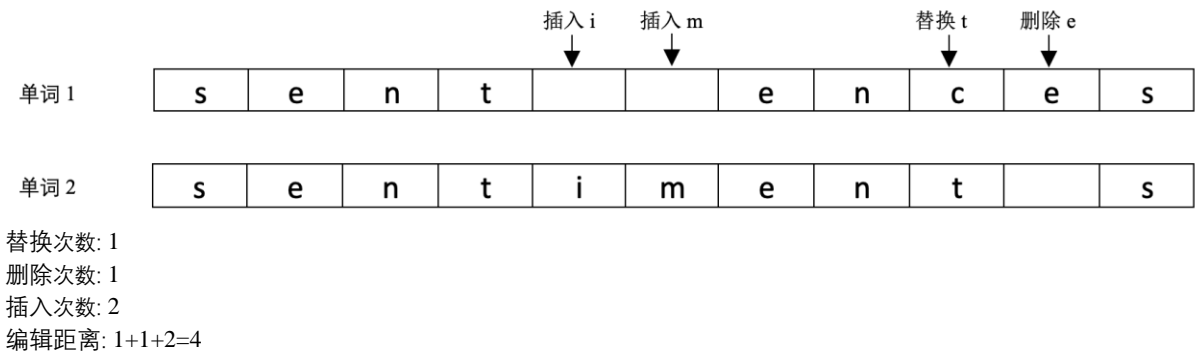


图 Q9. “sentences” 与 “sentiments” 之间的编辑距离

试写一程式以

输入：
两个单词。

输出：
两个词之间的编辑距离， d 。

Examples (例子)

Input (输入)	Output (输出)
kitten kitchen	2
park phase	3
cat dog	3
computer laptop	6
grill GriLL	0
length height	4
File Fail	2

Extra Test Cases

Input (輸入)	Output (輸出)
kitten kitchen	2
park phase	3
cat dog	3
computer laptop	6
grill GrILL	0
length height	4
File Fail	2
sentences sentiments	4
three Tree	1
radio AUDIO	2
climbing jumping	4
Captain capsule	4