tuentichallenge

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Challenge 4 - Shape shifters

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Humans have evolved and have mastered the art of changing their DNA, this process allowing them to change their appearance.

The shape shifting process is painful and dangerous.

Shifting from one form to another requires many small incremental DNA mutations (changing one nucleotide at a time).

Also there are clearly defined states in which the nucleotides can be set, any other configuration would lead to the irrevocable disintegration of the shape shifter's DNA.

Given these constraints, you must find a way to shape shift from one state to another through a set of possible intermediary safe DNA states.

Input and output definition

These DNA states are represented as strings.

The length of the strings is equal to the number of nucleotides, and the value of each character represents the value of a nucleotide at that index. Nucleotide values are A (adenine), C (cytosine), G (guanine), and T (thymine).

The input you are given is a source state (first line), a target state (second line) and all the permitted safe states for the shape shifter in the following format (example for three-nucleotide DNA):

```
AGC
CAA
AGC
TTT
CGC
CGA
CAA
TGT
```

The output should consist of a minimum number of transitions required to get from the source state to the target state, and in each step only one nucleotide may change value.

Remember that you can only go through permitted safe states and you can only change one nucleotide at a time.

For the example, the correct output would be:

```
AGC->CGC->CGA->CAA
```

Submit & test your code

To test and submit code we provide a set of tools to help you. Download contest tools if you haven't already done that. You will then be able to test your solution to this challenge with the challenge tokens.

```
Challenge tokens: CHALLENGE_4, CHALLENGE_SUBMIT_4
```

To test your program

```
./test_challenge CHALLENGE_4 path/program
```

A nice output will tell you if your program got the right solution or not. You can try as many times as you need.

To test your program against the input provided in the submit phase

```
./test_challenge CHALLENGE_SUBMIT_4 path/program
```

During the submit phase, in some problems, we might give your program harder inputs. As with the test token, a nice output will tell you if your program got the right solution or not. You can try as many times as you need.

In the actual contest you first need to solve the test phase before submitting the code, you must provide the source code used to solve the challenge and you can only submit once (once your solution is submitted you won't be able to amend it to fix issues or make it faster).

If you have any doubts, please check the info section.

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