Problem G. Changing a String

Time limit 2000 ms
Mem limit 262144 kB

There is a string s, consisting of capital Latin letters. Let's denote its current length as $|s|$. During one move it is allowed to apply one of the following operations to it:

- `INSERT` pos ch — insert a letter ch in the string s in the position pos ($1 \le pos \le |s| + 1, A \le ch \le Z$). The letter ch becomes the pos-th symbol of the string s, at that the letters shift aside and the length of the string increases by 1.
- `DELETE` pos — delete a character number pos ($1 \le pos \le |s|$) from the string s. At that the letters shift together and the length of the string decreases by 1.
- `REPLACE` pos ch — the letter in the position pos of the line s is replaced by ch ($1 \le pos \le |s|, A \le ch \le Z$). At that the length of the string does not change.

Your task is to find in which minimal number of moves one can get a t string from an s string. You should also find the sequence of actions leading to the required results.

Input

The first line contains s, the second line contains t. The lines consist only of capital Latin letters, their lengths are positive numbers from 1 to 1000.

Output

In the first line print the number of moves k in the given sequence of operations. The number should be the minimal possible one. Then print k lines containing one operation each. Print the operations in the format, described above. If there are several solutions, print any of them.

Sample 1

Input	Output
ABA ABBBA	2 INSERT 3 B INSERT 4 B

Sample 2

Input	Output
ACCEPTED WRONGANSWER	10 REPLACE 1 W REPLACE 2 R REPLACE 3 O REPLACE 4 N REPLACE 5 G REPLACE 6 A INSERT 7 N INSERT 8 S INSERT 9 W REPLACE 11 R