Peru

2023/2024 SEASON – SIXTH ROUND

Ivan got bored so he decided to hack the National Bank of Peru and on top of that, he decided to do it with the oldest hacking machine “Hacker 00”.

The boy has to guess the password to the bank. He knows it is N characters long and it contains only the letters P,E,R,U. To guess it, he needs to give “Hacker 00” a list of commands and then hope, that the machine does its job.

There are 3 possible commands:

- *terminal* guess *string*
- *terminal* add *string*
- *terminal* end

Each command has a terminal from 0 to N. At the beginning of its execution “Hacker 00” keeps a single variable bin, which is empty. It begins from terminal 0 and at any moment executes the first unexecuted command from the current terminal.

- If the command is guess, “Hacker 00” checks whether (bin+*string*) is a prefix of the password. If it is not, it just continues, but if it is, the value of bin is updated to the new value (bin+*string*) and the current terminal is increased by 1.
- If the command is add, “Hacker 00” directly updates the new value of bin to be (bin+*string*) and increases the current terminal by 1.
- If the command is end, “Hacker 00” finishes working and tries to guess the password.

After its done working, “Hacker 00” checks whether the value in bin is equal to the password, and if it is, it gives Ivan access to the bank. The problem is that the machine is so old, that if it guesses incorrectly, it will explode. Also “Hacker 00” has very little memory and if the amount of commands, given by Ivan, is bigger than 10^6 or the amount of guess command, which were executed, is bigger than 25000, the machine will explode.

Also if at any moment, there are no commands left in the current terminal for “Hacker 00” to execute, it will explode.

Ivan got bored again, so he tells you N, and asks you to write a program, which gives him a list of commands, with which “Hacker 00” can guess the password.

Input

The only line of the file **peru.in** contains N – the length of the password.

Output

On the first line of the file **peru.out** print 1 number k – the amount of commands, which you are giving to “Hacker 00”.

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On the next k lines print first the number ter – the terminal of the command, then its type – guess, add or end. If the command isn't end, also print the desired string.

If the output doesn't match the instructions, "Hacker 00" will explode.

Constraints

$1 \leq N \leq 10^4$

Time Limit: 1 sec.

Memory Limit: 256 MB.

Example Interaction

Input (peru.in)	**Output (peru.out)**
3	6 0 guess P 0 guess E 1 guess R 1 guess UP 2 add P 3 end

Possible Results

Let's look at a few cases:

If the password is **ERP**, "Hacker 00" will begin from the first command in terminal 0. Since bin is empty (bin+P)=P, so "Hacker 00" will check whether P is a prefix of the password, but it is not, so it will continue. It goes to the second command in terminal 0. Now it will check for E, which is a prefix of the password, so bin=E and it goes to terminal 1.

The first command in terminal 1 is to guess R: (bin+R)=(E+R)=ER , which is a prefix of the password , so "Hacker 00" will make bin=ER and go to the next terminal.

The first command in terminal 2 is to add P, so now bin=ERP and it goes to the next terminal.

The first command in terminal 3 is end, so "Hacker 00" will stop working.

After it's finished working bin=ERP , which is the password, so "Hacker 00" will give Ivan access to the Bank. Also the amount of guess commands which were executed was 3, which is smaller than 25000 so there is no Problem there.

If the password is **PPP**, "Hacker 00" will begin from the first command in terminal 0. He will check whether (bin+P)=P is a prefix of the password and since it is, he will make bin=P and will go to terminal 1.

The first command in terminal 1 is to guess R, "Hacker 00" will check whether (bin+R)=(P+R)=PR is a prefix of the password, but it is not, so he will go to the next command. The next command in terminal 1 is to guess UP, "Hacker 00" will check whether (bin+UP)=(P+UP)=PUP is a prefix of the password, but it is not, so it will go to the next command in the terminal. However there is no such command and "Hacker 00" will explode.

If the password is **PRU**, "Hacker 00" will begin from the first command in terminal 0. He will check whether (bin+P)=P is a prefix of the password and since it is, he will make bin=P and will go to terminal 1.

The first command in terminal 1 is to guess R: (bin+R)=(P+R)=PR , which is a prefix of the password , so "Hacker 00" will make bin=PR and go to the next terminal.

The first command in terminal 2 is to add P, so now bin=PRP and it goes to the next terminal.

The first command in terminal 3 is end, so "Hacker 00" will stop working.

After it's finished working bin=PRP, but that is not the password so "Hacker 00" will explode.

As can be seen, the given output doesn't always do the job, so it is not very good. Regardless of that, it can still give correct answers for certain passwords.