

Hash it!

Your task is to calculate the result of the hashing process in a table of 101 elements, containing keys that are strings of length at most 15 letters (ASCII codes 'A',..., 'Z'). Implement the following operations:

- find the index of the element defined by the key (ignore, if no such element),
- insert a new key into the table (ignore insertion of the key that already exists),
- delete a key from the table (without moving the others), by marking the position in table as *empty* (ignore non-existing keys in the table)

When performing find, insert and delete operations define the following function:

integer Hash(string key),

which for a string $key=a_1...a_n$ returns the value:

$Hash(key)=h(key) \bmod 101$, where

$h(key)=19 \cdot (ASCII(a_1) \cdot 1 + \dots + ASCII(a_n) \cdot n)$.

Resolve collisions using the open addressing method, i.e. try to insert the key into the table at the first free position: $(Hash(key) + j^2 + 23 \cdot j) \bmod 101$, for $j=1, \dots, 19$. After examining of at least 20 table entries, we assume that the insert operation cannot be performed.

Input

t [the number of test cases ≤ 100]

n_1 [the number of operations (one per line)] [≤ 1000]

ADD:string

[or]

DEL:string [other test cases, without empty lines between series]

Output

For every test case you have to create a new table, insert or delete keys, and write to the output:

the number of keys in the table [first line]

index:key [sorted by indices]

Example

Input:

1

11

ADD:marsz

ADD:marsz

ADD:Dabrowski

ADD:z

ADD:ziemii

ADD:wloskiej

ADD:do

ADD:Polski

DEL:od

DEL:do

DEL:wloskiej

Output:

5

34:Dabrowski

46:Polski

63:marsz

76:ziemii

96:z