

## Problem D. Message Made of Noise

Input file: *standard input*  
Output file: *standard output*  
Time limit: 2 seconds  
Memory limit: 512 mebibytes

Alisa wants to send a message to Eva using a *number wire*. The message is one English word.

Unfortunately, right now the number wire transmits just some noise: random integers from 0 to  $10^9 - 1$  inclusive. Alisa knows the sequence of the next 10 000 integers that will be transmitted.

Fortunately, Alisa has a superpower: she can erase any number of elements from any positions in the sequence. The relative order of the remaining elements does not change.

Unfortunately, after that, around half of the integers will be lost in transmission: each transmitted integer will disappear with a probability of  $1/2$ . The relative order of the remaining elements once again does not change.

How should Alisa and Eva act to transmit a given word?

### Interaction Protocol

In this problem, your solution will be run twice on each test. In input and output, numbers on a single line are separated by spaces. Each line of input is terminated by an end-of-line character.

### First Run

During the first run, the solution acts for Alisa. The first line contains the name “Alisa”. The second line contains one word from English dictionary, its length is from 2 to 15 letters, and it consists of lowercase English letters. The third line contains an integer  $n$ , the length of the sequence (in this problem,  $n$  is always equal to 10 000). The fourth line contains  $n$  integers from 0 to  $10^9 - 1$  inclusive: the initial sequence. The numbers are selected in advance by a pseudorandom number generator, all numbers from the range are equiprobable.

The solution should print the numbers that Alisa decided to **leave** in the sequence. On the first line, print an integer  $m$ : the number of integers left. On the second line, print the remaining numbers in the order they follow in the initial sequence.

### Second Run

During the second run, the solution acts for Eva. The first line contains the name “Eva”. The second line contains an integer  $k$ , the number of remaining integers in the sequence. The third line contains  $k$  integers from 0 to  $10^9 - 1$  inclusive: the remaining sequence itself. Each number that Alisa decided to leave in the sequence is present with probability  $1/2$  and missing with probability  $1/2$ . The way the numbers go missing is fixed in advance in each test, so, if solutions make the same choices in the first run, they will get the same sequences for the second run.

Print one English word: the word Alisa should have sent to Eva.

### Example

For each test, the input during the second run depends on the solution’s output during the first run.

Below we show two runs of a certain solution on the first test. The sequences are shown only partially for brevity. The full version of the example can be seen in `samples.zip`.

<i>standard input</i>
Alisa spark 10000 833080662 16249270 933346436 811379468 <...> 13286897 459644281
<i>standard output</i>
3900 933346436 811379468 877083772 408973036 <...> 583178591 13286897

<i>standard input</i>
Eva 1955 811379468 408973036 585189166 111199534 <...> 226510051 829146141
<i>standard output</i>
spark