

# Attack A Single Test File!

## Background

The purpose of this problem is to simulate attacking a problem with limited input/output data. Suppose a problem has only  $N$  bits (0/1) as input, 1 bit 0/1 as output. Obviously, it has  $2^N$  mutually distinct test files. Only with information given above, one can successfully get all the input/output data by submitting attacking programs and extracting judge's responses!

## Interactive Protocol

You should communicate with Judge using standard input and output.

**Attention: the program should clear the output buffer after printing each line. It can be done using `fflush(stdout)` command or by setting the proper type of buffering at the beginning of the execution - `setlinebuf(stdout)`.**

Each input contains exactly  $2^6 = 64$  games. The very first line of the input contains number  $N$ . After reading this data your program should play 64 games with judge.

At the beginning of each game, the judge will generate a permutation  $P$  of  $0..2^N-1$  and a 0/1 string  $S$  of length  $2^N$ . These two parameters won't change during the whole game.

Each time you should send to the judge a line with a 0/1 string  $S'$  of length  $2^N$ .

If  $S'$  is purely coincident with judge's string  $S$ , judge will send to you number "-1" as response. Your program should terminate the processing of this game immediately after getting this response.

Otherwise, judge's response will be a number  $T$  ( $0 \leq T \leq 2^N-1$ ), which means that, for each  $0 \leq i < T$ ,  $S'[P[i]] == S[P[i]]$ , while  $S'[P[T]] != S[P[T]]$ . All the indices are 0-based.

For each game you should not make more than 6666 queries, otherwise you will get **Wrong Answer** verdict.

## Scoring

For each game, if you use  $w$  queries before you get "-1" response, your score will be  $w^2$ . The score for each test file will be the sum of scores of the 64 games. The final score will be the average score of all test files. Smaller score is better.

## Constraints

$1 \leq N \leq 8$ .

Time limit for each test file is 33 seconds.

## Example

The example of communication. J=Judge, P=Player.

J: 1

P: 00

J: 1

P: 01

J: 0

P: 10

J: -1

P: 00

J: 0

P: 10

J: 1

P: 01

J: 0

P: 11

J: -1

[and 62 games more]

## Explanation

In the first example, judge's permutation is (1,0), while in the second example, judge's permutation is (0,1). The score of these two games will be  $2^2 + 3^2 = 17$ .