Submissions

Mixing Bowls
5pt | Not attempted **84/92 users** correct (91%)
9pt | Not attempted **71/81 users** correct (88%)

Code Sequence
7pt | Not attempted **15/21 users** correct (71%)
15pt | Not attempted **5/16 users** correct (31%)

Test Passing Probability
5pt | Not attempted **59/64 users** correct (92%)
14pt | Not attempted **25/37 users** correct (68%)

King
7pt | Not attempted **82/94 users** correct (87%)
38pt | Not attempted **0/10 users** correct (0%)

Top Scores

Bohua	62
SkidanovAlexander	62
radeye	62
linguo	53
andersk	47
Reid	47
antimatter	47
ploh	47
fuwenjie	47
pmnox	40

Problem B. Code Sequence

This contest is open for practice. You can try every problem as many times as you like, though we won't keep track of which problems you solve. Read the Quick-Start Guide to get started.

Small input 7 points	Solve B-small
Large input 15 points	Solve B-large

Problem

You are trying to compute the next number in a sequence S_n generated by a secret code. You know that the code was generated according to the following procedure.

First, for each k between 0 and 29, choose a number C_k between 0 and 10006 (inclusive).

Then, for each integer n between 0 and 1 000 000 000 (inclusive):

- Write n in binary.
- Take the numbers C_k for every bit k that is set in the binary representation of n. For example, when n=5, bits 0 and 2 are set, so C_0 and C_2 are taken.
- Add these C_k together, divide by 10007, and output the remainder as S_n.

You will be given a series of consecutive values of sequence S, but you don't know at which point in the sequence your numbers begin (although you do know that there is at least one more number in the sequence), and you don't know what values of C_k were chosen when the sequence was generated.

Find the next number in the sequence, or output UNKNOWN if this cannot be determined from the input data.

Input

The first line will contain an integer **T**, the number of test cases in the input file.

For each test case, there will be:

- One line containing the integer **N**, the number of elements of sequence S that you have.
- One line containing **N** single-space-separated integers between 0 and 10006, the known elements of the sequence.

Output

For each test case, output one line containing "Case #**X**: **Y**" where **X** is the number of the test case, starting from 1, and **Y** is the next number in the sequence, or the string UNKNOWN if the next number cannot be determined.

Limits

1 ≤ **T** ≤ 20

Small dataset

1 ≤ **N** ≤ 5

Large dataset

1 ≤ **N** ≤ 1000

Sample

Input	Output
3 7 1 2 3 4 5 6 7 4 1 10 11 200 4 1000 1520 7520 7521	Case #1: UNKNOWN Case #2: 201 Case #3: 3514

In the first case, C_0, C_1 and C_2 might have been 1, 2 and 4, and the values of

S_n we have starting at n=1. If this is correct, we don't know C_3, so the next number in the sequence could be anything! Therefore the answer is unknown.

In the second case, we cannot know all the values of C_k or even what n is, but we can prove that in any sequence, if 1, 10, 11, 200 occur in order, then the next value will always be 201.

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