

HOME TOP CATALOG CONTESTS GYM PROBLEMSET GROUPS RATING EDU API CALENDAR HELP

PROBLEMS SUBMIT CODE MY SUBMISSIONS STATUS HACKS ROOM STANDINGS CUSTOM INVOCATION

B. AND Reconstruction

time limit per test: 1 second memory limit per test: 256 megabytes

You are given an array b of n-1 integers.

An array a of n integers is called *good* if $b_i=a_i\ \&\ a_{i+1}$ for $1\le i\le n-1$, where & denotes the bitwise AND operator.

Construct a good array, or report that no good arrays exist.

Input

Each test contains multiple test cases. The first line contains a single integer t ($1 \le t \le 10^4$) — the number of test cases. The description of test cases follows.

The first line of each test case contains a single integer n $(2 \le n \le 10^5)$ — the length of the array a.

The second line of each test case contains n-1 integers b_1,b_2,\ldots,b_{n-1} ($0 \le b_i < 2^{30}$) — the elements of the array b.

It is guaranteed that the sum of n over all test cases does not exceed 10^5 .

Output

For each test case, output a single integer -1 if no good arrays exist.

Otherwise, output n space-separated integers a_1, a_2, \ldots, a_n ($0 \le a_i < 2^{30}$) — the elements of a good array a.

If there are multiple solutions, you may output any of them.

Example

input	Сору
4	
2	
1	
3	
2 0	
4	
1 2 3	
5	
3 5 4 2	
output	Сору
5 3	
3 2 1	
-1	
3 7 5 6 3	

Note

In the first test case, b=[1]. A possible good array is a=[5,3], because $a_1\ \&\ a_2=5\ \&\ 3=1=b_1$.

In the second test case, b=[2,0]. A possible good array is a=[3,2,1], because $a_1 \& a_2=3 \& 2=2=b_1$ and $a_2 \& a_3=2 \& 1=0=b_2$.

In the third test case, b=[1,2,3]. It can be shown that no good arrays exist, so the output is -1.

In the fourth test case, b = [3, 5, 4, 2]. A possible good array is a = [3, 7, 5, 6, 3].

Pinely Round 4 (Div. 1 + Div. 2)

Finished

Practice



→ Virtual participation

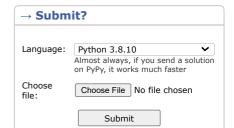
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Start virtual contest

→ Clone Contest to Mashup

You can clone this contest to a mashup.

Clone Contest



→ Last submissions		
Submission	Time	Verdict
273181850	Jul/28/2024 18:43	Accepted
273172489	Jul/28/2024 18:26	Time limit exceeded on pretest 2



→ Contest materials Announcement (en) Tutorial #1 (en) Video Tutorial (en)

7/29/24, 4:31 PM Problem - B - Codeforces

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The only programming contests Web 2.0 platform
Server time: Jul/29/2024 16:30:57^{UTC+5.5} (j1).
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