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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 Copy

```
4
2
1
3
2 0
4
1 2 3
5
3 5 4 2
```

output Copy

```
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

Virtual contest is a way to take part in past contest, as close as possible to participation on time. It is supported only ICPC mode for virtual contests. If you've seen these problems, a virtual contest is not for you - solve these problems in the archive. If you just want to solve some problem from a contest, a virtual contest is not for you - solve this problem in the archive. Never use someone else's code, read the tutorials or communicate with other person during a virtual contest.

Start virtual contest

→ Clone Contest to Mashup

You can clone this contest to a mashup.

Clone Contest

→ Submit?

Language: Python 3.8.10

Almost always, if you send a solution on PyPy, it works much faster

Choose file: Choose File No file chosen

Submit

→ Last submissions

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

→ Problem tags

bitmasks constructive algorithms greedy

No tag edit access

→ Contest materials

- Announcement (en)
- Tutorial #1 (en)
- Video Tutorial (en)