C. Racing

time limit per test: 2 seconds
memory limit per test: 256 megabytes

In 2077, a sport called hobby-droning is gaining popularity among robots.

You already have a drone, and you want to win. For this, your drone needs to fly through a course with n obstacles.

The i-th obstacle is defined by two numbers l_i, r_i. Let the height of your drone at the i-th obstacle be h_i. Then the drone passes through this obstacle if $l_i \le h_i \le r_i$. Initially, the drone is on the ground, meaning $h_0 = 0$.

The flight program for the drone is represented by an array $d_1, d_2, \dots, d_n$, where $h_i - h_{i-1} = d_i$, and $0 \le d_i \le 1$. This means that your drone either does not change height between obstacles or rises by 1. You already have a flight program, but some d_i in it are unknown and marked as -1. Replace the unknown d_i with numbers 0 and 1 to create a flight program that passes through the entire obstacle course, or report that it is impossible.

Input

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

In the first line of each test case, an integer n ($1 \le n \le 2 \cdot 10^5$) is given — the size of the array d.

In the second line of each test case, there are n integers $d_1, d_2, \dots, d_n$ ($-1 \le d_i \le 1$) — the elements of the array d. $d_i = -1$ means that this d_i is unknown to you.

Next, there are n lines containing 2 integers l_i, r_i ($0 \le l_i \le r_i \le n$) — descriptions of the obstacles.

It is guaranteed that the sum of n across all test cases does not exceed $2 \cdot 10^5$.

Output

For each test case, output n integers $d_1, d_2, \dots, d_n$, if it is possible to correctly restore the array d, or -1 if it is not possible.

Example

input Copy

```
5
4
0 -1 -1 1
0 4
1 2
2 4
1 4
3
0 -1 -1
0 1
2 2
0 3
2
-1 -1
0 0
2 2
8
-1 -1 1 -1 -1 0 0 -1
0 0
0 1
0 2
0 2
1 3
0 4
2 5
4 5
1
```

Codeforces Round 1026 (Div. 2)

Contest is running

01:33:31

Contestant

☆

→ Submit?

Language: GNU G++23 14.2 (64 bit, ms

Choose file: Choose File No file chosen

Be careful: there is 50 points penalty for submission which fails the pretests or resubmission (except failure on the first test, denial of judgement or similar verdicts). "Passed pretests" submission verdict doesn't guarantee that the solution is absolutely correct and it will pass system tests.

Submit

→ Last submissions

Submission	Time	Verdict
321079787	May/24/2025 17:58	Pretests passed

→ Score table

	Score
Problem A	452
Problem B	678
Problem C	1356
Problem D	1808
Problem E	2034
Problem F	2712
Successful hack	100
Unsuccessful hack	-50
Unsuccessful submission	-50
Resubmission	-50

* If you solve problem on 00:24 from the first attempt

```
0
1 1
```

output Copy

```
0 1 1 1
-1
-1
0 1 1 0 1 0 0 1
-1
```

Note

In the first test case, one possible answer is $d = [0, 1, 1, 1]$. The array h will be $[0, 0+1, 0+1+1, 0+1+1+1] = [0, 1, 2, 3]$. This array meets the conditions of the problem.

In the second test case, it can be proven that there is no suitable array d, so the answer is -1.