

E. Balanced

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

You are given a **cyclic** array a with n elements, where n is **odd**. In each operation, you can do the following:

- Choose an index $1 \leq i \leq n$ and increase a_{i-1} by 1, a_i by 2, and a_{i+1} by 1. The element before the first element is the last element because this is a cyclic array.

A cyclic array is called *balanced* if all its elements are equal to each other.

Find any sequence of operations to make this cyclic array balanced or determine that it is impossible. Please note that you **do not** have to minimize the number of operations.

Input

Each test consists of multiple test cases. The first line contains a single integer t ($1 \leq t \leq 2 \cdot 10^5$) — the number of test cases. The description of the test cases follows.

The first line of each test case contains a single integer n ($1 \leq n < 2 \cdot 10^5$, n is **odd**) — the length of the array a .

The second line of each test case contains n integers a_1, a_2, \dots, a_n ($1 \leq a_i \leq 10^6$) — the elements of the array a .

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

Output

For each test case:

- If it is impossible to make the cyclic array balanced, output -1 .
- Otherwise, output n integers v_1, v_2, \dots, v_n ($0 \leq v_i \leq 10^{18}$) — where v_i denotes the number of operations applied to index i . It can be proved that if any solution exists, then there exists a solution under the given constraints. If there are several solutions under the given constraints, output any of them.

Example

input	Copy
6 3 2 1 2 3 1 2 3 5 1 2 1 2 1 7 1 2 1 2 1 3 1 9 10000 10000 10000 10000 10000 10001 10002 10001 10000 1 10	
output	Copy
0 1 0 2 1 0 2 0 3 0 2 4 2 7 0 8 0 6	

Codeforces Round 983 (Div. 2)

Contest is running

00:04:53

Contestant



→ Submit?

Language: Python 3.8.10
Almost always, if you send a solution on PyPy, it works much faster

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.

→ Last submissions

Submission	Time	Verdict
289275569	Nov/01/2024 19:18	Wrong answer on pretest 1

→ Score table

	Score
Problem A	274
Problem B	411
Problem C	685
Problem D	959
Problem E	1233
Problem F	1644
Successful hack	100
Unsuccessful hack	-50
Unsuccessful submission	-50
Resubmission	-50

* If you solve problem on 01:53 from the first attempt

```
1 1 1 1 1 1 0 1 1
0
```

Note

In the first test case:

- After 1 operation applied to index $i = 2$, the array $a = [3, 3, 3]$.

In the second test case:

- After 2 operations applied to index $i = 1$, the array $a = [5, 4, 5]$.
- After 1 operation applied to index $i = 2$, the array $a = [6, 6, 6]$.

In the third test case:

- After 2 operations applied to index $i = 1$, the array $a = [5, 4, 1, 2, 3]$.
- After 3 operations applied to index $i = 3$, the array $a = [5, 7, 7, 5, 3]$.
- After 2 operations applied to index $i = 5$, the array $a = [7, 7, 7, 7, 7]$.

[Codeforces](#) (c) Copyright 2010-2024 Mike Mirzayanov
The only programming contests Web 2.0 platform
Server time: Nov/01/2024 22:28:08^{UTC+6} (j3).
Desktop version, switch to [mobile version](#).
[Privacy Policy](#)

Supported by

**ITMO**