C. Wonderful City

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

You are the proud leader of a city in Ancient Berland. There are n^2 buildings arranged in a grid of n rows and n columns. The height of the building in row i and column j is $h_{i,j}$.

The city is *beautiful* if no two adjacent by side buildings have the same height. In other words, it must satisfy the following:

- There **does not** exist a position (i, j) $(1 \le i \le n, 1 \le j \le n-1)$ such that $h_{i,j} = h_{i,j+1}$.
- There **does not** exist a position (i, j) $(1 \le i \le n-1, 1 \le j \le n)$ such that $h_{i,j} = h_{i+1,j}$.

There are n workers at company A, and n workers at company B. Each worker can be hired **at most once**.

It costs a_i coins to hire worker i at company A. After hiring, worker i will:

- Increase the heights of all buildings in row i by 1. In other words, increase $h_{i,1}, h_{i,2}, \ldots, h_{i,n}$ by 1.

It costs b_j coins to hire worker j at company B. After hiring, worker j will:

- Increase the heights of all buildings in column j by 1. In other words, increase $h_{1,j}, h_{2,j}, \ldots, h_{n,j}$ by 1.

Find the minimum number of coins needed to make the city beautiful, or report that it is impossible.

Input

Each test contains multiple test cases. The first line contains the number of test cases t ($1 \le t \le 100$). The description of the test cases follows.

The first line of each test case contains a single integer n ($2 \le n \le 1000$) — the size of the grid.

The i-th of the next n lines of each test case contains n integers $h_{i,1}, h_{i,2}, \ldots, h_{i,n}$ ($1 \le h_{i,j} \le 10^9$) — the heights of the buildings in row i.

The next line of each test case contains n integers $a_1, a_2, \ldots, a_n$ ($1 \le a_i \le 10^9$) — the costs of hiring the workers at company A.

The next line of each test case contains n integers $b_1, b_2, \ldots, b_n$ ($1 \le b_j \le 10^9$) — the costs of hiring the workers at company B.

It is guaranteed that the sum of n over all test cases does not exceed 1000.

Output

For each test case, output a single integer — the minimum number of coins needed, or -1 if it is impossible.

Example

input

```
4
2
1 2
2 1
100 100
100 100
4
```

Neowise Labs Contest 1 (Codeforces Round 1018, Div. 1 + Div. 2)

Contest is running

00:33:57

Contestant

→ Last submissions

Submission	Time	Verdict
316276953	Apr/19/2025 18:59	Pretests passed

→ Score table

	Score
Problem A	330
Problem B	495
Problem C	990
Problem D	1155
Problem E	1320
Problem F	1815
Problem G	1815
Problem H	2310
Successful hack	100
Unsuccessful hack	-50
Unsuccessful submission	-50
Resubmission	-50

* If you solve problem on 01:25 from the first attempt

```
1 2 1 2
3 2 1 2
1 2 1 1
1 3 1 2
1 2 3 4
5 6 7 8
3
1 2 2
2 2 1
2 1 1
100 100 100
100 100 100
6
8 7 2 8 4 8
7 7 9 7 1 1
8 3 1 1 8 5
6 8 3 1 1 4
1 4 5 1 9 6
7 1 1 6 8 2
11 23 20 79 30 15
15 83 73 57 34 63
```

output Copy

```
0
14
-1
183
```

Note

For the first test case, we can see that the city is already beautiful. Thus, the answer is 0.

For the second test case, we can hire worker 2 from company A, worker 4 from company A, and worker 4 from company B:

$$\begin{array}{|cccc|} \hline 1 & 2 & 1 & 2 \\ 3 & 2 & 1 & 2 \\ 1 & 2 & 1 & 1 \\ 1 & 3 & 1 & 2 \\ \hline \end{array} \quad \Longrightarrow \quad \begin{array}{|cccc|} \hline 1 & 2 & 1 & 3 \\ 4 & 3 & 2 & 4 \\ 1 & 2 & 1 & 2 \\ 2 & 4 & 2 & 4 \\ \hline \end{array}$$

The cost of hiring the workers is $2 + 4 + 8 = 14$. This is the minimum possible cost.

For the third test case, no matter what we do, it is impossible to make the city beautiful. Thus, the answer is -1.