Contest Duration: 2020-01-18(Sat) 19:00 (http://www.timeanddate.com/worldclock/fixedtime.html?iso=20200118T2100&p1=248) - 2020-01-18(Sat) 21:00 (http://www.timeanddate.com/worldclock/fixedtime.html?iso=20200118T2300&p1=248) (local time) (120 minutes)

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D - Swap and Flip

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Time Limit: 2 sec / Memory Limit: 1024 MB

Score : 700 points

Problem Statement

We have N cards numbered $1, 2, \ldots, N$. Card i $(1 \leq i \leq N)$ has an integer A_i written in red ink on one side and an integer B_i written in blue ink on the other side. Initially, these cards are arranged from left to right in the order from Card 1 to Card N, with the red numbers facing up.

Determine whether it is possible to have a non-decreasing sequence facing up from left to right (that is, for each i $(1 \leq i \leq N - 1)$, the integer facing up on the $(i+1)$-th card from the left is not less than the integer facing up on the i-th card from the left) by repeating the operation below. If the answer is yes, find the minimum number of operations required to achieve it.

- Choose an integer i $(1 \leq i \leq N - 1)$. Swap the i-th and $(i+1)$-th cards from the left, then flip these two cards.

Constraints

- $1 \leq N \leq 18$
- $1 \leq A_i, B_i \leq 50$ $(1 \leq i \leq N)$
- All values in input are integers.

Input

Input is given from Standard Input in the following format:

$$\begin{array}{l} N \\ A_1 \quad A_2 \quad \ldots \quad A_N \\ B_1 \quad B_2 \quad \ldots \quad B_N \end{array}$$

Output

If it is impossible to have a non-decreasing sequence, print `-1`. If it is possible, print the minimum number of operations required to achieve it.

Sample Input 1 Copy

Copy

```
3
3 4 3
3 2 3
```

Sample Output 1 Copy

Copy

```
1
```

By doing the operation once with $i = 1$, we have a sequence $[2, 3, 3]$ facing up, which is non-decreasing.

Sample Input 2 Copy

Copy

```
2
2 1
1 2
```

Sample Output 2 Copy

Copy

```
-1
```

After any number of operations, we have the sequence $[2, 1]$ facing up, which is not non-decreasing.

2020-11-20 (Fri)
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Sample Input 3 Copy

Copy

```
4
1 2 3 4
5 6 7 8
```

Sample Output 3 Copy

Copy

```
0
```

No operation may be required.

Sample Input 4 Copy

Copy

```
5
28 15 22 43 31
20 22 43 33 32
```

Sample Output 4 Copy

Copy

```
-1
```

Sample Input 5 Copy

Copy

```
5
4 46 6 38 43
33 15 18 27 37
```

Sample Output 5 Copy

Copy

```
3
```

Language

C++ (GCC 9.2.1) ▾

Source Code