AUSTRALIAN MATHS TRUST

Problem: Arranging Plants

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You may submit a solution using the form below. Please be sure to submit your **source code** (not a compiled executable), and to select the correct programming language in the drop-down box. Only submissions in C, C++, Caml, Haskell, Java, Pascal, PHP or Python are accepted at the present time.

This problem will be judged on **orac (compilers.pl)**.

Choose source file | C++ ▾

Submit

Arranging Plants

Input File: `plants.in`
Output File: `plants.out`
Time Limit: 1 second
Memory Limit: 64 MB

Richard has just come home from his vacation to Kazakhstan to find that his garden has been overrun with weeds! Luckily for him, Richard is quite fond of weeds and now all that remains is for him to rearrange the plants beautifully. Richard's meticulous garden is arranged as a $2 \times N$ grid with each cell containing exactly one weed. The weed in row i ($1 \le i \le 2$) and column j ($1 \le j \le N$) has species $A_{i,j}$. Richard considers an arrangement to be beautiful if no two weeds in the same row have the same species. As a 5 year old, Richard has only mastered the ability to swap the positions of two weeds at a time (this operation takes exactly one second) and, depending on the day, is constrained by which positions he is able to swap.

- On Saturday, Richard is able to swap any pair of weeds.
- On Sunday, Richard is only able to swap a pair of weeds if they lie in the same column.

Richard has asked you, his garden planner, to determine the minimum time required for him to rearrange his plants beautifully given the day he plans to garden and the initial arrangement of the plants.

Input

The first line of the input file contains two integers N and D, N being the number of columns in Richard's garden and D being the day (0 for Saturday or 1 for Sunday) he plans to rearrange his garden. The second line will contain N integers describing the initial arrangement of weeds in the first row. The ith integer on this line will be $A_{1,i}$. The third line will similarly contain N integers describing the arrangement of the second row $A_{2,i}$.

Output

The output file must contain exactly 1 line, containing the minimum time in seconds for Richard to make a beautiful garden or -1 if it is impossible to make a beautiful garden within the constraints.

Sample Input 1

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

Sample Output 1

```
-1
```

Sample Input 2

```
4 0
4 2 4 3
3 0 2 0
```

Sample Ouput 2

```
1
```

Sample Input 3

```
9 1
2 5 5 2 7 4 7 3 9
1 6 8 4 6 3 9 1 8
```

Sample Ouput 3

```
3
```

Subtasks \& Constraints

In all subtasks, $1 \leq N \leq 50000$, $0 \leq A_{i,j} \leq 100000$.

- For Subtask 1 (30 points), D = 0 and no further constraints apply.
- For Subtask 2 (20 points), D = 1 and $N \leq 20$.
- For Subtask 3 (50 points), D = 1 and no further constraints apply.

You have not made any previous submissions for this problem.

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