Akatsuki vs Leaf

Max. Marks: 100

Akatsuki is planning to attack the Leaf Village to capture Naruto. The Hokage (Head of the Village), came to know about the plan and also the number of members, N, in Akatsuki who are going to attack. So, Hokage planned an ambush.

Hokage selected a team of N members (one for each Akatsuki member) and named it **Leaf**. Each member of Leaf can attack **exactly one** Akatsuki member and an Akatsuki member is **NOT** attacked by **more than one** Leaf member. In the ambush there will be N fights (one of each N members of Leaf and N members of Akatsuki). You are the leader of Leaf. You know the positions (x-coordinates and y-coordinates) of all the Akatsuki members and Leaf members. Your task is to **assign each member of Leaf to exactly one member of Akatsuki team such that the sum of the distance between them is minimum**. Distance between two points (x_1, y_1) and (x_2, y_2) will be equal to $|x_1 - x_2| + |y_1 - y_2|$.

Input:

First line contains one integer N, number of **Akatsuki** members who are going to attack the village.
Next N lines will contain two integers each, X and Y, x-coordinate and y-coordinate of the **Akatsuki** members.
Next N lines will contain two integers each, X and Y, x-coordinate and y-coordinate of the **Leaf** members.

Output:
Print the **required minimum sum** of the distance.

Constraints:
$1 \leq N \leq 20$
$-10^6 \leq X, Y \leq 10^6$

SAMPLE INPUT

```
2
0 0
8 8
1 1
6 6
```

SAMPLE OUTPUT

```
6
```

Explanation

$N = 2$
So there are 2 **Akatsuki** members at position $(0, 0)$ and $(8, 8)$ and 2 **Leaf** members at position $(1, 1)$ and $(6, 6)$. There are 2 cases:
Case 1:
Leaf member at $(1, 1)$ will fight Akatsuki member at $(0, 0)$ and Leaf member at $(6, 6)$ will fight Akatsuki member at $(8, 8)$.
Sum of distances = $((|1 - 0| + |1 - 0|) + (|6 - 8| + |6 - 8|)) = (2 + 4) = 6$

Case 2:
Leaf member at $(1, 1)$ will fight Akatsuki member at $(8, 8)$ and Leaf member at $(6, 6)$ will fight Akatsuki member at $(0, 0)$.
Sum of distances = $((|1 - 8| + |1 - 8|) + (|6 - 0| + |6 - 0|)) = (14 + 12) = 26$

So Case 1 is optimal and minimum sum of distances is 6.

Time Limit:	1.0 sec(s) for each input file.
Memory Limit:	256 MB
Source Limit:	1024 KB
Marking Scheme:	Marks are awarded if any testcase passes.
Allowed Languages:	C, CPP, CLOJURE, CSHARP, D, ERLANG, FSHARP, GO, GROOVY, HASKELL, JAVA, JAVA8, JAVASCRIPT, JAVASCRIPT_NODE, LISP, LISP_SBCL, LUA, OBJECTIVEC, OCAML, OCTAVE, PASCAL, PERL, PHP,

PYTHON, PYTHON3, R, RACKET, RUBY, RUST, SCALA, SWIFT, VB

CODE EDITOR

☹ Our compiler wanted to be here!

But the mobile is too cramped for it to load. It says it would be more comfortable on the web.

Your Rating:

Bangalore, Karnataka 560095, India.

contact@hackerearth.com

+91-80-4155-4695

+1-650-461-4192