Problem D
A Not-So-Friendsgiving
Time Limit: *5 Seconds*

Problem Description

Your friend group has grown over the years and — unfortunately — there are cliques which have formed. Some of your friends down't get along with all other friends. You are hosting Friendsgiving and want to try to maximize everyone's happiness by having friends sit near people they want to sit near. You're going to find the **optimal seating arrangement** and avoid *all* of those awkward conversations.

You start by writing up a list of everyone invited and the amount their happiness would increase or decrease if they were to find themselves sitting next to each other person. You have a circular table that will be just big enough to fit everyone comfortably, and so each person will have exactly two neighbors.

For example, suppose you have only four attendees planned, and you calculate their potential happiness as follows:

- Alice would gain 54 happiness units by sitting next to Bob.
- Alice would lose 79 happiness units by sitting next to Carol.
- Alice would lose 2 happiness units by sitting next to David.
- Bob would gain 83 happiness units by sitting next to Alice.
- Bob would lose 7 happiness units by sitting next to Carol.
- Bob would lose 63 happiness units by sitting next to David.
- Carol would lose 62 happiness units by sitting next to Alice.
- Carol would gain 60 happiness units by sitting next to Bob.
- Carol would gain 55 happiness units by sitting next to David.
- David would gain 46 happiness units by sitting next to Alice.
- David would lose 7 happiness units by sitting next to Bob.
- David would gain 41 happiness units by sitting next to Carol.

A seating arrangement of the following layout results in an "optimal" solution (with Δ Happiness = 330):

```
     +41 +46
+55   David    -2
Carol       Alice
+60    Bob    +54
     -7  +83
```

Input File Format

Input consists of several lines. The first line contains a single integer N which tells you the number of friends you have joining you for Friendsgiving ($3 \leq N \leq 9$). The following $N * (N - 1)$ lines list each person's happiness when seated next to someone else. Each line is space-delimited with the person listed first, how their happiness changes second, and who they are seated next to third.

Output Format

Output the happiness resulting from the "optimal" seating of friends (highest achievable happiness)

Sample Input

```
4
David 4 Alice
Carol 60 Bob
Bob -7 Carol
David -7 Bob
Carol 55 David
Alice 54 Bob
David 41 Carol
Carol -62 Alice
Alice -2 David
Bob 83 Alice
Alice -79 Carol
Bob -63 David
```

Output for the Sample Input

```
330
```