B: Bicryption

Yidi Zang

Problem

Implement a winning strategy for the following encryption/decryption protocol:

- Anna and Ben are each given a word
- To encrypt a word, they need to replace each letter by some different letter
- They each encrypt their word twice, using two distinct letters in each position
- Charlotte receives the encrypted words from one of the players, in arbitrary order
- She then needs to identify the person, as well as their original word

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Solution

- Anna Caesar shifts her word by ± 1 and Ben by ± 2
- To identify the sender, Charlotte checks if the distance of first letters is ± 2 or ± 4
- To decrypt, she Caesar shifts by half that distance

Many other solutions are possible.

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