I: Island Tour

Problem Author: Jeroen Bransen

Problem

Three people start in three places on a cycle graph and walk around according to a timer. Where can you place them so that they won't ever be in the same place at the same time?

Solution

- A simple solution tries all $O(n^3)$ placements for Tijmen, Annemarie, and Imme and then simulates the $O(n)$ steps recording when each person arrives and departs at the nodes to compare with the others for overlap.
- However, $O(n^4)$ is too slow. We need to do some pre-calculation.
- Conflicts are between two people rather than three. We only need to answer the question does_intersect(a, b, s_a, s_b) for each pair of people a and b.
- So, for each **pair** of people a and b, try all $O(n^2)$ combinations and run the $O(n)$ simulation. Store the result in a table compatible$[a][b][x][y]$ for later.
- Using the table, we can try all $O(n^3)$ possibilities in $O(1)$ time each. This is fast enough.

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Statistics: 113 submissions, 36 + ? accepted