Analysis: Painting a Fence

This was meant to be the easiest problem in the match. A straightforward brute force solution suffices.

Step 1. Pick a set **C** of (up to) three colors to be used. There are **N** different colors, so $O(N^3)$ such choices.

Step 2. From the offers, filter out the ones where the color is not in the set **C**. We want to figure out whether the remaining offers can cover the whole fence, and if so, what the minimum required number of offers is.

Step 2 is a classical problem with a greedy scanline solution. We sort the offers (intervals) by their left endpoint, and scan from left to right, considering the offers one by one. At any moment, if we have covered the fence from section 1 to **k**, we always pick the next offer so that it starts before **k** and ends as far to the right as possible.

If we sort all the offers by their left endpoing in the beginning, then step 2 takes time $O(N)$, and the whole algorithm runs in time $O(N^4)$.