

Fix Flooded Floor

Problem author: Vitaly Aksenov; problem developer: Zakhar Iakovlev

We'll call a cell *empty* if it's damaged and not yet covered with a 1×2 piece, and *full* otherwise.

Let's process the columns greedily from left to right and try to fill the parquet with 1×2 pieces. We'll always maintain the invariant that all cells in the processed columns are full.

For the current column:

- If both cells are full, we don't need to do anything.
- If one cell is empty and the other one is full, the only thing we can do is put a new 1×2 piece horizontally, with its left half in the empty cell. Here, we need to make sure that the cell on the right of the empty cell is empty as well. If that's true, we put a new piece, so both empty cells are now full. Otherwise, the answer is "None".
- If both cells are empty, we have two options here. First, we could always put a vertical piece in this column. Second, only if both cells in the next column are empty, we could put two horizontal pieces covering these two columns. However, if we do the latter, we might as well use two vertical pieces for these two columns instead. Thus, if this happens, the answer can never be "Unique". We can just place a vertical piece and proceed, and if we manage to finish the tiling, the answer is "Multiple", otherwise it's "None".

To conclude, if the above process fails at any point, the answer is "None". If we ever encounter a situation where we could put either two vertical pieces or two horizontal pieces, the answer is "Multiple". Otherwise, the answer is "Unique".

Time complexity of this solution is $O(n)$.