Logic and Computability SS22, Practical Bonus Assignment 3

Due: TBD

[**5 Points**] *Tents and Trees.* In this task you have to implement the contraints present in the Tents and Trees Puzzle[1]. In this puzzle one has to put a tent next to each tree on a $(n \times m)$ grid such that each tree has a tent either horizontally or vertically adjacent (not diagonally). Furthermore, no tent should be adjacent to another tent, not even diagonally. Numbers on the side of the grid indicate the required number of tents in a given row or column.
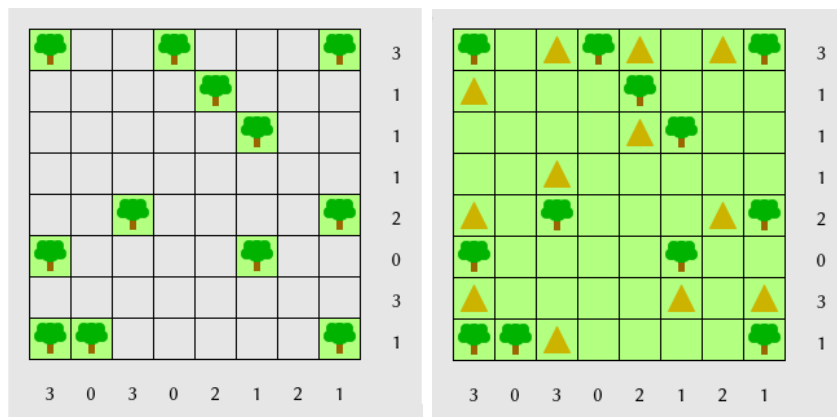

Figure 1: Example of a Tents and Trees Puzzle and its solution.

The skeleton file for this problem prepares the parsing and some helper functions that determine neighbours of a given cell (in two different fashions).
Your tasks are:

1. Define Z3 variables that represent the state of each cell.

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[1] https://www.chiark.greenend.org.uk/~sgtatham/puzzles/js/tents.html

2. Use the already present functions to constrain the amount of tents per row or per column.

3. Incrementally build up the `tree_constraint` that represents that atleast one of the adjacent cells of a tent has to be a tree *and*

4. add constraints that tell the solver that no tents can be placed next to another tent.

If a feasiable placement for all the tents can be found, we print it to the console. Otherwise the input will be shown.