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Practicum Proposal

The Problem

I have a large square foot garden in my backyard and I would like to plant vegetables and herbs in a somewhat optimal fashion. Unfortunately while the are many garden planning tools online there are none that help with optimizing the layout of a garden bed. Plants should be arranged shortest to tallest along the direction the sun faces the garden so that taller plants do not shade the shorter plants and all plants get direct exposure to sunlight. Some plants should also not be planted adjacently for horticultural reasons. Lastly I have specific quantities of specific types of plants I would like to plant. The problem then is to find garden bed layouts that optimall

The Method

This problem shares many similarities with sudoku, namely variables that need to be assigned values with constraints. So the problem can viewed as a similar constraint satisfaction problem and can be tackled with inference and backtracking search. This method is especially attractive as it requires no domain knowledge just a set of variables, the square feet to plant in, a set of domains, the plants that can be planted in each square, and a set of constraints.

Verifying Success

Success is achieved if the solver can find solutions to the constraint satisfaction problem in the form of a square foot garden plan. These plans can quickly be verified by a human with domain knowledge. While finding a solution to my own garden will be beyond the scope of this practicum (it is large and I have many plants), I will have several small pre-made garden plans that do not satisfy the constraints I can run through the solver to get plans that do satisfy the constraints.