1. (3 pts) What are the three components of a constraint satisfaction problem?

2. (3 pts) What is a solution to a constraint satisfaction problem?


In this book club, they don’t all have to read the same book. Alice only likes fiction, while Betty only likes non-fiction. Furthermore, Alice won’t read whatever either Betty or Carol are reading, while Betty and Carol always read the same book.

(a) (3 pts) Formulate this as a constraint satisfaction problem.

(b) (1 pts) Propagate unary constraints and show the results.

(c) (3 pts) Solve the CSP using a combination of search and constraint propagation. At each step (assignment or propagation), show the state of the problem. (Hint: You should only need two iterations if you’ve done it right.)

4. (4 pts) Consider the problem of creating (not solving) crossword puzzles. Assume you are given a rectangular grid with blank and shaded squares, and a list of words. Your goal is to fit the words into the grid satisfying the constraints of a crossword puzzle about shared letters.

Formulate this precisely as a constraint satisfaction problem. Comment on the strengths or weaknesses of your formulation.