Visualization for Reformulation Algorithm of Game of SET

Keegan Lunn, Hongfeng Yu, Berthe Choueiry
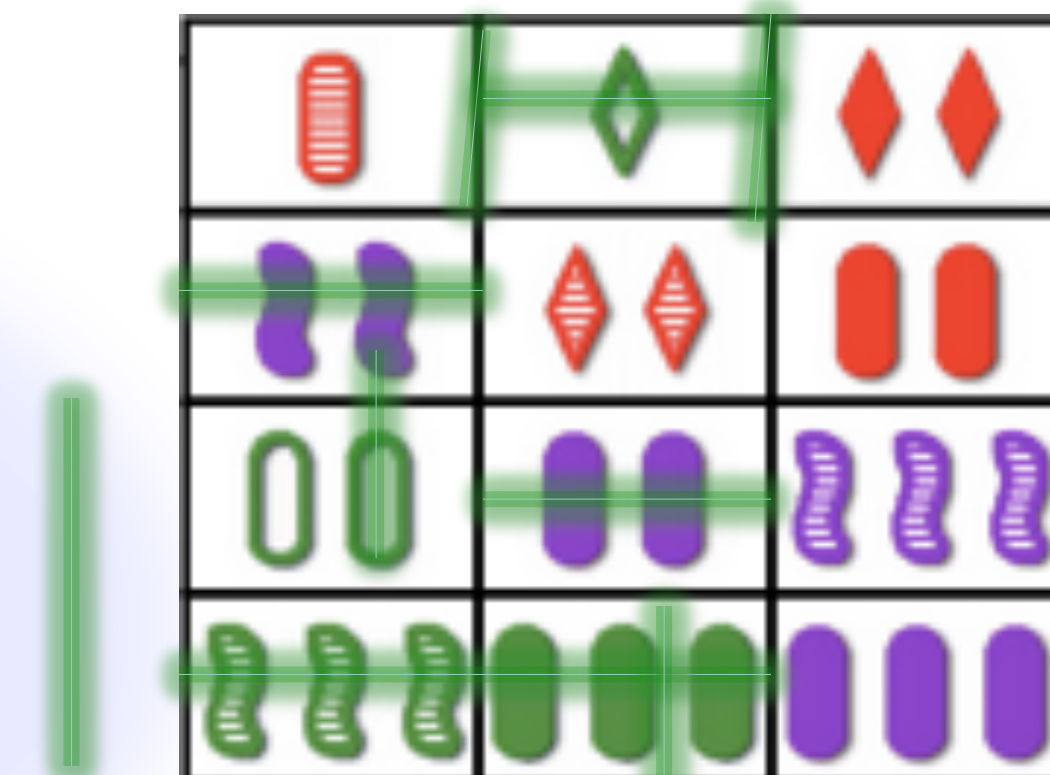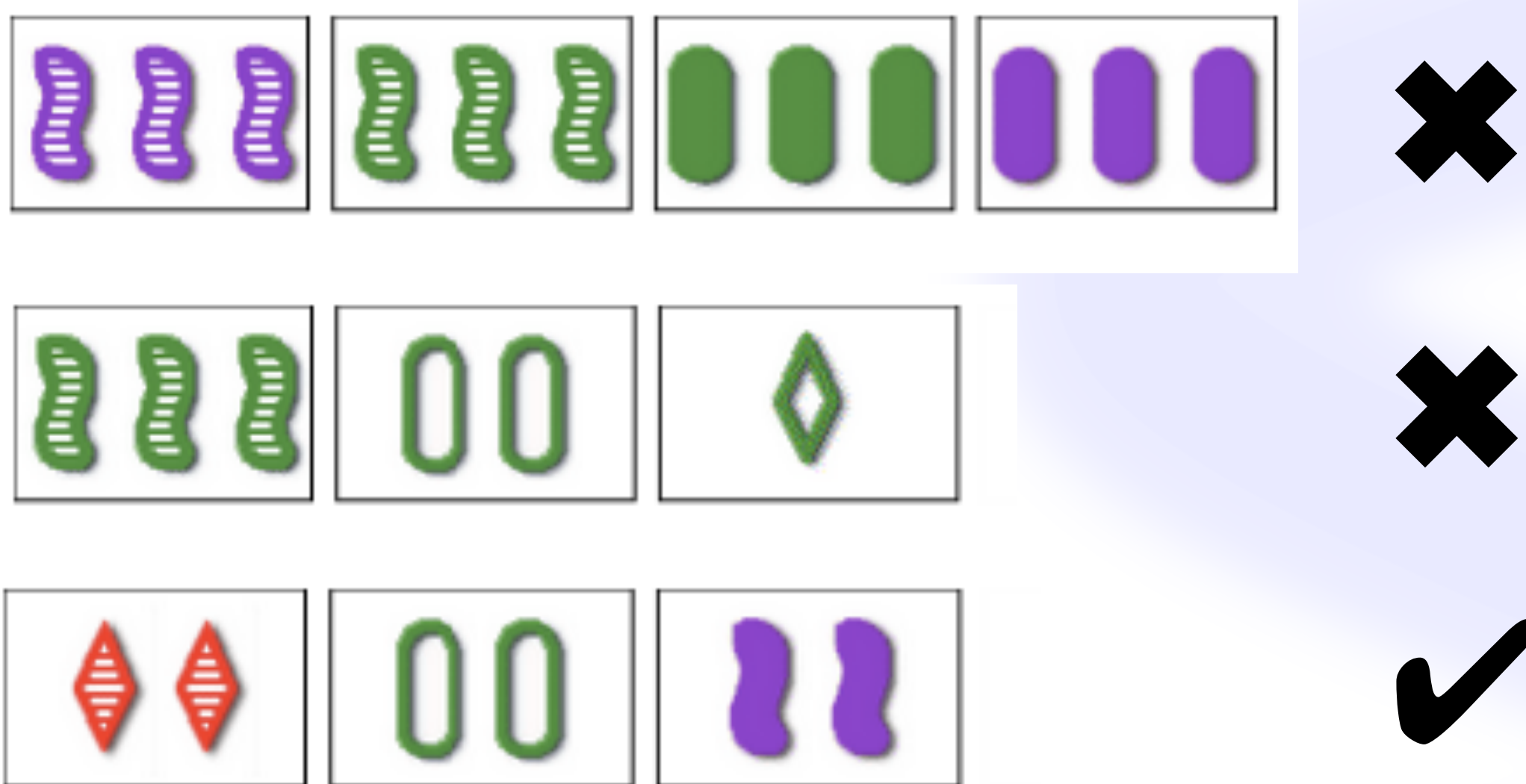
Department of Computer Science & Engineering • University of Nebraska-Lincoln

Visualiztion: http://cse.unl.edu/~klunn/gameofset/out/vis.html

Abstract

A visualization meant to teach fundamentals of disjunction and reformulation through Game of SET problem.
- Model Tree structure of reformulation
- Elaborate the patterns in each node

Game of SET

Cards have 4 attributes: Color, Number, Shape, Filling

All-same: All cards same value for referenced attribute.
All-diff: All cards different value for referenced attribute.
Scoring set: 3 cards, all-diff or all-same for every attribute.

Reformulation Algorithm: Attempts to split each problem into 3 All-same and 1 All-diff subproblem. Those that cannot be created are known not to contain a solution.
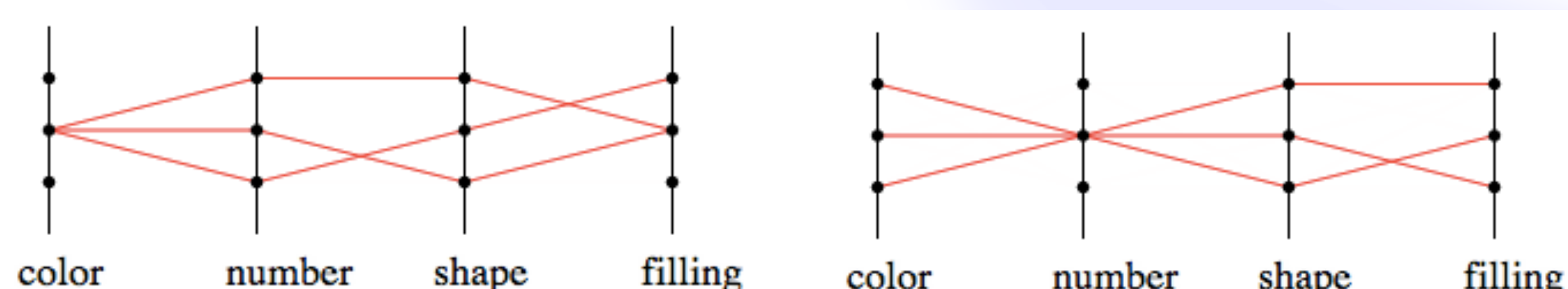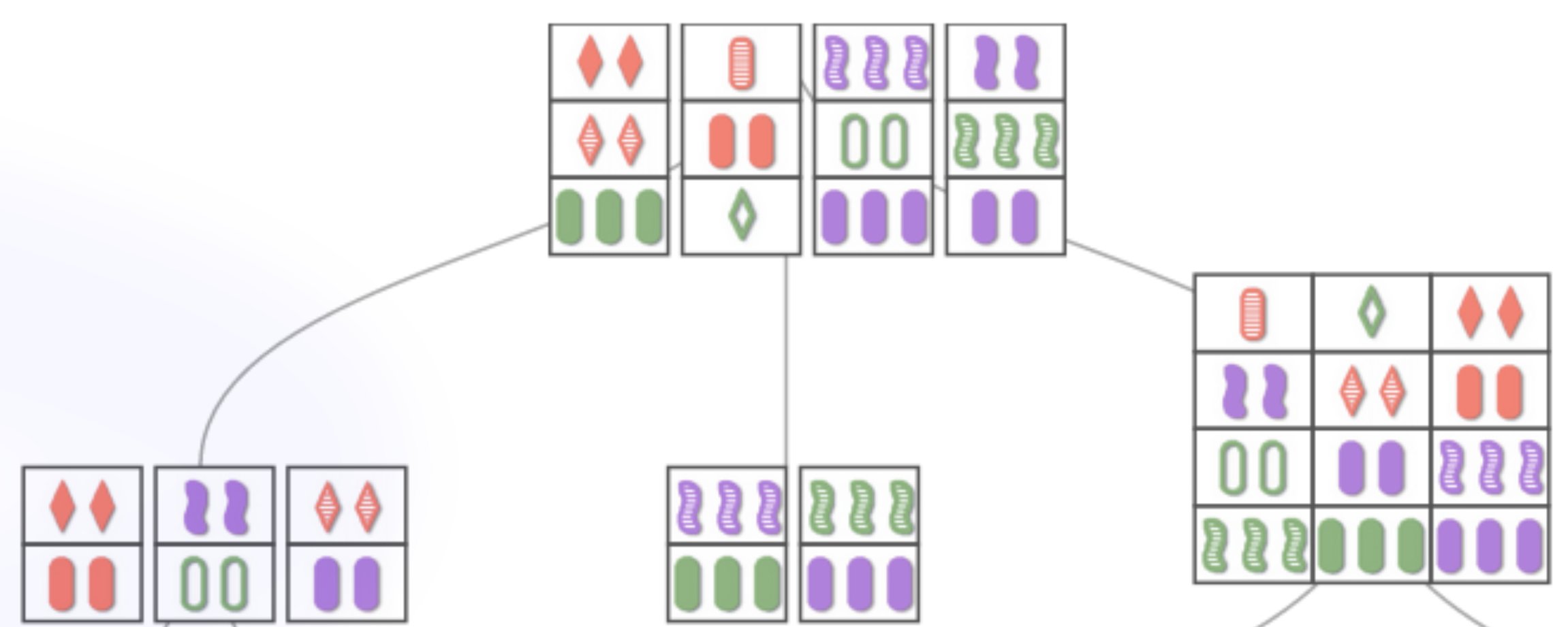
Visualization Techniques

Tree Structure: Reformulation algorithm creates 1-4 subproblems. Subproblems naturally fit to children.

Node Techniques: Ordering by next split allow for an easier understanding of disjunction.
  Parallel Coordinates: easy verification of scoring set

Simple interaction on nodes bridges the techniques

Future work

Expand node visualizations with more options
  - **Spatial Coordinates** for multi-dimensional
  - Further use of icons, color, etc
Simplify Tree visualization:
  - View Disjunction labelling

Couple the tree and node visualizations more tightly to make experience more fluid

UNIVERSITY OF Nebraska Lincoln