Knowledge Representation - Assignment 2

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CSP implementation

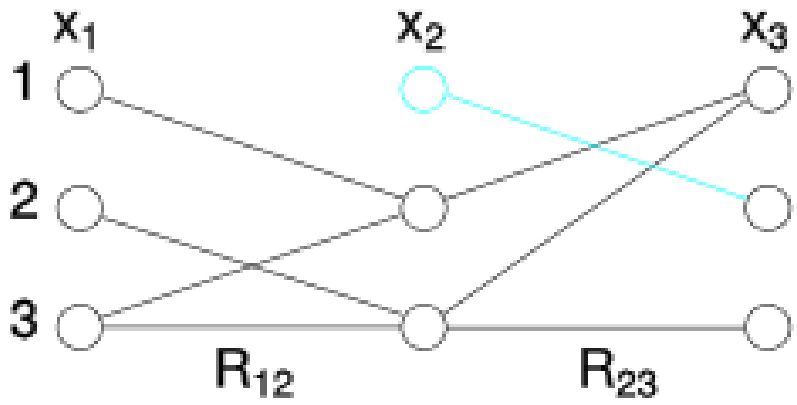
- Python
- Iterative implementation
  - Different forms of modeling
  - Propagation (Arc consistency)
  - Splitting strategies

Two models

- First model
  - Variables: Sudoku cells
  - Domain: Numbers $\{1, 2, 3, 4, 5, 6, 7, 8, 9\}$
  - Constraints: Relations between cells represented as inequalities
- Second model
  - Variables: Numbers for columns, Numbers for cells, Numbers for boxes
  - Domain: Sudoku cells
  - Constraints: Relations between numbers represented as inequalities

Propagation

- Without propagation
- Arc consistency



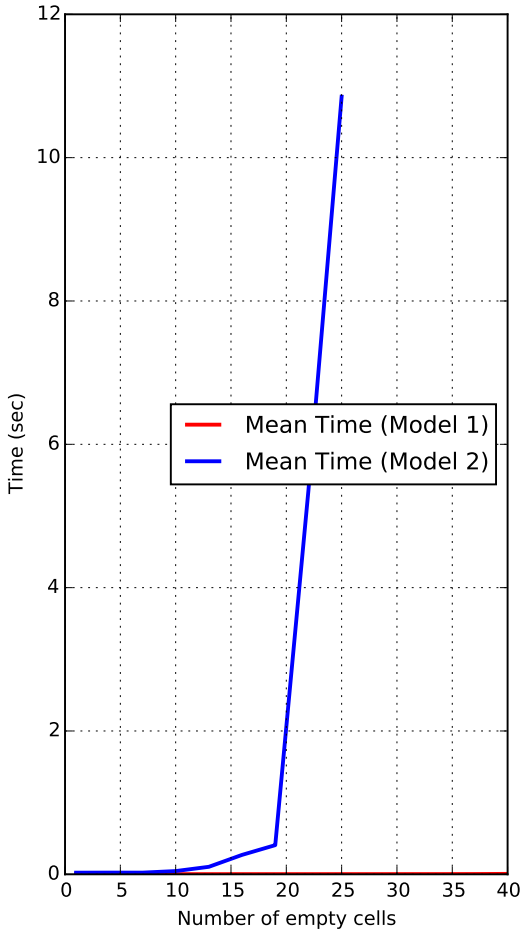
Splitting strategies

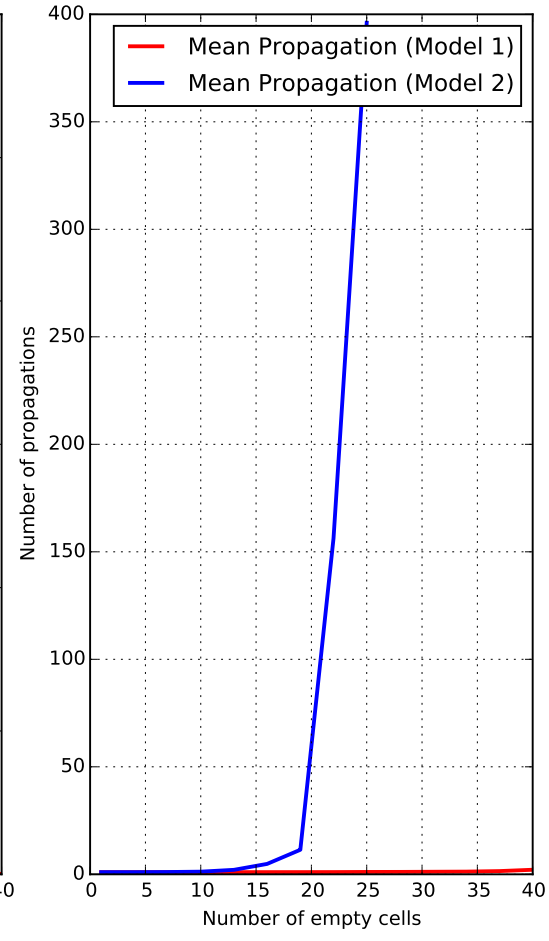
- Pick the first one
- Pick the one with the smallest domain

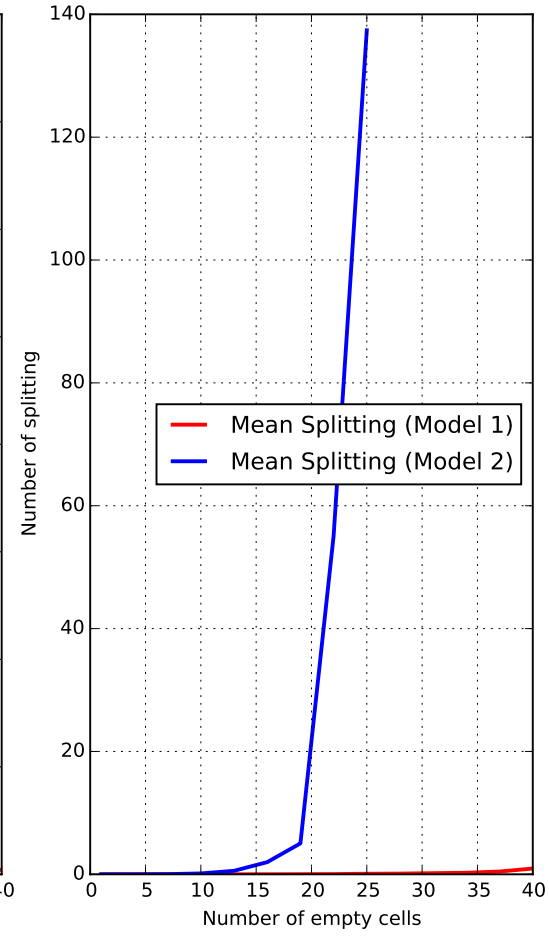
Experiments

- Comparison of Model1, Model2 with propagation, "naive" splitting
  - Sample Sudoku boards with different amount of empty cells (200 boards for each).
  - Compare mean values of time spending, number of propagation, splitting between 2 models.
- Comparison splitting strategies, propagation influence on the Model1.

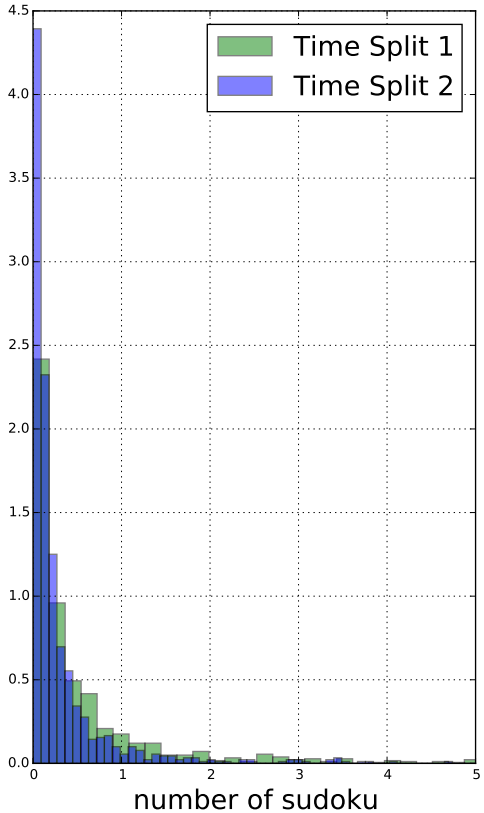
Results: Model 1 vs Model 2

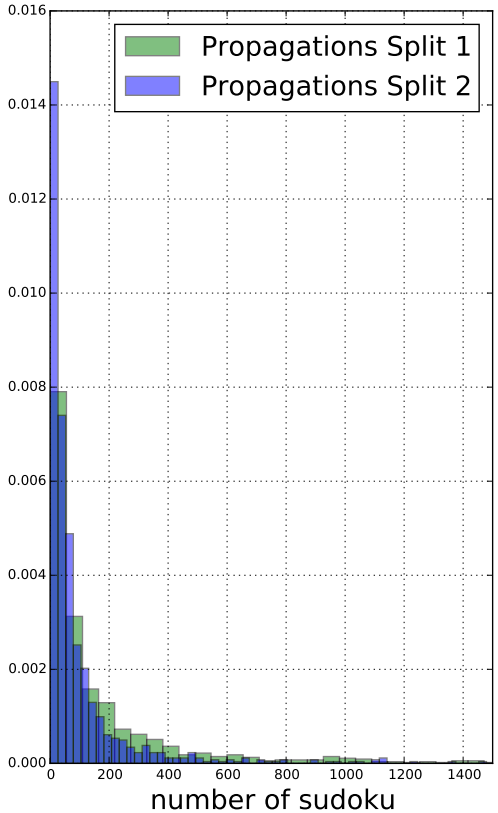


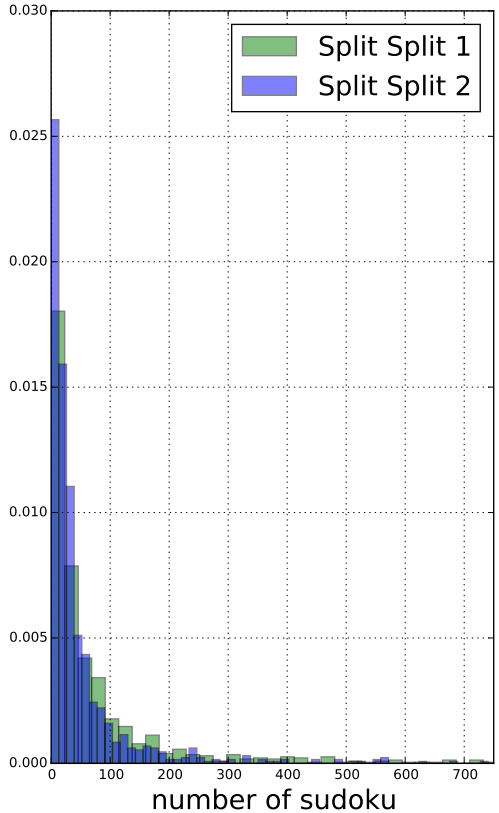




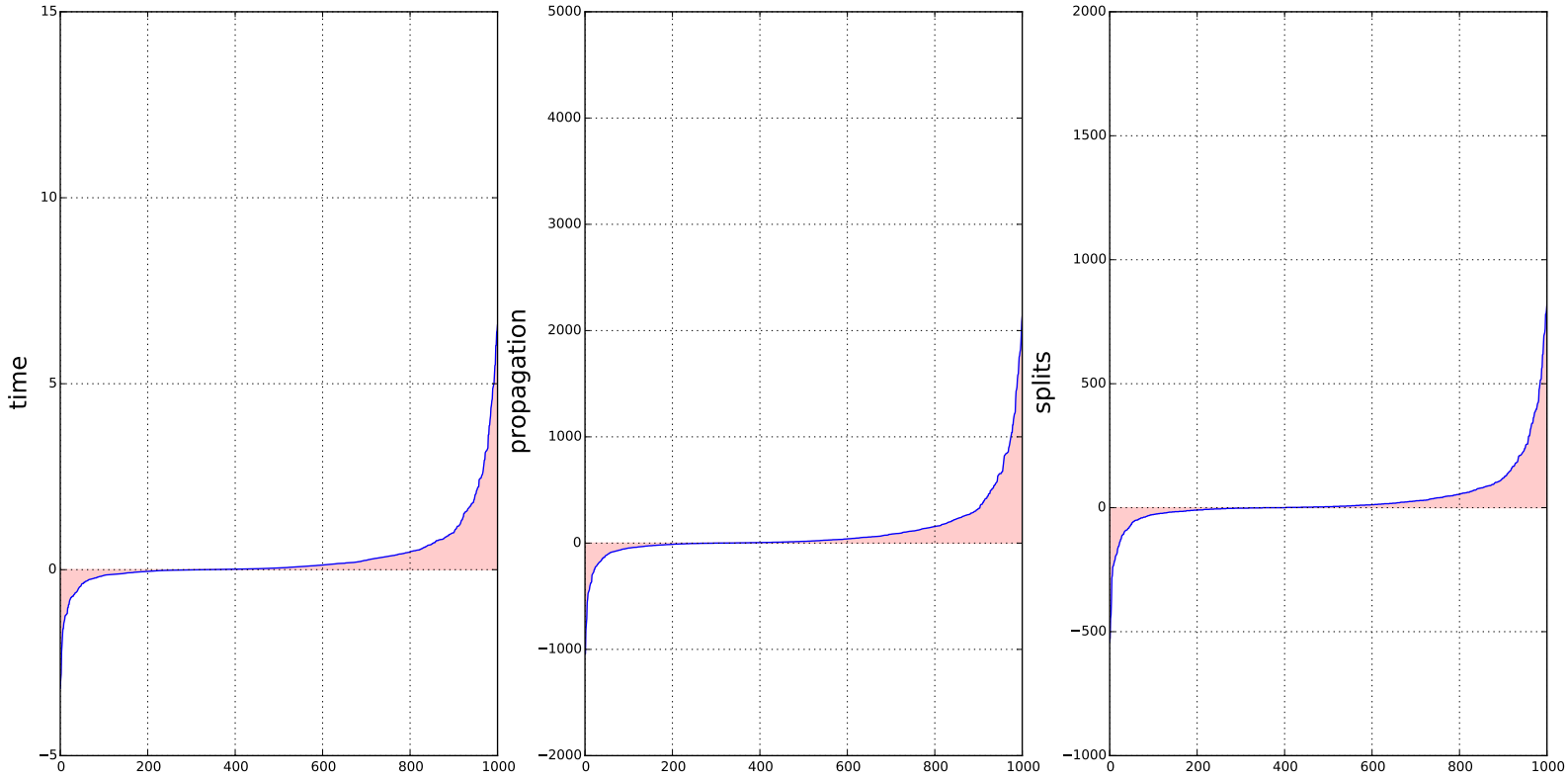
Results: Model 1 vs Model 2







Results: Model 1 vs Model 2



Conclusion

- The right model choice increases the performance of CSP solver significantly.
- Heuristics can help in complicated cases (but can make a model worse in easy cases).

Msi poutt ou!