What is limited belief?

**Classical** logic:
- Unrealistic: omniscient agent
- Undecidable (first-order) / intractable (propositional)

**Hypothesis**: good results at small belief levels

**Limited** belief:
- **Belief level 0**: explicitly written down in the KB
- **Belief level \( k > 0 \)**: derivable from KB with effort \( k \)

### Semantics

**Model**: set of clauses closed under unit propagation
- **Belief level 0**: subsumption
- **Belief level \( k > 0 \)**: \( k \) case splits

Example:

If all we know is:
1. \( \text{fatherOf}(\text{Sally}) = \text{Frank} \lor \text{fatherOf}(\text{Sally}) = \text{Fred} \)
2. \( \forall x (\text{fatherOf}(\text{Sally}) = x \lor \text{Rich}(x)) \)

Then, \( K_1 (\text{Rich}(\text{Frank})) \lor \text{Rich}(\text{Fred}) \)?

### Experiment: Sudoku

- **Easy**
- **Medium**
- **Hard**
- **Top**: Average # of cells solved at...

### Experiment: Minesweeper

- **Small**
- **Medium**
- **Large**
- **Huge**

**Next**: 1. actions 2. belief change 3. multiple agents