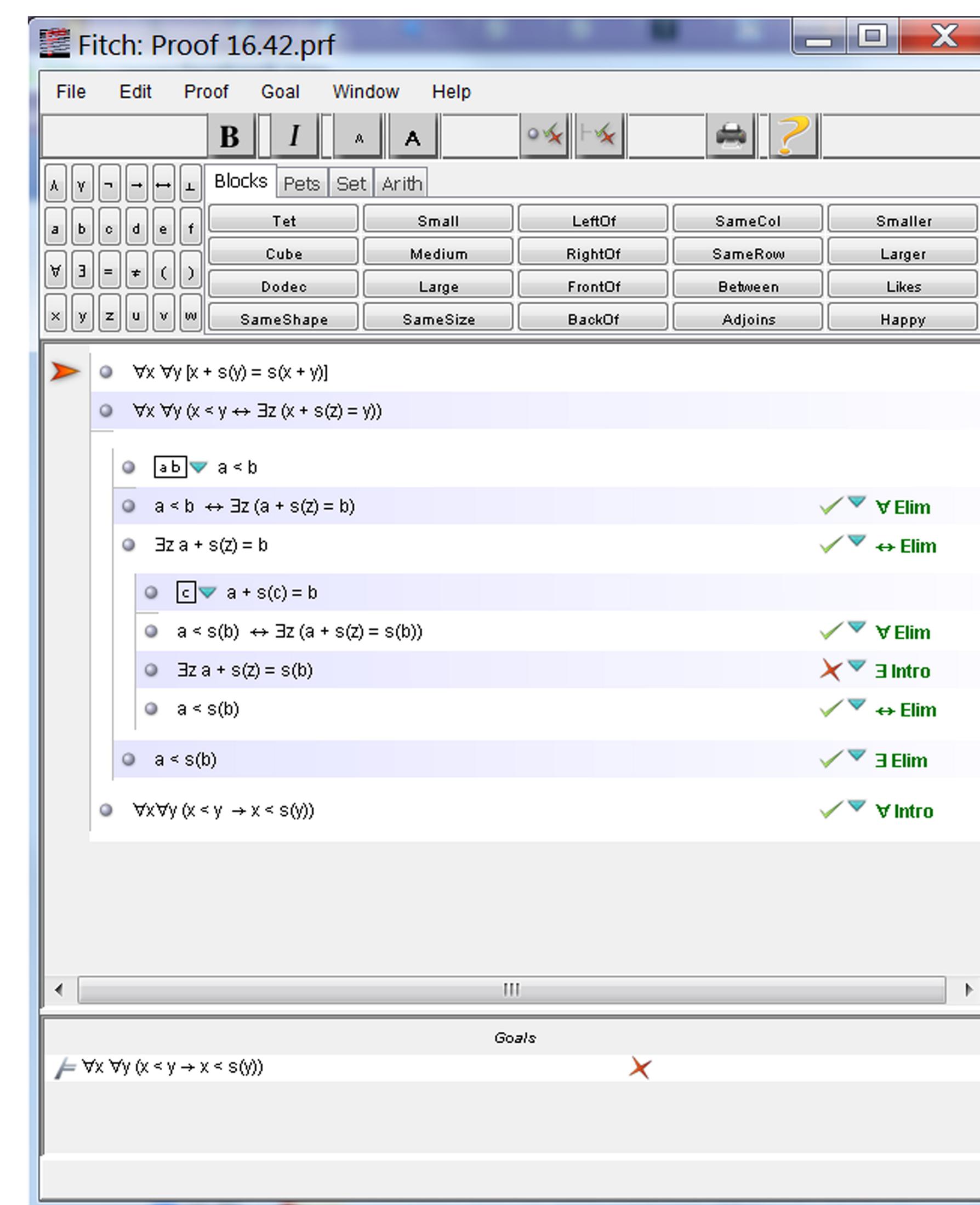


Problem:
Formal logic is...

B A H!
o b a
r s r
i t r
n a c
g a t

Formal logic proof using Fitch



Boring:

Formal logic involves manipulation of meaningless Ps and Qs. Reasoning about nothing is dry and boring.

Abstract:

Logical reasoning principles are general and abstract, but by completely removing the meaning from the symbols, formal logic has become too abstract, preventing many students from a deep understanding of the nature of logical reasoning.

Hard:

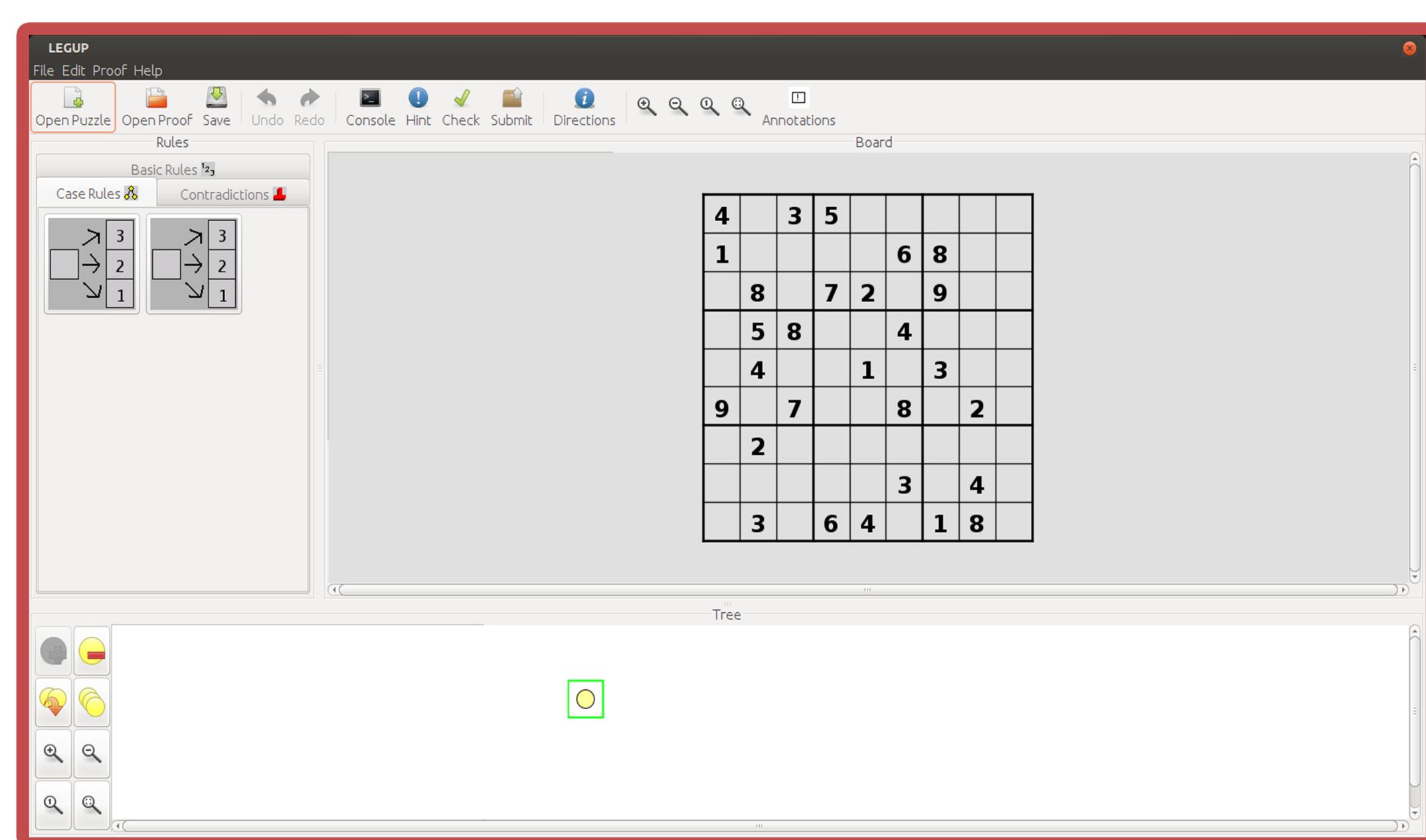
Reasoning about meaningless Ps and Qs is hard enough. But by insisting to formulate reasoning principles in terms of linear symbol string manipulations, formal logic introduces additional and unnecessary obstacles to the process of logical reasoning.

LEGUP

Logic Engine for Grid Using Puzzles

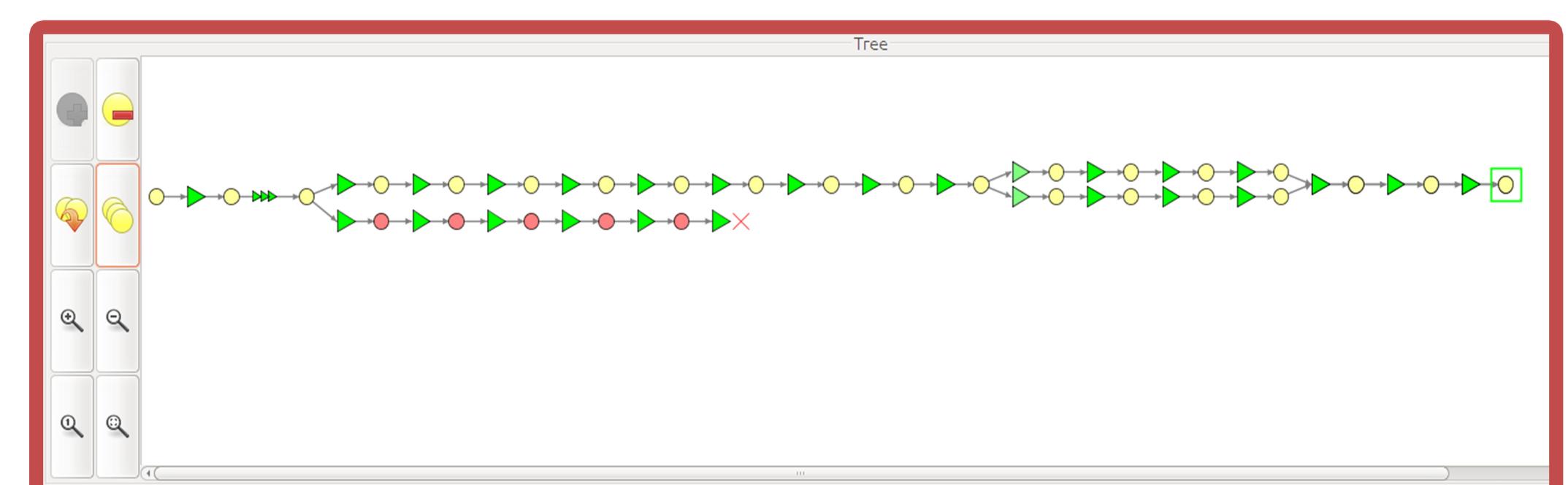
Interface:

The objective of the LEGUP project is to create an easy to use graphical interface that will facilitate learning of logical reasoning by using grid-based puzzles. LEGUP can be used while teaching courses in logic to make the concepts more approachable for students and increase their understanding of the subject. Systems of formal logic can be introduced once those concepts are in place.



Rules:

Students have a number of options when proving these puzzles: "basic rules" that allow the user to make forced moves, a case rule where the proof is split into a set of all possibilities for a grid location, and contradiction rules which would eliminate impossible cases.



Significance:

Why study logic?

Fundamental building block of many major concepts
Universally helpful across various disciplines
No one has perfect reasoning, we can all improve

Problems with current instruction:

Teaches students to manipulate symbols using a set of rules to reach a given goal
Often fails to convey the meaning beneath the symbols
Does not make logic applicable to other domains

How LEGUP is different:

Shows students the meaning beneath formal logic
Teaches that logic has an abstract nature and can be applied to different problems
Gives students a "deep" understanding of logical reasoning

Solution:

LEGUP is...
Engaging, Concrete, and Easy to Use

Engaging:

Grid-based puzzles like those employed in LEGUP build upon basic logic skills and can make learning logic a more interesting and entertaining game for students.

Concrete:

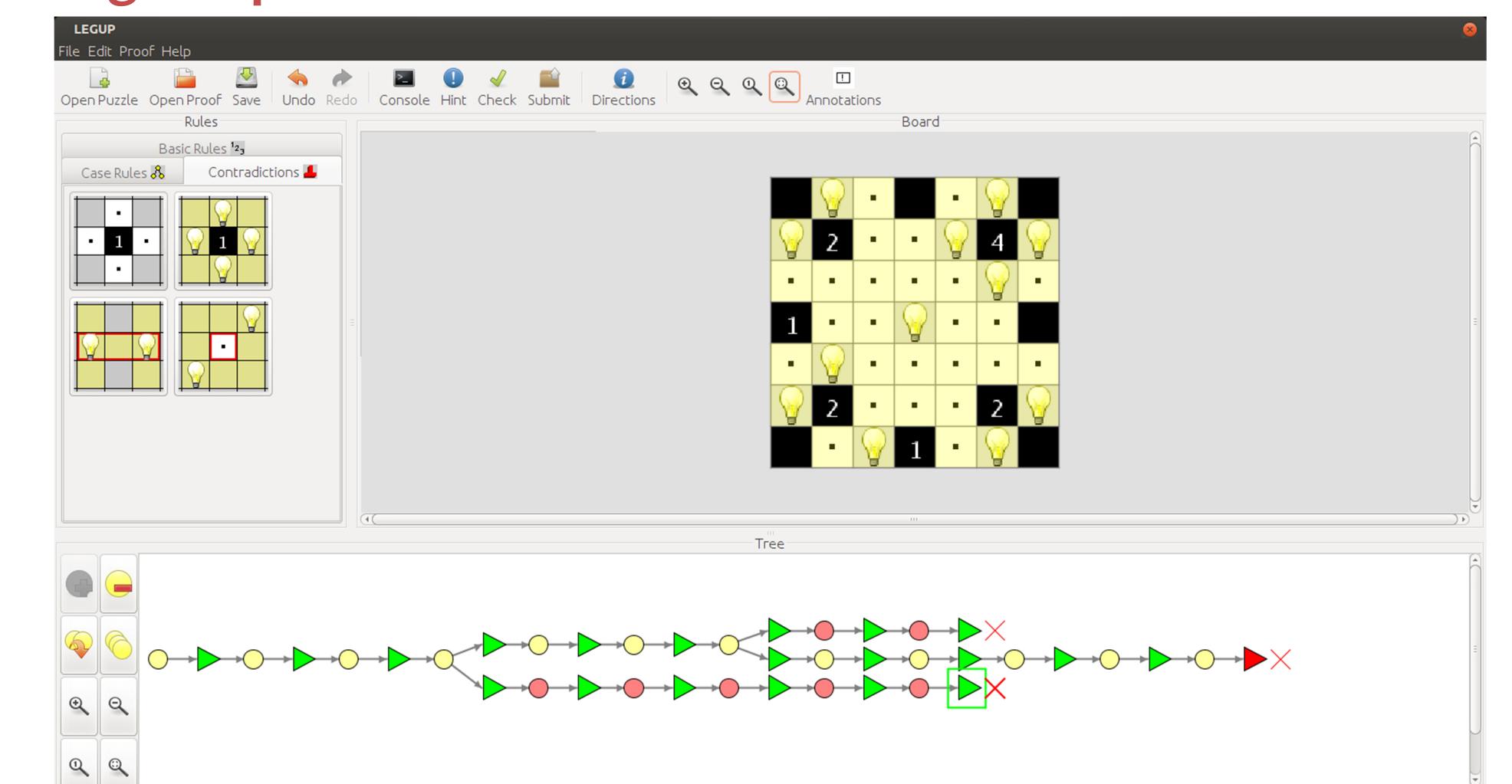
By using concrete logic puzzles, students have something concrete to reason about. Additionally, students can see that despite having different puzzles in LEGUP the same logical principles can be used to solve each one.

Easy to Use:

The visual, grid-based puzzles in LEGUP makes logic more approachable and easier to understand. The corresponding graphical proof tree also makes it easier to visualize the flow of the proof.

Other Games:

LightUp



Nurikabe

