

uProve

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Overview

- ◆ Building natural deduction proofs in propositional logic
 - ◆ Helping the user
 - ◆ Simple and easy-to-use program
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Natural deduction

- A proof line consists of:
 - List of dependencies
 - Line number
 - Formula
 - Justification
- Some symbols are slightly different

1,2 (3) p & q

1,2 &l

Dependencies

- ♦ Premises depend on themselves
 - ♦ Assumptions depend on themselves
 - ♦ Rule transforms formula and dependencies
 - ♦ Last line may only depend on premises
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Example rules

a_1, \dots, a_n	(j)	p	
b_1, \dots, b_u	(k)	q	
$a_1, \dots, a_n, b_1, \dots, b_u$	(m)	$p \ \& \ q$	$j, k \ \& \ I$

a_1, \dots, a_n	(j)	$p \rightarrow q$	
b_1, \dots, b_u	(k)	p	
$a_1, \dots, a_n, b_1, \dots, b_u$	(m)	q	$j, k \rightarrow E$

Example proof

1	(1)	$p \rightarrow q$	Premise
2	(2)	p	Premise
1,2	(3)	q	1,2 $\rightarrow E$
1,2	(4)	$p \ \& \ q$	2,3 $\& I$

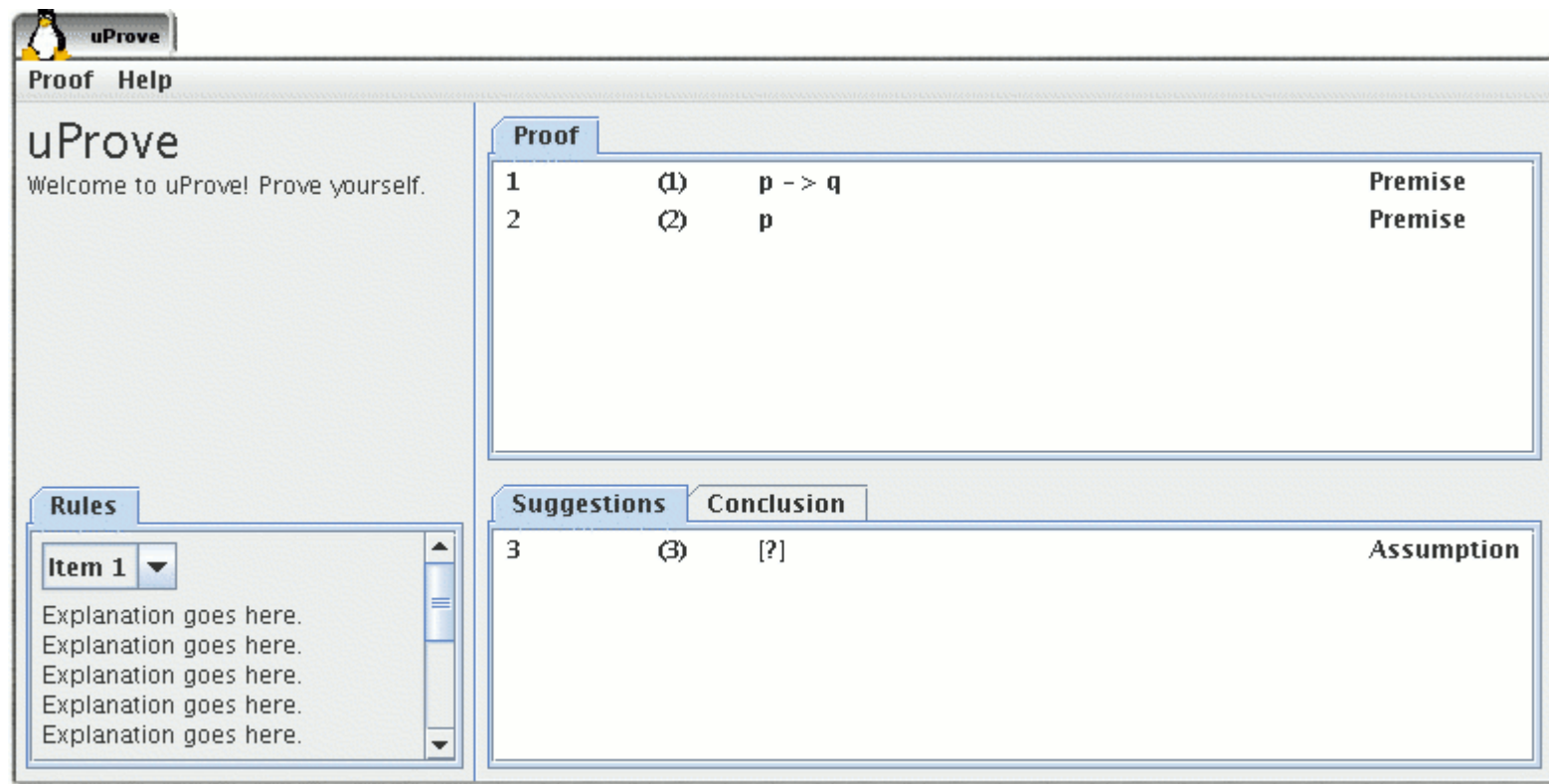
Another example rule

j	(j)	p	Assumption
a_1, \dots, a_n	(k)	q	
$\{a_1, \dots, a_n\}/j$	(m)	$p \rightarrow q$	$j, k \rightarrow I$

Another example proof

1	(1)	$p \rightarrow q$	Premise
2	(2)	$q \rightarrow r$	Premise
3	(3)	p	Assumption
1,3	(4)	q	1,3 \rightarrow E
1,2,3	(5)	r	2,4 \rightarrow E
1,2	(6)	$p \rightarrow r$	3,5 \rightarrow I

The program



The program

The screenshot shows the uProve application window. The title bar includes a penguin icon and the text "uProve". The menu bar contains "Proof" and "Help". The main window is divided into several sections:

- uProve**: A header with the text "Welcome to uProve! Prove yourself."
- Proof**: A table with two rows, both highlighted in pink. The first row contains "1", "(1)", " $p \rightarrow q$ ", and "Premise". The second row contains "2", "(2)", " p ", and "Premise".
- Rules**: A section with a dropdown menu showing "Item 1" and a list of five entries, each starting with "Explanation goes here."
- Suggestions**: A table with three rows. The first row contains "1,2", "(3)", " $\phi \rightarrow \psi \ \& \ p$ ", and "1,2 AndInt...". The second row contains "1,2", "(3)", " $p \ \& \ \phi \rightarrow \psi$ ", and "2,1 AndInt...". The third row contains "1,2", "(3)", " q ", and "1,2 Implic...".

Possible improvements

- ◆ GUI
 - ◆ Predicate logic
 - ◆ “Hints” or automated reasoning
 - ◆ Communication
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