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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 &I

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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

$a_1,...,a_n$ (j)   p

$b_1,...,b_u$ (k)   q

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

$a_1,...,a_n$ (j)   p -> q

$b_1,...,b_u$ (k)   p

$a_1,...,a_n,b_1,...,b_u$ (m)   q   j,k ->E

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Example proof

1	(1)	p -> q	Premise
2	(2)	p	Premise
1,2	(3)	q	1,2 ->E
1,2	(4)	p & q	2,3 &I

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Another example rule

j	(j)	p	Assumption
$a_1,...,a_n$	(k)	q	
$\{a_1,...,a_n\}/j$	(m)	$p \rightarrow q$	j,k ->l

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Another example proof

1	(1)	p -> q	Premise
2	(2)	q -> r	Premise
3	(3)	p	Assumption
1,3	(4)	q	1,3 ->E
1,2,3	(5)	r	2,4 ->E
1,2	(6)	p -> r	3,5 ->I

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The program

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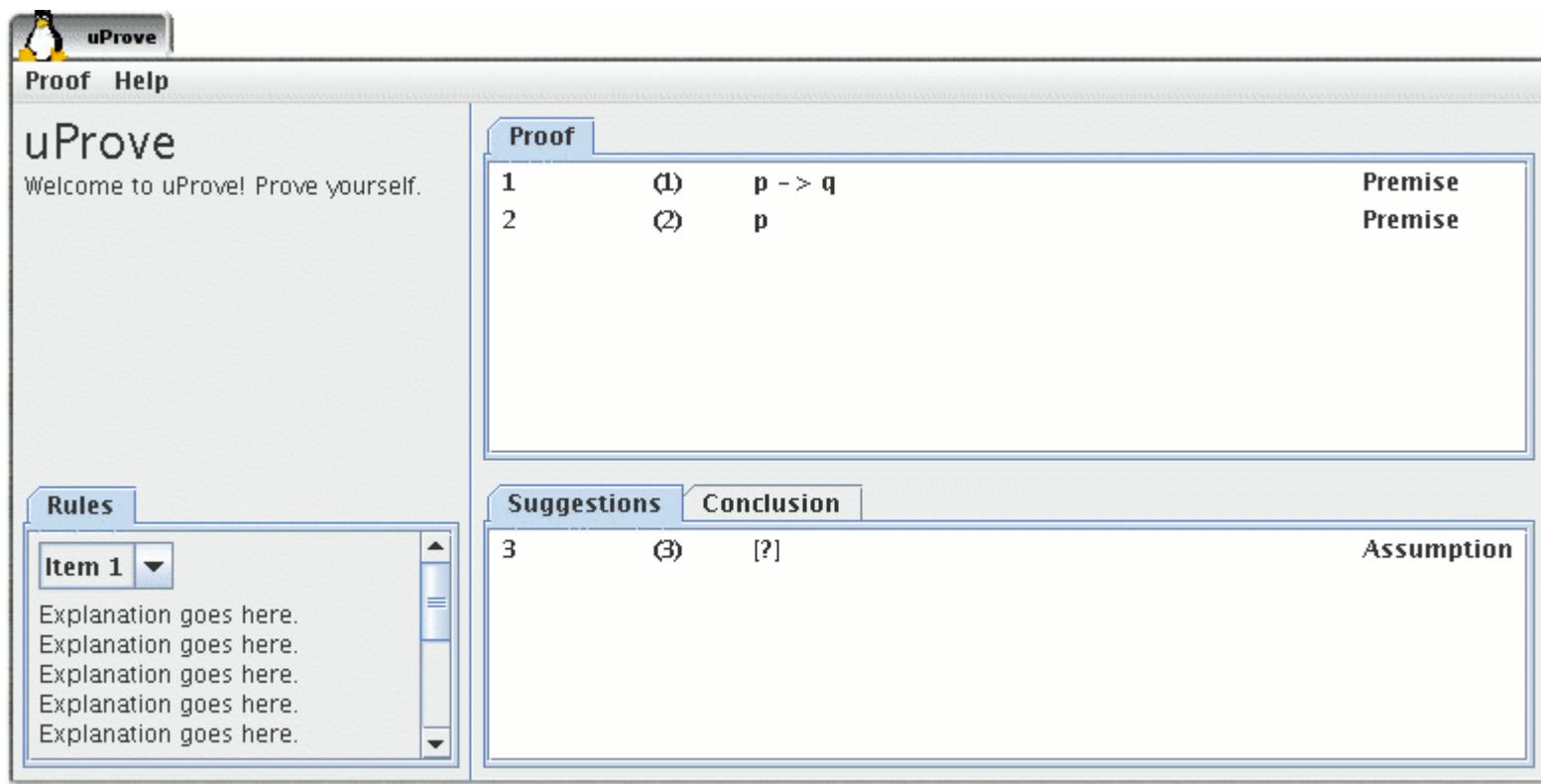
The program
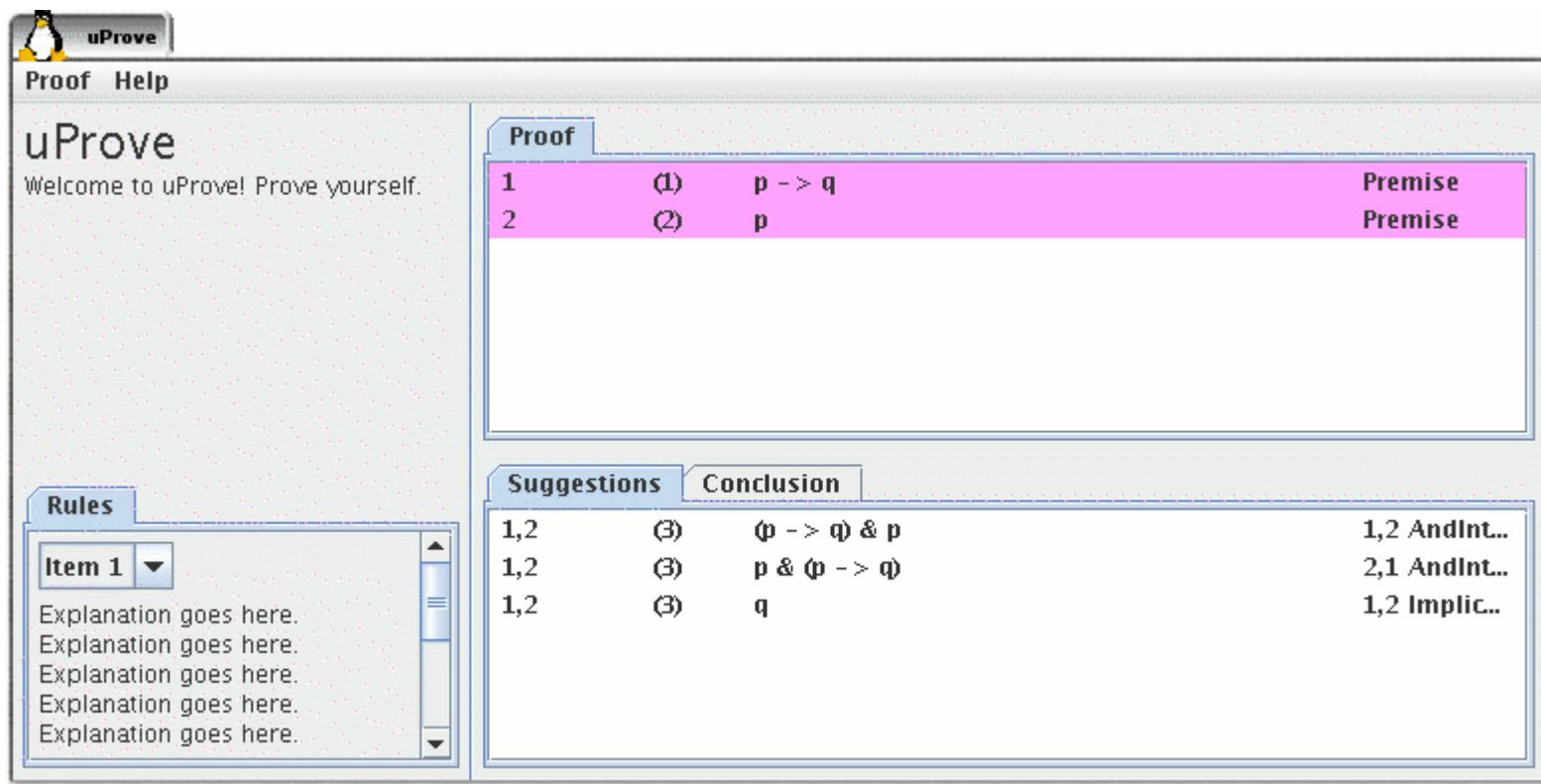
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Possible improvements

- GUI
- Predicate logic
- "Hints" or automated reasoning
- Communication

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