

# Introducing Slate...


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Introduction to Logic**

# Where to get Slate

- <http://www.cogsci.rpi.edu/slate/>
- Username: existential
- Password: remand\_DOXASTIC
- A .zip file is available for Windows. For Mac, please contact us directly.

- **A manual will be available (using the same username and password) at <http://www.cogsci.rpi.edu/research/rair/slate/manual/>**
- **Note, this manual is more specifically for the full first order logic version of Slate. The section on workspace interaction is still correct.**

- **Slate was developed as a tool for intelligence analysts.**
  - **Slate integrates the power of machine reasoning systems and model finders to help users discover novel possibilities and unexpected conclusions.**
  - **Slate harnesses the full expressive power of First Order, Multi-Sorted Logic.**
- 

# This version...

- **Restricts formulae to propositional logic.**
- **Enables only two machine reasoning systems, PARADOX and SNARK.**
- **Generates propositional models in a textual form. (rather than graphical)\***
- **Will be followed by a fuller version of Slate will be distributed when class covers full First Order Logic.**



**Slate Anatomy**

# *Workspace*

## *Main Tools*

### *Creation Tools*

Workspace Tools | Information Management | Logic Tools

Create

New Set

New Argument

New Subproof

Copy objects

Modify

Change Info

Remove Objects

Tool options

### *Modification Tools*

# *Workspace*

## *Main Tools*

### *Item Creation*

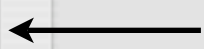
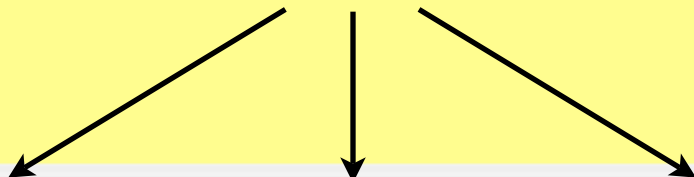
Workspace Tools | **Information Management** | Logic Tools

Tools:

- Create Information
- Translation Table
- Tacit Information
- Signature Manager

Tool:

*Unnecessary in this version*



# Workspace

## Main Tools

### Automated Tools

Workspace Tools | Information Management | Logic Tools

Tools:

- Build Models
- Check Consistency
- Generate Hypotheses
- Validate Sequents

Tool:

Propositions:

Input

Generate Models

Prover: Paradox Show Model:

Select the propositions which you wish to model. Then, press the 'Generate Models' button to try to generate a model in which the propositions are true

Models Found:

Output

### System Selection

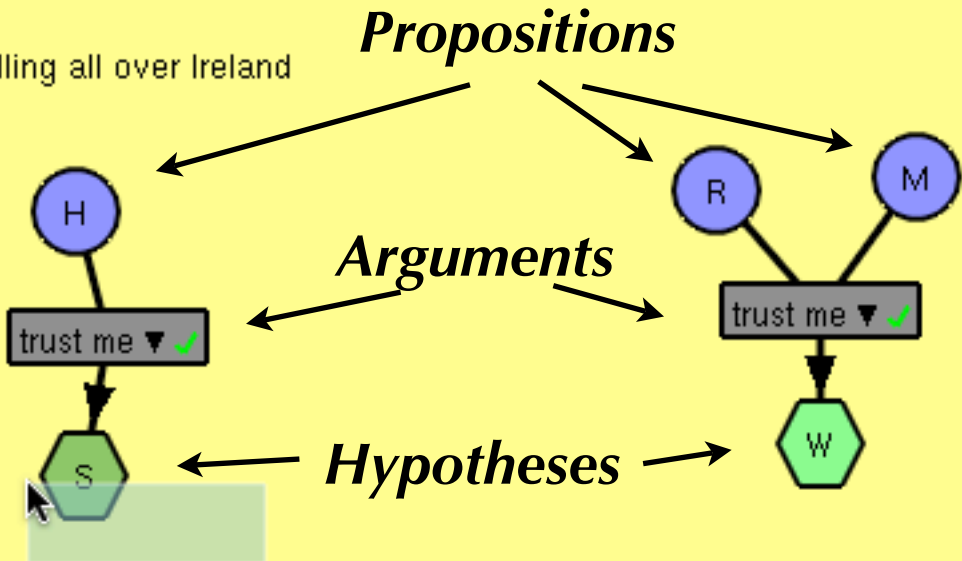
Single element selected:

S - Snow

Description:

The snow is falling all over Ireland

*Description of Selected Item(s)*



Workspace Tools

Information Management

Logic Tools

Create

New Set

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New Subproof

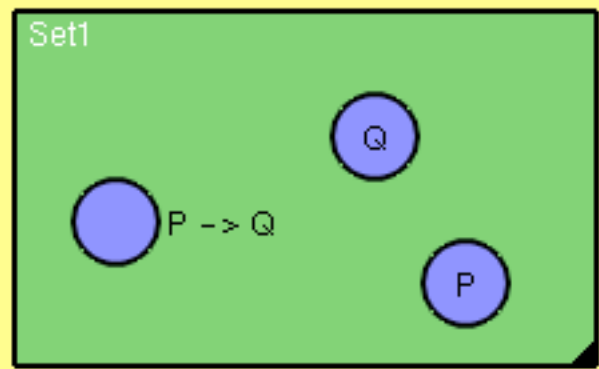
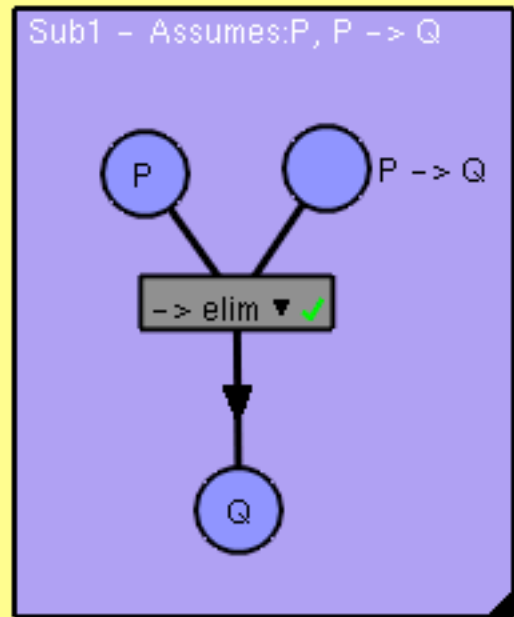
Copy objects

Modify

Change Info

Remove Objects

Tool options



*Sets*



Sub1

*Subproofs*

Workspace Tools    Information Management    Logic Tools

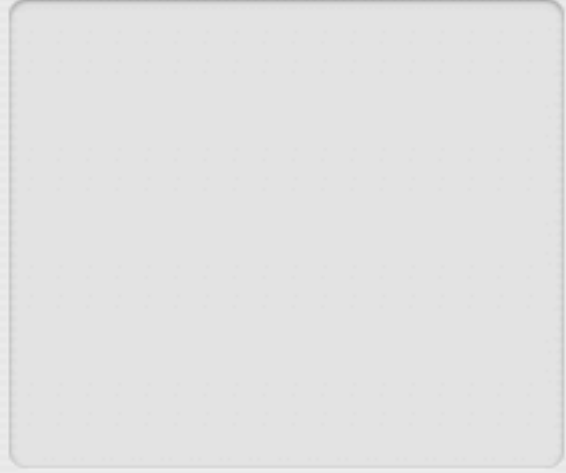
Create

- New Set
- New Argument
- New Subproof
- Copy objects

Modify

- Change Info
- Remove Objects

Tool options



# Syntax (propositional)

- Slate syntax is prefix notation
- Atomic formulae are combinations of letters, numbers, and dashes ('-') beginning with a letter.
- Connectives are
  - ' $\sim$ ' -- Negation ( $\sim P$ ) "Not P"
  - '&' -- Conjunction ( $\& P Q$ ) "P and Q"
  - ' $\vee$ ' -- Disjunction ( $\vee P Q$ ) "P or Q"
  - ' $\rightarrow$ ' -- Conditional ( $\rightarrow P Q$ ) "P implies Q"
  - ' $\leftrightarrow$ ' -- Biconditional ( $\leftrightarrow P Q$ ) "P if and only if Q"

# Rules of Inference

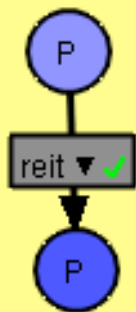
(intro and elim for each)

- **Reiteration**
- **Conjunction**
- **Conditional**
- **Biconditional**
- **Disjunction**
- **Contradiction**
- **Negation**

Single element selected:

P - P

Description:



Workspace Tools

Information Management

Logic Tools

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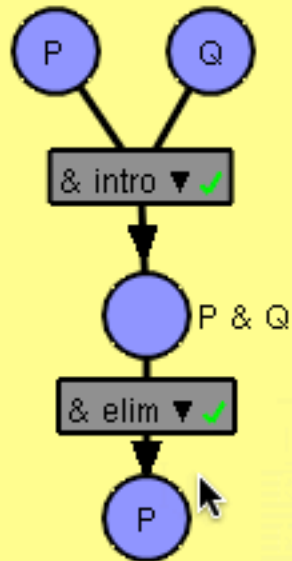
Tool options

# SLATE - Conjunction Rules

Single element selected:

-

Description:



Workspace Tools

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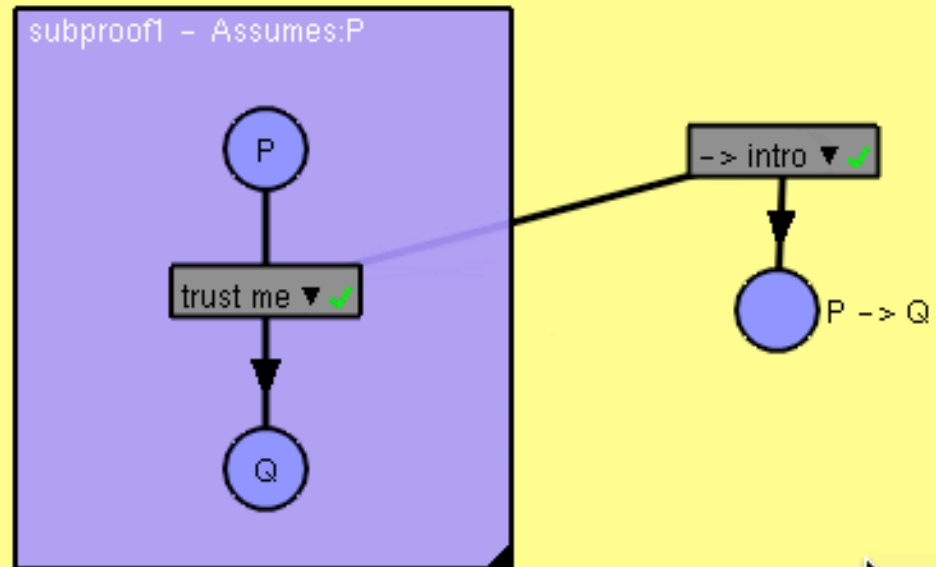
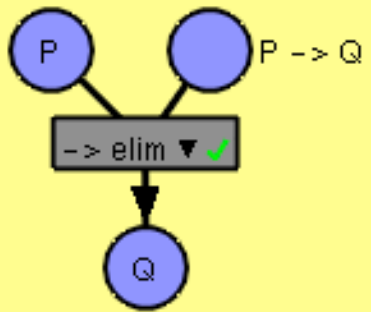
Tool options

# SLATE - Conditional Rules

Single element selected:

-

Description:



Workspace Tools

Information Management

Logic Tools

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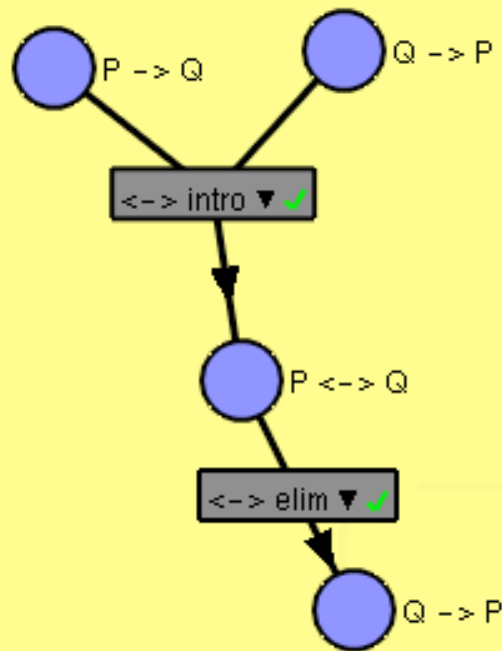
Copy objects

Modify

Change Info

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Tool options



Workspace Tools

Information Management

Logic Tools

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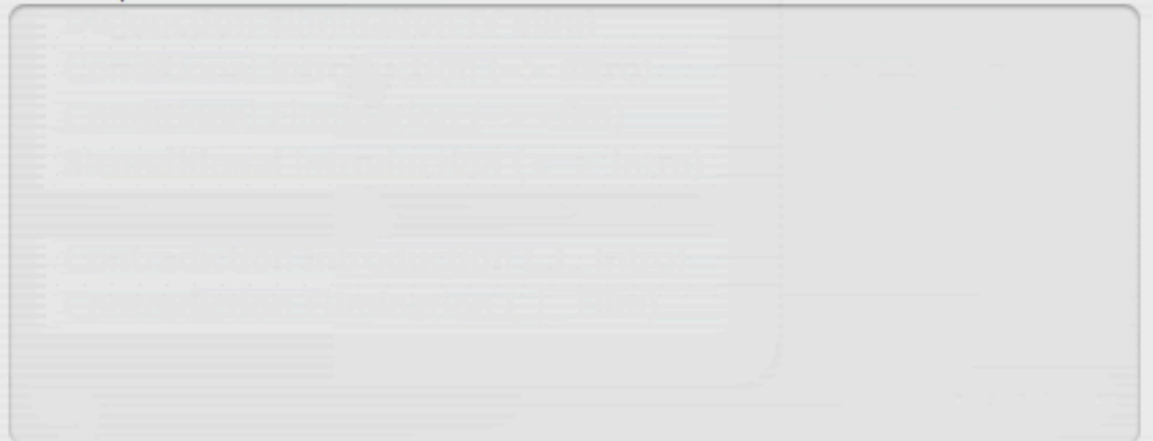
Copy objects

Modify

Change Info

Remove Objects

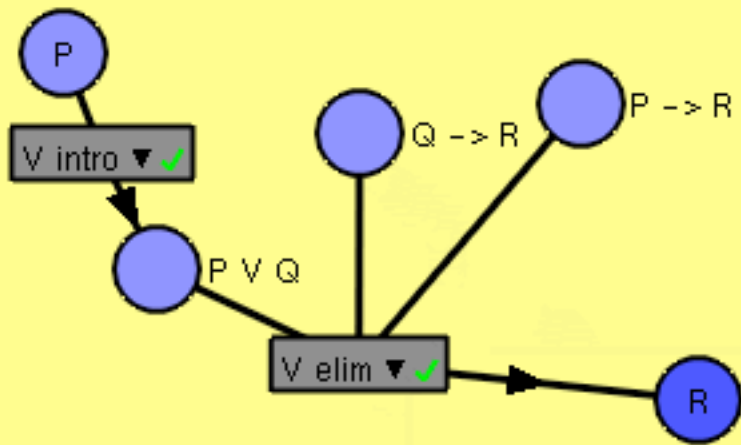
Tool options



Single element selected:

$R - R$

Description:



Workspace Tools

Information Management

Logic Tools

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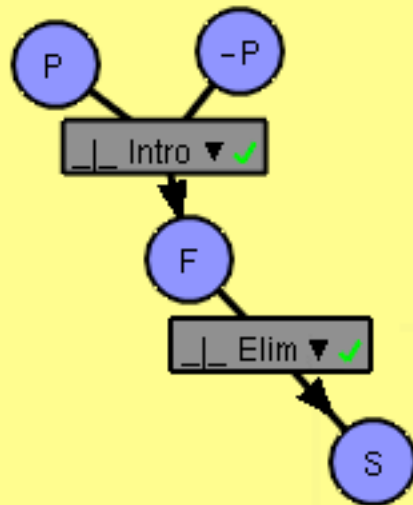


# SLATE - Contradiction Rules

Single element selected:

-

Description:



Workspace Tools

Information Management

Logic Tools

Create

New Set

New Argument

New Subproof

Copy objects

Modify

Change Info

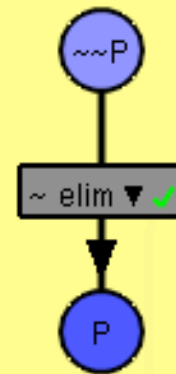
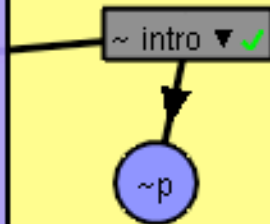
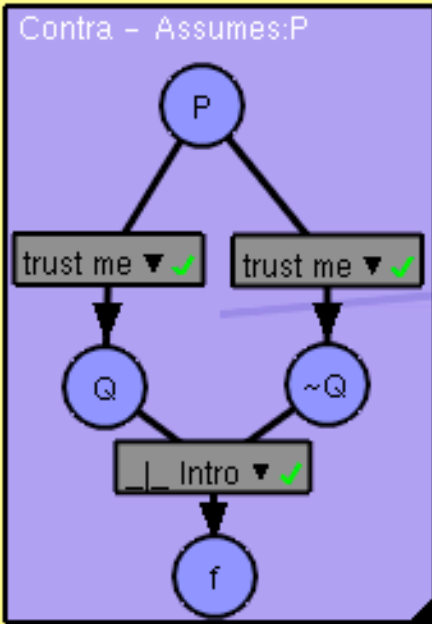
Remove Objects

Tool options

Single element selected:

P - P

Description:



### Workspace Tools

### Information Management

### Logic Tools

#### Create

New Set

New Argument

New Subproof

Copy objects

#### Modify

Change Info

Remove Objects

#### Tool options