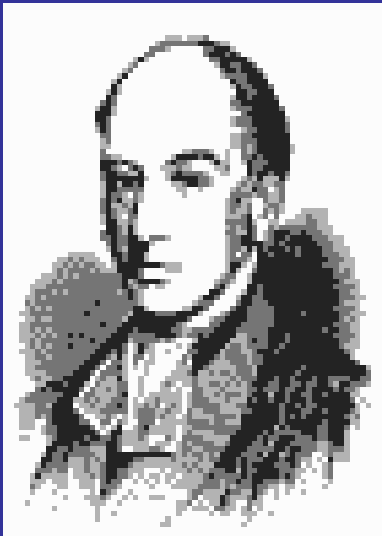


Wigmore, Toulmin & Walton

The Diagramming Trinity
and their Application in Legal Practice

Chris Reed

*School of Computing
University of Dundee, Dundee DD1 4HN
t. 01382 388083 f. 01382 345509
chris@computing.dundee.ac.uk
arg.computing.dundee.ac.uk*



1850s

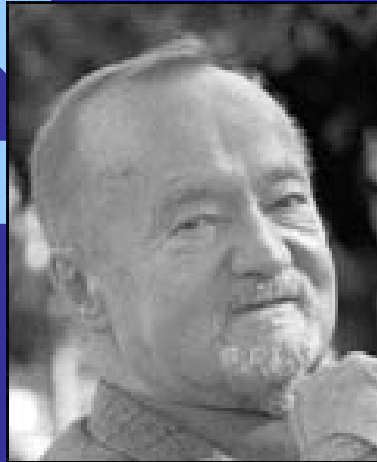
History of Arg Diagramming



1850s

1910s

History of Arg Diagramming

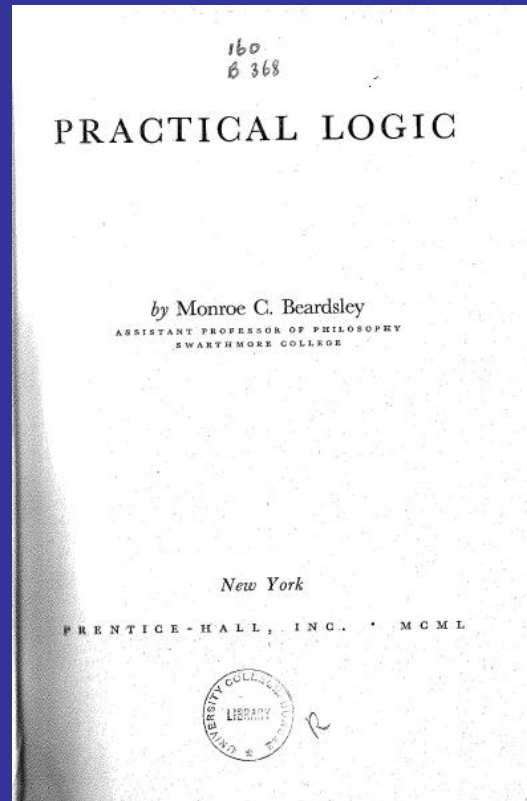


1850s

1910s

1950s

History of Arg Diagramming

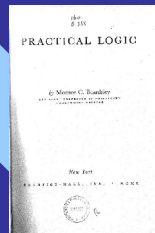


1850s

1910s

1950s

History of Argumentation



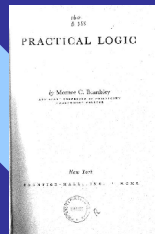
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History of Arg Diagramming



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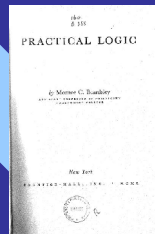
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1950s

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1980s

History of Arg Diagramming



1850s

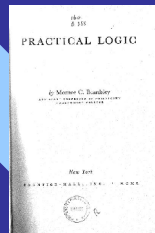
1910s

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History of Arg Diagramming



1850s

1910s

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1980s 1990s

History of Arg Diagramming



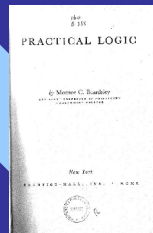
1850s



1910s



1950s



1970s



1980s



1990s

History of Arg Diagramming

Computational Approaches



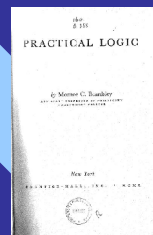

1850s



1910s



1950s



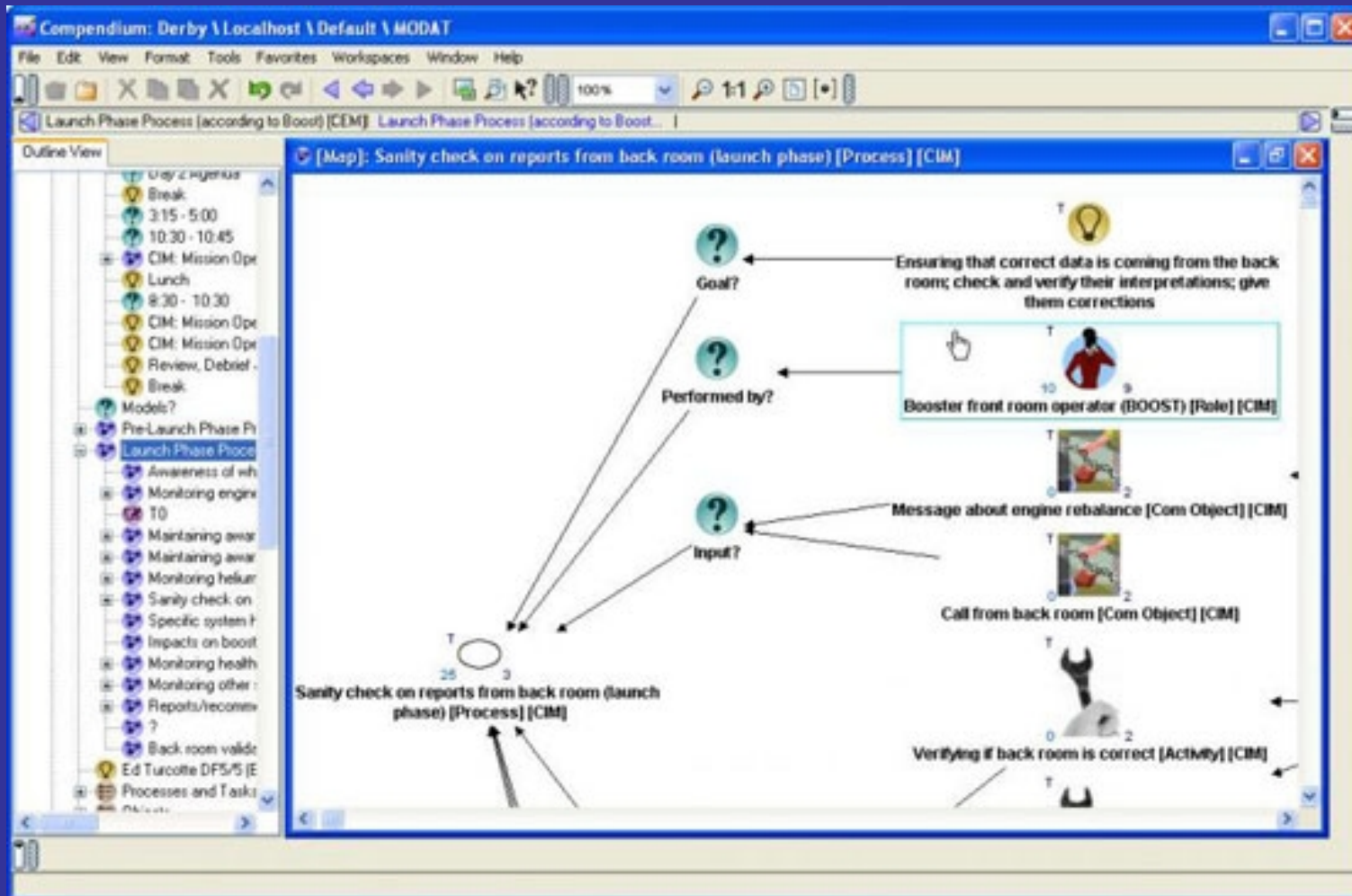
1970s



1980s 1990s



Computational Approaches



Computational Approaches



Reason!Able - C:\PROGRAM FILES\REASON\REASONABLE\Samples\FossilFuels.re3

File Edit View Folding Help

Lightbulb Green Lightbulb Red Lightbulb X Mountains Telescope Archway Recycle Bin Test Tubes Document Hammer Scales

Building Evaluation

Advice

Can you think of any evidence backing this reason up? Add reasons using the green toolbar icon. However you also need to consider evidence against it. Add objections using the red toolbar icon.

```

    graph BT
      A["We should reduce our use of fossil fuels."]
      B["Reason: Fossil fuels contribute to global warming."]
      C["Objection: Fossil fuels are cheaper than any alternative."]
      D["Objection: There is no good evidence that global warming is actually occurring."]
      E["Reason: Rise in global temperatures have followed massive use of fossil fuels this century."]
      F["Reason: Nuclear power plants are more expensive than coal plants."]
      G["Objection: Spending more to take a safer path is not wasting money."]
      D --> B
      E --> B
      F --> C
      G --> C
      B --> A
      C --> A
  
```

We should reduce our use of fossil fuels.

Reason: Fossil fuels contribute to global warming.

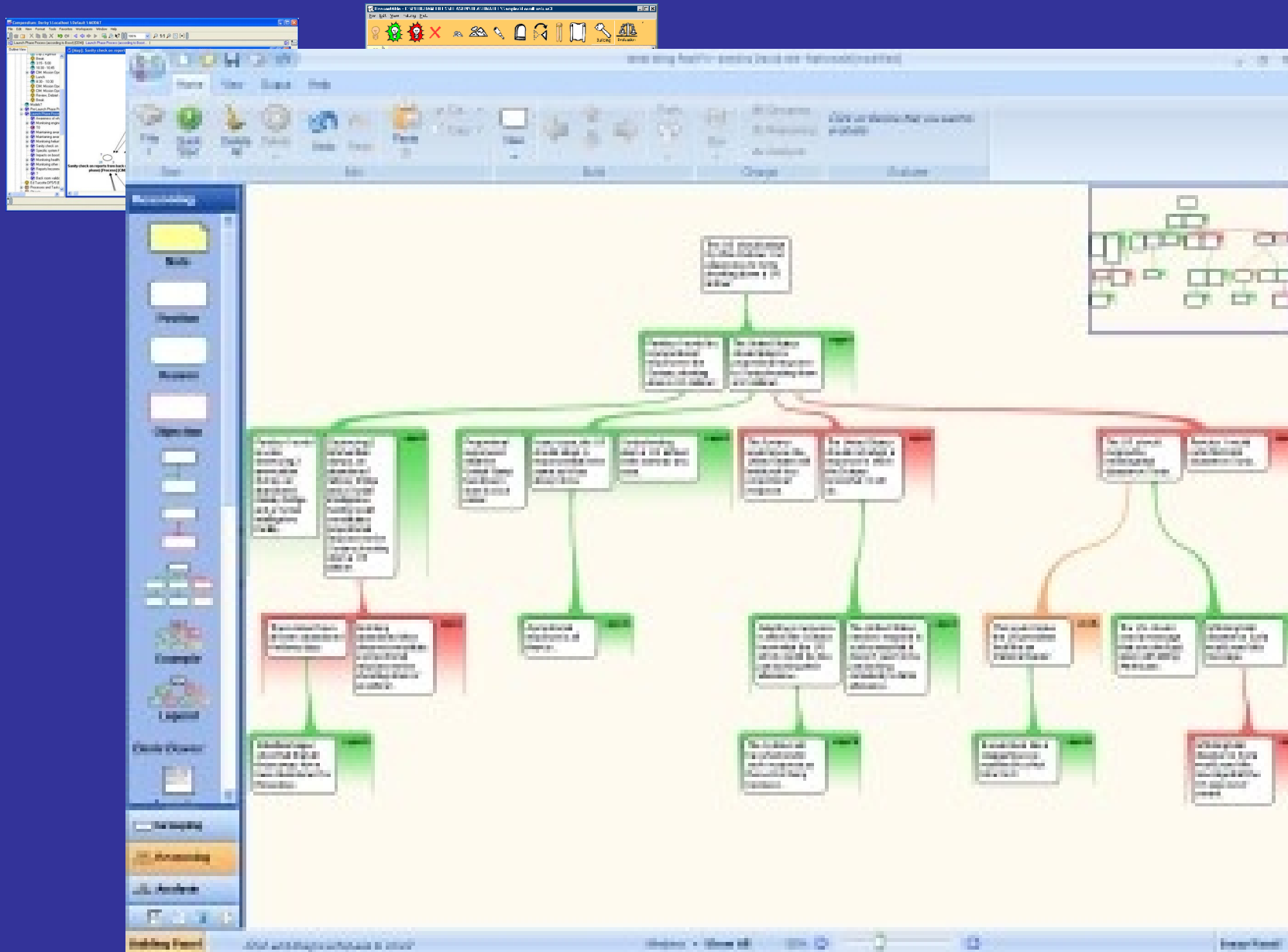
Objection: Fossil fuels are cheaper than any alternative.

Objection: There is no good evidence that global warming is actually occurring.

Reason: Rise in global temperatures have followed massive use of fossil fuels this century.

Reason: Nuclear power plants are more expensive than coal plants.

Objection: Spending more to take a safer path is not wasting money.

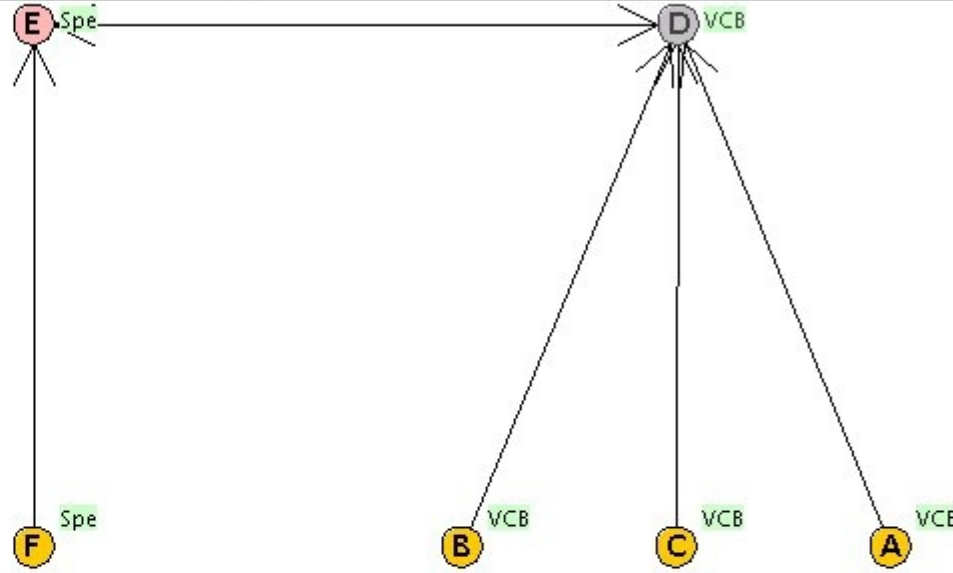


Araucaria

File Edit Schemes AraucariaDB Help

6. Vice Chancellor Brown has claimed that se...

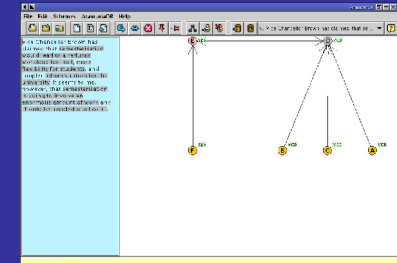
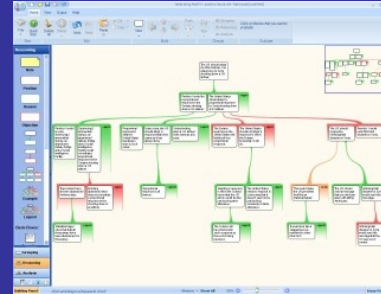
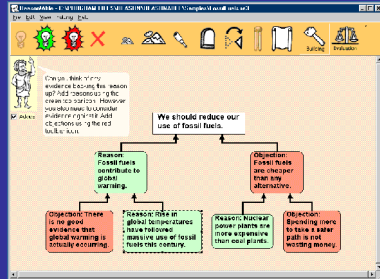
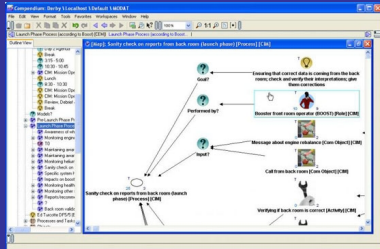
Vice Chancellor Brown has claimed that semesterisation would lead to a reduced workload for staff, more flexibility for students, and simpler administration for the university. It seems to me, however, that semesterisation is going to involve an enormous amount of work and should be avoided at all costs.



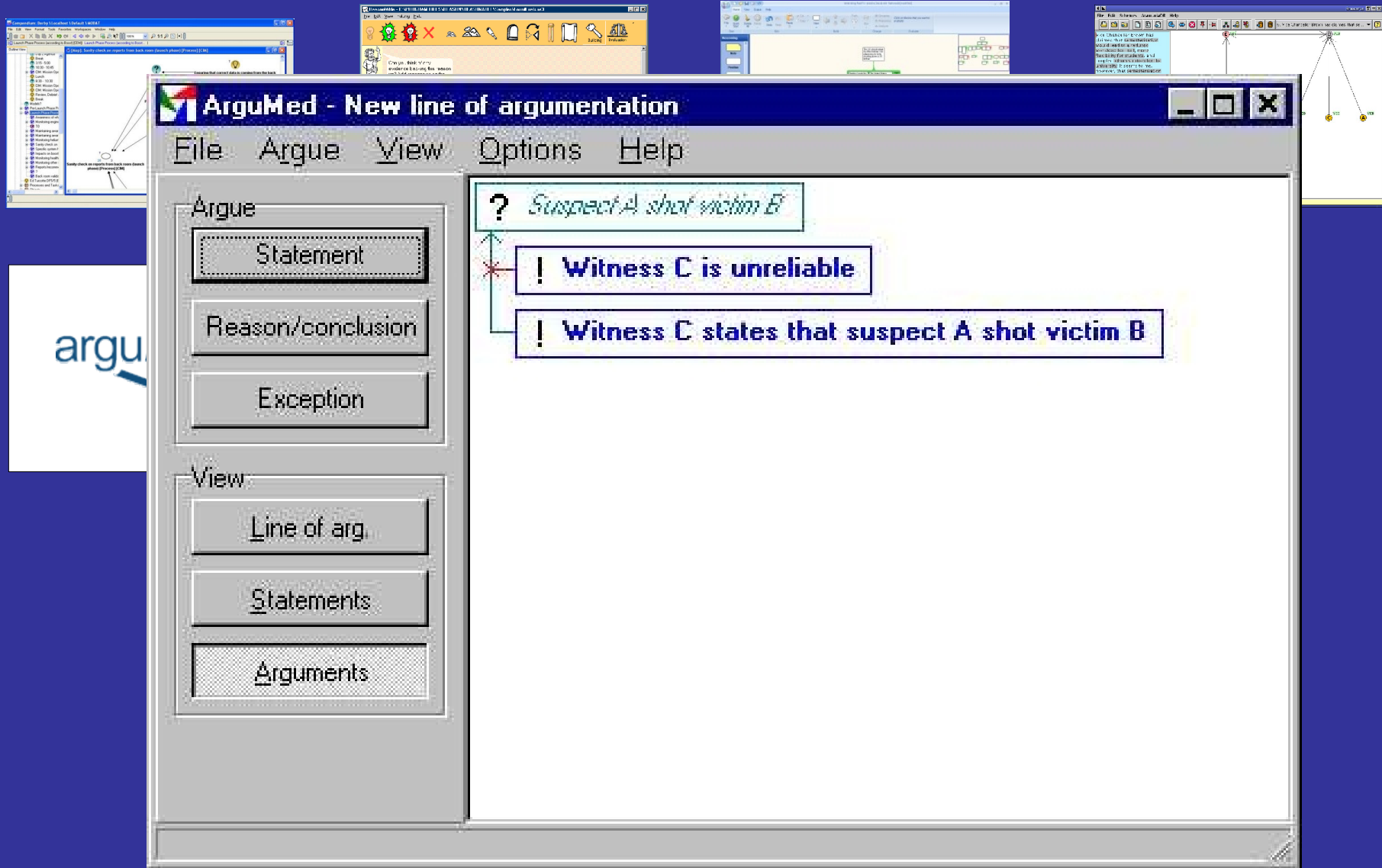
```

graph TD
    F((F Spe)) --> E((E Spe))
    E --> D((D VCB))
    D --> B((B VCB))
    D --> C((C VCB))
    D --> A((A VCB))
  
```

Computational Approaches



Computational Approaches

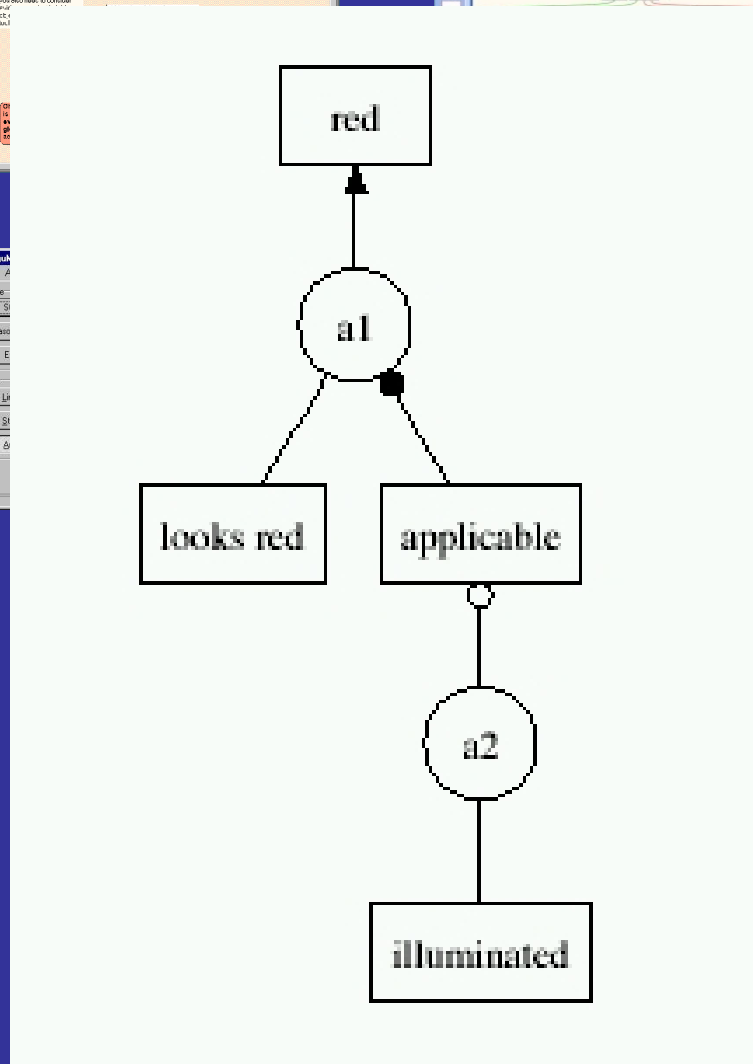
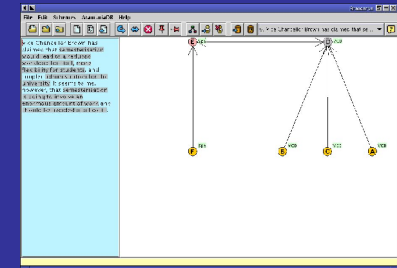
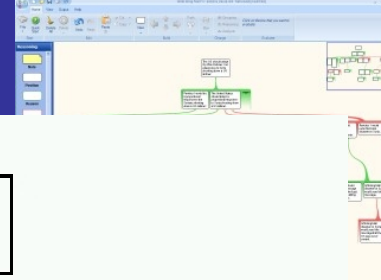
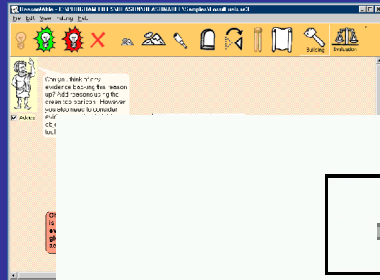
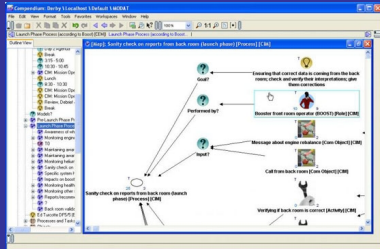


The screenshot displays the ArguMed software interface. The main window is titled "ArguMed - New line of argumentation" and features a menu bar with "File", "Argue", "View", "Options", and "Help". On the left side, there is a vertical toolbar with buttons for "Statement", "Reason/conclusion", "Exception", "Line of arg.", "Statements", and "Arguments". The main workspace contains a diagram of an argumentation structure:

- A root node: *Suspect A shot victim B* (enclosed in a light blue box with a question mark icon).
- A child node: **! Witness C is unreliable** (enclosed in a purple box, connected to the root by a red arrow).
- A child node: **! Witness C states that suspect A shot victim B** (enclosed in a purple box, connected to the root by a green arrow).

The background shows several other windows, including a file explorer, a diagram editor, and a text editor, suggesting a complex workflow environment.

Computational Approaches





PARMENIDES Discussion Forum

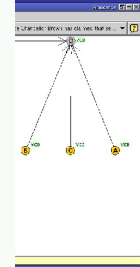


Welcome to the PARMENIDES discussion forum. The topic of this forum is:

"Is Invasion of Iraq Justified?"

This particular discussion forum is for illustrative purposes only as the topic concerns a past event, namely the invasion of Iraq. However, the intention of this forum is for public use to discuss current issues, prior to an event taking place.

Computational Approaches



rum

If this forum is:

concerns a past event, namely
discuss current issues, prior to



ArgDF is a Semantic Web-Based Argumentation System

Developed as part of a disseration project
At the British University in Dubai Jointly with the University of Edinburgh,
Informatics Department,
Knowledge and Data Management Stream,

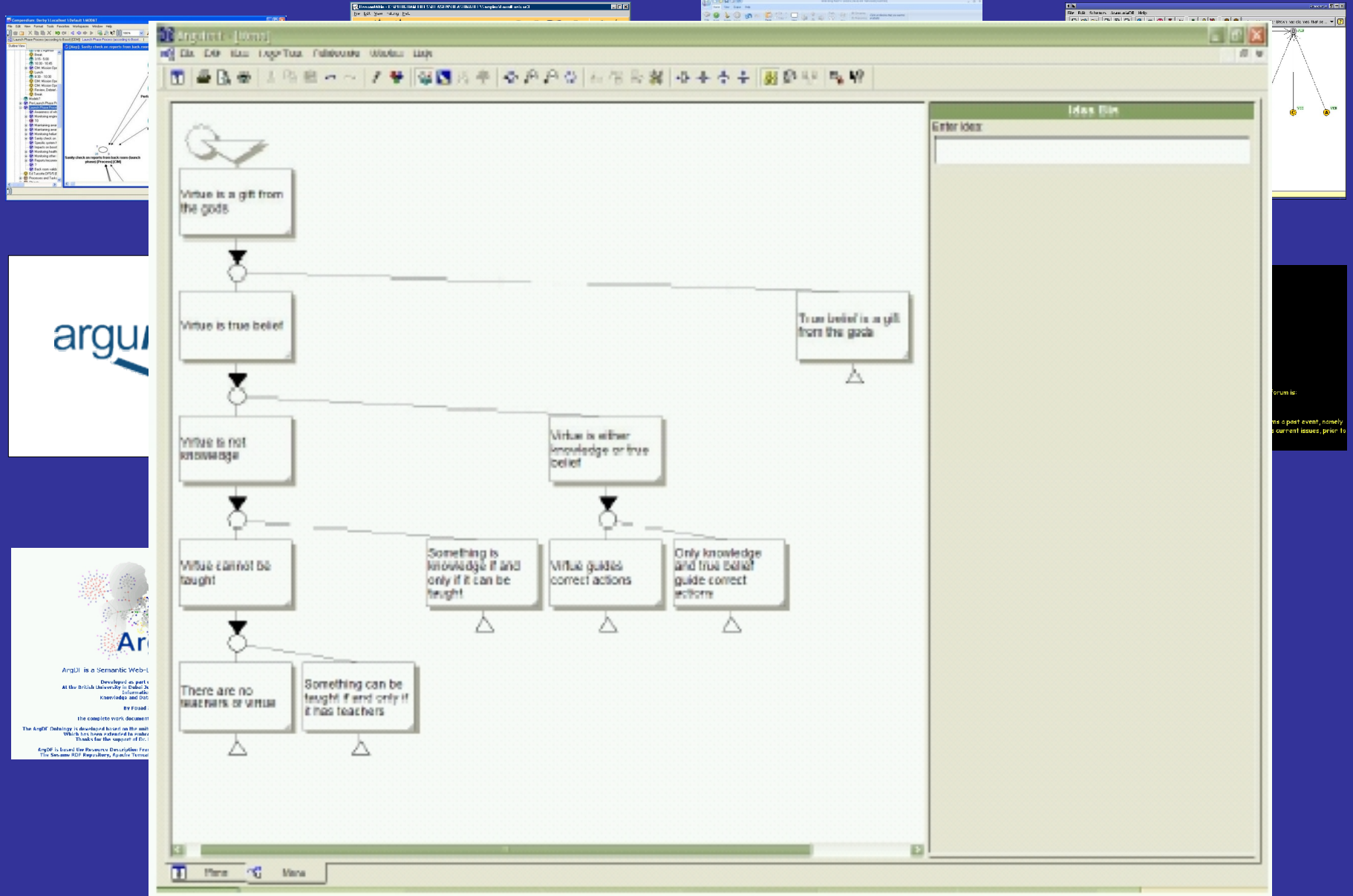
By Fouad Zablith, 2006

The complete work document will be available online shortly.

The ArgDF Ontology is developed based on the uniefd Argumentation Interchange Format (AIF) concepts,
Which has been extended to embrace Walton's Argumentation Schemes,
Thanks for the support of Dr. Iyad Rahwan and Dr. Chris Reed.

ArgDF is based the Resource Description Framework (RDF) Semantic language and requires:
The Sesame RDF Repository, Apache Tomcat Server, Apache HTTP Server, PHP and MySQL

Computational Approaches



The screenshot displays the Argui software interface, which is used for creating and managing semantic networks. The main workspace shows a complex network of concepts and relationships:

- Root Node:** "Virtue is a gift from the gods" (with a hand icon).
- Level 1 Nodes:**
 - "Virtue is true belief" (connected via a downward arrow).
 - "True belief is a gift from the gods" (connected via a downward arrow).
- Level 2 Nodes:**
 - "Virtue is not knowledge" (connected via a downward arrow).
 - "Virtue is either knowledge or true belief" (connected via a downward arrow).
- Level 3 Nodes:**
 - "Virtue cannot be taught" (connected via a downward arrow).
 - "Something is knowledge if and only if it can be taught" (connected via a downward arrow).
 - "Virtue guides correct actions" (connected via a downward arrow).
 - "Only knowledge and true belief guide correct actions" (connected via a downward arrow).
- Level 4 Nodes:**
 - "There are no teachers of virtue" (connected via a downward arrow).
 - "Something can be taught if and only if it has teachers" (connected via a downward arrow).

On the right side of the interface, there is an "Ideas Bin" with the text "Enter idea:" and a large empty text area. A small diagram in the top right corner shows a simple network structure with nodes and arrows.

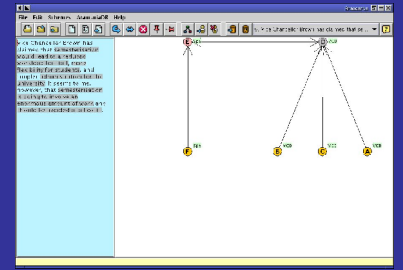
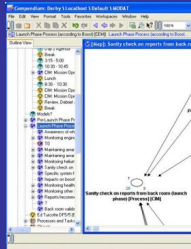


Argui is a Semantic Web-L
Developed as part of
the British University of Dundee
informatics
knowledge and ICT
BY FRODO
the complete work, decaem
The Argui Ontology is developed based on the work
of the British University of Dundee
informatics
knowledge and ICT
BY FRODO
the complete work, decaem
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of the British University of Dundee
informatics
knowledge and ICT
BY FRODO
the complete work, decaem

Forum is:
ins a past event, namely
current issues, prior to


Computational Approaches

Diagrams of our arguments are a virtuality



Extremely transform a diagram into an outline

PARMENIDES Discussion Forum



forum is:
...ens post event, namely
...ss current issues, prior to

The Glass Menagerie
by Tennessee Williams

- I. Characters**
 - A. Amanda Wingfield**
Amanda Wingfield is the mother of Tom and Laura. She clings to the past when she was a Southern belle and could have had her pick of anyone, but instead married a man who was charming, but irresponsible.
 - B. Laura Wingfield**
Laura is Tom's younger sister who is probably shy and has to wear a leg brace. She spends every day playing old records from her father's collection and playing with her collection of glass animals (menagerie). She is 20 years old.
 - C. Tom Wingfield**
Laura's older brother wants to be a poet but instead he has to work in a shoe warehouse to support the family. He likes to drink and goes to the movies.
 - D. Jim O'Connor**
The "gentleman caller." He loves Laura in high school when he was the model of success for the school play, popular athlete, very successful. His character contrasts with the Wingfield family.
 - E. Father**
He only appears in a picture on the wall, but he is on everyone's minds. He deserted the family. He is a symbol of how everything started to go wrong.
- II. Themes**
 - A. Memory**
 1. "The play is memory."
Tom states this in the prologue.
 2. Foreplay of failure

argu

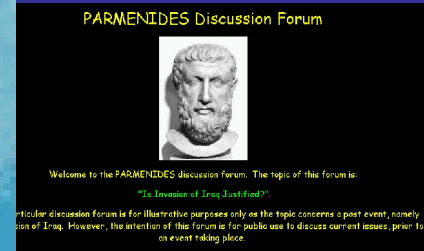
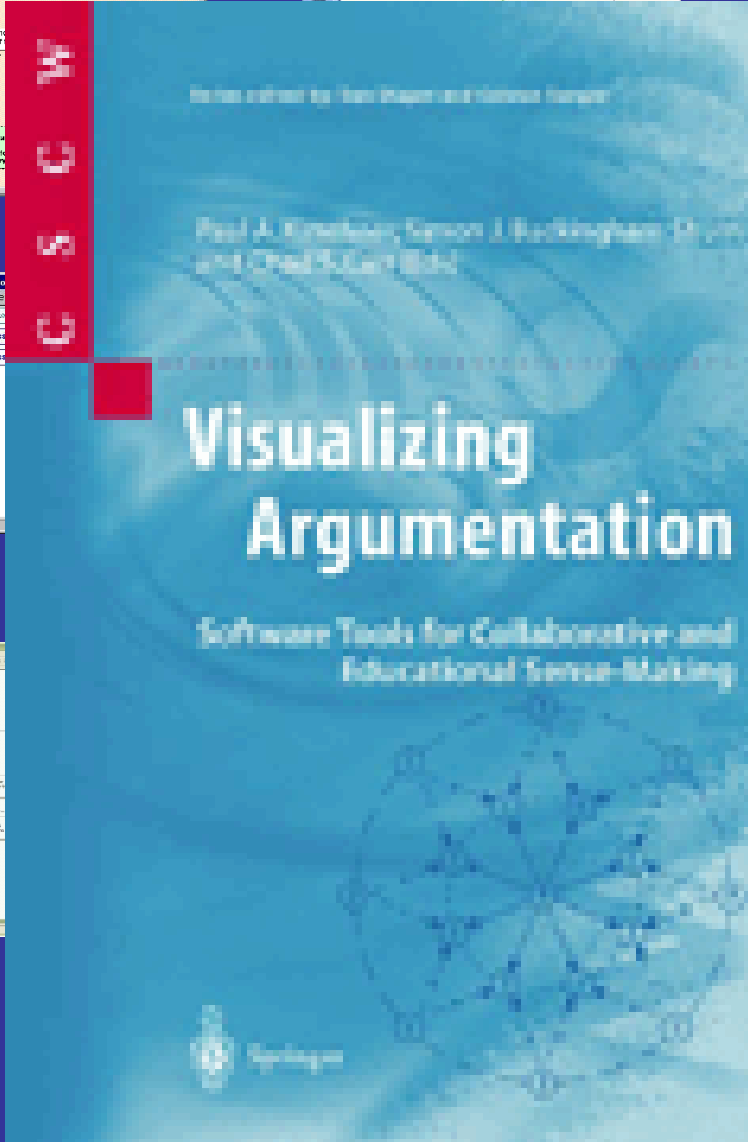
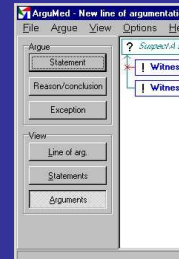
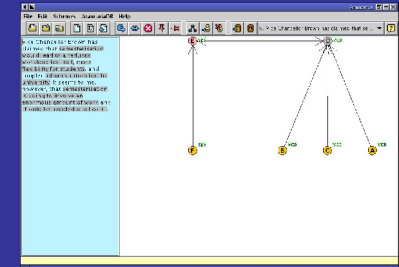
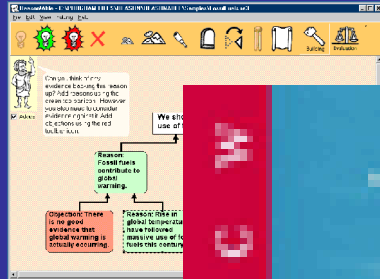
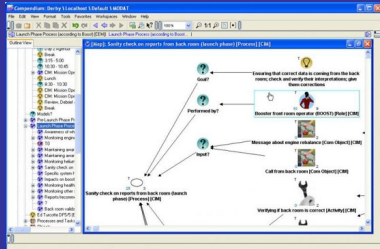


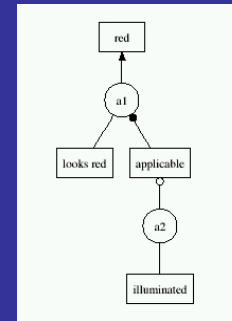
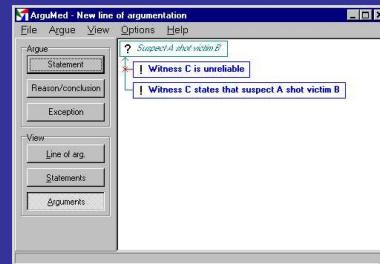
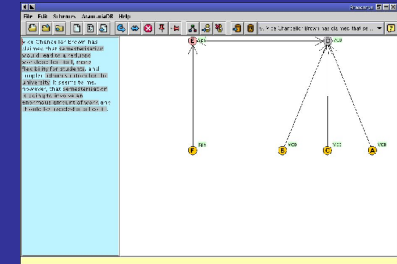
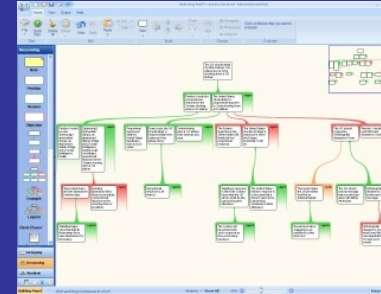
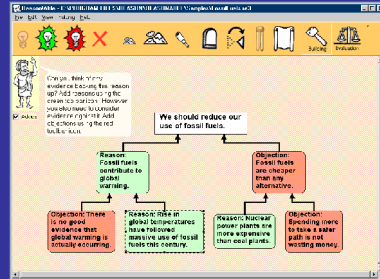
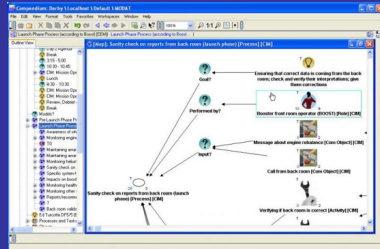
ArgDF

ArgDF is a Semantic Web-Based Argumentation System
Developed as part of a dissertation project
At the British University in Dubai under the direction of Edinburgh,
Informatics Department,
Knowledge and Data Engineering Stream,
By Foad Zahedi, 2006
The complete work document will be available online shortly.
The ArgDF Ontology is developed based on the natural Argumentation Interchange Format (AIF) concepts,
Which has been submitted to enhance Williams's Argumentative Sciences.
Thanks for the support of Dr. Fred Bahawan and Dr. Chai-Road.
ArgDF is based on the Semantic Description Framework (SDF) Semantic language and includes:
The Semantic SDF: Enclosures, Frames, Ternary Semantics, Apache HTTP Server, PHP and MySQL.


Condition shows the same ideas in a linear format:

Computational Approaches





PARMENIDES Discussion Forum



Welcome to the PARMENIDES discussion Forum. The topic of the forum is:
"Is Invasion of Iraq Justified?"

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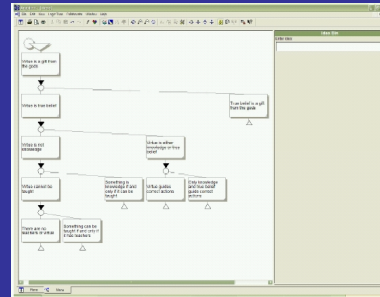
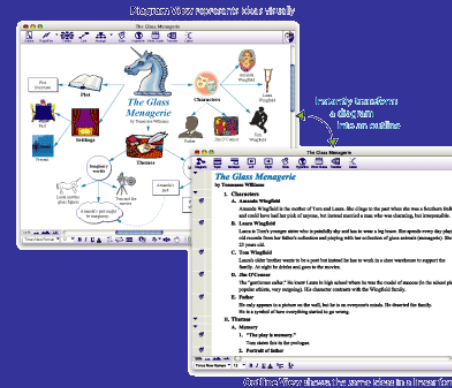
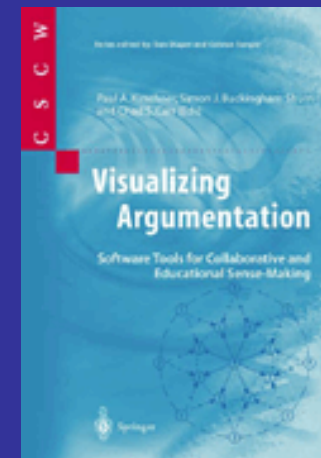


ArgDF is a Semantic Web-based Argumentation System
Developed as part of a 6-year research project
At the British University of Dubai, Faculty of the University of Edinburgh,
Informatics Department,
Knowledge and Data Engineering Stream,
BY Fouad Zabeti, 2006

The complete work document will be available online shortly.

The ArgDF ontology is developed based on the earlier Argumentation Frameworks (AFT) concepts,
which has been administered by Barbara Wallace, a government Scientist,
Thanks for the support of Dr. Iyad Rahwan and Dr. Chai-Road.

ArgDF is based on the Semantic Description Framework (SD) Semantic language and includes
The Semantic Web, Graphical, Plain, Trivalent, Semantic, Apache HTTP Server, PHP and MySQL.

Crossing theories



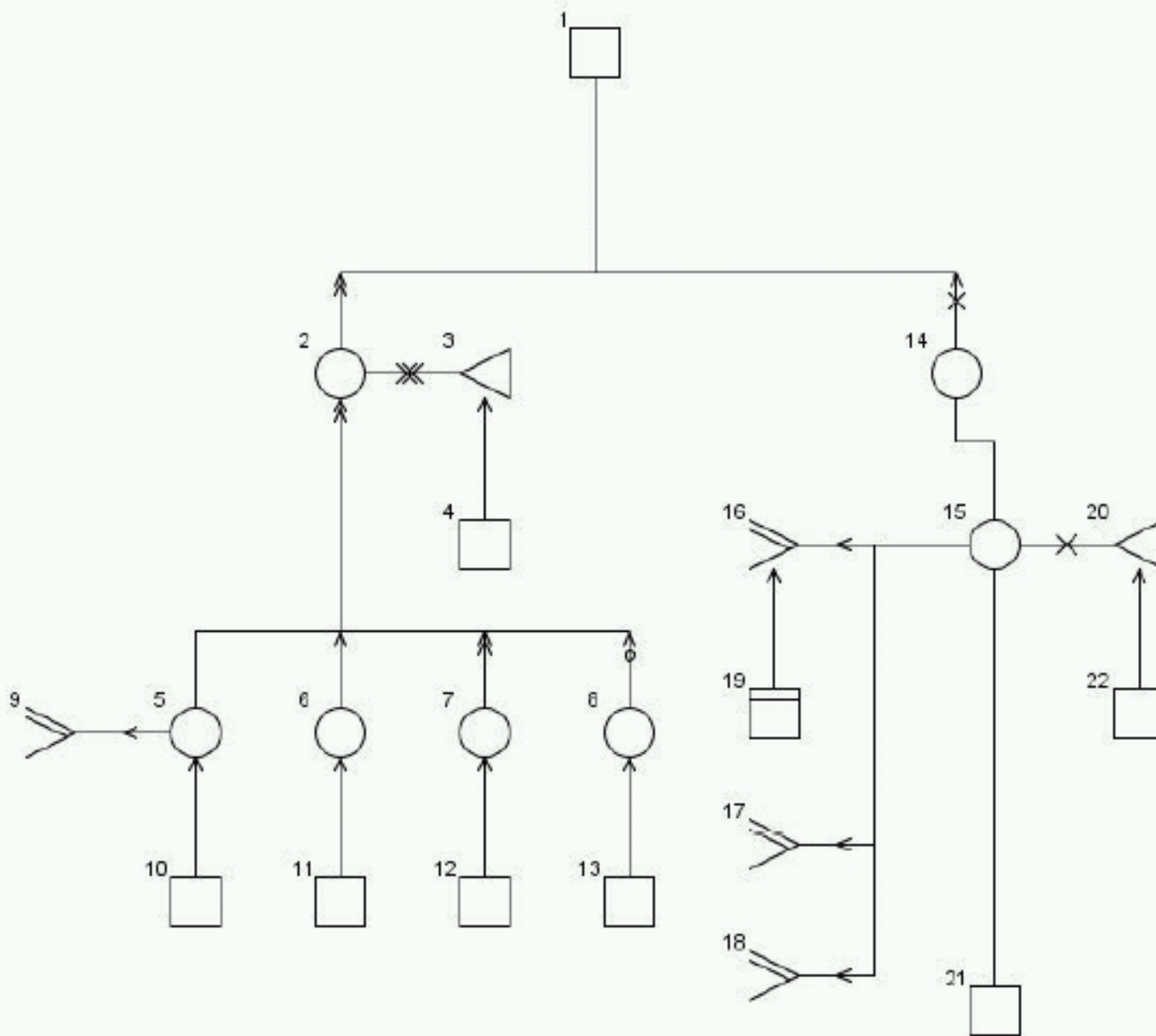
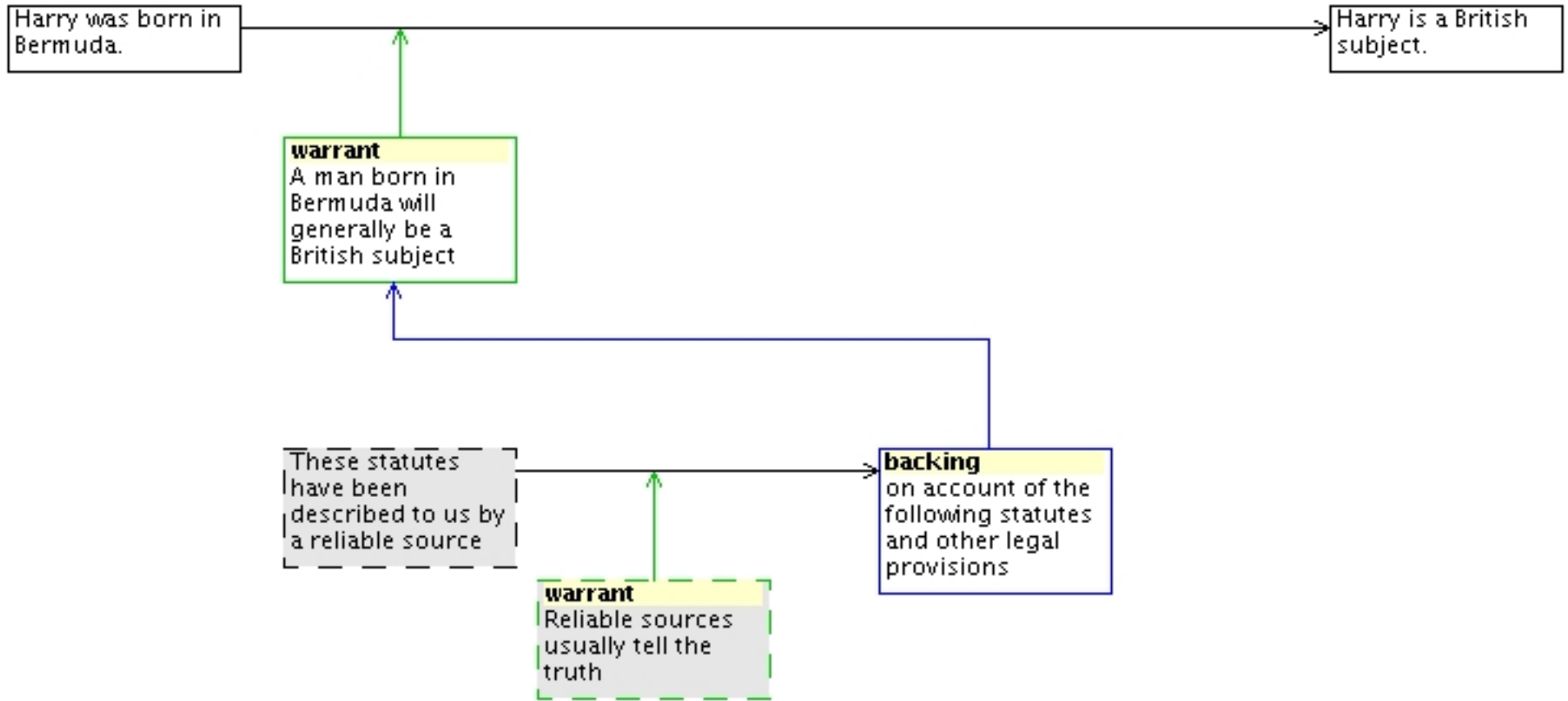
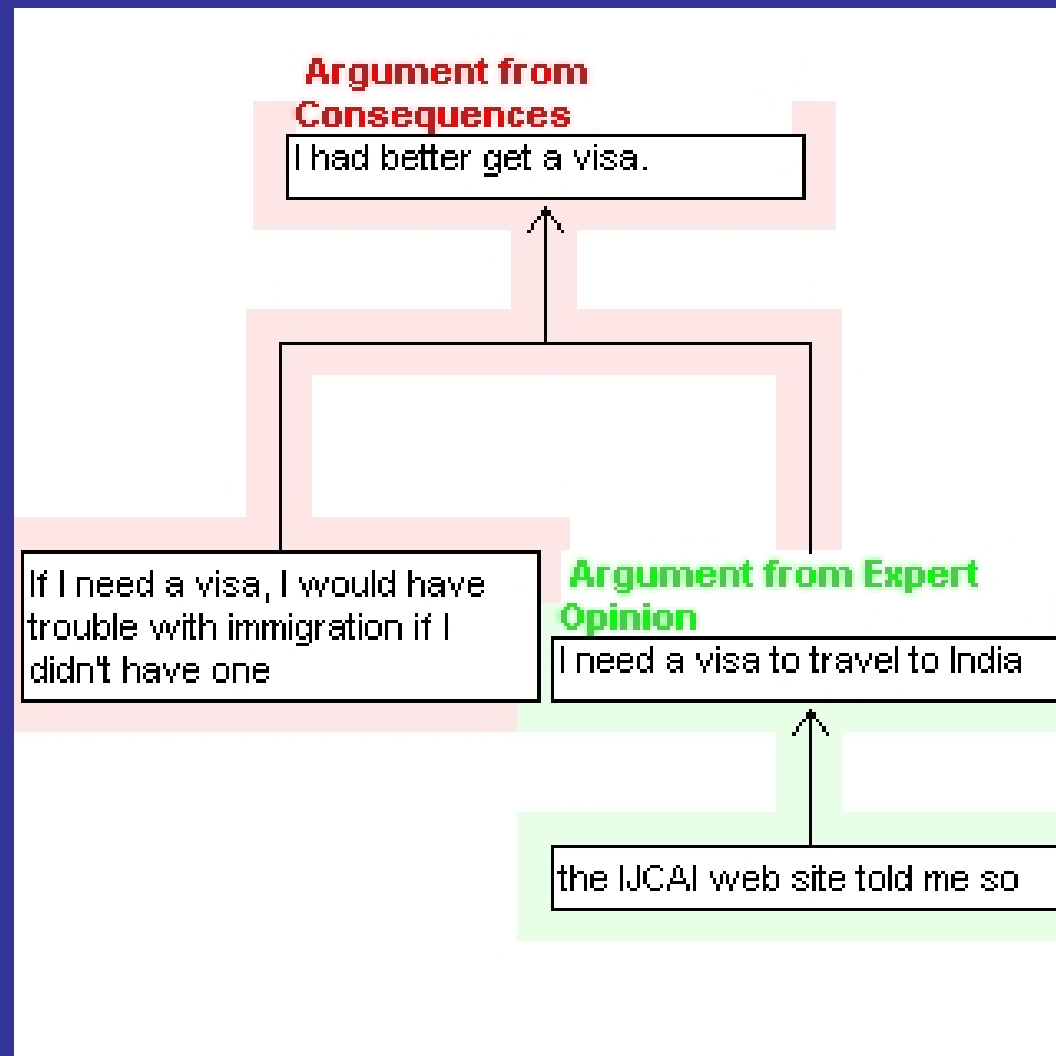


Figure 1. A sample Wigmore diagram, generated by Araucaria







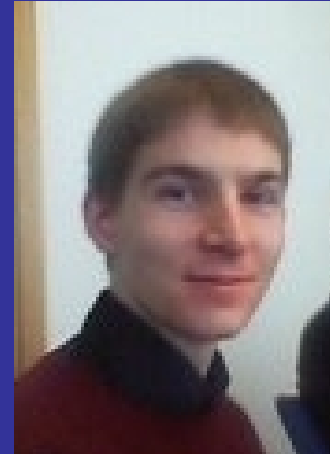
- Glenn Rowe
- System to analyse NL arguments
- Mark up text, draw pic
- Handle refutations, enthymemes, edge labelling, vertex labelling
- Stores in open XML format, AML
- Handle argumentation schemes
- Translates between theoretical frameworks (“Standard”, Toulmin, Wigmore)



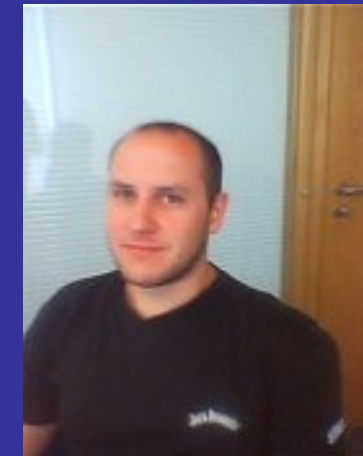
Araucaria

Reaching Agreement

- Devereux,
Gibson &
Wells

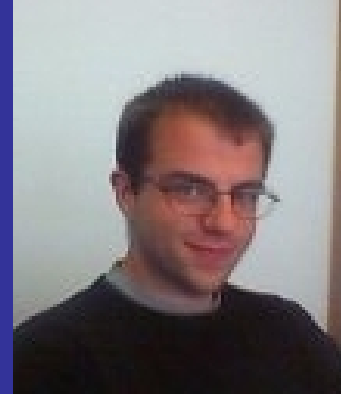


- Agreement in MAS
- Conditions for homogeneity
- Character of retraction
- Identification and use of (formal) fallacy



Supporting Discussion

- Lawrence and Deak
- Involving humans
- E-democracy
- Design discussions



- Rahwan (Dubai)



- Online creation and extension of arguments
- Rich ontological mark-up

Burdens of Proof

- Walton (Winnipeg)
and Prakken (Utrecht)



- Schemes
- Critical Questions
- Burden of Proof

Araucaria for Teaching

- Winnipeg – trialled on Arg course
- Groningen – rolled out on law course
- Dundee – rolled out on CT course, Blackboard integration in progress
- CUNY – to be used in e-learning delivery

Araucaria for Practice

- > 2000 downloads to > 40 countries
- Schools, colleges, universities, researchers, students
- Professionals
 - Lawyers in the US
 - Engineers in the UK
 - Magistrates in Canada

Araucaria for Magistrates



- Large-scale and small-scale cases
- Role of Araucaria
- Schemes and Critical Questions
- Future

(Some) current work

- Collaboration with Leuven on automatic recognition of types of legal argument
- Collaboration with Utrecht on software for crime investigation
- Corpus construction & study
- Argument interchange
- The challenge of dialogue

To find out more

- At Dundee,
 - arg.computing.dundee.ac.uk
 - araucaria.computing.dundee.ac.uk
- Symposium on Argument and Computation
Argumentation Machines
- Computational Models of Natural Argument
Workshops (IJCAI 2001, 2003, 2005; ECAI
2002, 2004, 2006)
- Argumentation in Multi-Agent Systems
Workshops (AAMAS 2004, 2005, 2006)

To find out more

- Special issue of *Intl J Int Sys*
- 7th Workshop on Computational Models of Natural Argument at IJCAI'07
- 4th Workshop on Argument in Multi-Agent Systems at AAMAS'07
- 1st International Conference on Computational Models of Argument (COMMA 2006)

Conclusion

- The theories of Wigmore, Toulmin and Walton all have features that may be of interest for evidence visualisation
- Building mechanisms for translating between these theories can offer the best of all worlds.