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A Modest Proposal for Annotating the Dialectical State of a Dispute

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Abstract

This essay reports on the evolution of our computer-supported argument diagramming and argument visualisation practices, as scholars of argument, and also as computer scientists interested in supporting the diagramming of argument. We begin with the Toulmin diagram, describe efforts to avoid boxes and arrows by using encapsulation, and efforts to depict the logic of legal argument from precedent. Our aim is to provide a theory of argumentation and a theory of legal precedent, and to provide visual correspondences for the logical rules. It is not our principal aim to provide tools for persuasive use, e.g., in a court of law. In the end, new possibilities for using text decoration and markup, dynamic text animation and interaction, and visual metaphor are envisioned. The possibilities are so rich that the final examples border on satire.

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1. Introduction

This essay reports on the evolution of our computer-supported argument diagramming and argument visualisation practices, as scholars of argument, and also as computer scientists interested in supporting the diagramming of argument. We begin with the Toulmin diagram, describe efforts to avoid boxes and arrows by using encapsulation, and efforts to depict the logic of legal argument from precedent. Our aim is to provide a theory of argumentation and a theory of legal precedent, and to provide visual correspondences for the logical rules. It is not our principal aim to provide tools for persuasive use, e.g., in a court of law. In the end, new possibilities for using text decoration and markup, dynamic text animation and interaction, and visual metaphor are envisioned. The possibilities are so rich that the final examples border on satire.

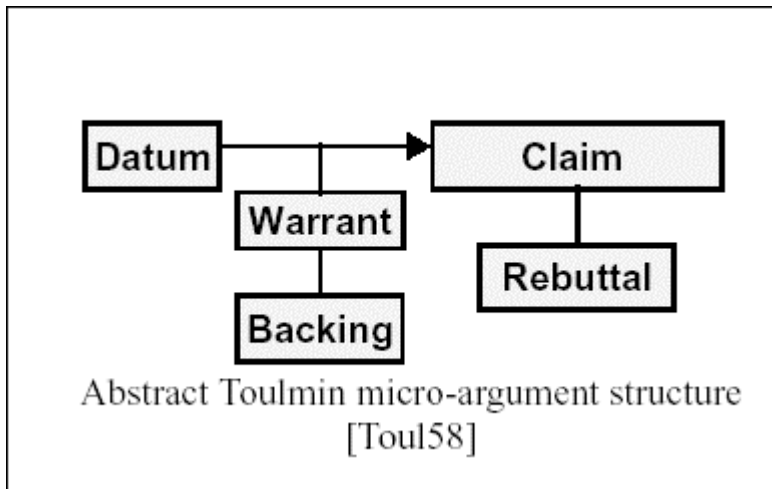
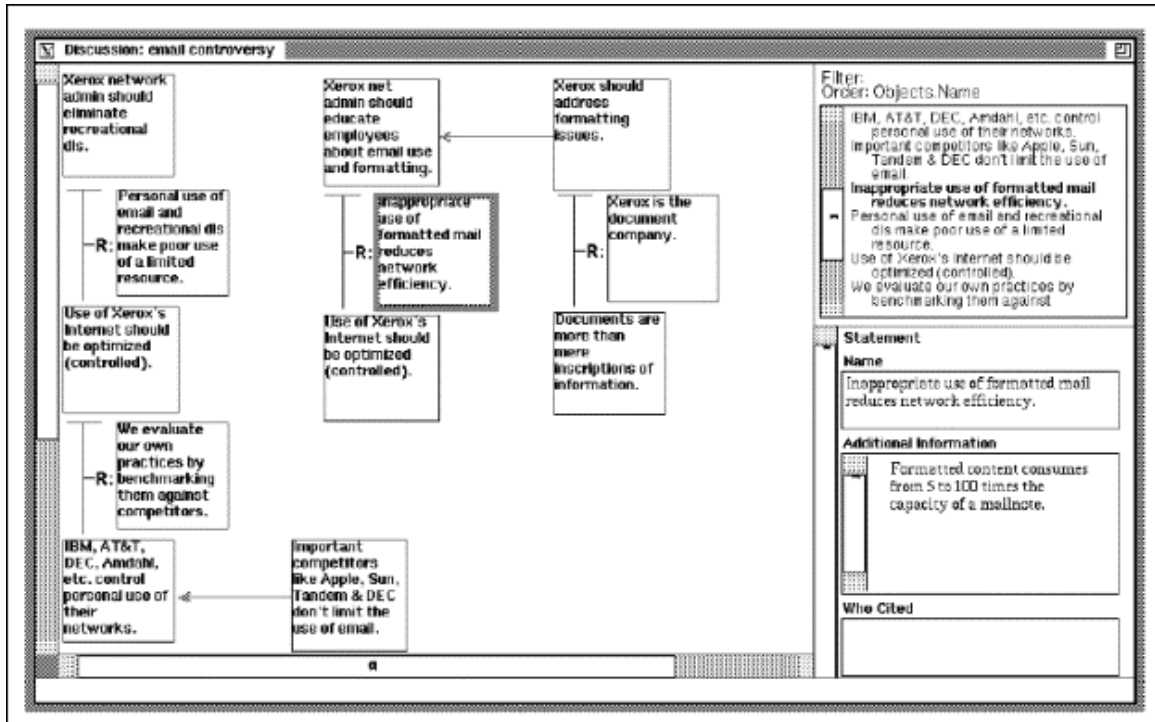
2. Toulmin

My starting point is the Toulmin diagram for visualising the structure of defeasible arguments. But I have some reluctance because I believe that this Toulmin kind of argument-diagramming is of limited relevance to those who have practical persuasive legal needs. The dialectical diagramming that my colleagues and I discuss in the theory of argumentation, after Toulmin, is mainly a device for elucidating logical structure. Our uses of these diagrams are for theorising, not persuading.

In an earlier paper with many co-authors,¹ I referred to Toulmin diagrams as “a spaghetti of boxes and arrows.”² Many people in the CSCW (computer-supported collaborative work) community had been writing on the user interfaces that they had created based on Toulmin's box-and-arrow diagram, and there seemed in the early 90's a plethora of programs available to support the manipulation of such box-and-arrow diagrams. Of course, one draws a Toulmin domino when one wants to connect the supporting claim to the claim it supports, and there is nothing wrong with one Toulmin domino (three or four boxes and two or three arrows) by itself. The problem is when many Toulmin dominoes are connected. Since there is no prescription for the layout of the various boxes and arrows, one must rely on the discipline of the user to create a visually understandable diagram. As boxes and arrows proliferate, it is not clear whether even the most disciplined arrangements of Toulmin are cogent, or even comprehensible.

¹ R Loui, J Norman, JAltepeter, D Pinkard, D Craven, J Linsday, M Foltz, “Progress on Room 5: a testbed for public interactive semi-formal legal argumentation”, 1997, *Proceedings of the 6th International Conference on Artificial intelligence and Law*, pp.207-214.

² S Toulmin, *The Uses of Argument* (1958).



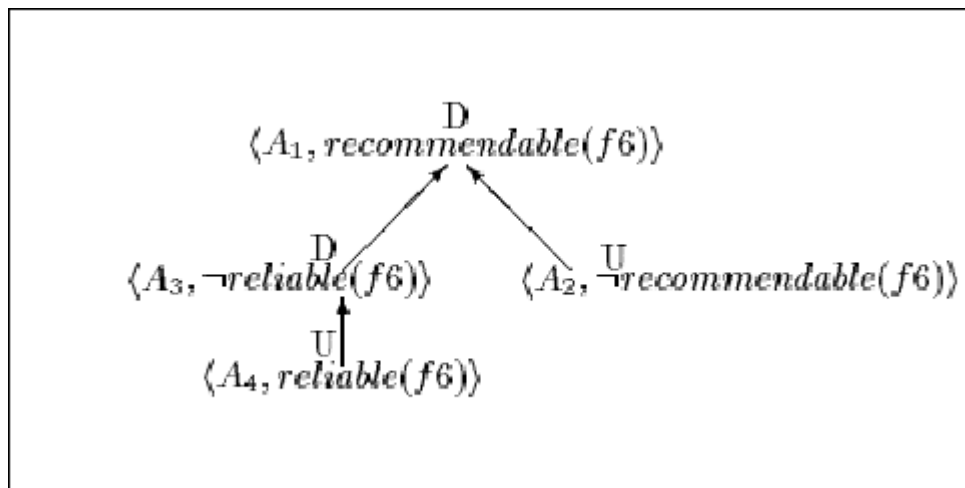
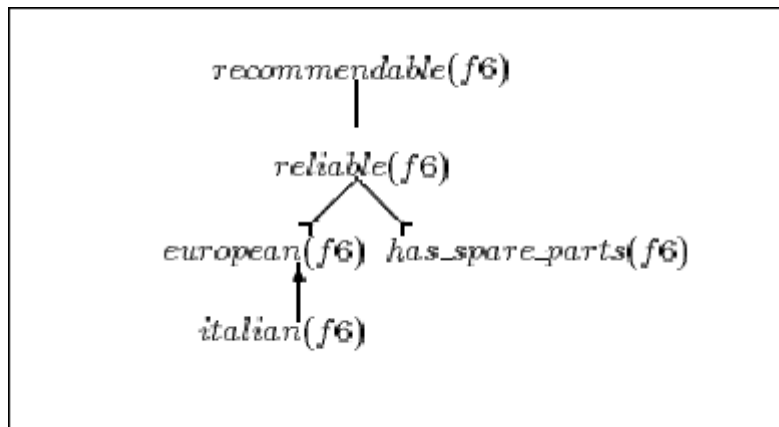
(from Marshall)³

Meanwhile, we had been diagramming arguments as trees, where the main claim of the argument sat at the root of the tree, and the unsupported claims sat at the leaves of the tree. (Trees were drawn with the root at the top of the page, as computer scientists prefer.) A defeasible connection between the children of a node and the node was made implicitly. Toulmin instead would make a box that explicitly stated this

³ C Marshall, F G Halasz, R A Rogers, W C Janssen, "Aquanet: A Hypertext Tool to Hold Your Knowledge in Place", 1991, *Proceedings of ACM Hypertext*, San Antonio, TX, 261-275.

defeasible connection. By convention, if a node labeled p had children labeled a , b , and c , then the required logical connection was “if a , b , and c , then defeasibly p .” This was perhaps the most common diagramming of arguments in the literature in the late 90’s.

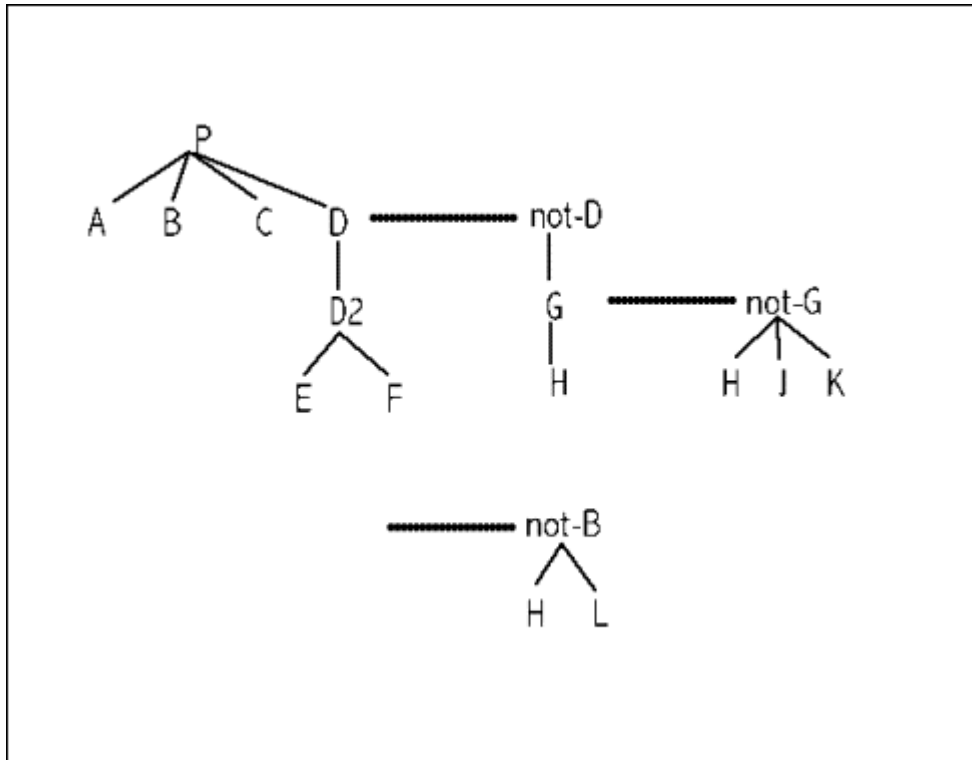
As several arguments might participate in a dialectical structure, where one argument countered another, and a third countered it in turn, seeking to reinstate the first argument, we would draw a second tree showing the relationships between the arguments. Some would call this the meta-argument tree, or the inter-argument tree, because it showed how the arguments related rather than how the arguments were constituted.

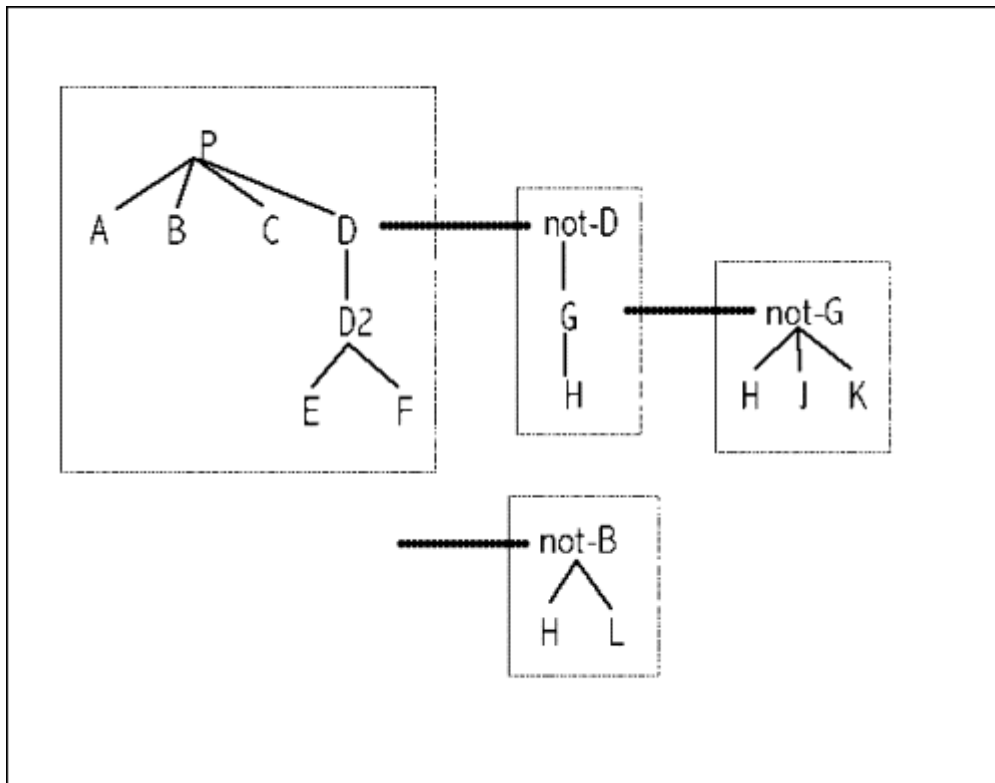


(from Chesnevar)⁴

⁴ C Chesnevar, A Maguitman, R Loui, “Logical Models of Argument” (2000) 32 (4) *ACM Computing Surveys*, pp. 343-387.

My own preference was to combine the two diagrams, so that dialectical relevance had a left-to-right discipline, and support was top-down. Alternate arguments would also be listed top-down, but would not be confused with support since each alternate argument would be its own tree, connected within itself, but not connected to the other tree.





If one insisted on comparing this to a Toulmin diagram, there were several differences, all working in our favor and against Toulmin. First, the largely redundant warrant and backing boxes would not be explicitly shown. If an attack were made against a warrant, then the warrant could be added at that time, or a counterattack would simply be aimed at a link instead of a node. Nothing prevented putting the names of cases or statutes on links, for example, and warrants are often citation references rather than textual statements. In any case, it was useful not to double the number of boxes unnecessarily.

Second, the arrangement into columns was a required part of our regimen. Alternate columns would represent pro and con, so that any argument in the second and fourth columns would presumably be adversary to the position taken in the first column. Reading left-to-right would reconstruct the dialectical dialogue in a logically useful way.

Third, there was no explicit requirement that a counterargument link to the exact node that was its logically contrary proposition or claim. This could be done, but indeed would promote spaghetti. It was sufficient, it seemed, to link the argument to its preceding column, wherein one would find the object of the argument's attack (possibly with some effort). Since the number of arguments in a column and the number of claims in an argument presumably would not be too large, the connection could be made easily simply by visually scanning for a negation. Even without locating this contrary proposition in the prior column, it was knowable simply by negating the claim at the root of the counterargument tree. Indeed, the heavy dotted line served as much to indicate a new, alternate attack, as to indicate, redundantly, that its relevance depended on something claimed in the prior column.

While this style of recording dialectical structure was intuitive, it actually clashed with the conventions of Rescher⁵ and the dialogue logicians, who preferred dialogical time to run top to bottom, and to intertwine support, challenge for support, and rebuttal. The logical exchange under Rescher would appear as:

PRO	CON
P	why P?
A,B, C, and D	why D?
D2	why D2?
E and F	not-D
why not D?	G
why G?	H
not-G	why not-G?
H, J, and K	not-B
why not B?	H and L

It is compact and can be written without graphical artifacts, but it does not display the argumentative structure, nor even indicate whether a move is sufficient. Rescher-form is in some sense the textual locutionary form that the Toulmin diagram and all subsequent diagrams attempt to compile into a more visually scannable, pictorial form.

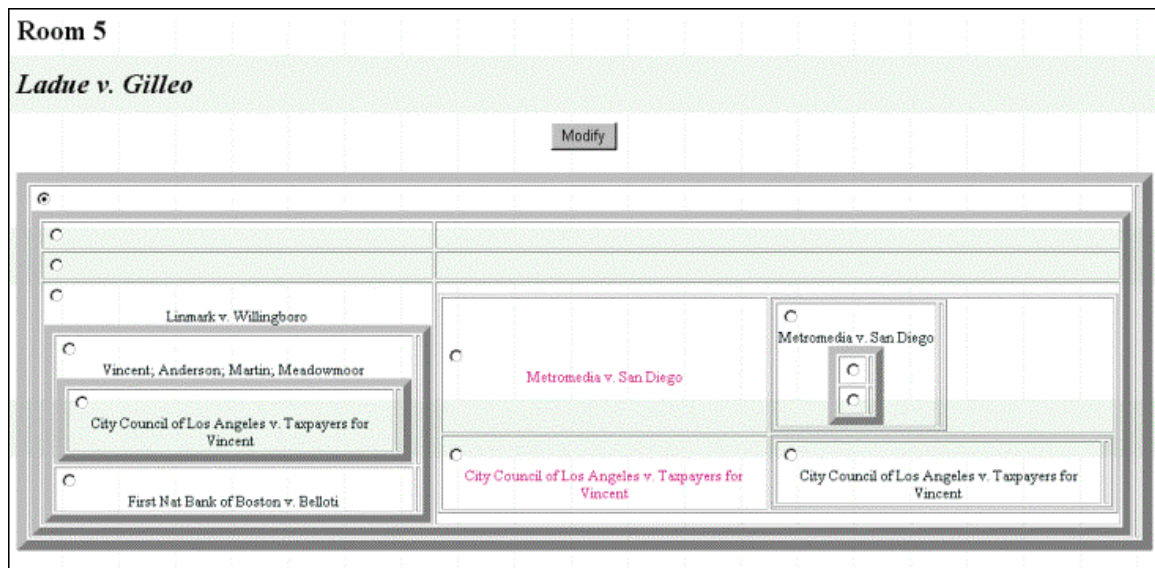
⁵ N Rescher, *Dialectics: A Controversy-Oriented Approach to the Theory of Knowledge* (1977).

2. Encapsulation

With the advent of HTML, and inspired by the encapsulation of dialogues into separate windows in computer GUI's, we proposed simplifying the diagrams further by removing all of the arrows. Support relations would be implicit in the narrowest containments. All containments after that would be of dialectical significance: left-to-right for countering, rebutting, or undercutting; top-to-bottom for alternate attacks of the same argument.

We even proposed several views of arguments in this encapsulated form, where one view gave the authorities of the claims, another gave a paraphrase, and yet another gave a simplified logical form.

(from Loui)⁶



⁶ R Loui, J Norman, J Altepeter, D Pinkard, D Craven, J Linsday, M Foltz, "Progress on Room 5: a testbed for public interactive semi-formal legal argumentation", 1997, *Proceedings of the 6th International Conference on Artificial intelligence and Law*, pp.207-214.

Ladue v. Gilleo

Modify

Ⓢ Ladue's interests are not sufficiently compelling to support a content-based restriction

<input type="radio"/> Ladue's interests are substantial	
<input type="radio"/> Ladue's restriction is content-based	
<input type="radio"/> The First Amendment can prevent a township from achieving its goals by restricting the free flow of information	<input type="radio"/> EVEN San Diego's ordinance was invalid
<input type="radio"/> Residential signs are an unusually cheap and convenient form of communication; a yard or window sign may have no practical substitute	<input type="radio"/> The practical effect of the San Diego ordinance was to eliminate the billboard as an effective medium for noncommercial messages
<input type="radio"/> The private citizen's interest in controlling the use of his own property justifies disparate treatment	<input type="radio"/> San Diego failed to make the strong showing needed to justify such content-neutral prohibitions of particular media of communication
<input type="radio"/> Regulation of speech can be impermissibly under-inclusive	<input type="radio"/> BUT that prohibition did not extend to private property
<input type="radio"/> A city's interest in traffic safety and its aesthetic interest in preventing visual clutter could justify a prohibition of off-site commercial billboards	
<input type="radio"/> City Council for LA upheld an ordinance that prohibited the posting of signs on public property, noting Metromedia's conclusion that visual clutter sufficed to justify a prohibition	

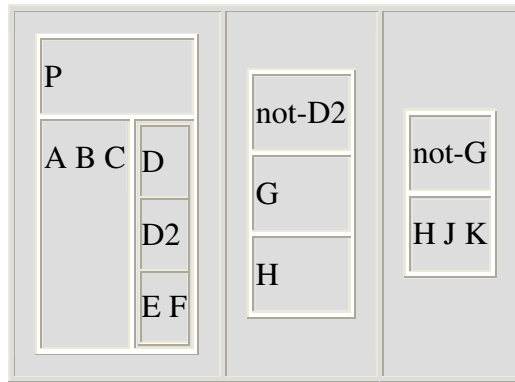
Ladue v. Gilleo

Modify

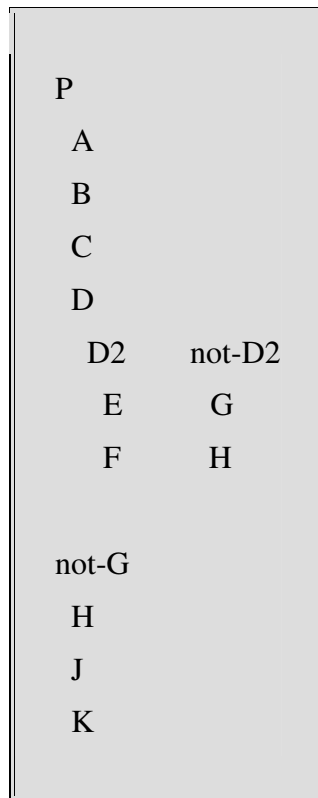
Ⓢ content-based restriction AND NOT compelling
THUS invalid

<input type="radio"/> substantial	
<input type="radio"/> content-based	
<input type="radio"/> restricts free flow of information THOUGH achieves goals THUS can be invalid	<input type="radio"/> STILL was invalid
<input type="radio"/> unusual form of expression THUS may have no practical substitute	<input type="radio"/> safety interest AND aesthetic interest THUS could justify prohibition
<input type="radio"/> private property THUS can be treated differently from public property	<input type="radio"/> eliminates medium
<input type="radio"/> doesn't regulate enough speech THUS can be invalid regulation	<input type="radio"/> not strong enough showing
	<input type="radio"/> visual clutter THUS can be prohibited
	<input type="radio"/> private property THOUGH visual clutter THUS maybe not justified

But we were crestfallen to realise that this form derives much of its intuitiveness from the simple two-column outline form that is familiar to high school debate participants. For example,



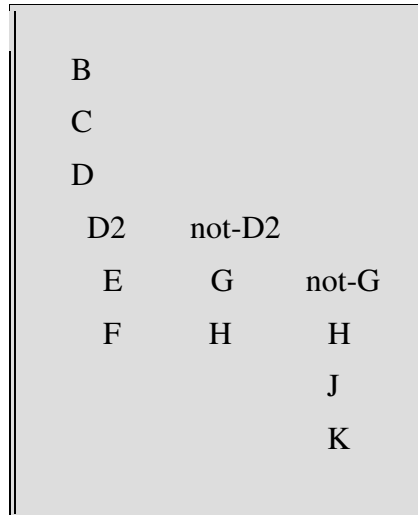
could be written as



with no loss of visual clarity.

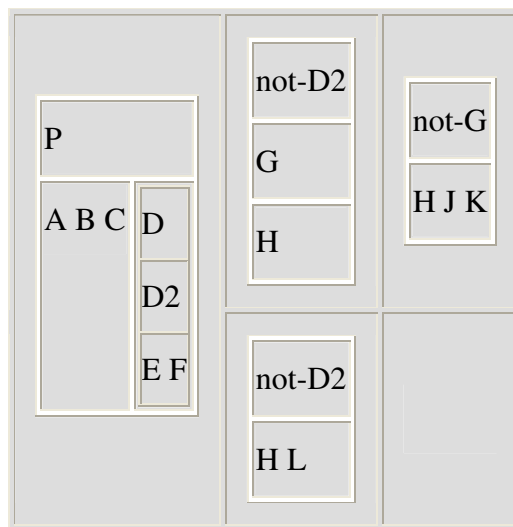
This two column form, “debate-form,” is not entirely satisfying, as here it permits the lines for E and F’s support of D2 to collide with the lines for G and H’s support of not-D2. E and G share lines, but their sharing has a different semantics from D2 and not-D2 sharing a line. Where would a counterargument against E be placed in this scheme? Moreover, the semantic overloading of the line is exacerbated if we permit the third column and make no provision for overlapping lines (E bears no relation to not-G, and they share a line):



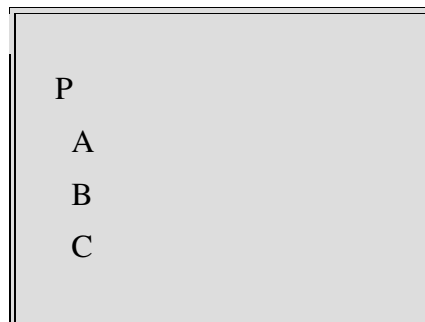


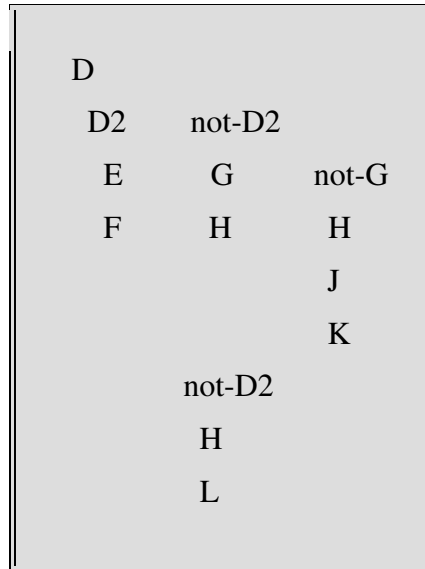
But the reality is that the semantics of boxes within boxes is not so transparent, and strict adherence to too many encapsulation rules can actually decrease comprehension. The main advantage of the boxes is that they permit a rotation from top-down to left-right for lists of supporting propositions.

For the diagram,

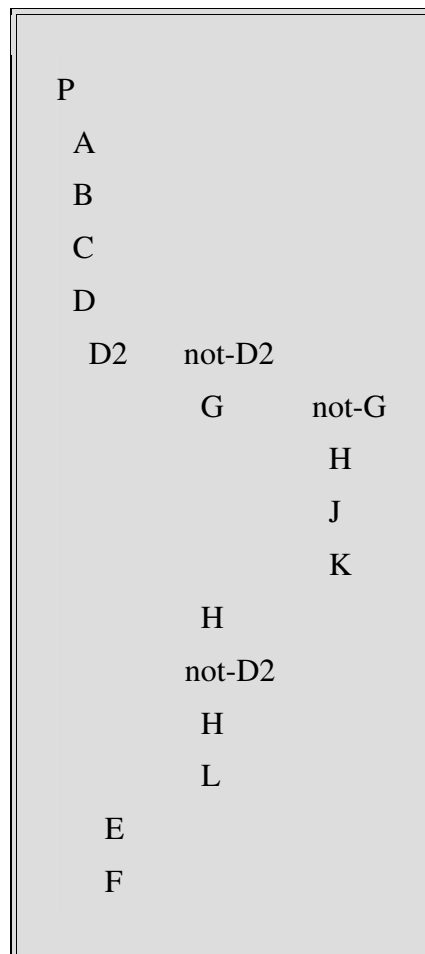


the equivalent naive outline,





is really equally useful, if a bit ad hoc. And any attempt to clarify the semantics of a line by imposing a push-and-pop spatial grammar (e.g., the left-hand-side contiguity always defers to the right-hand-side, during a counterargument) simply ruins the visual appeal. The proper rendering, while preserving line semantics, decreases density and reduces juxtaposition within arguments, thus increasing scan effort:

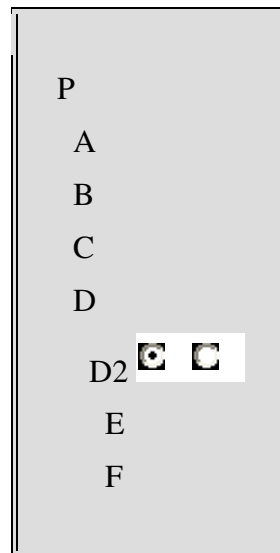


These are exactly the considerations that first led to our adoption of encapsulation.

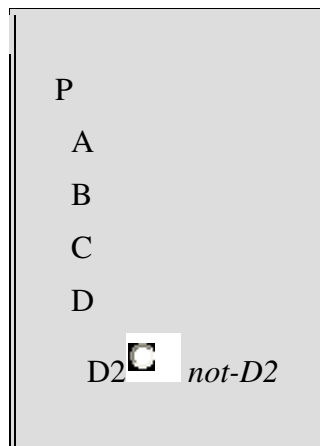
3. *Web Markup, Dynamics, and Animation*

We are now all familiar with the font control and dynamics of HTML, and the possibilities for rendering argument are dizzying. Not only did we use color to differentiate PRO's and CON's positions above, but we could have used size and style, face and font-weight as well. All of the original CSCW argument systems were precursors of hypertext systems, so their authors envisioned actions of hiding and unhiding upon user action.

For example, the outline form above seems not so sparse when counterarguments can be hidden or restored from hiding. Thus,

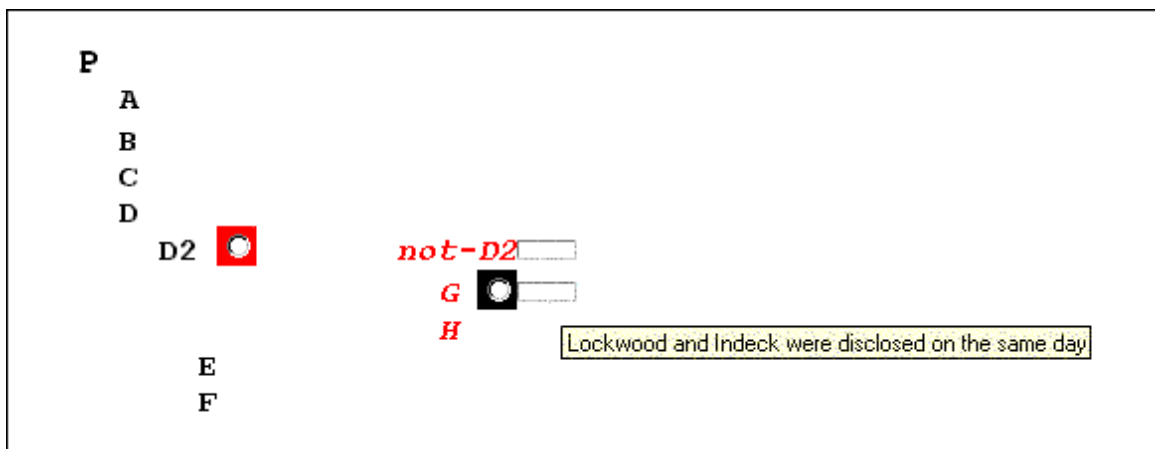
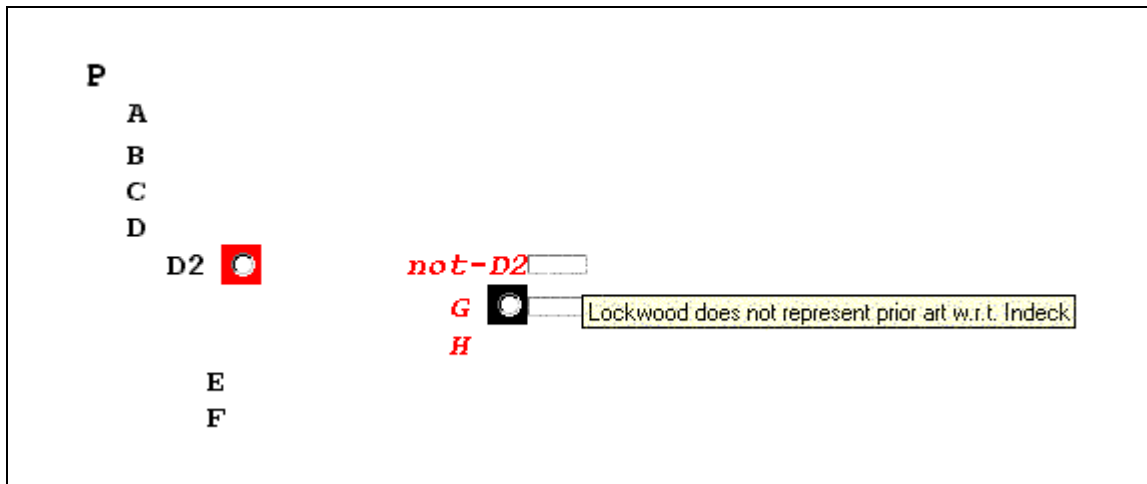


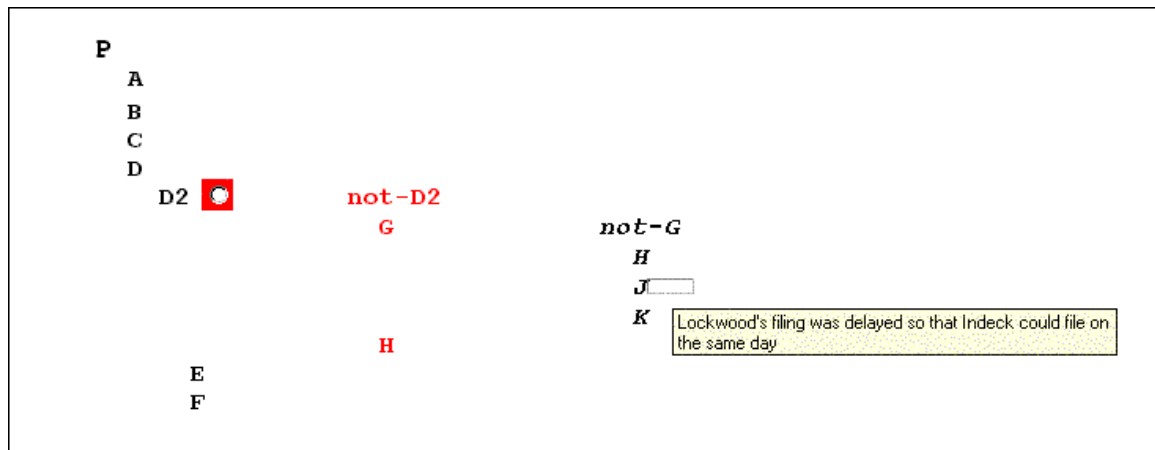
might display the main argument, whereupon clicking on the box next to D2 exposes the argument for not-D2, and further options for exploring counterarguments.





Interface dynamics might include a mouseover or pop-up window for viewing longer forms of the claim, or viewing the authorities of the defeasible rules when mousing over the “links”.





In the extreme, animations could be used, which would be difficult to print in a paper such as this, even with screen captures. Animations could show not only the historical development of the dialogue or its dialectical structure; animations could also be used to show the differing views of the state of the dispute, especially as participants were willing to accept certain assertions, presumptions, or defeat relations among competing arguments.

4. A Plea for Structure over Style

No doubt, the enterprising software interface designer has already thought of connecting Microsoft Word functions and Adobe Photoshop tools to the layout of arguments. Why not check the spelling and grammar? How about smart quotes and a minimum font size?

There is a fine line between aiding the thought process that underlies the formation of rational beliefs, and the markup of text for its own sake, or for mainly stylistic purposes. Of course, persuasion may indeed at times require style. It is simply good practice to be as clear as possible, and style helps. Perhaps the rhetorical desire to produce multi-column aligned outlines would eventually be satisfied by authors of PowerPoint providing some kind of columnar text support for PRO/CON presentations.

Our real interest in diagramming arguments derives from a desire to understand structure as sophisticates. It seems our natural obligation to offer symbolic regimes that sometimes go far beyond the work-a-day visualisations. It would be folly to impose complex structure on all argumentative forms. Even when the argument could be diagrammed so as to expose inherent specific structure, the academic must recognise that the practitioner need not do so. Even when the user could use a template with more numerous well-formedness constraints, the programmer must recognise her right to use a simpler template. Still, our job is to invent those templates.

Here are two forms that derive from the analysis of legal reasoning from precedent. These are simple diagrams, but have had no real hearing in the community of those who like diagramming.

The first is the idea of Kevin Ashley, in *HYPO*.⁷ The idea begins simply enough: a present case is related to a prior case by the enumeration of its similarities and dissimilarities.

To argue P on the basis of a past case exhibiting A, B, C, and D, one need only remark that the current case has A and B in common, has C as a distinction, did not report on D, and has an added fact of possible relevance, E, that was not reported in the precedent. We can find this basic idea in Raz,⁸ complete with letters A through E.

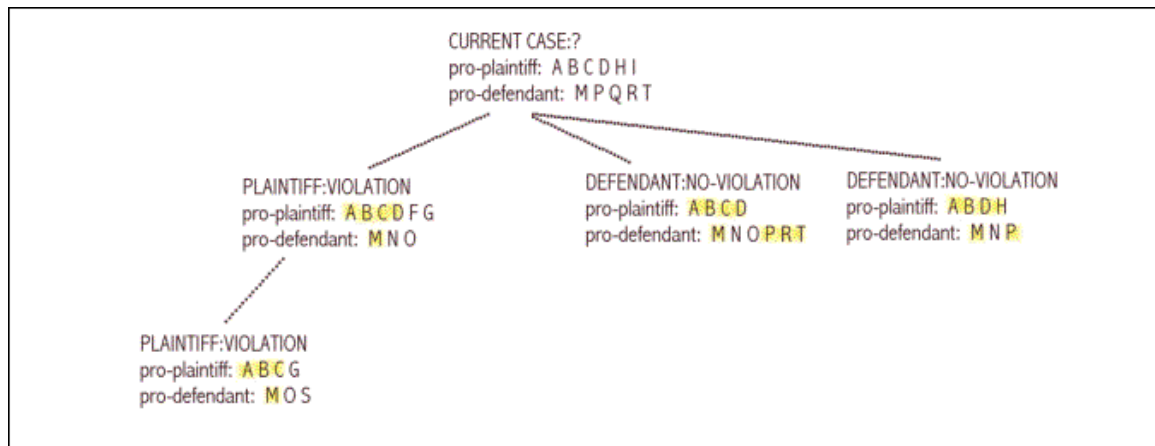
PrecedentCase	CurrentCase
P	P
A	A
B	B
C	not-C
D	
	E

Without going into too much detail, Ashley proposes an improvement of this model for the restricted domain of reasoning about trade secrets violations. He manually determines the dimensions along which precedent cases and current cases may be compared for similarity. He identifies each dimension as inherently pro-plaintiff or pro-defendant so that reasoning can be augmented by dimensions, or factors, that are not present in past cases.

The result is a “claim lattice,” which is intended to show the most on-point cases for plaintiff and defendant, based on subset-relations among factors and the inclusion of additional pro-plaintiff factors by the plaintiff, the omission of additional pro-defendant factors by the plaintiff, the inclusion of additional pro-defendant factors by the defendant, or the omission of additional pro-plaintiff factors by the defendant.

⁷ K Ashley, *Modeling Legal Arguments: Reasoning with Cases and Hypotheticals* (1991).

⁸ J Raz, *The Authority of Law* (1997).



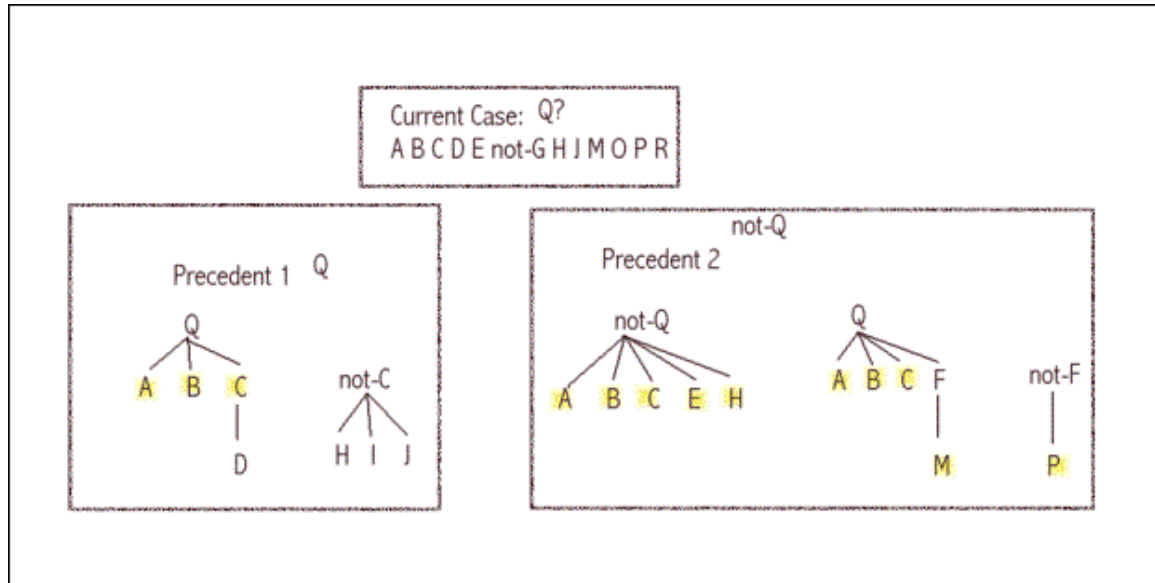
The second template, or argument form, is the generalisation and possible improvement of Ashley's analysis, according to my co-author, Jeff Norman, and myself.⁹ (This in turn may have been improved by Prakken and Sartor, depending on what you think of analogies that are based on quite a bit less similarity.¹⁰)

The main idea here is to record the actual disputation tree from the past case. An attempt to make use of a past case's argumentation is not just a listing of similarities, but a recall, re-enactment or re-citation of the past arguments, to the extent that they can be made in the current context. The synthetic contribution of the prior case is the judicial decision that one argument defeated another in the past case; hence, that same argument should defeat the same counterargument in the current case, all things being equal. However, if the past case's main argument survived a counterargument in the presence of a reinstating argument, and if that reinstating argument is not available to the arguers of the current case, then the authority of the past case is dubious.

What can be visualised in this scheme are the past relationships among arguments, and the current context's ability to recall each of those arguments, in part or in whole.

⁹ R Loui, J Norman, "Eliding the arguments of cases," 1997, unpublished paper presented at the *International Association for Philosophy of Law and Social Philosophy (IVR)*, Buenos Aires.

¹⁰ H Prakken, G Sartor, "Reasoning about precedents in a dialogue game", 1997, *Proceedings of the 6th International Conference on Artificial intelligence and Law*, pp.1-9.



Here, Precedent1 and Precedent2 appear to conflict over the conclusion of Q in the current case. But the relevant similarities are not “A B C D H J” versus “A B C E H M P,” which is an indeterminate contest. The relevance of Precedent1 is that the “A B C for Q” argument can be made. The counterargument that was disfavored in Precedent1 is irrelevant in the current case because C is not a current issue. Meanwhile, Precedent2 contains three arguments, all of which can be made in the current fact situation, and the argument for Q in Precedent2 is actually stronger than the argument for Q in Precedent1. Nevertheless, at least in the context of the disrupting argument “P for not-F,” the “A B C E H for not-Q” argument was preferred in Precedent2. Thus, Precedent2’s decision is authoritative here.

Perhaps not so many case-based analogical arguments in the real world can benefit from this kind of analysis, but I believe this kind of argument diagramming, and the ambition to provide a calculus of rationality, should not be lost as we see stylistic markup proliferate among GUI tools for argumentation and cooperative problem solving.

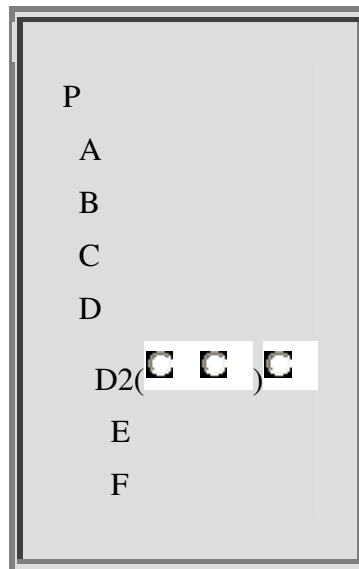
No less a figure than Cass Sunstein pronounced HYPO to be inadequate as an account of general legal analogy, at a conference sponsored by Chicago Law Review students about a decade ago.¹¹ However, all of his concerns appear to my eyes to be addressed in this deeper, argument-based model of the case. I do look forward to legal scholars’ reactions to this subsequent modeling of the logic of analogical reasoning. It has been almost fifteen years since we proposed it, and HYPO itself is now over twenty years old. It is a bit unfair to be looking at first generation models when judging the entire AI and Law field.

¹¹ L K Branting, K Ashley, C Sunstein, “Legal Reasoning & Artificial Intelligence: How Computers ‘Think’ Like Lawyers” (2001) 8 (1) *University of Chicago Law School Roundtable*.

5. Jonathan Swift's *Modest Proposal*

The title of this talk contains the phrase “Modest Proposal,” and there is a certain obligation to live up to Jonathan Swift’s legacy.¹² If there were something as outrageous as the famine of Irish families in the world of argument visualisation, I would not hesitate to stryke a satyrical tone. Perhaps if a generation of lawyers had grown too enamored of Toulmin spaghetti diagrams, it would be high time to suggest that we feed them a carb-free diet of old-fashioned prosodic meat.

I had in mind the unambitious annotation of an argument with the warrant-status of all hidden arguments: red for a defeating counter argument, pink for an interfering counterargument, pale pink-gray for a defeated putative counterargument, black for an effective reinstater, and gray for an ineffective putative reinstater. Parentheses could be used to group the dialectical chains. D2 below has a putative interferer that is defeated by a reinstater, but also has an actual interferer with no rebuttal.

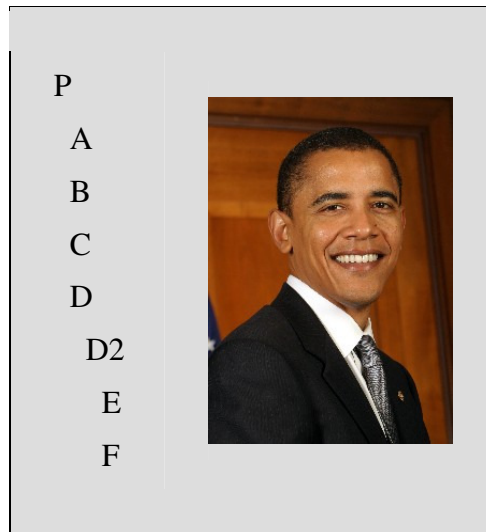


I have indicated the warrant status of P with a gray surrounding box instead of a black surrounding box because of the existence of the unrebutted interferer. Visually, one can see immediately that this is an argument supported on four main points, with one deep (potentially weak) chain, where a counterargument has been rebutted and another counterargument has not been.

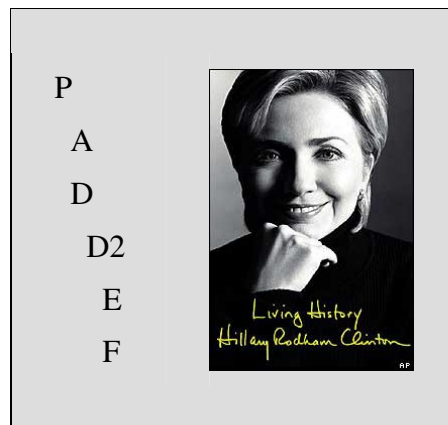
But thinking further, and a bit lightly, about how arguments could be annotated based on their warrant status and apparent strength, I am happy to suggest the following markup.

Here is how you would indicate that an argument is little tested, but inherently sound, has unusually wide appeal, and is probably an argument that you would not want to have to defeat.

¹² J Swift, *A Modest Proposal and Other Satirical Works* (1996)




Here is an argument you have been waiting to make for some time, which you expect would be a very good argument, that is, if there isn't a better argument to be found; and it is a familiar argument that has survived many pointed attacks in the past.

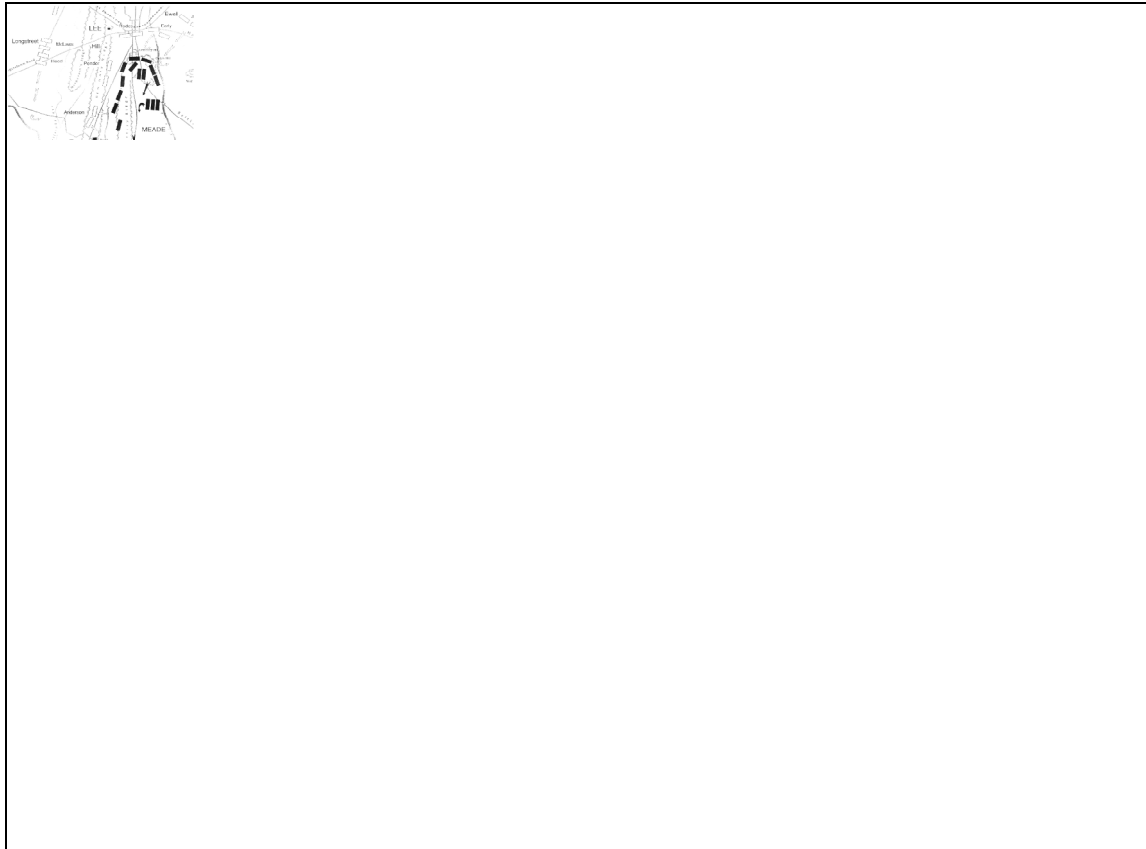


And here is an argument that you just do not want to be making, an argument that many may have made in the past with good intentions, an argument that derives from a very strong precedent, but an argument that has far too many points that are now simply indefensible.

not-P
C
D
F

A photograph of George W. Bush, dressed in a dark suit and white shirt with a dark bow tie, standing behind a podium. He is holding a small glass in his right hand and appears to be speaking. The podium features a golden eagle sculpture. The background is a light-colored wall with a decorative border.

Finally, this is a fantasy view of how the dialectical state of longstanding and well-understood arguments might be visualised, taking mainly into account the potential strength of each.





3. Conclusion

We began wanting only to improve on Toulmin diagrams by using encapsulation instead of boxes and arrows (the same basic idea is used in any Window-based graphical user interface). The same organisational components were found to be available to highly disciplined multi-column outline forms, where indenting with vertical progression indicated subordinate support, and horizontal progression indicated counterargument. These diagrams were difficult to read, however. Part of what made these diagrams unwieldy was their inability to hide uninteresting parts of the dialectical state. It was then suggested that dynamics could be used to open and close argument details, in the same way that users interact with folders and subfolders of files in many common software programs today. There were suddenly many possible ways that interaction could alternately hide and reveal information. More interestingly, the graphical object used to summarise a hidden argument could convey information about the argument's force or validity: a consistent coloring of red for undefeated arguments and black for defeated arguments could be used, for example. Meanwhile, we noted that there were many interesting structural devices, corresponding to logical constraints of specific argument forms, that should be considered in the diagramming of arguments. To ignore structure at the expense of graphical devices seemed an unending walk into the world of text decoration, even web design. Finally, we suggested, half-satirically, that a more cogent and powerful visual shorthand could be found in simple metaphors to politics and other orders of combat.