



# Representing the Structure of a Debate

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## Abstract

In this article I aim to use the 1948 Russell-Copleston debate to highlight some recent problems I have experienced teaching argument analysis in my philosophy courses. First, I will use argument diagramming to represent the arguments in the debate while reflecting on the use of this approach use to teach argument analysis skills. Then, I will discuss the tools and methods scholars have proposed to represent debates, rather than just individual arguments. Finally, I will argue that there is not, but needs to be, a good way to represent argumentative debates in a way that neither obscures the essential details of the exchange nor becomes too unwieldy to extract a sense of the overall debate.

**Keywords** Argumentative debate · Argument diagram · Argument map · Pedagogy · Visual representation

## 1 Introduction

In 1948, BBC Radio hosted a debate between Bertrand Russell (1872–1970) and Frederick Copleston (1907–1994) (Russell 1986). In that year, Russell was a quite well-known philosopher and logician, while Copleston was an English Roman Catholic Jesuit priest, philosopher, and historian of philosophy who had just begun to publish his multi-volume *A History of Philosophy* (1946–75). The subject of the debate was arguments for the existence of God, with Copleston insisting that there are good arguments *for* God's existence, and Russell maintaining not that there are any good arguments *against* God's existence, but rather that there are no good arguments for that conclusion.

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While I believe this debate is fascinating in its own right—for both its philosophical and historical significance<sup>1</sup>—I became interested in this debate as a text to analyze with students. It is better, I thought, that the students should read a serious debate between two very intelligent scholars who are responding to each other in real time than for them to read opposing articles separated by time and space. For this purpose, it served very well—the students were fascinated by both the messiness of the back and forth and also the very nuanced points that each man made.

In this article I aim to use this debate to highlight some recent problems I have experienced in teaching philosophy. First, I will begin to visually represent the arguments in the debate while reflecting on its use to teach argument analysis skills. Then, I will discuss the tools and methods scholars have proposed to analyze debates, rather than just individual arguments. Finally, I will argue that there is not, but needs to be, a good way to represent argumentative debates in a way that neither obscures the essential details of the exchange nor becomes too unwieldy to extract a sense of the overall debate.

## 2 Diagramming the Russell-Copleston Debate

Although there may be several useful accounts of what constitutes a debate, the description I use is dictated by the pedagogical purposes the debate serves in my classes. Thus, I consider the kind of argumentative debate I find useful to be a discussion between interlocutors in which an argument for a specific claim is considered, and reasons for and against the quality of the argument are exchanged.<sup>2</sup> Ultimately, I want to teach my students two lessons from a debate: (1) modeling a discussion of an argument that emphasizes support for, and objections to, the claims and inferences made in the argument (and not focus on the person making the argument), and (2) practice determining which parts of an argument are being questioned in the discussion, and what can ultimately be learned about the argument from the exchange.

The Russell-Copleston debate is an excellent example of the kind of argumentative debate I like to use. In it, Copleston proposes three different arguments for the existence of God: the argument from contingency, the argument from religious experience, and the moral argument. The two men agree at the outset on a definition of God, and then Copleston lays out his first argument using Leibniz's principle of sufficient reason. About halfway through the broadcast, Russell and Copleston turn briefly to the second argument, before moving to the third.

The debate that ensues after Copleston introduces each of the three arguments are illuminating in their own ways, but for the purposes of examining the suitability of the debate for teaching argument analysis skills, I want to focus on the first. Particularly interesting is that (a) Russell objects to Copleston's argument at various

<sup>1</sup> This point is emphasized by the recent publication of *How Philosophers Argue: An Adversarial Collaboration on the Russell–Copleston Debate*, by Leal and Marraud (2022).

<sup>2</sup> The interlocutors of the debate need not actually be separate people; a single author can present a debate with herself by representing two or more different voices. Many dialogues in the history of philosophy are examples of this kind of debate.

points, each highlighting a different premise or inference that troubles him, and (b) his objections, as well as Copleston's responses, are themselves arguments with rich structures.

I teach argument representation, analysis, and evaluation using argument diagramming (AD) in all my classes. An AD is a visual representation of the content and structure of an argument, using a very basic graphical structure using nodes and edges.<sup>3</sup> For example, consider Copleston's argument from contingency, mentioned above:

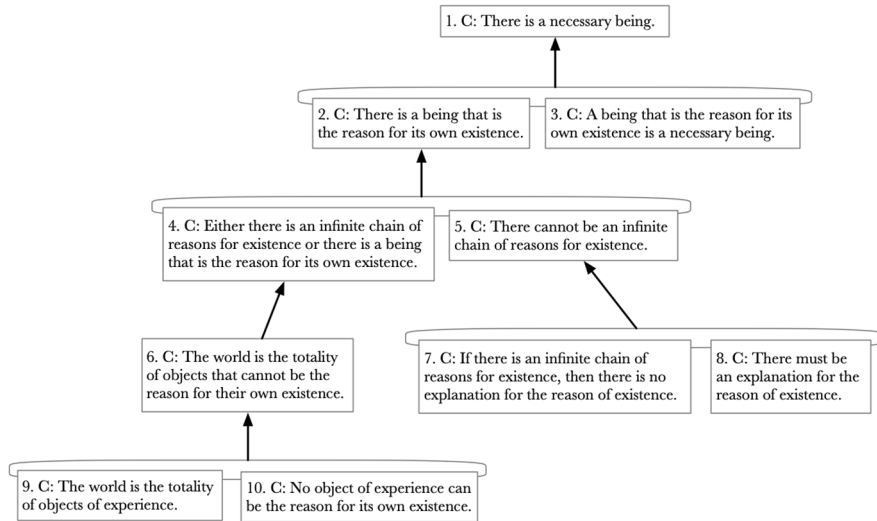
First of all, I should say, we know that there are at least some beings in the world which do not contain in themselves the reason for their existence. For example, I depend on my parents, and now on the air, and on food, and so on. Now, secondly, the world is simply the real or imagined totality or aggregate of individual objects, none of which contain in themselves alone the reason for their existence. There isn't any world distinct from the objects which form it, any more than the human race is something apart from the members. Therefore, I should say, since objects or events exist, and since no object of experience contains within itself reason of its existence, this reason, the totality of objects, must have a reason external to itself. That reason must be an existent being. Well, this being is either itself the reason for its own existence, or it is not. If it is, well and good. If it is not, then we must proceed farther. But if we proceed to infinity in that sense, then there's no explanation of existence at all. So, I should say, in order to explain existence, we must come to a being which contains within itself the reason for its own existence, that is to say, which cannot not exist. (Russell 1986, 1p.24)

For the AD, I represent the claims as the nodes (text in boxes) and represent the inferential connections between claims as the edges (arrows indicating direction of inference), and all the excess verbiage<sup>4</sup> is removed (see Fig. 1).

Research over the past few decades shows that learning to diagram arguments improves students' critical thinking skills (Chounta et al. 2017; Harrell 2011, 2016; Twardy 2004; van Gelder 2001; Gelder 2003; van Gelder et al. 2004), writing skills (Harrell and Wetzel 2015), and collaboration skills (McLaren et al. 2011). Additionally, research specifically on computer-supported argument visualization has shown that the use of software programs specifically designed to help students construct

<sup>3</sup> There are, of course, many different models for diagramming arguments, and each has its own ontology, syntax and semantics. For example, in the Toulmin model, there are boxes for different kinds of statements (claim, warrant, etc.) and arrows can point to either boxes or other arrows. In my classes, which consist mostly of first- and second-year college students, I use a modified Beardsley-Freeman model as it is very easy to learn the basics. For an overview of the development of argument diagramming, as well as a description of many models, see Reed et al. (2007).

<sup>4</sup> For my purposes, "excess verbiage" is defined loosely, and is intended as a guide to help students (re-) write complete, independent statements in the boxes of the diagrams. For example, students do not include the premise/conclusion indicator phrases in the boxes; these phrases are instead "represented" as arrows in the diagram. Additionally, I advise my students to eliminate discounts, repetition, assurances, and hedges. As their argument analysis skills become more sophisticated, these guidelines are relaxed, and students can consider the differences between, for example, claims made with hedges and claims made without hedges.



**Fig. 1** Diagram of Copleston's opening argument

argument diagrams can significantly improve students' critical thinking abilities over the course of a semester-long college-level course (Kirschner, Shum, and Carr, 2003; Twardy 2004; van Gelder 2001, 2003). These computer aids include programs that give students just the bare necessities to construct diagrams (iLogos) to programs that offer hints and suggestions to help students' construction (Rationale).

By tradition and experimentation, the AD community has developed some syntactic and semantic standards for constructing argumentative exchanges between arguers (or a single arguer considering multiple positions). Inferences made between the main claims of an argument are usually represented by black (or sometimes green) arrows pointing from the premise to the (sub-)conclusion, objections to claims are represented by red arrows (with the head of the arrow at the objectionable claim), and replies to objections are represented either by red arrows (as they are objections to objections) or by orange arrows (although, for a different approach, see, e.g. Peldszus and Stede 2013). Thus, a debate can in theory be represented in a single diagram.

For example, after Copleston presents his first argument, Russell's first objection is to the very idea of a necessary being, and it is supported by a robust argument.<sup>5</sup> Figure 2 shows this argument in isolation.

To diagram the exchange between the two we would connect statement 11 in Fig. 2 to statement 1 in Fig. 1 with a red arrow, as shown in Fig. 3. But, of course, this makes the diagram even bigger than the original, and we've just barely started.

<sup>5</sup> In the modified Beardsley-Freeman model of argument diagramming that I use, all criticisms of claims in an argument are called "objections." The reason I do this is for simplicity when guiding students through tasks of argument analysis. Early on, students struggle to determine which claims are being targeted for criticism in a debate. While it is important in the long run to distinguish between an objection to the conclusion of an argument and an objection to a premise of an argument, in the early stages of learning I have found that such distinctions merely confuse students.

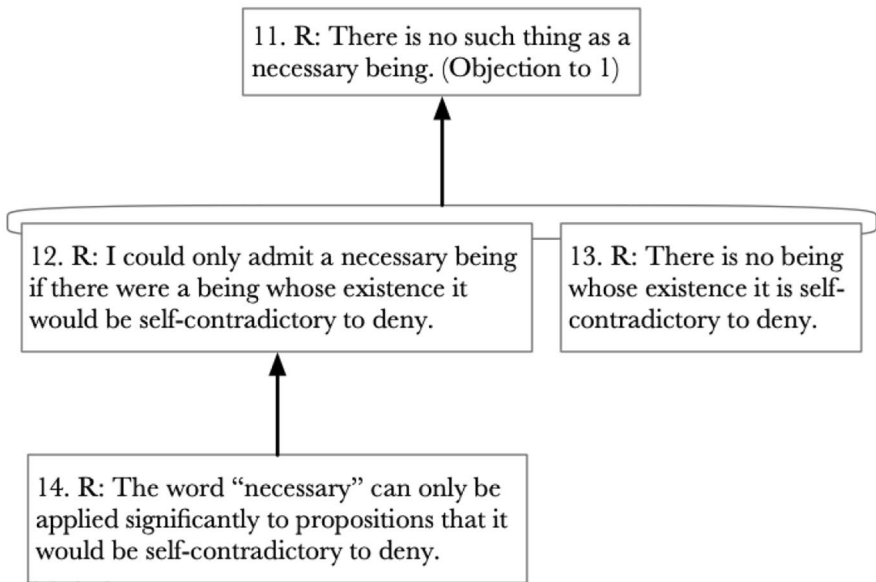


Fig. 2 Diagram of Russell’s first objection to Copleston’s opening argument

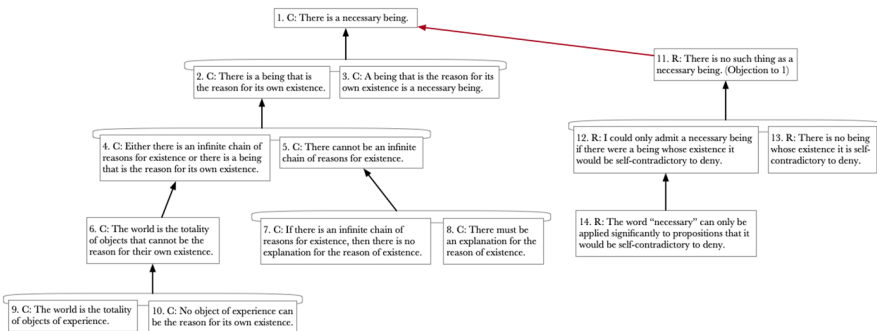
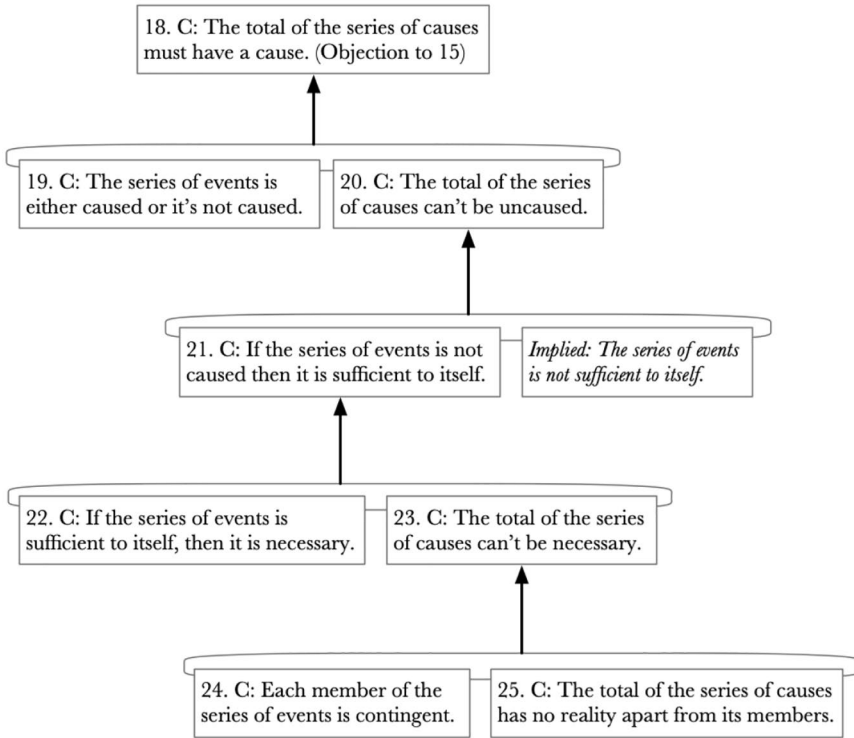


Fig. 3 Diagram of the combination of Copleston’s opening argument and Russell’s first objection

In general, while it is possible (both in theory and in practice with some programs) to construct an argument diagram with dozens or hundreds of boxes, after 25+ boxes, the usefulness of the diagrams to visualize and understand as a cohesive whole seems to deteriorate. If we continue with this way of diagramming arguments, we can see why.

In the debate, Russell and Copleston fail to come to a resolution on the question of whether a necessary being is possible. So, Russell moves to his next objection, which is to question the truth of premise 8, as shown in Fig. 4. We can integrate these representations by connecting statement 15 to statement 8 with a red arrow, as seen in Fig. 5.





**Fig. 6** Diagram of Copleston's reply to Russell's second objection

I am not the only one with this view. In 2020, Dana Khartabil wrote a dissertation titled, *Visualisation Techniques to Facilitate Argument Exploration*. One of her main goals was to explore argument visualization software by users' experiences. In so doing, she interviewed many scholars in the AD community.

During the interviews, the experts mentioned limitations of the previous ArgVis [argument visualization] tools and the four main limitations are listed below:

(L1) "Most of the tools use nodes and arrows, which are brilliant when you have a small number of arguments but when the number increases to 20–30 nodes, the graph becomes very dense, making exploration very tough."

(L2) "The tools which used node-link have become dense and impenetrable. Arguments can not just be made into pretty pictures because we're also interested in the content."

(L3) "The tools we have designed are only for small scale arguments; I would like to have tools that handle a large number of arguments."

(L4) "The biggest challenge of presenting the large-scale arguments is that we want to see the whole picture and see the details of what's going on using the same tool which we miss in most of the current argument tools". (Khartabil 2020, p.50–51)

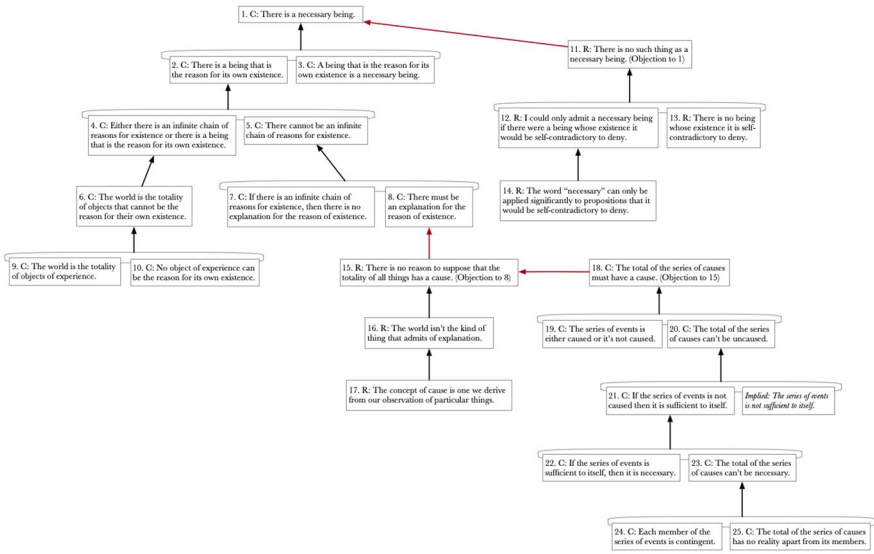


Fig. 7 Diagram of Copleston’s opening argument, Russell’s objections, and Copleston’s reply to Russell’s second objection

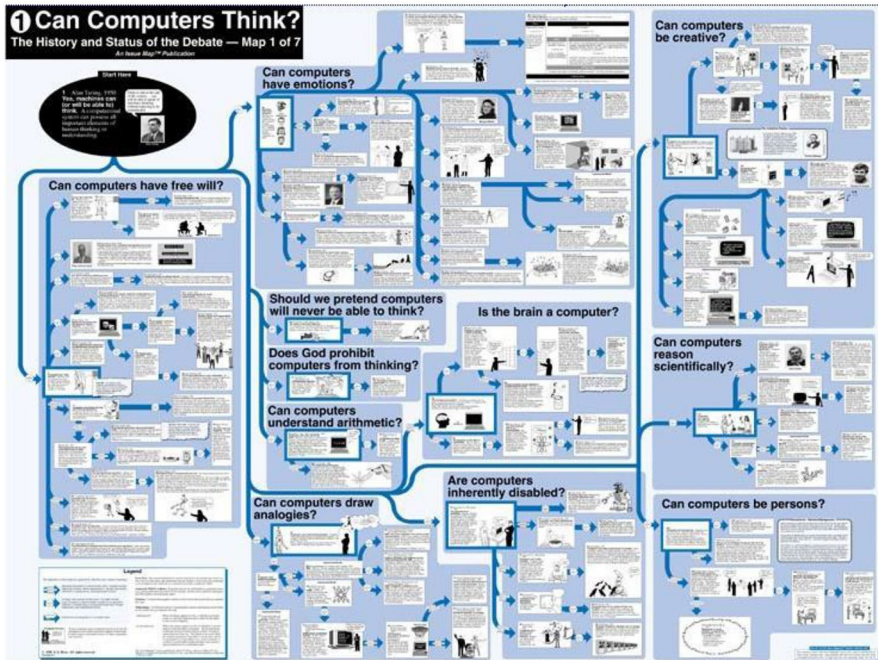


Fig. 8 Map 1 of 7 of Horn’s “Can Computers Think?” argument map

Another of Khartabil’s main goals was to pilot test some alternative computer sup-



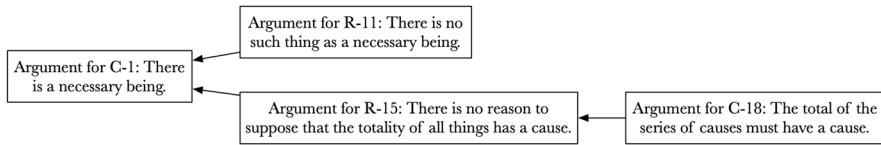


Fig. 9 Yoshimi-style map of the Russell-Copleston debate

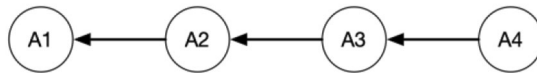
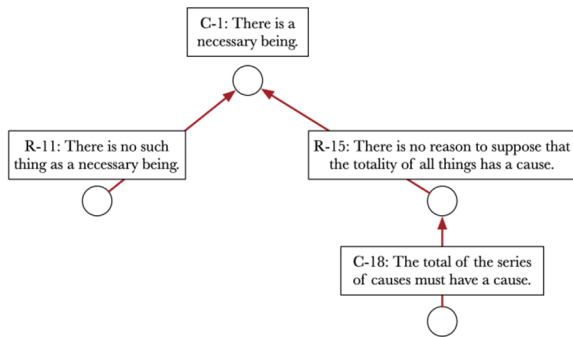


Fig. 10 Dung-style representation of a debate in which A1, A2, A3, and A4 are arguments such that, as indicated by the arrows, A2 attacks A1, A3 attacks A2, and A4 attacks A3

Fig. 11 Delhomme-style map of the Russell-Copleston debate



ported argumentation visualization tools that tried to counter these limitations. Alternatives of this sort are explored in the next section.

### 3 Mapping Debates

There are debate representation options other than AD; for example, Bob Horn’s maps of the “Can Computers Think?” debate (Horn et al. 1998). Just as an argument diagram is a graph that represents statements as nodes and inferences as edges, a Horn-style map is also a graph that, instead, represents whole arguments as the nodes and support, dispute or restatement as the edges to indicate the relationship between arguments in time (see Fig. 6).

As indicated on the map, Fig. 6 is just one of seven maps Horn and his team produced to represent the state of the debate about thinking computers in 1998. Each map is a poster approximately four feet by three feet, and they are truly a work of art. The content necessitates the size, as the debate included many, many arguments.

One of Horn’s collaborators, Jeffrey Yoshimi, came to similar conclusion regarding the visualization of debates in “Mapping the Structure of Debate” (2004). Here,

he is striving to improve upon Horn's method to illustrate the importance of looking beyond individual arguments to exchanges in a debate. "Debate level structures are worth studying for the obvious reason that they are pervasive—any time two or more parties trade off arguments, a debate is underway" (Yoshimi 2004, p.2). In this article, Yoshimi clearly and succinctly expresses a kind of hybrid approach—creating a graph of graphs.

It is important not to confuse argument-level structures with debate-level structures. For example, argument diagrams—a standard tool in introductory critical reasoning courses—employ graph theory similar to that employed here. But whereas argument diagrams relate premises and conclusions within an argument (allowing one to distinguish divergent, convergent, linked, and serial arguments, among others), debate maps relate whole arguments (allowing one to distinguish different forms of thread, debate, and position). Thus, every node on a debate-map can be represented by its own argument map, resulting in a graph of graphs. (Yoshimi 2004, p.3)

Yoshimi describes what he calls "debate threads," in which a thread is a series of arguments offered in a debate offered by each participant representing a line of argument/objection/reply/objection, and so on. In this scheme, the Russell-Copleston debate (at least the part analyzed above), could be represented by the debate-level structure shown in Fig. 7.

Additionally, if we were to apply the concept of a graph of graphs, then the nodes in Yoshimi's scheme would contain the entire argument sections from Figs. 1, 2, 4 and 6, while the edges would represent the red arrows I used to represent the objections in Fig. 7. Ultimately, then, one could see the overall structure of the exchange between debaters and also drill down to the argument-level structure to see the details of the arguments given.

Tools used to visualize debate structure developed by computer scientists and artificial intelligence (AI) research have come and gone over the past two decades (see, e.g., Baker, et al., 2007; Cerutti, et al., 2016; Corbel, et al., 2002). One of the most recent is AIPA (Argument Interface for Participatory Approach), developed by Delhomme et al. (2022). In their paper introducing AIPA published just this year, Delhomme and his colleagues lamented the fact that these types of tools have not lasted:

Whether involved in, or observing a debate, more often than not, it is hard to follow its progress; positions are unclear and arguments are unstructured often resulting in circular discussions. This is true both for participants in an ongoing debate hoping to reach a consensus as well as for those who, a posteriori, wish to understand what was discussed and how. However, *at the current time, there are to our knowledge no tools to support real-time debates by allowing participants to visualize arguments and identifying opposing points of view in order to resolve conflicts.* (Delhomme, et al., 2022, 1, emphasis mine)

Briefly, they want a representational structure that can serve both to track debates in real time, and also allow students to be able to analyze and evaluate debates and their

components after the fact. Nearly all these different tools, including AIPA, have been based on Phan Minh Dung's (1995) abstract argumentation framework (AAF).

An important goal of computational argumentation in AI research is to find a system which will allow computers to reason – to accept or reject arguments based on the arguments put forward to support or reject them. According to Dung (1995), an argumentation framework (AF) consists in a set of arguments and an attacking relation. In the original formulation, we can determine the acceptability of an argument by looking at the relationship between the arguments in the set.

In subsequent adoption and extensions of Dung's work (Bench-Capon 2003; Delhomme et al. 2022) it has become standard to represent argument frameworks as graphs in which the arguments are the nodes and the attack relations are the edges. The template of an argument framework might look like this:

Delhomme et al. (2022) develop a model of debate using Dung's argumentation framework, AIPA, and demonstrate their web-based implementation of AIPA, WebAipa. This model allows for the visualization of the arguments (or, rather the conclusions of the arguments) in the course of a debate, as well as the attack and support relations between the arguments. The Russell-Copleston debate (as far as I have analyzed it above) might look like this:

An important component of the semantics of these various representations is that an argument is acceptable if all of the arguments that attack it are themselves attacked without rebuttal. As Bench-Capon explains, "The key question to ask about such a framework is whether a given argument  $A$ ,  $A \in AR$ , should be accepted. One reasonable view is that an argument should be accepted only if every attack on it is rebutted by an accepted argument" (Bench-Capon 2003, p.431). This amounts to a rule that the last attacking argument in a debate is the one that should be accepted. This makes sense if this theory is based on Dung's original formulation of the graphs he envisions, "Here, an argument is an abstract entity whose role is solely determined by its relations to other arguments. No special attention is paid to the internal structure of the arguments" (Dung 1995, p.326).

This view about what makes an argument acceptable indicates serious problems for applicability of any computer supported argument visualization tool that may be used in the classroom to teach critical thinking skills. First, it is plainly false that an argument should be accepted on the basis of whether it actually is subjected to an objection or counterargument. Arguments should be accepted or rejected based on truth of their premises and the strength of support they provide the conclusion. Of course, we might set that worry aside if we are only considering debates in which objections and replies are given by all participants. Even so, that brings us to the second problem; this view equates "winning" a debate, in terms of essentially being the last one standing, with making the best case for a particular conclusion. In fact, most critical thinking textbooks warn students against this false equivalence.

Lastly, while this theory of argumentation might allow for implementation in AI systems, it falls far too short of the graph of graphs concept proposed by Yoshimi (2004). For using debate to teach critical thinking, it is crucial for students to inter-

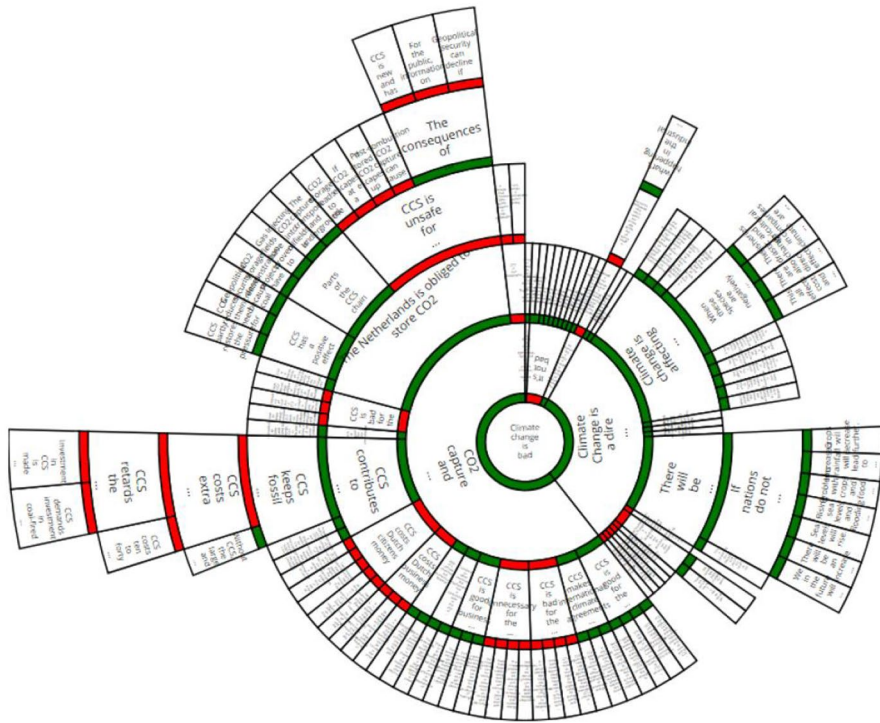
rogate both the internal structure of the of the individual arguments given and the relationship between these arguments in the context of the entire debate.<sup>6</sup>

## 4 What is Needed

An ideal representation of an argumentative debate would be one that combines a Delhomme-style graph of the debate structure with a standard diagramming graph of the structure of each of the arguments that are represented by the nodes of the debate structure. To my mind, then, this ideal representation would have the following requirements:

1. Two levels of representation: the debate graph and the argument diagram.
  - a. Each would be a graphical representation with nodes and edges.
    - i. The debate graph would represent whole arguments as nodes and the support/object/rebut relationships between arguments as edges.
    - ii. The argument diagram would represent the statements in which an argument consists as nodes and the inferential connections between the statements as edges.
2. Both the debate-level graph and the argument level graph should allow for a large number of nodes, although the medium in which the graphs are represented (program, slide, paper) should be a consideration.
3. The edges of the debate-level graph should allow color-coding of either the nodes or the edges, or both (one color for support, another for objection, and possibly a third for rebuttal, etc.) so it would be straightforward to determine the general flow of the debate at a glance.
4. The edges of the argument-level graph need not be color coded to indicate support/objection/rebuttal relationships, and so, while not necessary, color-coding could be used instead to represent features of the statements (conditional, probabilistic, etc.) and/or the inferences (deductive, inductive, abductive, etc.).
5. The user should have a way to “expand” the debate-level nodes to see a graphical representation of the internal structure of any argument, and then “collapse” these nodes so as not to perpetually take up valuable representation space.

<sup>6</sup> I am thankful to an anonymous reviewer for pointing out that I have mentioned only three relations between arguments in the Russell-Copleston debate. This, again, is due to my pedagogical focus on argumentation. In all aspects of argument analysis, I have learned to simplify the kind and amount of argumentation theory I teach my students. Recently, Leal and Marraud (2022) distinguish many more important relations between arguments in a debate, and in so doing, argue for alternatives to diagramming like “regimented paraphrase.” A discussion of the advantages and disadvantages of each approach is important, but outside the scope of this article.



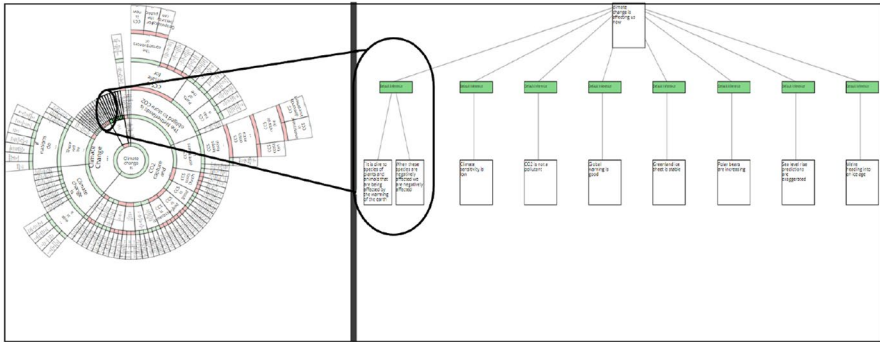
**Fig. 12** Khartabil’s sunburst representation of an argument. The white spaces contain the statements, the radial lines represent argument structure, and the colors represent support vs. objection

Requirement (5) above is, I think the critical feature of the debate representation, and in principle should be straightforward to implement. In her dissertation, Khartabil (2020) develops and user-tests a few versions of the kind of computer supported argument visualization that does this, although she was not using them to represent the two levels of representation I have outlined here. Rather, she was using them to “zoom in on” the structure of different parts of very complex arguments.

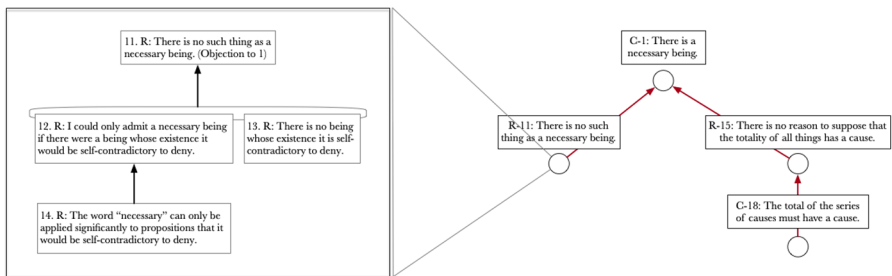
As noted above, Khartabil was trying to accommodate the limitations that experts in the argument diagramming community described as drawbacks to traditional argument diagramming tools; in other words, she wanted to be able to represent arguments with hundreds or more boxes while not giving up the information contained in the box and arrow graphs. All of her versions started with representing the overall argument as a sunburst, instead of the traditional tree structure (see Fig. 12).

One of the versions then has a “pop-out” feature that displays a part of the argument as a “node-link” layout (see Fig. 13).

The kind of ideal debate representation I have in mind would use the “pop-out” feature to connect the debate level graph with the argument-level graphs (see Fig. 14).



**Fig. 13** Khartabil's sunburst representation of an argument with the accompanying pop-out representation of the details of part of the argument



**Fig. 14** A mock-up of my own ideal debate representation  
Now, if only I could get someone to build it for me

## 5 Conclusion

In my own teaching, I value the process of students learning argumentation by constructing argument diagrams. My students create diagrams to represent their individual and collaborative understanding of the arguments in the texts we read, as well as to assist in evaluation of the same arguments. My students also create diagrams of their own essays to aid their writing process, as well as create diagrams of each other's essay drafts to facilitate peer review. Fortunately, there are many options for computer supported argument visualization, and I can choose according to my specific needs for any given class.

Argument diagrams do, however, have substantial limitations, especially when analyzing long texts. They are also quite limited in their ability to accurately and easily represent debates that authors have either with themselves in a single text, or with others across multiple texts. Using debates in my classes to teach argumentation has, therefore, always been quite frustrating; and despite recognizing the benefits that it might have in many classes, I don't use it as much as I would like. There are, of course, options available for representing debates, but for the reasons outlined above, they do not meet the requirements I have for a successful tool of this sort.

Thus, I have introduced the specifications for the sort of tool which would allow me to use debates to teach argumentation in my classes. There are so many excellent historic and contemporary debates I could use to teach a variety of concepts, from issues in the nature of the mind to argumentative fallacies. It would also be wonderful to be able to have my students engage in their own debates in class or online while also having a visual way to represent and keep track of those debates for both the short and long term. If I have persuaded anyone to take up the task of building such a program, then I would consider myself a very fortunate teacher indeed.

**Compliance with Ethical Standards** I attest that I have no conflicts of interest, and no human and/or animal subjects were used in this research.

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