Ethics for Nerds

An Advanced Course in Computer Science
Summer Semester 2020

Precise Thinking 1.1
Getting Started with Arguments

Introduction

Prof. Holger Hermanns,
Kevin Baum, Sarah Sterz

UNIVERSITÄT
DES
SAARLANDES

PRECISE THINKING

independent, sharp, balanced thinking that is based in reason, evidence and logic

the practice of proper argumentation

PRECISE THINKING

* at least that's how I and lots of others see it

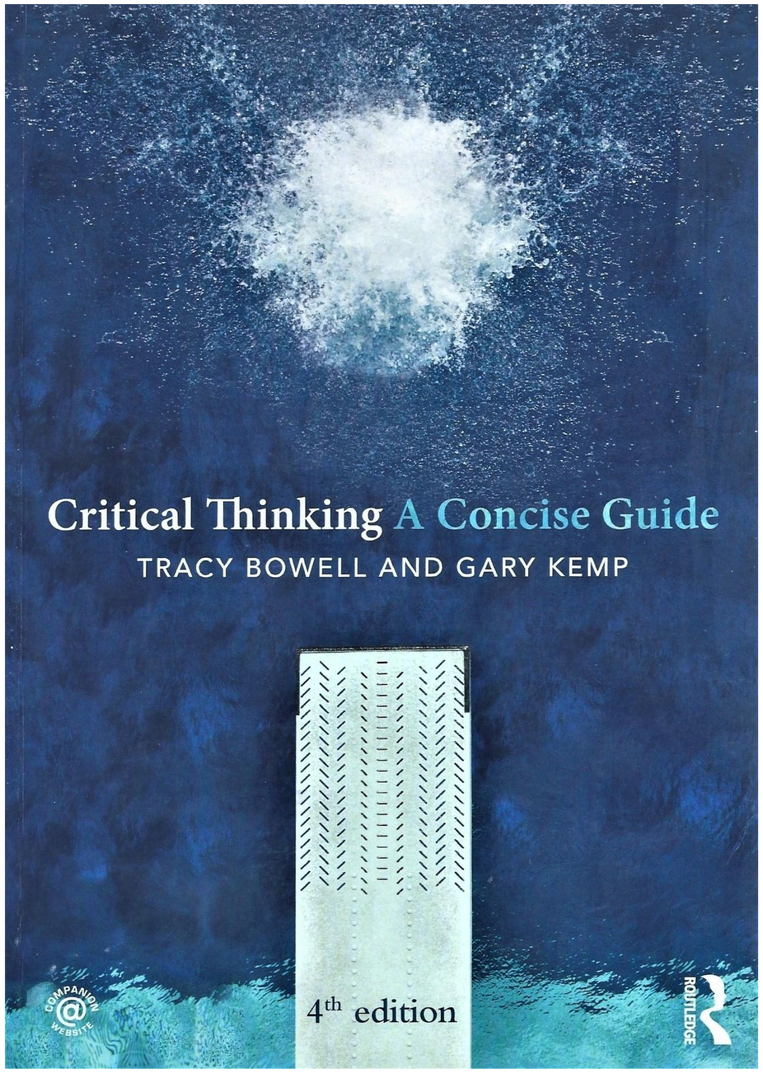
Also see:
https://www.youtube.com/watch?v=HnJ1bqXUnIM

What do we want to teach you?

higher-order skills
to arrive at your own, independent position, but based on reason

- analyse infor-mation
- identify the key aspects in arguments
- weigh different types of evidence and arguments
- criticise weak arguments
- strengthen strong arguments
- assess meaning and significance of arguments
- express yourself clearly

PRECISE THINKING



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PRECISE THINKING

Anheuser-Busch Inbev, www.welt.de/wirtschaft/article115454943/

https://commons.wikimedia.org/wiki/File:Cdu_parteitag_dezember_2012_merkel_rede_04.JPG

Kevin_Snyman, https://pixabay.com/photos/demonstration-london-demo-activist-4193109/

docmonstereyes, https://www.flickr.com/photos/docmonstereyes/8436688978

Paul Downey, https://www.flickr.com/photos/psd/20552004021

Steve Rhodes, https://www.flickr.com/photos/ari/3971540270

https://en.wikipedia.org/wiki/Open_Happiness#/media/File:Open_Happiness.jpg

ARGUMENTS

argument

~~fight, disagreement~~

attempts of persuasion by giving reason, what we want when we ask for a good reason

Why should people in general care?

attempts to persuade are everywhere

https://en.wikipedia.org/wiki/Open_Happiness#/media/File:Open_Happiness.jpg

https://commons.wikimedia.org/wiki/File:Cdu_parteitag_dezember_2012_merkel_rede_04.JPG

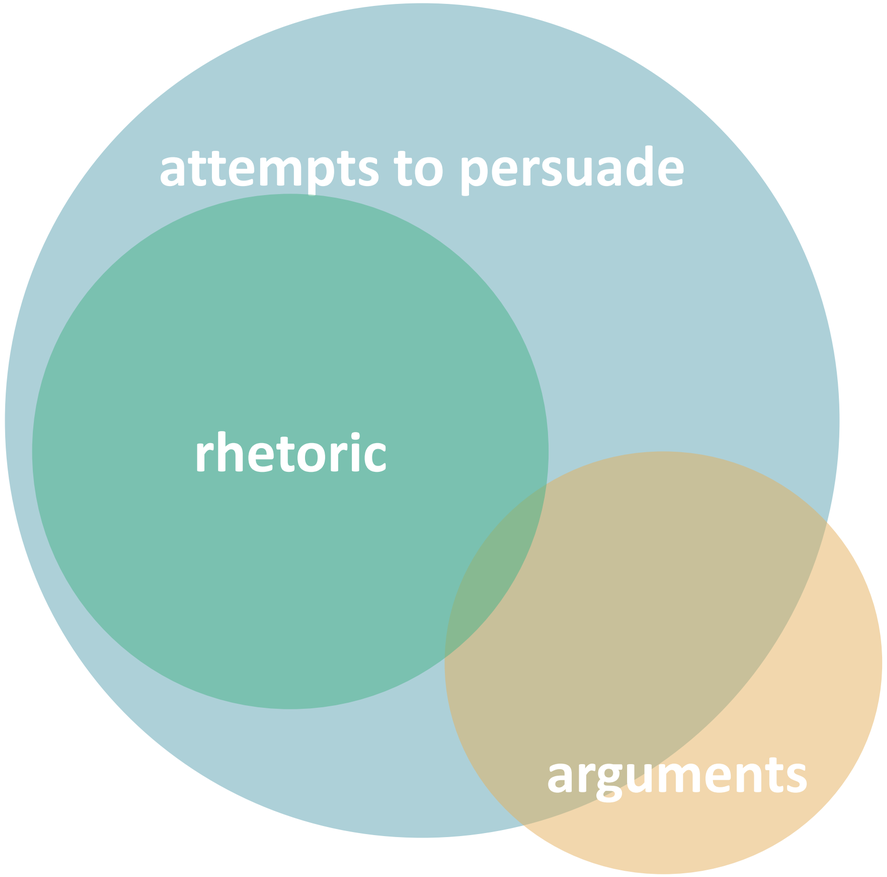
they are a main force in our society

https://en.wikipedia.org/wiki/12_Angry_Men_(1957_film)#/media/File:12_angry_men.jpg

reasoning can be crucial

blickpixel, https://pixabay.com/de/photos/zeitung-stapel-zeitungen-lesen-568058/

ARGUMENTS



Rhetoric (working definition)

An attempt to persuade mostly though the power of the words used, not through reason.

Rule of thumb:
Arguments are mainly about truth, rhetoric is mainly about emotions.

Unsupported vs supported claims

It‘s going to rain later today.	vs	I looked at the weather forecast and it said it’s going to rain later today. That’s usually reliable.
Computer scientists are nerds.	vs	Computer scientists are nerds. I met a lot of computer scientists and all of them looked rather nerdy to me.
Crypto currencies are unsustainable.	vs	Maintaining a block chain needs lots and lots of resources. Bitcoin consumes about as much energy as the whole of Austria. Thus, crypto currencies are unsustainable.

Unsupported vs supported claims

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ARGUMENTS

Argument (working definition)

A collection of statements of which at least one functions as a conclusion and the remainder as premises. The premises are intended to support the conclusion.

STANDARD FORM

Therefore, France is west of Germany.

Therefore, you should not drink and drive.

Probably, you have a cold.

STANDARD FORM

You know that drinking and driving puts others and yourself in grave danger.

Drinking and driving can usually be easily avoided.

If drinking and driving can usually be easily avoided and you know that drinking and driving puts others and yourself in grave danger, then you should not drink and drive.

Therefore, you should not drink and drive.

Germany is east of France.

Therefore, France is west of Germany.

You have a runny nose.

You have no pollen allergy.

You have a headache.

Probably, you have a cold.

STANDARD FORM

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STANDARD FORM

P1: You know that drinking and driving puts others and yourself in grave danger.

P2: Drinking and driving can usually be easily avoided.

P3: If drinking and driving can usually be easily avoided and you know that drinking and driving puts others and yourself in grave danger, then you should not drink and drive.

C: Therefore, you should not drink and drive.

P1: Germany is east of France.

C: Therefore, France is west of Germany.

P1: You have a runny nose.

P2: You have no pollen allergy.

P3: You have a headache.

C: Probably, you have a cold.

STANDARD FORM

P1: You know that drinking and driving puts others and yourself in grave danger.

P2: Drinking and driving can usually be easily avoided.

P3: If drinking and driving can usually be easily avoided and you know that drinking and driving puts others and yourself in grave danger, then you should not drink and drive.

C: Therefore, you should not drink and drive. ✓ | –

P1: Germany is east of France.

C: Therefore, France is west of Germany. ✓ | –

P1: You have a runny nose.

P2: You have no pollen allergy.

P3: You have a headache.

C: Probably, you have a cold. ✗ | (✓)

Standard Form of Arguments

An argument in standard form is an argument of the following form:

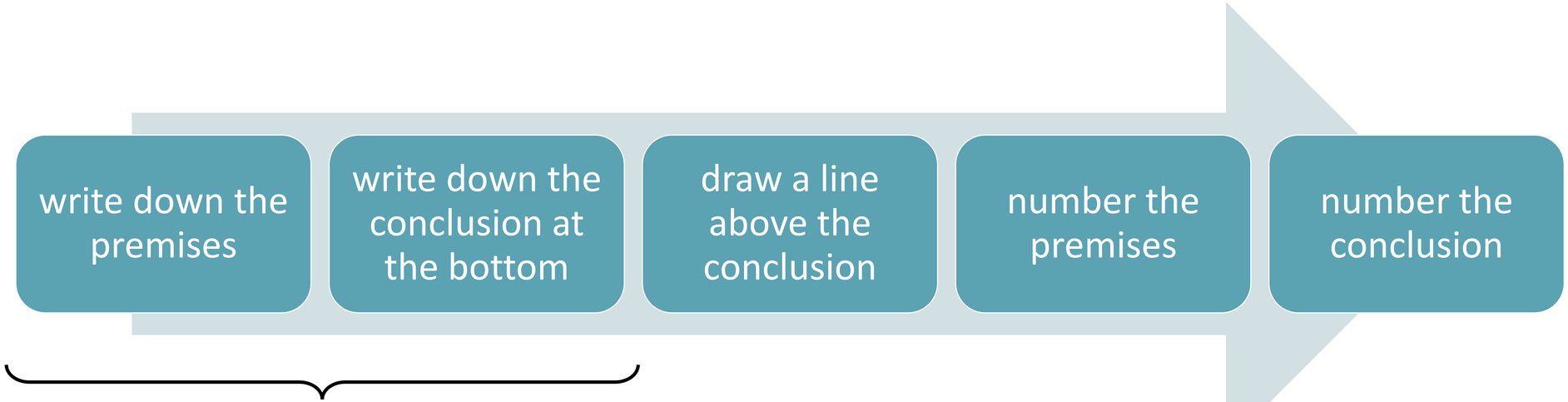
Pn_1:	[n_1-th premise]
Pn_2:	[n_2-th premise]
	⋮
Pn_i:	[n_i-th premise]
Cm:	[optional: indicator word], [conclusion]

The premises have indexes from a suitable index set. The conclusion can, but does not need to have an index.

(The keyword in front of the conclusion indicates what 'flavour' of reasoning the argument tries to have, but you can just ignore that for now. We will come to that later. ⟶ **PT3 Logics I** & ⟶ **PT2 Logics II**)

STANDARD FORM

How to write an argument in Standard Form?



What are the premises and what is the conclusion?

Was that it already?

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Precise Thinking 1.2
Getting Started with Arguments

Premises and Conclusions

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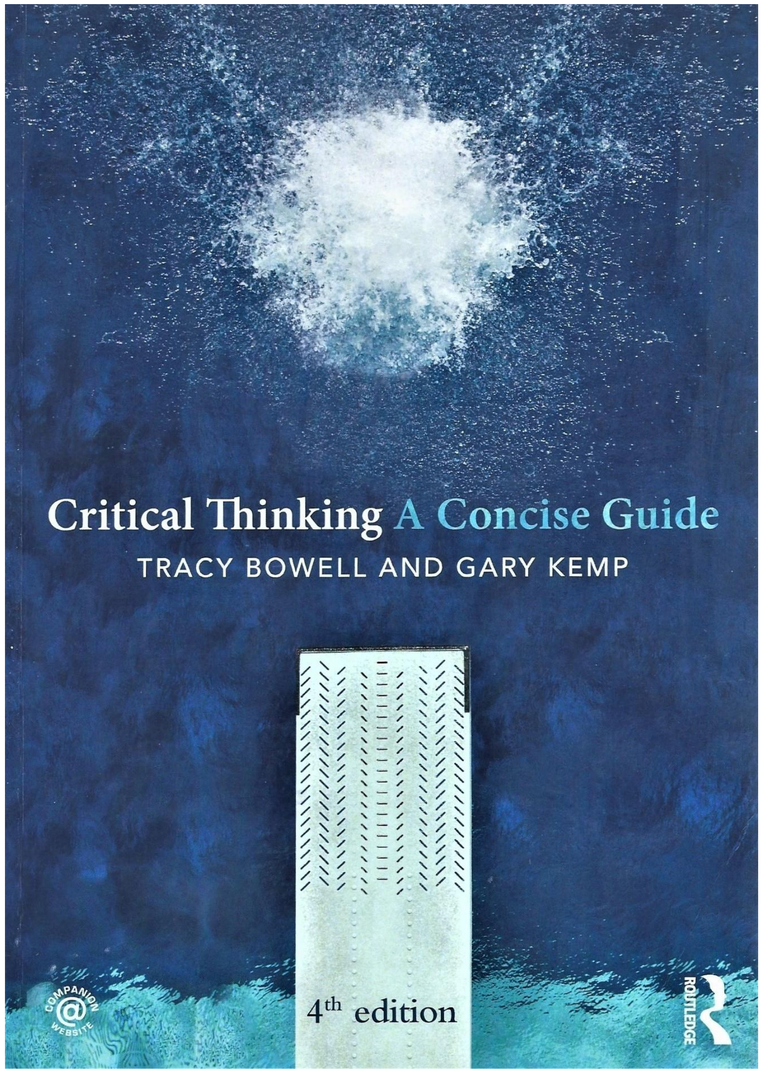
PRECISE THINKING



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IDENTIFYING CONCLUSIONS AND PREMISES

What should the premises and the conclusion be for a standard form of…

your own argument?

Conclusion: what you want to argue for

Premises: reason to believe in your conclusion

⟶ PT2 Logics I & ⟶ PT3 Logics II

another‘s argument?

there is no fast and easy way to tell

heavily depends on the context

⟶ PT5 Argument Reconstruction

IDENTIFYING CONCLUSIONS AND PREMISES

Example

“You have to load the hyperref-package last. See, I included it at the very bottom and my file compiles!”

Possibility 1:

Friend: “My file doesn’t compile, what am I doing wrong? Yours seems to work…”

You: “**You have to load the hyperref-package last**. See, I included it at the very bottom and my file compiles!”

P1: My file compiles.

P2: I included the hyperref-package last.

C: You have to load the hyperref-package last. ✗ | ✗

IDENTIFYING CONCLUSIONS AND PREMISES

Example

“You have to load the hyperref-package last. See, I included it at the very bottom and my file compiles!”

Possibility 2:

> Friend: “You’re file won’t compile, because you misplaced the “\usepackage{hyperref}” in your document.”
>
> “You have to load the hyperref-package last. See, I included it at the very bottom and my file compiles!”

P1: You have to load the hyperref-package last.

P2: I included the hyperref-package last.

C: My file compiles. ✗ | ✗

IDENTIFYING CONCLUSIONS AND PREMISES

Example

“You have to load the hyperref-package last. See, I included it at the very bottom and my file compiles!”

Possibility 3:

> Friend: “I’m not sure whether that could be your mistake, but you might want to check whether you load any packages after you loaded hyperref…”
>
> “You have to load the hyperref-package last. See, **I included it at the very bottom** and my file compiles!”

P1: You have to load the hyperref-package last.

P2: My file compiles.

C: I included the hyperref-package last. ✗|✗

IDENTIFYING CONCLUSIONS AND PREMISES

Example

“You have to load the hyperref-package last. See, I included it at the very bottom and my file compiles!”

Possibility 1:

P1: My file compiles.

P2: I included the hyperref-package last.

C: You have to load the hyperref-package last. ✗ | ✗

Possibility 2:

P1: You have to load the hyperref-package last.

P2: I included the hyperref-package last.

C: My file compiles. ✗ | ✗

Possibility 3:

P1: You have to load the hyperref-package last.

P2: My file compiles.

C: I included the hyperref-package last. ✗ | ✗

Identifying conclusions

Usually the first step when you try to work out an argument (both when you write one yourself and when you reconstruct others‘ arguments)

Examples: what are the conclusions?

- Covid-19 can be dangerous to a certain population and spreads very fast if we do not take appropriate action. We need to slow the virus down. Thus, we need to minimize physical contact with others.
- Since Kevin is a computer scientist and all computer scientists like coffee, I guess that Kevin likes coffee, too.
- I think that sport hunting is wrong. After all, it’s wrong to kill animals just for pleasure and sport hunting involves killing innocent animals for fun.

Identifying conclusions

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IDENTIFYING CONCLUSIONS AND PREMISES

Tricks for finding conclusions

1. If you paraphrase the main point of a section that you believe to contain an argument as one precise sentence, it is likely to capture the main conclusion of the argument of that paragraph.*
2. Look for certain keywords and phrases that may indicate a conclusion**:
   - “therefore”, “thus”, “it can be concluded that”, “hence”, “so”, …
   - “proves”, “implies”, “establishes”, “shows”, …
   - “because”, “for”, “since”, “follows from the fact that”, “is established by”, “is implied by”, …

*except when it isn’t;

**except when they aren’t (and in the wild they often aren’t)

IDENTIFYING CONCLUSIONS AND PREMISES

Things that should *not* guide you in finding the conclusion are

1. Complexity
    - Conclusions can have any kind of complexity, from very trivial to extremely sophisticated.
2. Sentence type
    - Even though conclusions should be expressed by declarative sentences in academic writing, anything can stand in as a conclusion in everyday situations, e.g., questions, gestures, …
3. Method of elimination
    - There can be multiple conclusions, especially when you have intermediate conclusions or when there are just several arguments.
4. Exclusions based on what the text does not explicitly say
    - You should never butcher the text! But sometimes (and *only* sometimes!) the conclusion is not stated explicitly, but implicitly.
    - Example: “There is so much pornography online these days, and young people are influenced so easily, that it’s bound to lead to depravity and ultimately the breakdown of society! Is that what you want?”

IDENTIFYING CONCLUSIONS AND PREMISES

Identifying premises

- Harder to find than conclusions
- Requires a both close and charitable reading

Tricks for finding premises

1. Ask yourself what the writer's or speaker's reason for believing the conclusion could be. These reason are likely to be part of premises in one way or the other.*
2. Look for certain keywords and –phrases that may indicate premises**:
    - "My reason is", "My evidence is", "This is so because", …
    - "proves", "implies", "establishes", "shows", …
    - "because", "for", "since", "follows from the fact that", "is established by", "is implied by", …

*except when they're not

**except when they aren't (and they aren't more often than not)

IDENTIFYING CONCLUSIONS AND PREMISES

Things that should *not* guide you in finding the premises are

1. Complexity
    - Premises can have any kind of complexity, from very trivial to extremely sophisticated.
2. Sentence type
    - Even though premises should be expressed by declarative sentences in academic writing, anything can stand in as a premise in everyday situations (questions, pictures, …).
3. Method of elimination
    - There almost always are multiple premises. (Thanks, Captain Obvious!)
    - And there often are plenty of things in an everyday argument that are neither a premise nor a conclusion.
4. Exclusions based on what the text does not explicitly say
    - You should never butcher the text! But often there are implicit premises that are not explicitly stated.

PRINCIPLE OF CHARITY

Always **read** using the *principle of charity*:

- find the best and strongest interpretation of an argument (or any text)
- assume that every argument (or text) was written by someone rational, capable and intelligent
- Find *charitable* premises and conclusions when reconstructing another's argument

Read as close to the text as possible, and as far away as necessary.

~~Meh. Yeah, well, it'll be close enough.~~

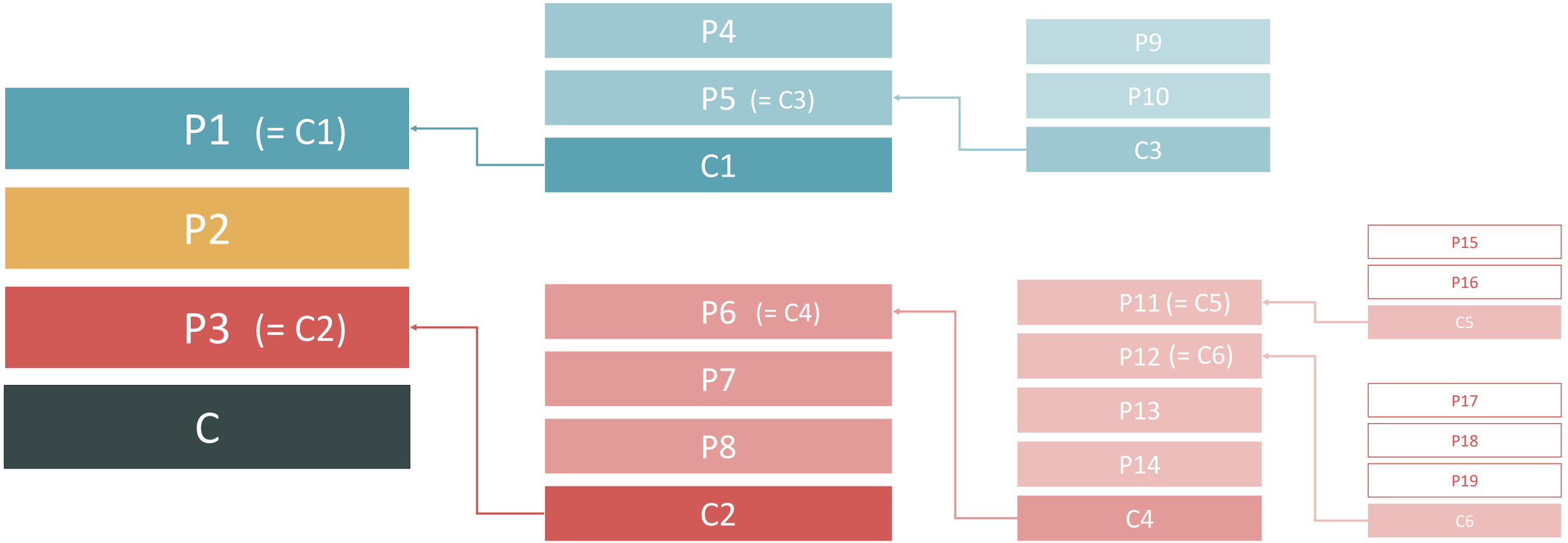
But **write** as if it was not applied to your work:

- write as precise as if your addressee is a mean, nasty expert who hates the principle of charity and loves to point out ambiguities, mistakes and inconsistencies
- write as easy and crisp as if your addressee is my mother (and my mother is intelligent, but neither a philosopher nor a computer scientist)

Write as easy and straight forward as possible, and as complicated as necessary.

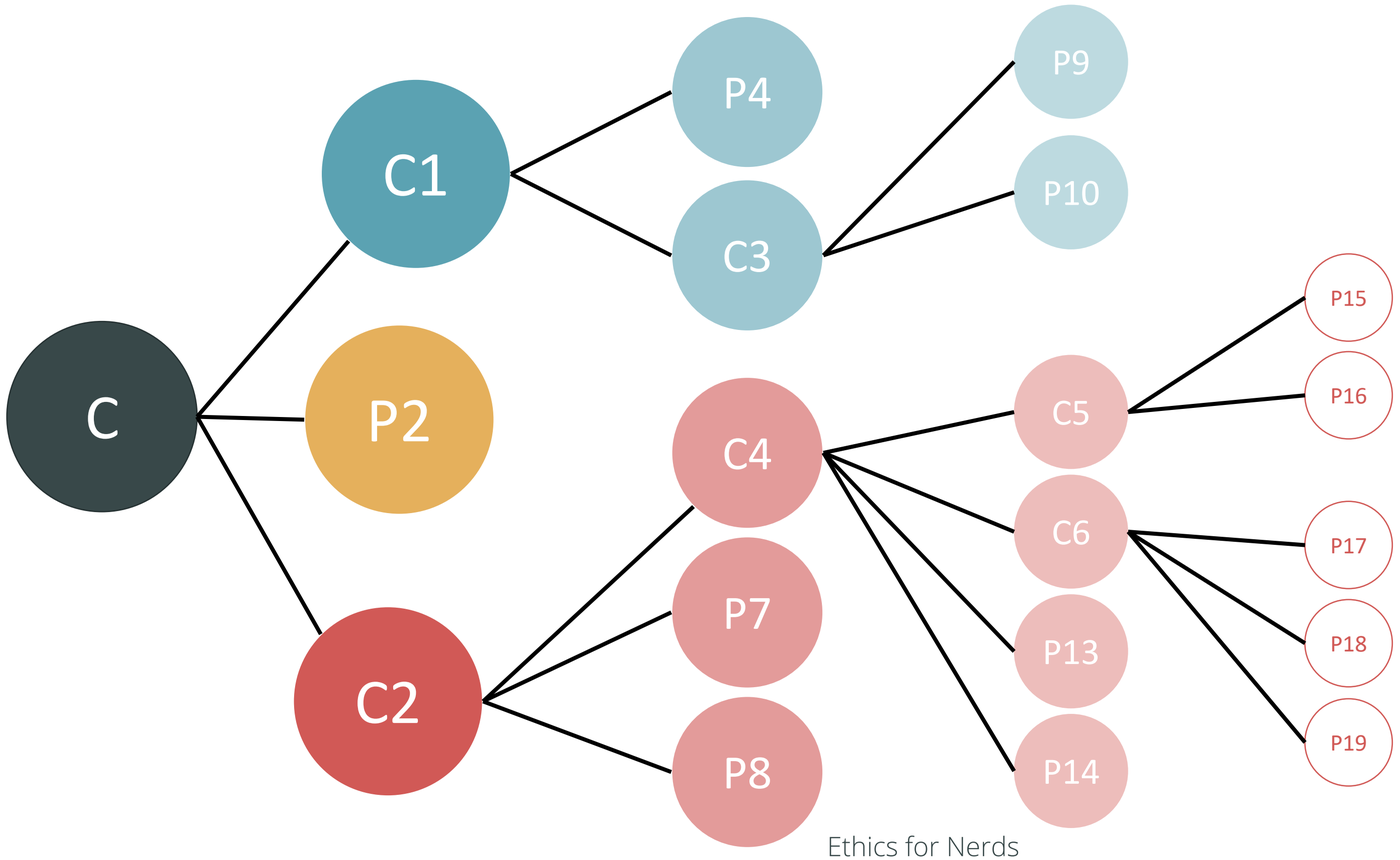
Intermediate Conclusions

- We may want to split an argument into multiple standard forms, such it is easier to read.
- Modular arguments are useful in roughly the same way as modular code is useful.



Argument Trees

- you can depict an extended argument as a usually tree-like graph: the conclusion is the root, intermediate conclusions are inner nodes and premises are leaves



Example

P1: =C1 You know that drinking and driving puts others and yourself in grave danger.

P2: =C2 Drinking and driving can usually be easily avoided.

P3: If drinking and driving can usually be easily avoided and you know that drinking and driving puts others and yourself in grave danger, then you should not drink and drive.

C: Therefore, you should not drink and drive. ✓ | –

P4: You know that under the influence of alcohol the risk of severe accidents raises significantly.

P5: You know that you are not the only road user.

P6: If P4 and P5, then you know that drinking and driving puts others and yourself in grave danger.

C1: Therefore, you know that drinking and driving puts others and yourself in grave danger. ✓ | –

P7: It is usually not of great importance to use the car instead of alternative methods of transportation.

P8: If P7, then drinking and driving can usually be easily avoided.

C2: Therefore, drinking and driving can usually be easily avoided. ✓ | –

Extended Standard Form of Arguments with Intermediate Conclusions

As a short hand for multiple standard forms for arguments with intermediate conclusion we introduce the following notation:

Pn_1: [n_1-th premise]

⋮

Pn_j: [n_j-th premise]

Cm_1: [optional: keyword][m_1-th intermediate conclusion] ([premises and intermediate conclusions used for Cm_1])

Pn_l: [n_l-th premise]

⋮

Pn_i: [n_l-th premise]

Cm_r: [optional: keyword][m_r-th intermediate conclusion] ([premises and intermediate conclusions used for Cm_1])

C: [optional: indicator word], [conclusion] ([premises and intermediate conclusions used for C])

The premises have indexes from a suitable index set. The conclusion can, but does not have to have an index. Intermediate conclusions need to be indexed and it has to be stated in brackets how they follow.

Example:

P4: You know that under the influence of alcohol the risk of severe accidents raises significantly.

P5: You know that you are not the only road user.

P6: If P4 and P5, then you know that drinking and driving puts others and yourself in grave danger.

C1: Therefore, you know that drinking and driving puts others and yourself in grave danger. (P4, P5, P6)

P7: It is usually not of great importance to use the car instead of alternative methods of transportation.

P8: If P7, then drinking and driving can usually be easily avoided.

C2: Therefore, Drinking and driving can usually be easily avoided. (P7, P8)

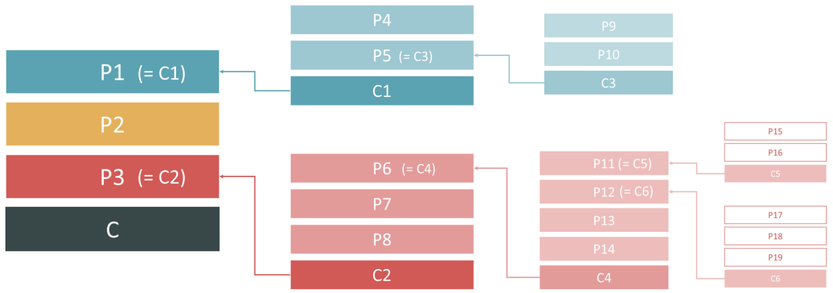
P3: If drinking and driving can usually be easily avoided and you know that drinking and driving puts others and yourself in grave danger, then you should not drink and drive.

C: Therefore, you should not drink and drive. (C1, C2, P3) ✓ | –

THE STRUCTURE OF ARGUMENTS

Note:

- Every premise, intermediate conclusion and conclusion should only be stated once, even if you use them more than once.
- You can use intermediate conclusions to argue for other intermediate conclusions.
- You can only use what you defined above, e.g. you could not use C2 to argue for C1, but only the other way around.
- You can rename your premises when transforming arguments from one form to another.
- Do not include keywords like “because”, “for”, “since” in your premises. They indicate structural properties of the argument that should be reflected in the structure of the argument!



Conditionalization

conditionalization of C

Sometimes, arguing for a conclusion C is very hard or impossible, because, e.g., whether or not C holds depends on other factors. In this case it can be helpful to argue for a conditionalization of C.

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Complications that Come with Natural Language

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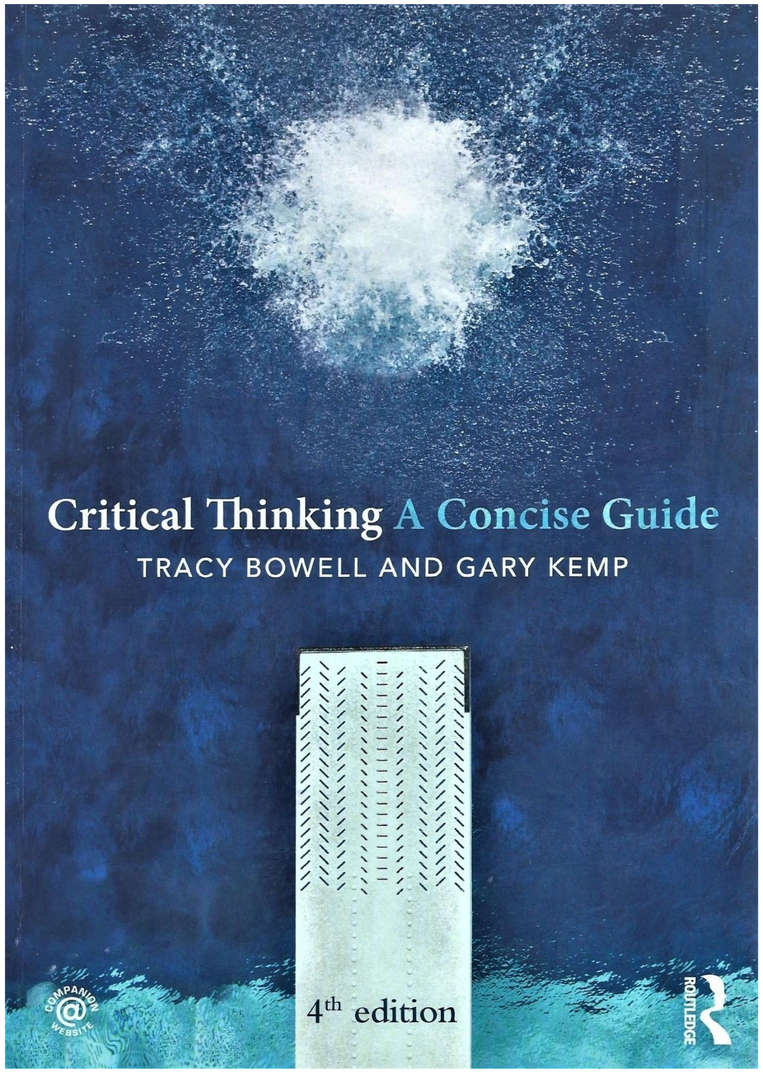
PRECISE THINKING



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Pitfall:
Natural Language

NATURAL LANGUAGE

“I did not understand him because…”

- I do not speak French. (foreign language)
- it’s too noisy in here. (environment)
- he tried to speak with his mouth full. (speaker’s articulation)
- I am hard of hearing. (listener’s ability to hear)
- I lack the necessary expertise. (listener’s background knowledge)
- I have a mental disability. (listener’s cognitive capacities)
- **…?** **(certain linguistic phenomena)**

AMBIGUITY

„I made her duck“ (taken from http://faculty.cs.niu.edu/~freedman/csnl/intro-duck02.txt)

1. I cooked waterfowl for her.
2. I cooked waterfowl belonging to her.
3. I created the (toy or sculpture?) duck she owns.
4. I caused her to quickly lower her head or body.
5. I turned her into waterfowl (using my magic wand?).

Ambiguity (working definition)

An expression is ambiguous in a context C iff if there is more than one thing it could plausibly be taken to express in C.

Problem with ambiguity: when something is ambiguous, there sometimes is more than one thing that someone could have meant

Solution: make a case distinction

VAGUENESS

Vagueness (very, very, very rough working definition)

An expression is vague iff there are boarder cases for which it is just not clear what it means.

Problem with vagueness: When someone uses a vague expression, you sometimes will not be able to tell if they are right or not, what they meant or even if they applied the expression correctly

Solution: Is it a clear case? Then you are good. Isn‘t it a clear case? Then try a case distinction and maybe go for a conditional answer in the end.

VAGUENESS

Example: Who is bald?

- Some are,
- some aren’t,
- and for some cases, it’s not clear.

The existence of unclear border cases does not imply

- that there are no clear cases or
- that the term is not useful or even meaningless

but only that the corresponding term (or concept) is vague.

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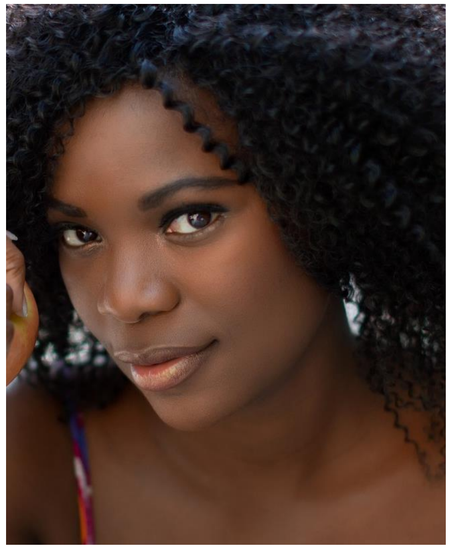

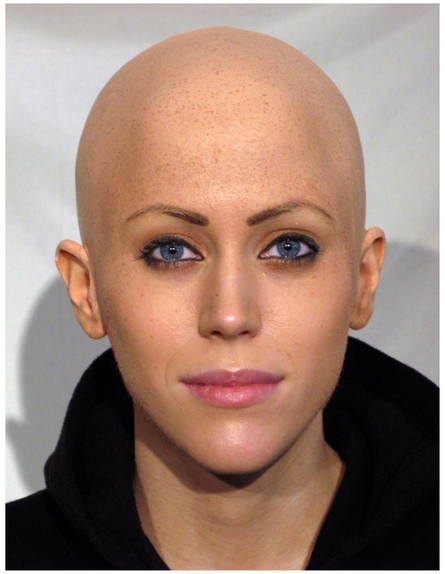

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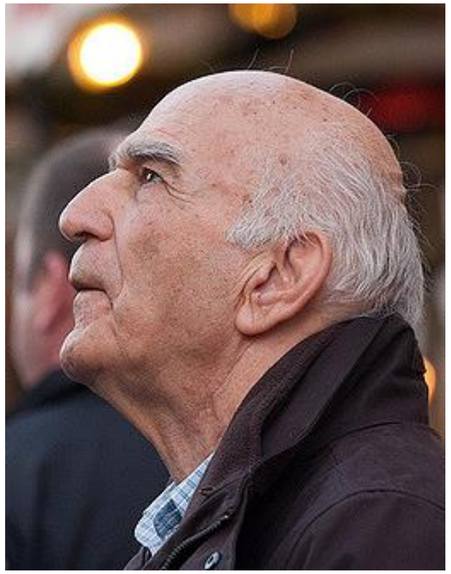

https://commons.wikimedia.org/wiki/File:Indian_woman_smiles.jpg

RHETORICAL QUESTION

Rhetorical Question (working definition)

A question is rhetorical when it is not really intended as a question, but as an assertion.

Problem with rhetorical questions: often used for allegedly obviously true statements of which the speaker thinks that the audience agrees

- but many times it is not actually obvious or agreed upon
- make it harder to tell the speaker's standpoint

Solution: Rewrite rhetorical questions as what you think the speaker tries to tell you

RHETORICAL QUESTION

Rewrite rhetorical questions as what you think the speaker tries to tell you:

Should my right to freedom of speech be limited just because you disagree with me?

→ My right to freedom of speech should not be limited just because you disagree with me.

Does bureaucracy really need to be that difficult?

→ Bureaucracy doesn’t really need to be that difficult.

Do I really need to explain how rhetorical questions work?

→ I don’t have to explain how that because you all know how rhetorical questions work.

UNCLEAR REFERENCE CLASS

Uncle Eddie is a fast runner.

Taxes are high.

She earns an above average salary.

My watch is the best of its kind.

The rent on our house is low.

Problem with unclear reference classes: It can be unclear whether the sentence is true or false.

Solution: Try to make the referece class explicit and make a case distinction if necessary.

Rhetorical force and implicature

Meaning that is not literally given by the words that a speaker says, but by some other aspect of their speaking:

- **Example 1**: “He is just a minor.” and “He is just a child!” express (roughly) the same, but can be used to mean very different things.
- **Example 2**: “Well, your daughter has not been thrown out yet for missing her classes.” means that the daughter is not doing well at university.

The difference between rhetorical force and implicature is not of interest for us. What’s important: sentences can express things go beyond what they literally say.