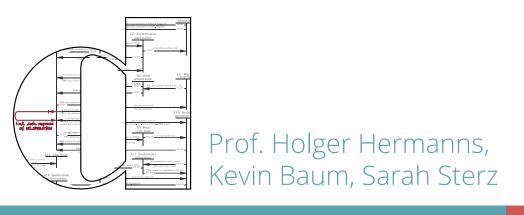


# Ethics for Nerds

An Advanced Course in Computer Science Summer Semester 2020

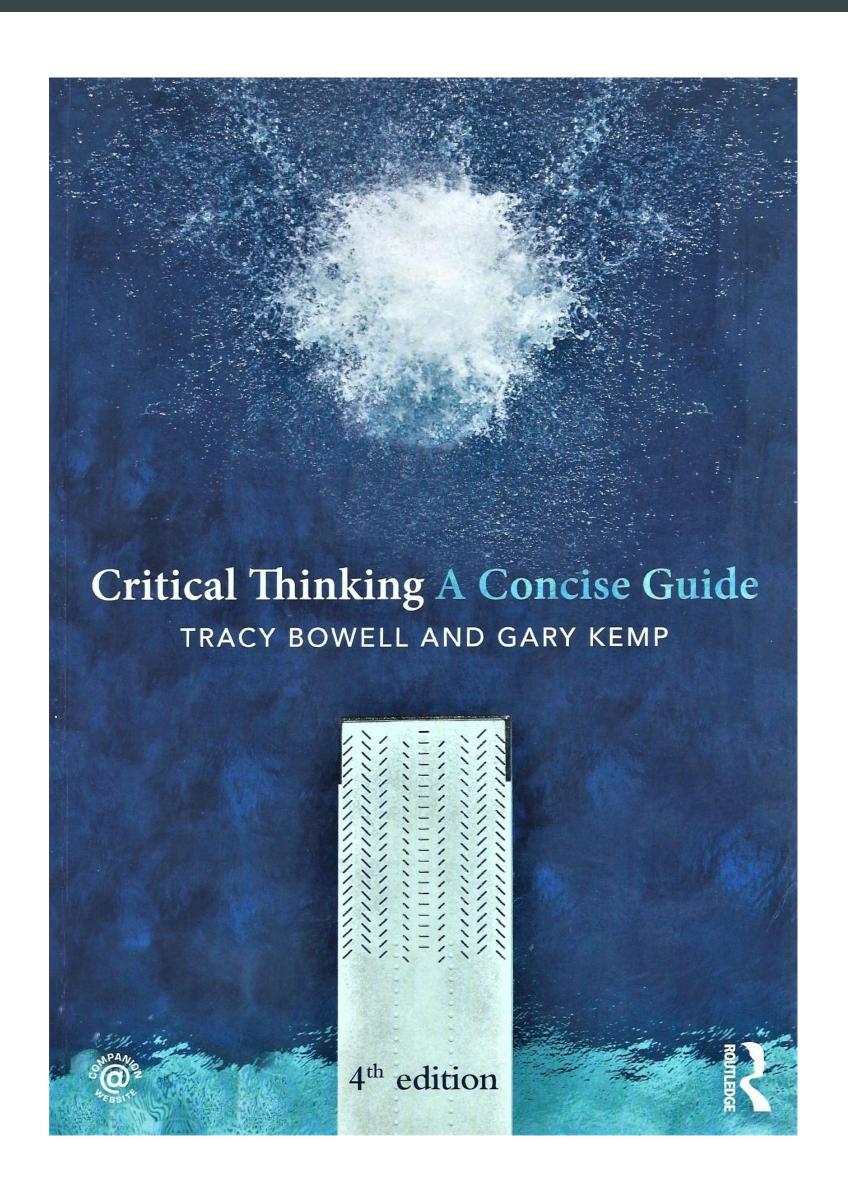
Precise Thinking 6.1
The Art of Argument Reconstruction

Why and How





#### PRECISE THINKING



We *very* loosely follow this book:

Bowell, T., & Kemp, G. (2015). *Critical thinking: A concise guide (4<sup>th</sup> ed.)*. Routledge.

However, *lots* of things deviate from the book. What is said in the lecture has precedence over the book.

You do <u>not</u> have to buy the book. If you want to have an inexpensive look, you can find a digital copy of the 2<sup>nd</sup> edition online at:

http://www.academia.edu/download/46383480/ Tracy Bowell Critical Thinking A Concise Guide BookFi.org.pdf

## **MOTIVATION**

we want to know whether we should be persuaded by what someone says

we need to know if they make a good point

we need to know what point they make

## **MOTIVATION**

we want to know whether we should be persuaded by someone's argument

we need to know if they give a good argument

at best, we can get a charitable reconstruction in standard form of the other's argument

we need to know what their argument is

## **MOTIVATION**



http://www.scottkurowski.com/tetriscube/

## Argument reconstruction is hard.

There can be, and usually are, many charitable, good reconstructions of an argument in text form.

However, there are a lot more wrong ones.

But luckily there are a few tricks on how to arrive at a good reconstruction.

#### **EXAMPLE**

## Example

(1) Once again the problem of young people engaging in cyberbullying rears its ugly head. (2) And it is a very ugly head, indeed. (3) Nevertheless, cyberbullying is so all-present that people seem to shrug their shoulders, accept it as a part of modern life or even as some kind of law of nature. (4) So, are we simply resigned to it? (5) Do we simply accept that some young people are excluded from their peer groups and bullied into depression? (6) Do we stand idly by? (7) I don't think so. (8) Not at any rate. (9) And there is a ready solution. (10) Let us turn to an old solution for a new problem: being offline. (11) A few decades ago, children were offline by default for a very simple reason: there was no internet. (12) Without internet, there is no cyberbullying. (13) This is a very trivial insight. (14) The interesting question is: how do we make sure that our children stay offline in a online world? (15) Children themselves want to go online, schools have no say about their student's private life, and parents cannot be trusted with consequently saying no to their begging teens. (16) So there is only one player left that can effectively regulate children's use of the internet. (17) The issue needs to be determined by the policy and a law needs to be passed that prohibits the use of the internet for minors.



## **Step 1: Idenfity conclusion**

(1) Once again the problem of young people engaging in cyberbullying rears its ugly head. (2) And it is a very ugly head, indeed. (3) Nevertheless, cyberbullying is so all-present that people seem to shrug their shoulders, accept it as a part of modern life or even as some kind of law of nature. (4) So, are we simply resigned to it? (5) Do we simply accept that some young people are excluded from their peer groups and bullied into depression? (6) Do we stand idly by? (7) I don't think so. (8) Not at any rate. (9) And there is a ready solution. (10) Let us turn to an old solution for a new problem: being offline. (11) A few decades ago, children were offline by default for a very simple reason: there was no internet. (12) Without internet, there is no cyberbullying. (13) This is a very trivial insight. (14) The interesting question is: how do we make sure that our children stay offline in a online world? (15) Children themselves want to go online, schools have no say about their student's private life, and parents cannot be trusted with consequently saying no to their begging teens. (16) So there is only one player left that can effectively regulate children's use of the internet. (17) The issue needs to be determined by the policy and a law needs to be passed that prohibits the use of the internet for minors.

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#### 2. Get rid of extraneous material

(1) Once again the problem of young people engaging in cyberbullying rears its ugly head. (2) And it is a very ugly head, indeed. (3) Nevertheless, cyberbullying is so all-present that people seem to shrug their shoulders, accept it as a part of modern life or even as some kind of law of nature. (4) So, are we simply resigned to it? (5) Do we simply accept that some young people are excluded from their peer groups and bullied into depression? (6) Do we stand idly by? (7) I don't think so. (8) Not at any rate. (9) And there is a ready solution. (10) Let us turn to an old solution for a new problem: being offline. (11) A few decades ago, children were offline by default for a very simple reason: there was no internet. (12) Without internet, there is no cyberbullying. (13) This is a very trivial insight. (14) The interesting question is: how do we make sure that our children stay offline in a online world? (15) Children themselves want to go online, schools have no say about their student's private life, and parents cannot be trusted with consequently saying no to their begging teens. (16) So there is only one player left that can effectively regulate children's use of the internet. (17) The issue needs to be determined by the policy and a law needs to be passed that prohibits the use of the internet for minors.

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#### 2. Get rid of extraneous material

**Sidenote**: Sometimes, things that initially may look extraneous (e.g. like pure rhetoric) are in fact part of the argument.

**Example:** A co-worker of yours comments an incident where another employee, Smith, stole money from the company:

"That damned Smith's been caught with his hand in the cookie jar. Put me in a dress and call me Sally if he isn't history."

- P1: If Smith has been caught stealing money from the company, he is going to be/should be fired.
- P2: Smith has been caught stealing money from the company.
- C: Therefore, Smith is going to be/should be fired.



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Sketch:

C: pass anti-internet law

(to make clear that this is not a proper argument, but just a sketch and that it desperately needs changing, I set it in Comic Sans. As nothing should ever be set in Comic Sans, it is very evident that this sketch still needs work to become a proper argument.)

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Sketch:

P1: should not accept cyberbullying

P2: one solution is to take children offline

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Sketch:

P1: should not accept cyberbullying

P2: one solution is to take children offline

P3: only politics can take children offline

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P1: should not accept cyberbullying

P2: one solution is to take children offline

P3: only politics can take children offline

P4: politics take children offline → pass antiinternet law

C: pass anti-internet law

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P5: should not accept cyberbullying  $\rightarrow$  take a solution

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#### Sketch:

P1: should not accept cyberbullying

P2: one solution is to take children offline

P3: take children offline → politics take children offline

P4: politics take children offline → pass antiinternet law

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## 3. Logical Streamlining

What kind of argument is this supposed to be?

Deductive!

Is the argument valid?

P1: a

P2:  $a \rightarrow b$ 

P3: c

P4:  $d \rightarrow e$ 

P5: e → f
C: f

If this was the logical form, it would not be valid... What now?

#### Sketch:

P1: should not accept cyberbullying

P2: should not accept cyberbullying  $\rightarrow$  take a solution

P3: one solution is to take children offline

P4: take children offline → politics take children offline

P5: politics take children offline → pass antiinternet law

C: pass anti-internet law

## 3. Logical Streamlining

The logical form is not valid. What now?

There are two possibilities:

- 1. The text form actually contains a valid argument
  - a) we reconstructed it right but did a mistake when transforming it into the logical form
  - b) we reconstructed it wrongly
- 2. It does not contain a valid argument (and we thus did everything right)

To conclude 2., we have to rule out 1.

#### Sketch:

- P1: should not accept cyberbullying
- P2: should not accept cyberbullying  $\rightarrow$  take a solution
- P3: one solution is to take children offline
- P4: take children offline → politics take children offline
- P5: politics take children offline → pass antiinternet law
- C: pass anti-internet law

## 3. Logical Streamlining

Did we reconstruct it right but did a mistake when transforming it into the logical form?

- Maybe propositional logic was not the proper logic.
  - First order logic?
  - Deontic logic?
  - •

None works!

#### Sketch:

- P1: should not accept cyberbullying
- P2: should not accept cyberbullying  $\rightarrow$  take a solution
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- C: pass anti-internet law

## 3. Logical Streamlining

Did we reconstruct it wrongly?

## Rough guide:

- 1) Answer the question: Why isn't it valid? I.e. where does the inference plausibly break?
- 2) Are these "mistakes" in the textual form, too, if read charitably?
  - i. yes:
    - a. we mistakenly assumed the wrong form of argument (e.g. deductive instead of abductive argument)
    - b. we did not do anything wrong
  - ii. no: we reconstructed it wrongly

#### Sketch:

- P1: should not accept cyberbullying
- P2: should not accept cyberbullying  $\rightarrow$  take a solution
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#### Sketch 1:

P1: should not accept cyberbullying

P2: should not accept cyberbullying  $\rightarrow$  take a solution

P3: one solution is to take children offline

P4: take children offline → politics take children offline

P5: politics take children offline → pass antiinternet law

C: pass anti-internet law

This is certainly one way of reconstructing it. But the question is: is there a more charitable way of reconstruction?

(3) – (8) We should not accept cyberbullying. (9) And there is a ready solution. (10) Let us turn to an old solution for a new problem: being offline. (11) A few decades ago, children were offline by default for a very simple reason: there was no internet. (12) Without internet, there is no cyberbullying. (14) The interesting question is: how do we make sure that our children stay offline in a online world? (15) Children themselves want to go online, schools have no say about their student's private life, and parents cannot be trusted with consequently saying no to their begging teens. (16) So there is only one player left that can effectively regulate children's use of the internet. (17) The issue needs to be determined by the policy and a law needs to be passed that prohibits the use of the internet for minors.

#### Sketch 2:

P1: should not accept cyberbullying

P2: should not accept cyberbullying  $\rightarrow$  should take a solution

P3: should take a solution → should take children offline

P4: should take children offline → politics should take children offline

P5: politics should take children offline → should pass anti-internet law

C: should pass anti-internet law

Is this more charitable?

#### 3. Logical Streamlining

Is Sketch 2 more charitable than Sketch 1?

- Sketch 2 is valid, Sketch 1 is not
- but Sketch 2 has a problematic premise that Sketch 1 does not have
  - P3 is false if taking children offline is not the best solution to the problem of cyberbullying.
  - Would the author plausibly, if read charitably, subscribe to P3?
    - Most likely yes.
    - Is P3 true?
      - No, there are other solutions, e.g. education campaigns, or excessive monitoring by parents, or restricting the access to social media (not the whole internet), of which at least some are better

there is no strict rule, but maybe Sketch 1 and Sketch 2 are on par when it comes to charity

#### Sketch 2:

- P1: should not accept cyberbullying
- P2: should not accept cyberbullying  $\rightarrow$  should take a solution
- P3: should take a solution → should take children offline
- P4: should take children offline → politics should take children offline
- P5: politics should take children offline → should pass anti-internet law
- C: should pass anti-internet law

## 3. Logical Streamlining

Back to the question: Did we reconstruct it wrongly?

## Rough guide:

- 1) Answer the question: Why isn't it valid? I.e. where does the inference plausibly break?
- 2) Are these "mistakes" in the textual form, too, if read charitably?
  - i. yes:
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## 3. Logical Streamlining

Back to the question: The logical form is not valid. What now? There are two possibilities:

- 1. The text form actually contains a valid argument
  - a) we reconstructed it right but did a mistake when transforming it into the logical form
  - b) we reconstructed it wrong (but we found an alternative reconstruction)
- 2. It does not contain valid argument (and we thus did everything right)

To conclude 2., we have to rule out 1.

#### Sketch 1:

- P1: should not accept cyberbullying
- P2: should not accept cyberbullying  $\rightarrow$  take a solution
- P3: one solution is to take children offline
- P4: take children offline → politics take children offline
- P5: politics take children offline → pass antiinternet law
- C: pass anti-internet law

## 3. Logical Streamlining

The logical form is not valid. What now?

There are two possibilities:

- 1. The text form actually contains a valid argument (at least not Sketch 1)
  - a) we reconstructed it right but did a mistake when transforming it into the logical form
  - b) we reconstructed it wrong (but we found an alternative reconstruction)
- 2. It does not contain a valid argument (and we thus did everything right)
- → If we go for Sketch 1, the argument is not valid. If we go for Sketch 2, the argument is valid, but not sound.

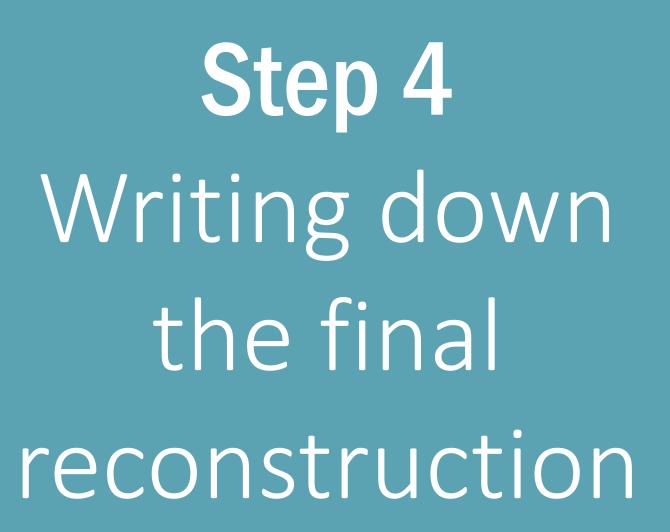
#### Sketch 1:

- P1: should not accept cyberbullying
- P2: should not accept cyberbullying  $\rightarrow$  take a solution
- P3: one solution is to take children offline
- P4: take children offline → politics take children offline
- P5: politics take children offline → pass antiinternet law
- C: pass anti-internet law



https://knowyourmeme.com/memes/why-not-both-why-dont-we-have-both

If you have two (or even more) reconstructions that are equally plausible and equally charitable: Describe their strengths and weaknesses. Assess all of them.



## STEP 4

# 4. Writing down the final reconstruction

Get rid of Comic Sans!

#### Sketch 1:

P1: should not accept cyberbullying

P2: should not accept cyberbullying  $\rightarrow$  take a solution

P3: one solution is to take children offline

P4: take children offline → politics take children offline

P5: politics take children offline → pass antiinternet law

C: pass anti-internet law

#### Reconstruction 1:

- P1: We should not accept cyberbullying.
- P2: If we should not accept cyberbullying, then we should implement a solution to cyberbullying.
- P3: One possible solution is to make sure that children stay offline.
- P4: If we have to make sure that children stay offline, then politics have to make sure that children stay offline.
- P5: If politics have to make sure that children stay offline, then a law needs to be passed that prohibits the use of the internet for minors.
- C: A law needs to be passed that prohibits the use of the internet for minors.

#### STEP 4

# 4. Writing down the final reconstruction

Get rid of Comic Sans!

#### Sketch 2:

P1: should not accept cyberbullying

P2: should not accept cyberbullying  $\rightarrow$  should take a solution

P3: should take a solution → should take children offline

P4: should take children offline → politics should take children offline

P5: politics should take children offline > should pass anti-internet law

C: should pass anti-internet law

#### Reconstruction 2:

P1: We should not accept cyberbullying.

P2: If we should not accept cyberbullying, then we should adopt a solution to cyberbullying.

P3: If we should adopt a solution to cyberbullying, then we should make sure that children stay offline.

P4: If we should make sure that children stay offline, then politics should make sure that children stay offline.

P5: If politics should make sure that children stay offline, then a law should be passed that prohibits the use of the internet for minors.

C: A law should be passed that prohibits the use of the internet for minors.

# We successfully reconstructed the argument!

Reconstruction 1:		Reconstruction 2:	
P1:	We should not accept cyberbullying.	P1:	We should not accept cyberbullying.
P2:	If we should not accept cyberbullying, then we should take a solution to cyberbullying.	P2:	If we should not accept cyberbullying, then we should adopt a solution to cyberbullying.
P3:	One possible solution is to make sure that children stay offline.	P3:	If we should adopt a solution to cyberbullying, then we should make sure that children stay offline.
P4:	If we have to make sure that children stay offline, then politics have to make sure that children stay offline.	P4:	If we should make sure that children stay offline, then politics should make sure that children stay offline.
P5:	If politics have to make sure that children stay offline, then a law needs to be passed that prohibits the use of the internet for minors.	P5:	If politics should make sure that children stay offline, then a law should be passed that prohibits the use of the internet for minors.
C:	A law needs to be passed that prohibits the use of the internet for minors.	C:	A law should be passed that prohibits the use of the internet for minors.

# STEP 4

So when reconstructing an argument:

- 1. Identify the conclusion
- 2. Get rid of extraneous material
- 3. Find out the plausible logical form(s) (aka 'Logical Streamlining')
- 4. Write down the final reconstruction(s)

There are a few things along the way to keep in mind!





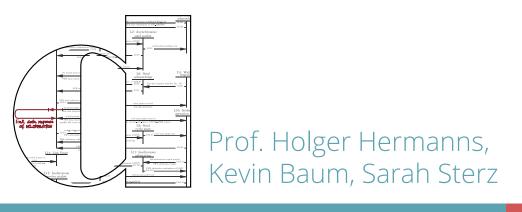


# Ethics for Nerds

An Advanced Course in Computer Science Summer Semester 2020

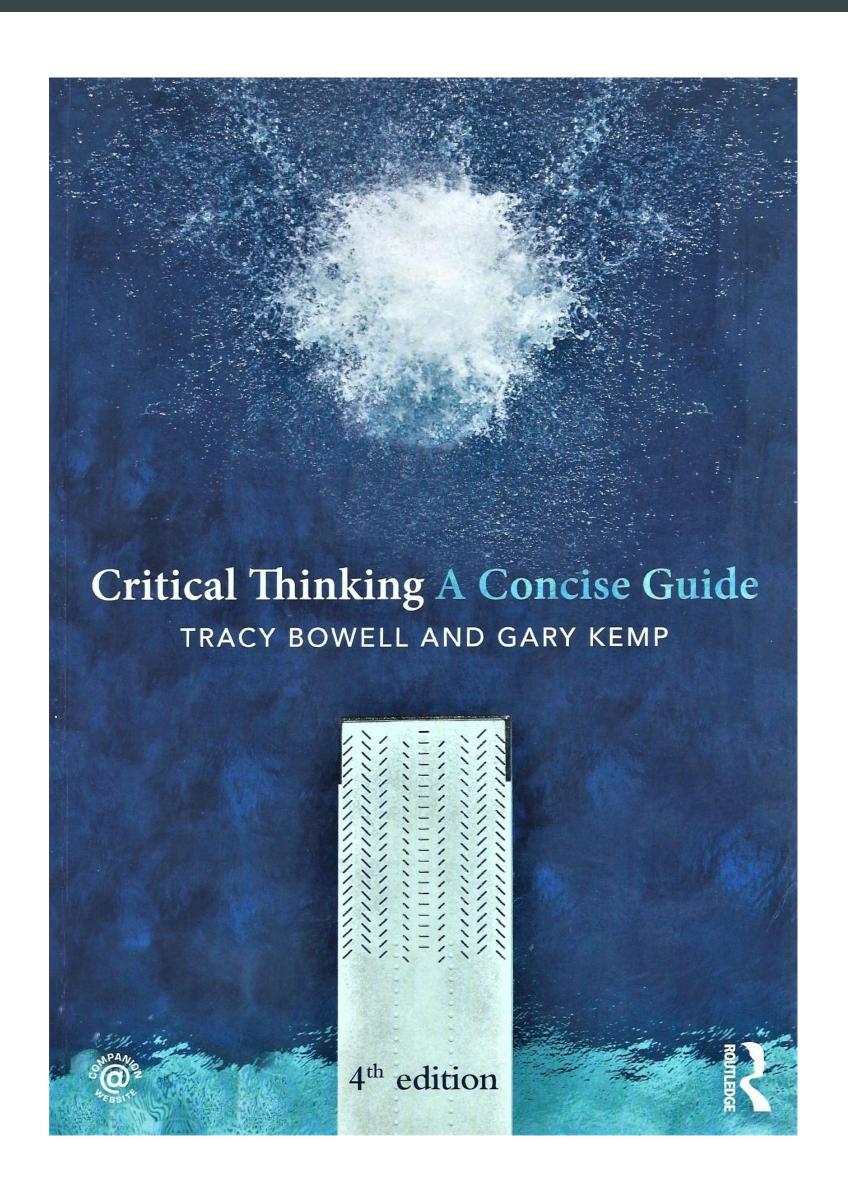
Precise Thinking 6.2
The Art of Argument Reconstruction

**More Remarks** 





#### PRECISE THINKING



We *very* loosely follow this book:

Bowell, T., & Kemp, G. (2015). *Critical thinking: A concise guide (4<sup>th</sup> ed.)*. Routledge.

However, *lots* of things deviate from the book. What is said in the lecture has precedence over the book.

You do <u>not</u> have to buy the book. If you want to have an inexpensive look, you can find a digital copy of the 2<sup>nd</sup> edition online at:

http://www.academia.edu/download/46383480/ Tracy Bowell Critical Thinking A Concise Guide BookFi.org.pdf

# 1. Implicit and explicit premises and conclusions

Some things are not said explicitly or are said in a different way. You need to keep this in mind.

Example

"I'll bring some cake today. Max will be happy."

P1: I bring some cake today.

P2: If I bring some cake today, Max will be happy.

C: Max will be happy.

P2 is an implicit premise.

Sometimes, even the conclusion is implicit.

# 2. Leave out things that are not relevant for the standard form

(a) There never should be unnecessary premises in an argument in standard form. A premise is unnecessary iff the argument would still be valid if you left the premise out.

P1: If and only if you do not mind your data getting lost, it is not true that you should backup your data.

P2: If you do not backup your data, your data can get lost.

P3: You do mind your data getting lost.

C: You should backup your data.

# 2. Leave out things that are not relevant for the standard form

(a) There never should be unnecessary premises in an argument in standard form. A premise is unnecessary iff the argument would still be valid if you left the premise out.

P1: If and only if you do not mind your data getting lost, it is not true that you should backup your data.

P2: If you do not backup your data, your data can get lost.

P3: You do mind your data getting lost.

C: You should backup your data.

P1: 
$$\neg a \leftrightarrow \neg b$$

P2: 
$$c \rightarrow d$$

# 2. Leave out things that are not relevant for the standard form

(a) There never should be unnecessary premises in an argument in standard form. A premise is unnecessary iff the argument would still be valid if you left the premise out.

P1: If and only if you do not mind your data getting lost, it is not true that you should backup your data.

P2: If you do not backup your data, your data can get lost.

P3: You do mind your data getting lost.

C: You should backup your data.

P2 is unnecessary and has to be left out.

P1: 
$$\neg a \leftrightarrow \neg b$$

$$P2: C \rightarrow C$$

# 2. Leave out things that are not relevant for the standard form

(b) Sometimes, less is more. Collapse unnecessarily detailed premises into one premise:

- P1: If we do not work on our assignments with the necessary care, we will get less than 50% of the overall points.
- P2: If we get less than 50% of the overall points, we will not get enough points to get the exam admission.
- P3: If we do not get enough points for the exam admission, we are not allowed to write the exam.
- P4: If we are not allowed to write the exam, we will fail the course.
- P5: If we want to pass the course, and it holds that if we do not work on our assignments with the necessary care, we will fail the course, then we should work on our assignments with the necessary care.
- C: If we want to pass the course, we should work on our assignments with the necessary care.

# 2. Leave out things that are not relevant for the standard form

(b) Sometimes, less is more. Collapse unnecessarily details premises into one premise:

P1*:	If we do not work on our assignments with the necessary care, we will not get
	enough points for the exam admission.

P3\*: If we do not get enough points for the exam admission, we will fail the course.

P5: If we want to pass the course, and it holds that if we do not work on our assignments with the necessary care, we will fail the course, then we should work on our assignments with the necessary care.

C: If we want to pass the course, we should work on our assignments with the necessary care.

The rest can go into the soundness reasoning.

# 2. Leave out things that are not relevant for the standard form

(c) soundness reasoning and background information do not belong in a standard form!

"Training martial arts really boosts your confidence and helps you become a stronger person – both mentally and physically. I and some friends of mine have some experience with martial arts and this was true for all of us. Thus, I can really recommend to start doing some martial arts!"

#### yes:

P1: Martial arts boosts your confidence, and helps you become mentally and physically stronger.

P2: If P1, it is advisable to do martial arts.

C: It is advisable to do martial arts.

#### no:

P1: It was true for me and my friends that martial arts boosted our confidence, and helped us become mentally and physically stronger.

P2: If P1, then martial arts boosts your confidence, and helps you become mentally and physically stronger.

P3: If P2, it is advisable to do martial arts.

C: It is advisable to do martial arts.

# 3. Think ambiguous and vague aspects through

Sometimes, reconstructions look plausible on first glance, but they actually have some problems.

Jane reads the following ad: "CryptoCure: the leading provider of cryptographic solutions" and assumes that this ad is not lying. She says: "I should hire the leading provider of cryptographic solutions for implementing the cryptography in my product, so I should hire CryptoCure."

- P1: CryptoCure is the leading provider of security solutions.
- P2: If I hire someone for implementing cryptographic protocols in my product, I should hire the leading provider of cryptographic solutions.
- C: If I hire someone for implementing cryptographic protocols in my product, I should hire CryptoCure.

But what does "the leading provider" mean here?

- the best provider?
- the biggest provider?
- the most profitable provider?
- the most famous provider?

P2 is only prima facie plausible, if you assume it means "the best provider".

#### 4. Intensional contexts

Intensional contexts (rough working definition)

An intensional context is a (linguistic) context in which not only the designation of a term matters, but also its meaning.

A key property of intensional contexts is that you typically cannot just substitute terms that refer to the same thing.

When reconstructing arguments (as well as when writing arguments) you have to pay a lot of attention that you do not make false inferences!

# INTENSIONAL CONTEXTS

# **Examples** (uncontroversial ones):

- Harry Potter wants to destroy the second-last horcrux.
- Harry Potter wants to destroy Harry Potter.
- It is commonly known that the Evening Star is the Evening Star.
- It is commonly known that the Evening Star is the Venus.
- Oedipus wants to marry Jocasta.
- Oedipus wants to marry his mother.
- You are certain that the square root of 1 equals 1.
- You are certain that the square root of 1 equals the number of siblings my best friend has.

# INTENSIONAL CONTEXTS

# **Examples** (*much* more controversial ones!):

- It was rational for Timo to turn on the light.
- It was rational for Timo to set off the bomb.
- Standing up from the sofa was not morally wrong.
- Stepping onto the dogs tail was not morally wrong.
- You **should** pull the lever.
- You **should** make the trolley run over the worker on the side track.

#### INTENSIONAL CONTEXTS

#### This is invalid:

- P1: Luke desperately wants to get to know his father.
- P2: Luke's father is Darth Vader.
- C: Luke desperately wants to get to know Darth Vader.

# This most likely is invalid:

- P1: It is morally permitted for Lisa that she turns on the light.
- P2: If Lisa turns on the light, then she attracts the attention of the burglar who will kill everybody in the house.
- C: It is morally permitted for Lisa to attract the attention of the burglar who will kill everybody in the house.

