

1.5. Chain Arguments and Argument Maps

1. Chain Arguments. Combo sentences provide the stepping stone necessary to understand more complex arguments such as the following.

Jack is a short-haired cat, so he's not a Birman. But he can't be a tabby, since he has seal-point markings. Therefore Jack is either a Siamese or a Burmese.

The sentence "Jack is either a Siamese or a Burmese" is marked as the conclusion, both by its location at the end, and by the word "therefore". But it's a mistake to think the standard form of this argument is as follows.

💀 Standard Form ?? 💀

1. Jack is a short-haired cat, so he's not a Birman.
2. But he can't be a tabby, since he has seal-point markings.

∴ Jack is either a Siamese or a Burmese.

That's because neither of the other two sentences are *simply* premises. The conclusion marker "so" in the middle of the first sentence makes clear that it's a *combo sentence* – a miniature argument with its own premise and conclusion.

Jack is a short-haired cat, so he's not a Birman.

↖ *Premise*

↖ *Conclusion*

The standard form of this combo sentence is as follows.

1. Jack is a short-haired cat

∴ He's not a Birman.

The second sentence is also a combo sentence, with premise marker “since” and conclusion-marking modal “can’t”.

He can’t be a tabby, since he has seal-point markings.



Conclusion



Premise

It looks like this in standard form.

2. He [Jack] has seal-point markings

∴ He [is]n’t a tabby

What we have here is **an argument with smaller arguments as parts**. The true standard form of the whole argument is as follows.

Standard Form

1. Jack is a short-haired cat

2. He [Jack] has seal-point markings

∴ He’s not a Birman

∴ He [is]n’t a tabby

∴ Jack is either a Siamese or a Burmese.

Sentences (1) and (2) are clearly premises, and the last sentence is clearly a conclusion. But those middle two sentences are hybrids: each is a conclusion supported by a previous sentence, yet also acting as a premise in support of the final sentence. We call such a hybrid sentence a **sub-conclusion**.¹

Likewise every inference from premise(s) to conclusion will be a **sub-argument**. So this argument is made up of three sub-arguments (since three different conclusions are inferred).

¹ In mathematics, a sub-conclusion is called a **lemma**.

The argument as a whole is therefore a **chain argument**, with sub-arguments as parts.

Chain argument: an argument having two or more smaller arguments as parts.

We say the final conclusion of the argument is the **main conclusion** of the whole argument. The main conclusion is the only sentence in the chain not supporting some further conclusion.

2. Argument Maps. With earlier, non-chain arguments, stating the standard form was a simple affair: we stated each premise and the conclusion in a single list. But chain arguments threaten to leave this format confusingly cluttered. Our earlier example was still manageable in list form, because it had only three sub-arguments.

Standard Form

1. Jack is a short-haired cat <hr style="width: 80%; margin: 5px auto;"/> ∴ He's not a Birman	2. He [Jack] has seal-point markings <hr style="width: 80%; margin: 5px auto;"/> ∴ He [is]n't a tabby
<hr style="width: 60%; margin: 0 auto;"/> ∴ Jack is either a Siamese or a Burmese.	

But with numerous sub-arguments such a depiction would be eye-boggling. That's why we introduce a revised format for presenting the standard form of complex arguments, called an **argument map**.

The **first step** in making an argument map is **numbering each premise and conclusion** (including sub-conclusions – conclusions that act as premises for a further conclusion). Since a combo sentence has both a premise and a conclusion, the two parts of a combo sentence get different numbers. We number **all** the sentences now because it's often not obvious at first which parts of a chain argument are premises, which sub-conclusions, and

which the main conclusion. More importantly, the shorthand depiction of standard form developed here will refer to each sentence by its number alone.

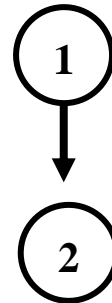
For instance, our earlier chain argument would be numbered like so.

(1) Jack is a short-haired cat, so (2) he's not a Birman. But (3) he can't be a tabby, since (4) he has seal-point markings. Therefore (5) Jack is either a Siamese or a Burmese.

We show that one sentence is supporting another sentence by drawing a downward arrow from premise number to conclusion number.

1. Premise

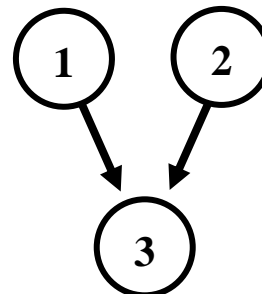
 \therefore 2. Conclusion



If more than one premise supports the same conclusion, we draw an arrow from each premise number to the conclusion number.

1. Premise
 2. Premise

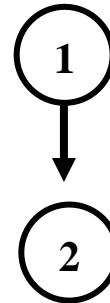
 \therefore 3. Conclusion



In the our earlier chain argument, Sentence (1) is a premise supporting Sentence (2).

1. Jack is a short-haired cat

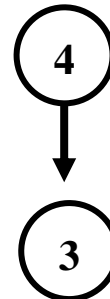
 \therefore 2. He's not a Birman.



And Sentence (4) is a premise supporting of Sentence (3).

4. He has seal-point markings

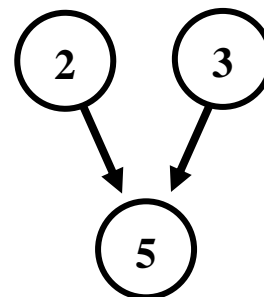
 \therefore 3. He isn't a tabby



Sub-conclusions (2) and (3) support the main conclusion, sentence (5).

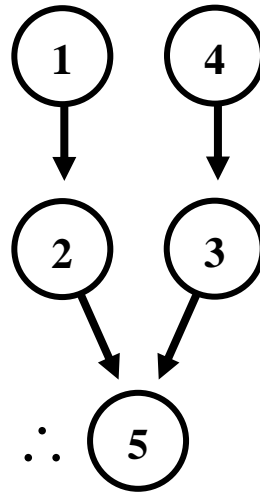
2. He's not a Birman.
 3. He isn't a tabby.

 \therefore 5. Jack is either a Siamese or a
 Burmese.



Putting these links together yields an argument map for this chain argument.

(1) Jack is a short-haired cat, so (2) he's not a Birman. But (3) he can't be a tabby, since (4) he has seal-point markings. Therefore (5) Jack is either a Siamese or a Burmese.



We reserve the conclusion symbol “∴” for the **main** conclusion.

Two closing notes: **first**, despite its novel appearance, an argument map is just a shorthand statement of **standard form**. So material left out of standard form (e.g. markers and questions) is likewise left out of an argument map.

Second, note that all we're really doing here is using premise and conclusion markers (and similar clues, such as likely places) to show **each premise-to-conclusion move** (with a downward arrow). In this example, (2) was marked as a (sub-) conclusion by “so”; (4) was marked as a premise for (3) by “since”; and main conclusion (5) was marked by “therefore” (and in a likely place for the main conclusion). While we'll add a bit more to our argument mapping technique, these familiar clues already suffice to carve out most of an argument's structure.

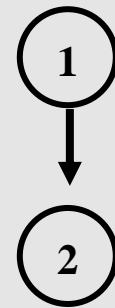
Summary: Argument Maps

1. Number each premise and conclusion. This includes each sub-conclusion – so the two **parts a combo sentence receive different numbers**.

2. When one sentence supports a second sentence (as shown by markers), draw a **downward arrow from premise number to conclusion number**.

1. Premise

 \therefore 2. Conclusion



If **two or more sentences** act as premises for the same conclusion, draw an **arrow from each** premise number to the conclusion number.

1. Premise
 2. Premise

 \therefore 3. Conclusion

