

## Exercise Set 12.2: Mapping complex arguments

**Objective:** To give you practice mapping more complex arguments.

**Instructions:** Draw an argument map for each of the following arguments.

**Tips for success:** As with mapping simple arguments, the first step in mapping complex arguments is to identify, bracket, and number each claim in the argument. Remember that you only need to number the premises and the conclusion. Any other sentences, such as those providing background information or expressing thoughts that are only indirectly related to the argument, need not be included.

The second step in mapping an argument is figuring out how the various premises relate to one another and to the main conclusion. There are

several ways to go about this, and you should find the strategy that works best for you.

One strategy is to work backward. Start by identifying the main conclusion and put it at the very bottom of the argument. Then, figure out which of the premises lead immediately to the main conclusion. Those go one row up from the main conclusion. (Don't worry yet whether they are linked or independent.) Next, look at each premise in that row and ask yourself what reasons the argument gives for each of *those* premises. Put those reasons one more row up from the main conclusion, being sure to keep track of which premises lead to which subconclusions. Repeat this process until you have placed all of the premises on your map.

Once you have figured out which premises lead to which (sub)conclusions, look at each subargument and ask yourself whether the premises of that subargument are linked or independent. Start by looking at pairs of premises. Suppose that one of those premises is false, and ask yourself whether the other premise still counts as a reason to accept the premises' immediate conclusion. If so, then the premises are independent. If not, then they are linked.

Some people prefer a less systematic approach to mapping arguments. One such approach is to proceed as if you were solving a jigsaw puzzle. See which "pieces" of the argument "fit together" by thinking about which claims lead to which other claims and which claims are linked to which other claims. As you connect premises into subarguments, the overall structure of the argument may become clearer, enabling you to connect all of the pieces into a single argument map. You could even use numbered index cards or sticky notes to represent the claims and try arranging them in different ways on a table or wall.

Whatever approach you take, remember that you will probably need to try out several different possibilities for each argument before you find one that you think is correct.

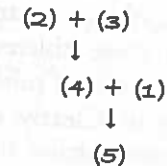
### Sample

Uranium emits rays similar to X-rays. These rays arise either from an interaction between the uranium and its surroundings or from the uranium itself. If the rays arise from an interaction between the uranium and its surroundings, then the amount of radiation should vary with temperature, illumination, or other factors. The radiation, however, is constant: it does not vary with temperature, illumination, or other factors. Thus, the radiation does not arise from an interaction

between the uranium and its surroundings. The radiation, therefore, comes from the uranium itself.

*Adapted from: Marie Skłodowska Curie, "Radium and Radioactivity," Century Magazine (Jan 1904), 461-66*

uranium emits rays similar to X-rays. <sup>1</sup>[These rays arise either from an interaction between the uranium and its surroundings or from the uranium itself.] <sup>2</sup>[If the rays arise from an interaction between the uranium and its surroundings, then the amount of radiation should vary with temperature, illumination, or other factors.] <sup>3</sup>[The radiation, however, is constant: it does not vary with temperature, illumination, or other factors.] Thus, <sup>4</sup>[the radiation does not arise from an interaction between the uranium and its surroundings.] <sup>5</sup>[The radiation, therefore, comes from the uranium itself.]



*This argument is the same as the sample argument for Exercise Set 6.5. (Page 152. Go back and look!) Notice how much more clearly an argument map reveals the structure of the argument, as compared to the premise-and-conclusion outline used in Exercise Set 6.5.*

*As explained in Exercise Set 6.5, premises (2) and (3) jointly lead, via modus tollens (Rule 23), to (4). Premises (4) and (1) jointly lead, via disjunctive syllogism (Rule 25), to the main conclusion, (5). (Hint: The premises of the deductive argument forms introduced in Chapter 6 are always linked.)*

*To piece this argument together, it helps to begin by identifying the main conclusion: (5). Once you've found the main conclusion, ask yourself which of the premises lead directly to the main conclusion. Premises (1) and (4) do the trick. What role, then, do (2) and (3) have in the argument? Since (4) is introduced by the conclusion indicator "Thus," we can guess that it's a subconclusion. This means that there must be reasons given for it in the argument. (2) and (3) work as reasons for (4), so we place them above (4) in our argument map as the premises of a subargument.*

*If you bracketed and labeled the first sentence of the passage—the one that provides the background information that uranium emits rays similar to X-rays—you might have trouble figuring out where it fits into the argument map. If you find a claim that doesn't seem to fit into the argument map anywhere, it might be because it's not really part of the argument at all.*

1. Governments ought not to pay ransoms to terrorists who have kidnapped people. Doing so encourages terrorists to kidnap more people. Paying ransom also provides the terrorists with the resources to kill even more people. Therefore, even though ransoming hostages can save the hostages' lives, paying ransom ultimately leads to more deaths. As hard as it may be to accept, it's more important to minimize the overall harm that terrorists do than it is to save any specific hostage.

*Adapted from: Peter Singer, "Refusing to Pay Ransoms Saves Lives in the End," Denver Post, Dec 13, 2014, [http://www.denverpost.com/opinion/ci\\_27126654/refusing-pay-ransoms-saves-lives-end](http://www.denverpost.com/opinion/ci_27126654/refusing-pay-ransoms-saves-lives-end)*

2. Basketball brings in a lot of money for a lot of universities. This money depends on the hard work and dedication of student athletes. Thus, student athletes contribute a great deal to many universities' finances. Yet, these athletes receive little compensation—often no more than the cost of tuition—compared to the amount of money they bring in. Clearly, student athletes deserve more compensation for their work.

*Adapted from: Ramogi Huma, "A Fair Day's Pay for a Fair Day's Work," U.S. News & World Report, Apr 1, 2013, <http://www.usnews.com/debate-club/should-ncaa-athletes-be-paid/a-fair-days-pay-for-a-fair-days-work>*

3. Drugs ought to be legalized. Attempting to ban drugs is futile. Countries all over the world have tried for decades to ban various drugs. None of the attempts have been successful. Furthermore, making drugs illegal contributes to the development of failed states by empowering criminal drug cartels around the world. The other problems associated with legalizing drugs are more manageable than the problems with criminalizing them too.

*Adapted from: "How to Stop the Drug Wars," The Economist, Mar 5, 2009, <http://www.economist.com/node/13237193>*

4. Archaeologists have found Viking artifacts on Baffin Island in northern Canada. Admittedly, these artifacts could have arrived there by trade. But archaeologists have also found ruins of a large, old stone structure. Since the native people of Baffin Island only built small, cozy structures, the structure must have been built by Vikings. The Vikings wouldn't have built such a large structure

unless they'd actually settled on the island. Thus, the Vikings actually settled on Baffin Island for a time.

*Adapted from: Heather Pringle, "Vikings and Native Americans," National Geographic, Nov 2012, <http://ngm.nationalgeographic.com/2012/11/vikings-and-indians/pringle-text>*

5. I see your wife is out of town. How do I know? Since the female detective you're working with is wearing men's deodorant, I take it she borrowed someone else's deodorant this morning. And since it smells the same as your deodorant, it stands to reason that she's wearing your deodorant. Which she would only do if she'd woken up at your place after spending the night there. So she spent the night at your place—I'm right so far, aren't I? Of course I am. And since you're married, she wouldn't have spent the night with you unless your wife was out of town. *That's* how I know.

*Adapted from: Sherlock, "A Study in Pink," BBC, Jul 25, 2010*

6. Contrary to what popular science programs on TV might have you believe, the brain is not elegantly designed. From a design perspective, it's a mess. Consider neurons, the basic cells that make up the brain. Neurons are inefficient means of transmitting signals. They transmit signals slowly. They use an enormous amount of energy in the process too. And they often fail to transmit the signal they are trying to transmit! At a slightly higher level, the brain has parts that are redundant. For instance, we have two completely distinct visual systems—one ancient, one modern. At an even higher level, many brain systems that are only needed some of the time are always "on." This is a waste of energy, and it leads to some unintended and undesirable side effects.

*Adapted from: David J. Linden, The Accidental Mind (Cambridge, MA: The Belknap Press, 2007), 5–14, 47–48*

7. When one person knowingly causes a fatal injury to another, that is murder. Capitalism deprives many people of the basic necessities of life. It requires them to live in cramped, squalid, toxic conditions. It leaves them without resources for medical care. It leaves them unable to afford the most minimally nutritious food. It leaves them no respite from work, save sex and drink.

Furthermore, because capitalism leaves wealth and power in the hands of the few, it leads to power structures that prevent the oppressed from taking the necessities of life by force. Being deprived of the necessities of life leads to death just as surely as does being actively harmed. Society knows full well that capitalism has this effect. Thus, society is committing murder by allowing capitalism to continue.

*Adapted from: Friedrich Engels, The Condition of the Working Class in England (1845; repr. New York: Oxford University Press, 1999), 106–7*

8. Our galaxy is so big that intelligent life must have developed elsewhere in the galaxy too. And our galaxy is so old that spacefaring civilizations should have visited every corner of it many times. So aliens must know that we're here. And yet, none of those aliens have contacted us. If they know that we're here but we haven't heard from them yet, then they must have made a conscious choice not to contact us. Therefore, aliens must have made a conscious choice not to contact us.

*Adapted from: George Dvorsky, "11 of the Weirdest Solutions to the Fermi Paradox," io9, Mar 20, 2013, <http://io9.com/11-of-the-weirdest-solutions-to-the-fermi-paradox-456850746>*

9. Our distant ancestors lived in very small societies. On a normal day, everyone they met would be someone they had known all of their lives. These societies did not interact very much with other societies. Just about everything they ate, everything they wore, and every tool they used was made within that group. Today, of course, we live in vast societies. We can look out at a busy city street and see, all at once, more people than our ancestors saw in their entire lives. We live in a global trading system. Indeed, our world is unimaginably different from the world of our distant ancestors. Our minds, however, are designed for the life of our distant ancestors. Thus, our minds may not be well adapted to the special challenges of the modern world.

*Adapted from: Kwame Anthony Appiah, Cosmopolitanism: Ethics in a World of Strangers (New York: W. W. Norton, 2007), xi–xii*

10. If people see a child about to fall down a well, they will immediately want to help the child. This desire will not come from self-interested motives. It will not come from the desire to win the favor of the child's parents. It will not come from the desire to gain a reputation for heroism or to avoid a reputation for callousness. This shows that people naturally want to help others avoid suffering. Since people naturally want to help others avoid suffering, and helping others to avoid suffering is part of being a good person, all people have it within themselves to be a good person. If you have it within yourself to become a good person, then you can make yourself a good person by focusing on your own virtue. Thus, you can make yourself a good person by focusing on your own virtue.

*Adapted from: Mengzi, Mengzi, translated by Bryan W. Van Norden (Indianapolis: Hackett Publishing Company, 2008), 46*