The Basics of Logic

(Version 9.0)

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Last updated: 09/07/2022 10:21:50GMT

Acknowledgements

Thanks to my students for helping me improve this text. Any comments are welcome.

Contents

Chapter 1 What is An Argument?

1. What is Logic?
    - The word "logic" may refer to
        1. a particular way of thinking about something. For example, I fail to see your logic in cutting philosophy class.
        2. the way facts or events follow or relate to each other. For example, the revolution proceeded according to its own logic.
        3. a proper or reasonable way of thinking about something. For example, there is no logic in what he says.
        4. the science concerning the analysis and evaluation of arguments.
    - We will use "logic" in the last sense throughout this textbook. Since logic is about the analysis and evaluation of arguments, we should first grasp the notion of argument.
2. "An argument, in the sense used in logic, is a set of statements consisting of premises and a conclusion. The premises are statements that (are intended to) give supporting evidence; the conclusion is what is allegedly supported by these statements. Arguments put into words a possible act of reasoning" (Gensler, *Introduction to Logic*, 2010: 2). Notice the distinction between "allegedly supported" and "actually supported". If p and q are intended to support r, but p and q do not actually support r, then "p and q, therefore r" is still an argument.
    - Example 1: *The old believe everything; the middle-aged suspect everything; the young know everything*. (Oscar Wilde)
        1. This is a nice remark, not an argument, because it is not a set of statements where one is intended to be supported by the others.
    - Example 2: *We should not eat dogs because dogs are human friends and we should not eat our friends*. (George Bernard Shaw)
        1. This is an argument. The conclusion is that we should not eat dogs. There are two premises: 1. dogs are human friends; 2. we should not eat our friends.
3. According to the definition of argument, an argument must have a conclusion and at least one premise. It may have two or more premises, but it can only have one conclusion.
4. An argument for p is an argument whose conclusion is p; an argument against p is an argument whose conclusion is the negation of p. For example,
    - Here is an argument for the claim that Heidegger's theory of truth is profound:
        1. *Some thoughts are so profound that they cannot be stated clearly. Heidegger's theory of truth is unclear. Therefore, Heidegger's theory of truth is profound.*
    - Here is an argument against the claim that some abortions are not wrong.
        1. *All abortions kill innocent human life. It is always wrong to kill innocent human life. So all abortions are wrong.*

5. Not every argument is good. Sometimes a person claims that the premises of his argument support the conclusion, but actually they do not. Then his argument is not good. The purpose of logic, as the science that evaluates arguments, is to develop methods and techniques that allow us to distinguish good arguments from bad. We will return to this topic in the next chapter.
    - An example of bad argument:
        1. I can explain why you believe that philosophy is valuable.
        2. Therefore, your belief that philosophy is valuable is false.
    - Note that a bad argument is yet an argument! If you are merely required to write an argument for a certain view, you do not have to give a good argument:-)
6. Philosophers aim to express an argument in a clear, direct, emotionless way. But in daily life, people often make arguments in an emotional, indirect, and unclear way.
    - Example: *You gave me a D? Do you know how much effort I put into this course?! Do you know how much I loved your class?!*
        1. Analysis: this is not an explicit argument, for there is no explicit premises or conclusions. But it can be interpreted as an argument. The implicit conclusion is that I deserve a grade better than D. There are two implicit premises: 1. I put a lot of effort into this course; 2. I loved your class very much.
    - It is better to use declarative sentences to make an argument.
        1. Four Types of Sentences
            1. Declarative → makes a statement. Examples: Socrates was a classical Greek philosopher; God exists; The unexamined life is not worth living.
            2. Interrogative → asks a question. Examples: What did the teacher say to you yesterday? Why do you like analytic philosophy?
            3. Exclamatory → shows strong emotion. Examples: How beautiful the poem is! I can't believe this!
            4. Imperative → gives a direction or a command. Examples: Get me some water; Let's go!
        2. Unlike the other three types of sentences, declarative sentences are often clear, direct, emotionless, and capable of being true or false.
            1. A declarative sentence is true just in case it corresponds to the fact.
                - "Xingming Hu is the President of the United States" is false because it does not correspond to the fact.
            2. If a declarative sentence is true, then its negation must be false; if the negation of a declarative sentence is true, then the declarative sentence must be false.

        - Consider the claim that all ravens are black. Its negation is that some ravens are not black (not that no ravens are black). If the claim that all ravens are black is true, then its negation is false.
    3. Declarative sentences are sometimes called "statements," or "claims," or "propositions," or simply "sentences." I will use these terms interchangeably throughout this textbook.
7. More Examples
    - Example 1: *My doctor told me to lose weight and give up smoking. But she's an overweight smoker herself, so I can safely ignore her advice.*
        1. Analysis: it is an argument. The conclusion is that I can safely ignore my doctor's advice that I should lose weight and give up smoking. The premise is that my doctor is an overweight smoker herself.
    - Example 2: *When a man wants to murder a tiger he calls it sport: when the tiger wants to murder him he calls it ferocity. (George Bernard Shaw)*
        1. Analysis: it is a nice remark, but not an argument, because it is not a set of statements where one is intended to be supported by the others.
    - Example 3: *I have never looked upon ease and happiness as ends in themselves – this critical basis I call the ideal of a pigsty. The ideals that have lighted my way, and time after time have given me new courage to face life cheerfully, have been Kindness, Beauty, and Truth. Without the sense of kinship with men of like mind, without the occupation with the objective world, the eternally unattainable in the field of art and scientific endeavors, life would have seemed empty to me. The trite objects of human efforts – possessions, outward success, luxury – have always seemed to me contemptible. (Albert Einstein)*
        1. Analysis: this is an inspiring passage, not an argument, because it is not a set of statements where one is intended to be supported by some of the others.
8. In an argumentative passage, not every statement is necessarily part of an argument.
    - Consider the following passage:
        1. *Descartes is a great philosopher. He is also a pious believer in God. He argues that God must exist, for God is perfect, and if a thing does not exist, it cannot be perfect. This argument is known as the ontological argument for the existence of God. It is valid. And the premises are apparently true. But many people are not convinced by it.*
    - It contains an argument: God must exist, for God is perfect, and if a thing does not exist, it cannot be perfect. The first sentence is the conclusion. The other two sentences are the premises.
    - All other sentences of the passage are irrelevant to the argument in the sense that they lend no support to the conclusion that God must exist. They are not the premises of the argument. Also, they do not form an independent argument by themselves.

9. A distinction between atomic argument and complex argument
    - In an atomic argument, premises are independent of each other; no premises are used to support other premises. For instance,
        1. Pigs don't have knowledge.
        2. If knowledge is sensation, then pigs have knowledge.
        3. ∴ Knowledge isn't sensation.
    - This argument is an atomic argument, because the two premises are independent of each other. Premise 1 is not used to support Premise 2. Nor is Premise 2 used to support Premise 1.
    - Suppose you think Premise 1 is not obvious and provide the following argument:
        1. Pigs cannot speak a simple language.
        2. Speaking a simple language is necessary for having knowledge.
        3. Therefore, Pigs don't have knowledge.
    - Suppose you put this argument into the original argument. Then you make a complex argument:
        1. Pigs cannot speak a simple language.
        2. Speaking a simple language is necessary for having knowledge.
        3. Therefore, pigs don't have knowledge.
        4. If knowledge is sensation, then pigs have knowledge.
        5. ∴ Knowledge isn't sensation.
    - This argument is complex because it consists of two atomic arguments: 1-3 constitute an atomic argument, and 3-5 constitute another.
    - In general, a complex argument consists of at least two atomic arguments. Put differently, in a complex argument, at least one premise is intended to be supported by other premises.
10. A distinction between argument and reasoning
    - When you make an argument, you give reasons to support your view, you think your view is true and your reasons are good, and you want others to accept your view based on the reasons you give. So, when you make an argument, you affirm that all the premises are true, that the conclusion is true, and that the premises together support the conclusion (i.e., the conclusion logically follows from the premises).
    - When you merely make a piece of reasoning, you affirm neither that the"premises" are true, nor that the "conclusion"is true. Rather, you merely affirm that the "conclusion"logically follows from the "premises."
    - Example 1: *Suppose X+7=10. Then X=3.*.
        1. This is a piece of reasoning, not an argument. It does not affirm that X+7=10. For similar reasons, the following passage is a piece of reasoning rather than an argument: "Assume that if a thing cannot be seen, then it does not exist. Now love is a feeling that cannot be seen. Therefore, love does not exist."

- Example 2: *If S does not exist, then S cannot doubt anything. I am doubting not only whether I am dreaming, but also whether I exist. Therefore, I exist.*.
    1. This can be regarded as an argument. It affirms the two premises and the conclusion. It also affirms that the conclusion logically follows from the two premises.
- Clearly, when you make an argument, you must make a piece of reasoning, for making an argument entails affirming that the conclusion logically follows from the premises.

11. A distinction between argument and explanation
    - Words such as "because," "for," "since," and "therefore" are not always indicators of arguments. In some cases, they are indicators of explanations.
    - Difference between Argument and Explanation
        1. An argument is an answer to the question of *what are the reasons to believe p*, while an explanation is an answer to the question of *why p is true*. In order to determine whether a passage is an argument or an explanation, oftentimes we need to know the intention of the author. When you make an argument for p, you want to convince the people who do not believe p. When you make an explanation of p, you want to help the people who already believe p to understand why p.
    - Example 1: *Confucius was happy because his wife was going to divorce him*.
        1. This is best construed as an explanation because when you say this, you seem to assume that your audience already believe that Confucius was happy but do not understand why he was happy. So you offer an explanation.
    - Example 2: *Confucius was happy because both his wife and his son reported that he was happy, and they had no reason to lie about this matter.*
        1. This is best construed as an argument because when you say this, you seem to assume that your audience do not believe that Confucius was happy. So you make an argument in order to convince them.
    - Some passages may be interpreted as either an argument or an explanation. For example,
        1. *Humans have varying skin colors as a consequence of the distance our ancestors lived from the Equator. It's all about sun. Skin color is what regulates our body's reaction to the sun and its rays. Dark skin evolved to protect the body from excessive sun rays. Light skin evolved when people migrated away from the Equator and needed to make vitamin D in their skin. To do that they had to lose pigment. Repeatedly over history, many people moved dark to light and light to dark. That shows that color is not a permanent trait. (Nina Jablonski, "The Story of Skin," The New York Times, 9 January 2007)*
        2. This is essentially an explanation. What is being explained is the fact that humans have varying skin colors. The explanation is that

different skin colors evolved as humans came to live at different distances from the Equator and hence needed different degrees of protection from the rays of the sun. One might interpret the passage as an argument whose conclusion is that skin color is not a permanent trait of all humans. Under this interpretation, all the propositions preceding the final sentence of the passage serve as premises. (Copi et al, *Introduction to Logic*, 2014, p.20)

12. A distinction between argument, interpretation, and definition
    - As we have seen, when you make an argument for/against p, you are trying to show that there are some reasons to accept/reject p. Here is another example: "God by definition is omnipotent and perfectly good. A perfectly good being would eliminate evil as far as it could; there is no limit to what an omnipotent being can do. Therefore, if God exists, there would be no evil in the world. But there is evil in the world. Therefore, God does not exist."
    - An interpretation of X is an answer to the question of *what X means/says or what X is about*. The object of interpretation is a text or an artwork or a symbol or a picture. Here are some paradigm cases of interpretation: (i) What does "soul" in Plato's *Republic* mean? According to Plato's *Republic* , a soul is in a state of psychic harmony when reason rules. (ii) This is a picture of duck rather than rabbit. (iii) *Mona Lisa* shows the subject sitting upright and sideways in a chair, with her face and chest turned slightly towards the viewer: a posture derived from the 'pyramid' image used to depict a sitting Madonna. Her left arm sits comfortably on the armrest of the chair and is clasped by the hand of her right arm which crosses her front. The slightly protective position of her arms, as well as the armrest, creates a sense of distance between sitter and spectator.
    - A definition of X is an answer to the question of *what X is*. Here is an example: "Knowledge is justified true belief". Here is another example: "Ontology, as etymology suggests, is the study of being, of what there is. The ontologist asks: What entities or kinds of entity exist? Are there abstract entities, such as sets or numbers, in addition to concrete entities, such as people and puddles and protons? Are there properties or universals in addition to (or instead of) the particular entities that, as we say, instantiate them? Questions such as these have divided philosophers down the ages, and divide them no less to this day." (SEP) This is a definition. It simply tells people what ontology is. It does not give reasons for the view that ontology is the study of being.

Chapter II How to Evaluate an Argument?

1. Not every argument is good.
    - Example: God exists because my grandma told me so.
    - This is clearly a bad argument.
        - But why is it bad?
2. In general, how to tell good arguments from bad ones? What are the criteria of a good argument?
    - Three Criteria
        - An argument is not good if one of its premises is false.
        - An argument is not good if it is not valid, that is, the combination of its premises does not necessarily support its conclusion.
        - An argument is not good if it is circular, that is, one of the premises of an argument simply repeats what the conclusion says.
    - Note: This set of criteria is just a start. You may question these criteria when you learn more about logic and philosophy. If you are interested, you may want to read my paper: Hu, Xingming (2017). Must a Successful Argument Convert an Ideal Audience? *Argumentation* 31 (1):165-177.
3. Arguments that have false premises are not good
    - Example
        - Chinese philosophers provided a lot of deep insights but made few arguments.
        - American philosophers made a lot of arguments but provided no deep insights.
        - If X provided a lot of deep insights but made few arguments, while Y made a lot of arguments but provided no deep insights, then X is more important than Y.
        - Therefore, Chinese philosophers are more important than American philosophers.
    - Analysis: This argument is not good for Premise 1 and 2 are both false.
        - In fact, Chinese philosophers such as Mozi, Xunzi, Zhuangzi, Han Fei, and so on made a lot of interesting arguments. Some Chinese philosophers were very good at making arguments.
        - Further, it is widely recognized that many American philosophers (e.g., Charles Peirce, Thomas Kuhn, John Rawls, and so on) have offered deep insights into various philosophical issues.
4. Invalid arguments are not good
    - Example
        - George Washington married a wealthy widow.
        - Benjamin Franklin believed that a young man should prefer old women to young ones.
        - Therefore, Barack Obama publicly affirmed his personal support for the legalization of same-sex marriage.

- Analysis: this argument is not good for it is invalid.
  - Both premises are true, so is the conclusion. But the combination of the premises obviously does not support the conclusion. So it is invalid.

5. Circular arguments are not good
   - Example
     - Jack is smart.
     - All conscientious people have great abilities.
     - Therefore, Jack is smart.
   - Analysis: this argument is not good for it is circular.
     - The first premise simply repeats the conclusion.
   - Some circular arguments are tricky. For example: you should not cut class because you are obliged to attend all classes. This argument is circular, because "you are obliged to attend all classes" simply means "you should not cut class."
6. A note on circularity
   - The following argument is NOT circular, because neither of the two premises *singly* repeats the conclusion, although the combination of the two premises entails the conclusion.
     - No human beings can survive without oxygen.
     - Ki can survive without oxygen.
     - Therefore, Ki is not a human being.
7. More about validity
   - When the combination of all the premises of an argument necessarily supports its conclusion, the argument is valid. Otherwise, it is invalid.
   - The combination of all the premises of an argument may appear to necessarily support its conclusion, but actually it does not.
     - For example,
       1. The best explanation for the wide range of empirical facts about biological organisms (including fossil records, comparative structure, geographical distribution and embryology) is evolution.
       2. It is reasonable to believe that the best explanation is true.
       3. Therefore, evolution is true.
     - The combination of the two premises appears to support the conclusion, but actually it does not. Rather, the combination of the two premises only supports that *it is reasonable* to believe that evolution is true. For it might be reasonable to believe a proposition though it is false.
   - Here is a more formal definition of "necessarily support" or "valid":
     - "An argument is valid if it is impossible for all its premises to be true and yet its conclusion be false. The truth of the premises of a valid argument guarantees the truth of its conclusion" (Howard Kahane,

Alan Hausman, and Frank Boardman, *Logic and Philosophy A Modern Introduction*, Thirteenth Edition, p.4).

- Given this definition, if it is possible (not contradictory) that [all the premises of an argument are true, but the conclusion is false], then the argument is invalid.
- Thus, to determine whether an argument is valid is to determine whether it is possible that [all the premises and the *negation* of the conclusion are all true].
- We may determine the validity of an argument in two steps.
  - First, replace the conclusion with its negation.
  - Second, ask whether the premises and the negation of the conclusion could be all true. If yes, the argument is invalid; if no, valid.
- Example I
  - Consider the argument:
    1. Russians are better at math than Americans.
    2. If A is better at math than B, A is smarter than B.
    3. Therefore, Russians are smarter than Americans.
  - We can show that it is valid as follows:
    1. First, we replace the conclusion with "Russians are not smarter than Americans."
    2. Then we ask: Could "Russians are better at math than Americans", "If A is better at math than B, A is smarter than B", and "Russians are not smarter than Americans" be all true?
    3. Clearly, the answer is "No." If one believes all the three statements are true, one is inconsistent. Therefore, the argument is valid.
- Example II
  - Now consider another argument:
    1. Peking University (PKU) is better than Nanjing University (NJU).
    2. Therefore, every student at PKU is better than every student at NJU.
  - We can show that it is invalid as follows:
    1. First, we replace the conclusion with "not every student at PKU is better than every student at NJU."
    2. Then we ask: could "PKU is better than NJU" and "not every student at PKU is better than every student at NJU" be both true?
    3. Clearly, the answer is "Yes." While PKU is overall better than NJU, NJU's A-level students are far better than PKU's C-level students. Some of NJU's A-level students are just as good as PKU's best students. So the argument is invalid.
- Some arguments are valid even though some of its premises are false.

        - "In calling an argument valid, we aren't saying whether the premises are true. We're just saying that the conclusion follows from the premises – that if the premises were all true, then the conclusion also would have to be true" (Gensler 2010: 3).
        - For example,
            1. Obama is the president of China.
            2. The president of China must be born in China.
            3. Therefore, Obama was born in China.
        - This argument is valid because "Obama is the president of China", "The president of China must be born in China" and "Obama was not born in China" cannot be all true.
    - We must not confuse validity with truth.
        - As far as an argument is concerned, "true/false" only applies to a premise or the conclusion while "valid/invalid" only applies to the argument as a whole. A premise, as well as a conclusion, is neither valid nor invalid. And an argument is neither true nor false. This is just like a number is neither fat or thin，a person is neither even nor odd, a TV is neither a woman nor a man, a stone is neither smart nor stupid, etc. Some words simply do not apply to some things! [BTW, we may say "an argument is fallacious," which means that the argument is bad.]
8. We can tell whether an argument is circular or valid even if we cannot tell whether its premises are all true.
    - Example I
        - Argument
            1. God exists.
            2. Humans are created by God.
            3. Therefore, God exists.
        - Analysis
            1. We don't know whether two premises are true. But we know that the argument is circular because Premise 1 simply repeats the conclusion. So we know that the argument is not good.
    - Example II
        - Argument
            1. There is no water on Venus.
            2. There is no oxygen on Venus.
            3. Therefore, there is no life on Venus.
        - Analysis
            1. It is unclear whether the two premises are both true. But we can know the argument is NOT good because even if the two premises are true, the combination of them does not really support the conclusion. Put differently, the argument is invalid in that it is possible that [both premises are true, and

there is life on Venus]. (It is possible that some forms of life do not need water and oxygen.)

9. Often it is hard to tell whether an interesting argument is good. In order to determine whether the premises are all true, we need to do painstaking research.
    - For example,
        - If US manipulated its currency in the past, then US is not justified in accusing China of manipulating its currency.
        - US manipulated its currency in the past.
        - Therefore, US is not justified in accusing China of manipulating its currency.
    - This argument is valid and non-circular. But are the two premises true? It's hard to say. The first premise is a philosophical claim, while the second is a historical claim. To determine whether they are true, we need to do a lot of philosophical and historical research.

Chapter III Basic Propositional Logic

1. Validity is an essential notion in logic.
    - It is possible that [all the premises of a non-circular argument are true, but the argument is still bad]. For the combination of all the premises might not necessarily support the conclusion, that is, the argument might be invalid.
    - The notion of validity is essential to logic.
        1. If you do not grasp the notion of validity, you cannot grasp basic logic.
        2. If you cannot grasp basic logic, you cannot understand philosophical arguments.
        3. If you cannot understand philosophical arguments, you cannot do philosophy.
        4. Therefore, in order to do philosophy, you must grasp the notion of validity.
2. Learning basic propositional logic can help you get better at distinguishing valid arguments from invalid arguments.
    - Consider the following argument
        1. If God created the universe then the universe is perfect.
        2. The universe is not perfect.
        3. Therefore, it is not the case that God created the universe.
    - Let P stand for "God created the universe" and Q for "The universe is perfect." We may re-write the argument as follows:
        1. If P, then Q.
        2. Not-Q.
        3. Therefore, not-P.
    - Let us further use $P \rightarrow Q$ to stand for "If P, then Q", $\neg P$ for "not-P", and $\neg Q$ for "not-Q". We may re-write the argument as follows:
        1. $P \rightarrow Q$
        2. $\neg Q$
        3. $\therefore \neg P$
    - By formalizing an argument -- using symbols to rewrite an argument -- we can better determine whether an argument is valid.
        1. First, we need to develop the basics of a formal language.
            1. We have seen that $\neg p$ stands for not-p (i.e., the negation of p). Similarly, $\neg q$ stands for not-q (i.e., the negation of q). We have also seen that $(p \rightarrow q)$ stands for (if p, then q)
            2. Now let $(p \wedge q)$ stand for (p and q), $(p \vee q)$ for (p or q), and $(p \leftrightarrow q)$ for (p if and only if q).
                - The term "iff" is short for "if and only if". The proposition "p iff q" means that p and q are equivalent. "Iff" is often (though not always) used in making

definitions. For example, a shape is a triangle iff it has three angles.

2. Here are some logic truths:
    1. A proposition is either true or false (p v ¬p). It cannot be both true and false (¬(p ∧ ¬p)). If p is true, then ¬p is false (p→¬(¬p)).
        - No matter whether p is true, p∧¬p is always false. It is known as a contradiction or an impossibility or an absurdity.
    2. Whether p∧q is true depends on whether both p and q are true.
        - If both p and q are true, then p∧q is true.
        - If p is true, but q is false, then p∧q is false.
        - If p is false, but q is true, then p∧q is false.
        - If both p and q are false, then p∧q is false.
    3. Whether p∨q is true depends on whether *one* of p and q is true.
        - If both p and q are true, then p∨q is true.
        - If p is true, but q is false, then p∨q is true.
        - If p is false, but q is true, then p∨q is true.
        - If both p and q are false, then p∨q is false.
    4. From the above logic truth, it follows that p∨¬p cannot be false. No matter whether p is true, p∨¬p is always true. It is known as a necessary truth.
    5. Whether p→q is true depends on whether p and ¬q can be both true. (This is not very intuitive)
        - If p and ¬q are both true, then p→q is false. (Example: "If I win 100 million dollars, I will give you half of them" is false when I actually win 100 million dollars but do not give you half of them.)
        - If p and ¬q are not both true, that is, if at least one of them is false, then p→q is true.
        - More specifically, if p is false (no matter whether q is true), then p→q is true. Example: as long as I do not win 100 million dollars, "If I win 100 million dollars, I will give you half of them" is true, even though I do not give you any money.) If q is true (no matter whether p is true), then p→q is true. Example: as long as I give you 50 million dollars, "If I win 100 million dollars, I will give you half of them" is true, even though I do not win any money.
    6. Whether p↔q is true depends on whether both (p→q) and (q→p) are true.
        - If both (p→q) and (q→p) are true, then p↔q is true.

- If (p→q) is true, but (q→p) is false, then p↔q is false.
- If (p→q) is false, but (q→p) is true, then p↔q is false.
- If both (p→q) and (q→p) are false, then p↔q is false.

3. Now we can prove that some arguments are valid/invalid. For example,
    1. Consider any argument that takes the following form:
        - p→q
        - ¬q
        - ∴ ¬p
    2. To prove an argument valid is to show that it is contradictory (impossible) that (all its premises are true, but its conclusion is false). If it is not contradictory, then the argument is invalid.
    3. The argument has two premises: (1) p→q and (2) ¬q. Its conclusion is ¬p. If the conclusion is false, then p must be true. Suppose all its premises are true, but its conclusion is false. Then we have (p→q, ¬q and p).
        - Here p is short for "p is true". p→q is short for "p→q is true." ¬q is short for "¬q is true."
    4. Thus, to prove that the argument is valid, we need to show that (p→q, ¬q and p) is a contradiction.
    5. Now (¬q and p) implies that p→q is false.
    6. And (p→q is false) contradicts (p→q).
    7. Hence, (p→q, ¬q and p) is a contradiction.
    8. Therefore, the argument is valid.
4. Here is another example
    1. Consider any argument that takes the following form:
        - p→q
        - ¬p
        - ∴ ¬q
    2. To figure out whether such argument is valid, we need to know whether (p→q, ¬p and q) is a contradiction.
    3. Now (¬p and q) implies that p→q. Thus, (p→q, ¬p and q) is not a contradiction.
    4. Hence, the argument is invalid.
5. Here is an example of a complicated argument
    1. Consider any argument that takes the following form:
        - p→q
        - q→r
        - s∨p
        - ¬r
        - ∴ s
    2. To figure out whether such argument is valid, we need to know whether (p→q, q→r, s∨p, ¬r, and ¬s) is a contradiction.

3. Now if s∨p is true, then at least one of s and p must be true. If ¬s, then p must be true. Hence, given s∨p and ¬s, p must be true.
4. If p→q is true, then (p and ¬q) cannot be both true, that is, at least one of (p and ¬q) must be false. Thus, if p→q is true, and p is true, then ¬q must be false, that is, q must be true.
5. Therefore, given p→q, s∨p, and ¬s, q must be true.
6. If q→r is true, then (q and ¬r) cannot be both true, that is, at least one of (q and ¬r) must be false. Thus, if q→r is true, and q is true, then ¬r must be false, that is, r must be true.
7. Therefore, given p→q, s∨p, ¬s, and q→r, r must be true.
8. Hence, (p→q, s∨p, ¬s, q→r, and ¬r) is a contradiction.
9. So the argument is valid.

3. Arguments who share the same form are equally valid or invalid.
   - Consider the following three arguments:
     1. Argument I
        1. If it is a car, then it has wheels.
        2. It does not have wheels.
        3. Therefore, it is not a car.
     2. Argument II
        1. If you did not love money more than anything else, you would not have married him.
        2. You married him.
        3. Therefore, you loved money more than anything else.
     3. Argument III
        1. If God created the universe, then the universe would be perfect.
        2. The universe is not perfect.
        3. Therefore, it is not the case that God created the universe.
   - These three arguments share the same form
     1. Each argument has two premises: one is a conditional, the other is the negation of the consequent of the conditional. Each argument has the negation of the antecedent of the conditional as its conclusion.
        1. A conditional takes the form "If p, then q." P is called the "antecedent", and q is called the "consequent."
     2. The shared form can be expressed as follows:
        1. p→q
        2. ¬q
        3. ∴ ¬p
   - An argument that shares this takes this form is called *Modus Tollens*.
   - As we have proved, any argument that takes the form of *Modus Tollens* is valid.
4. Notes on Conditionals

- We may distinguish three types of "If p, then q".
    1. Consider the following examples: (i) If a=b and b=c, then a=c; (ii) If x is copper, then x conducts electricity; (iii) If I find her address, I'll send her an invitation.
    2. All three take the form "p→q"
    3. (i) is necessarily true. It is impossible that [p is true but q is false] in this case. Indeed, we cannot imagine that [a=b and b=c, but a≠c].
    4. (ii) is necessarily true in a weaker sense. We have not discovered any piece of copper that does not conducts electricity. But it does not follow that it is impossible/contradictory that [x is copper, but x does not conduct electricity]. At least, we can imagine such possibility.
    5. (iii) is true if, say, I find her address, and I will send her an invitation. But (iii) is not necessarily true. It is entirely *possible* that [I find her address, but I will not send her an invitation].
- Note that "p→q is true" is different from "p→q is necessarily true". If both p and q are true, then p→q is true, but it might not be necessarily true.
- Another thing to note is that "If p, then q" is different from "p, therefore, q."
    1. "p, therefore, q" is an argument while "If p, then q" is a single proposition.
    2. When you make the argument "p, therefore, q", you affirm that its premise p is true, its conclusion q is true, and its premise supports its conclusion. But when you claim (p→q), you affirm neither p nor q. Rather, you only claim that (if p, then q). Even if you think both p and q are false, you may still consistently claim that (p→q) is true.

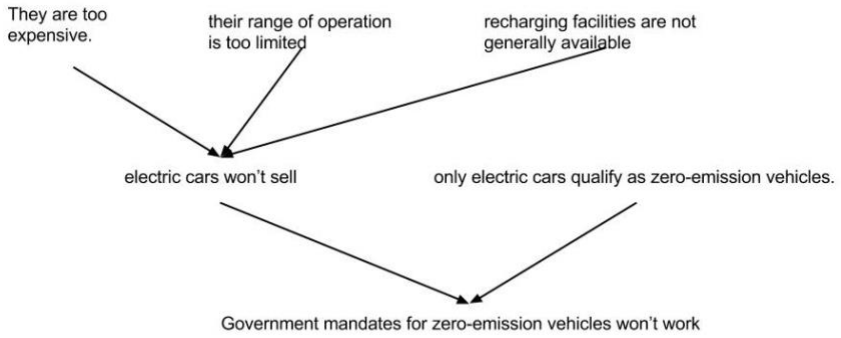
5. A Note on Disjunctive Syllogism
    - Sometimes p ∨ q means either p or q but not both. For example, "Please ring me or send an email" likely means "do one or the other, but not both".
        1. In such cases, affirming a disjunct is valid. For example,
            1. Either I major in philosophy, or I major in biology. (But not in both.)
            2. Philosophy is my major.
            3. Therefore, I do not major in biology.
        2. This argument is obviously valid.
    - But in logic, p ∨ q means either p is true, or q is true, or both p and q are true.
        1. For example, "Her grades are so good that she's either very bright or studies hard" allows for the possibility that the person is both bright and hardworking.

Chapter IV Understanding Arguments Through Reconstruction

1. Many of the cases of argument considered in previous chapters sound contrived because we do not usually hear arguments spelled out in such painful detail (perhaps except when we do logic or philosophy). In everyday discourse, arguments are often sketchy.
    - For example, if you ask people what they think about gay marriage, some would say, "If we allow gay marriage, incest is next!". Clearly, the person is making an argument against gay marriage, but not all premises are explicitly stated. What's more, even the conclusion is not openly stated. Rather, only the conditional "If we allow gay marriage, incest is next" is said. If we fill in the missing details, the argument looks like this:
        1. If we allow gay marriage, we must allow incest.
        2. But we should never allow incest.
        3. Therefore, we should never allow gay marriage.
2. There are many reasons why we do not often spell out every premise/conclusion of our arguments, including the following two:
    - we often assume that our interlocutors will be able to fill in the missing details. In order to make the communication more efficient, we may avoid mentioning the obvious or the common background knowledge.
    - people sometimes leave out some premises of their argument because they don't want others to pay attention to them (for these premises cannot stand close examination).
3. However, it is important to learn how to reconstruct a sketchy argument in the standard form.
    - Here is a quote from Chris Bobonich (Professor of Philosophy and Professor of Classics at Stanford University): "Reconstructing arguments is one of the most important philosophical skills. Once you learn to dissect and reconstruct an argument, evaluating and analyzing the argument will become much easier."
4. In order to learn how to reconstruct sketchy arguments, it would be helpful to see how several simple/atomic arguments compose a complex argument.
    - In Chapter 1, we have seen that some arguments are simple/atomic. For example,
        1. If we give an irrational person freedom, she will destroy herself.
        2. We should prevent anyone from destroying oneself.
        3. Therefore, we should not give an irrational person freedom.
    - Some arguments are a little complex. For example,
        1. If we give an irrational person freedom, she will destroy herself.
        2. We should prevent anyone from destroying oneself.
        3. Therefore, we should not give an irrational person freedom.
        4. Children are irrational.
        5. Therefore, we should not give children freedom.

- Note: this argument consists of two simple/atomic arguments: 1, 2 and 3 constitute an argument; 3, 4 and 5 also constitute an argument. 3 is the conclusion of the first argument but a premise of the second argument.
- A complex argument is composed of at least two simple/atomic arguments. Here is an example of more complex argument:
    1. If we give an irrational person freedom, she will destroy herself.
    2. We should prevent anyone from destroying oneself.
    3. Therefore, we should not give an irrational person freedom.
    4. Children are irrational.
    5. Therefore, we should not give children freedom.
    6. If we should not give children freedom, then Alice should not allow her six year old son to play video games at his pleasure.
    7. Therefore, Alice should not allow her six year old son to play video games at his pleasure.

5. Now let's learn how to reconstruct an argumentative passage.
    - Consider the following passage.
        1. Government mandates for zero-emission vehicles won't work because only electric cars qualify as zero-emission vehicles, and electric cars won't sell. They are too expensive, their range of operation is too limited, and recharging facilities are not generally available. (William Campbell, "Technology Is Not Good Enough"; quoted from Patrick J. Hurley, A Concise Introduction to Logic, 10th edition)
    - Analysis
        1. "Only electric cars qualify as zero-emission vehicles, and electric cars won't sell" is intended to support "Government mandates for zero-emission vehicles won't work."
        2. "They are too expensive, their range of operation is too limited, and recharging facilities are not generally available" is intended to support "electric cars won't sell."
    - The structure of the argument may be presented as follows (quoted from Hurley, *A Concise Introduction to Logic*, 10th edition):



        1.
    - This is a complex argument. We may reconstruct the argument as follows:

1. Electric cars are too expensive.
2. Electric cars' range of operation is too limited.
3. Recharging facilities for electric cars are not generally available.
4. If 1, 2 and 3, then electric cars won't sell.
5. Therefore, electric cars won't sell. (from 1, 2, 3 and 4)
6. Only electric cars qualify as zero-emission vehicles.
7. If 5 and 6, then government mandates for zero-emission vehicles won't work.
8. Therefore, government mandates for zero-emission vehicles won't work. (from 5, 6 and 7)

- Note that 4 and 7 are implicitly assumed in the passage. To facilitate the evaluation of an argument, we should spell out all its implicit premises and reconstruct it in a valid form.

6. Criteria of good reconstruction
    - Call the argumentative text to be reconstructed "T". Call the argument that is a reconstruction of T "R". R is a good reconstruction of T *only if*
        1. R respects T.
            1. R does not respect T if R contains something that contradicts what the text says.
                - For example, a good reconstruction of the above text about electric cars should not contain a premise stating that electric cars are cheap, because it contradicts what the text says.
            2. R does not respect T if R contains something that T does not even remotely suggest.
                - For example, a good reconstruction of the text about electric cars should not contain a premise stating that many people like electric cars, because the text does not even remotely suggest this.
        2. R is a valid argument in the standard form.
            1. To be sure, if T explicitly says something like "p, therefore, not-p," then we cannot reconstruct this argument in a valid form. But few philosophical texts make such silly arguments.
        3. There are no redundant premises: Each premise of R is necessary in order to make R valid.
        4. R is a charitable reading of T
            1. R1 is a more charitable reading of T more than R2 if other things being equal, R1 is more plausible (or at least less controversial) than R2.
                - A note on the principle of charity: Suppose R1 and R2 are two different reconstructions of the same text T. Suppose R1 and R2 share the same premises except one: R1 rests on Premise P1, while R2 rests on Premise P2.

Suppose P1 is more plausible (or less controversial) than P2. Then R1 is better than R2 (if other things are equal).

- Consider a reconstruction of the text about electric cars that shares all the premises and the conclusion of the above reconstruction except Premise 4: In this reconstruction, Premise 4 states that anything that is too expensive, too limited in the range of operation, and difficult to get routine service won't sell. This premise somehow respects the text. But this premise seems less plausible (or at least more controversial) than Premise 4 of the original reconstruction. Thus, the original reconstruction is more charitable than this one.

- Example 1
    1. Consider the following passage:
        1. *Philosophy is valueless because it cannot help us make money.*
    2. Here is a bad reconstruction:
        1. Philosophy cannot help us make money.
        2. Computer Science can help us make money.
        3. Philosophy is different from Computer Science.
        4. If X can help us make money, then X is valuable.
        5. Therefore, philosophy is valueless.
    3. This reconstruction is not good for two reasons. First, it is invalid. Can you figure out why it is invalid? second, it fails to respect the passage: it states some things (i.e., 2 and 3) that the passage does not say or suggest.
    4. The following reconstruction is also bad:
        1. Philosophy cannot help us make money.
        2. Therefore, philosophy is valueless because anything that cannot help us make money is valueless.
    5. This reconstruction is not good because it is not a valid argument in the *standard* form. In the standard form, each premise and the conclusion of argument must be an independent proposition. "Philosophy is valueless because anything that cannot help us make money is valueless" is an argument rather than an independent proposition.
        1. Notice: "q because p" (or "q since p" or "p therefore q") is often considered an argument, not a proposition. It should not be translated as $(p \wedge (p \rightarrow q)) \rightarrow q$. Instead, it should be translated as follows:
            - p
            - $p \rightarrow q$
            - $\therefore q$

2. It states that p is true, (p → q) is true, and consequently, q is true.
3. Notice the difference between a conditional and an argument.
    - When I claim that if p then q, I don't claim or assume that p is true. I merely claim (p → q) is true. And (p → q) could be true even if p is false. Suppose you take the final exam. But the conditional "if you don't take the final exam, you will fail this course" is still true.
    - However, when I make the argument "p, therefore q" or "q because p", I claim that p is true, q is true, and the reason why q is true is that p is true.

6. The following reconstruction is good
    1. If a thing cannot help us make money, then it is valueless.
    2. Philosophy cannot help us make money.
    3. Therefore, philosophy is valueless.

- Example 2
    1. Consider the following passage:
        1. *I was really taken aback when I learned Einstein regarded Bertrand Russell as one of the greatest minds of the 20th century. I don't like Russell. He was really a philosophy dilettante. His main interest was sex. He and Einstein were both womanizers. He had no sense of morality. He once remarked, "The fact that an opinion has been widely held is no evidence whatever that it is not utterly absurd; indeed in view of the silliness of the majority of mankind, a widespread belief is more likely to be foolish than sensible." But this view is absurd because if it were true, the widespread belief that one should not drink alcohol before driving would be more likely to be foolish than sensible! *
    2. This passage contains an argument. Some might reconstruct the argument as follows:
        1. Russell and Einstein were both womanizers.
        2. He had no sense of morality.
        3. He claims that a widespread belief is more likely to be foolish than sensible.
        4. If this claim is true, then the widespread belief that one should not drink alcohol before driving would be more likely to be foolish than sensible.
        5. But that belief is absolutely sensible.
        6. Russell was really a philosophy dilettante.
        7. His main interest was sex.
        8. Therefore, his claim is false.

3. This is a terrible reconstruction because it contains too many irrelevant propositions. Premise 1, 2, 6, and 7 lend no support to the conclusion, which can be deduced simply from 3, 4, and 5. Thus Premise 1, 2, 6, and 7 are unnecessary to make the argument valid.
4. A good reconstruction should look like this:
    1. Russell claims that a widespread belief is more likely to be foolish than sensible.
    2. If this claim is true, then the widespread belief that one should not drink alcohol before driving would be more likely to be foolish than sensible.
    3. But that belief is absolutely sensible.
    4. Therefore, Russell's claim is false.

7. Let's look at two more examples.
    - Argument I
        1. The ancient Greek Anaxagoras has many strange views. For example, he argues that atoms of water are wet because the atoms constituting a substance must themselves have the salient observed properties of that substance. However, this argument is not good because from the fact that the whole has a certain property, it does not follow that all or some of its parts must also have the property.
    - A good reconstruction of Argument I should look like this:
        1. The argument of Anaxagoras goes like this: (i) the atoms constituting a substance must themselves have the salient observed properties of that substance; (ii) water is wet; (iii) therefore, atoms of water are wet.
        2. From the fact that the whole has a certain property, it does not follow that all or some of its parts must also have the property.
        3. If (2), then Premise (i) of Anaxagoras' argument is false.
        4. If a premise of an argument is false, then the argument is not good.
        5. Therefore, Anaxagoras' argument is not good.
            1. Note that Premise (1) is a proposition that states the content of an argument. It is not an argument itself. Similarly, "The argument of Anaxagoras is not good" is a proposition, not an argument.
    - Argument II
        1. Traditionally, knowledge is defined as justified true belief. Specifically, S knows that P if and only if (i) P is true, (ii) S believes that P, and (iii) S is justified in believing that P. Suppose that Smith and Jones have applied for a certain job. And suppose that Smith has strong evidence for the following conjunctive proposition: (d) Jones is the man who will get the job, and Jones has ten coins in his pocket. Smith's evidence for (d) might be that the president of the company assured him that Jones would in the end be selected, and that he, Smith, had counted the coins in Jones' pocket ten minutes ago.

Proposition (d) entails: (e) The man who will get the job has ten coins in his pocket. Let us suppose that Smith sees the entailment from (d) to (e), and accepts (e) on the grounds of (d), for which he has strong evidence. In this case, Smith is clearly justified in believing that (e) is true. But imagine, further, that unknown to Smith, he himself, not Jones, will get the job. And, also, unknown to Smith, he himself has ten coins in his pocket. Proposition (e) is then true, though proposition (d), from which Smith inferred (e), is false. In our example, then, all of the following are true: (i) (e) is true, (ii) Smith believes that (e) is true, and (iii) Smith is justified in believing that (e) is true. But it is equally clear that Smith does *not* know that (e) is true; for (e) is true in virtue of the number of coins in Smith's pocket, while Smith does not know how many coins are in Smith's pocket, and bases his belief in (e) on a count of the coins in Jones' pocket, whom he falsely believes to be the man who will get the job. Hence, the traditional definition of knowledge is false. (Edmund Gettier)

- Here is a step-by-step reconstruction of Gettier's argument:
    1. First step: figure out the conclusion of the complex argument
        1. Conclusion: the traditional definition of knowledge is false.
    2. Second step: figure out the big picture, that is, the core of the argument
        1. If the traditional definition of knowledge is true, then there cannot be such a case where one has a justified true belief yet does not have knowledge.
        2. There might be such a case where one has a justified true belief yet does not have knowledge.
        3. Therefore, the traditional definition of knowledge is false.
    3. Third step: figure out the sub-argument for each premise
        1. There is no sub-argument for Premise 1, which seems to be trivially true.
        2. Here is the core of the sub-argument for Premise 2
            - The following case is possible: Smith and Jones have applied for a certain job. Smith believes that (d) Jones is the man who will get the job, and Jones has ten coins in his pocket, because the president of the company assured him that Jones would in the end be selected, and that he, Smith, had counted the coins in Jones' pocket ten minutes ago. Proposition (d) entails: (e) The man who will get the job has ten coins in his pocket. Smith sees the entailment from (d) to (e), and accepts (e) on the grounds of (d). But unknown to Smith, he himself, not Jones, will get the job. And, also, unknown to Smith, he himself has ten coins in his pocket.

- In the above case, Smith believes (e).
- In the above case, (e) is true.
- In the above case, Smith is justified in believing (e).
- In the above case, Smith does not know (e).
- Therefore, there might be such a case where one has a justified true belief yet does not have knowledge.

4. Fourth Step: figure out the core of the sub-argument for each premise of the sub-argument above
    1. No sub-argument for Premise 1
    2. No sub-argument for Premise 2
    3. No sub-argument for Premise 3
    4. Here is the sub-argument for Premise 4
        - In the above case, the president of the company assured him that Jones would in the end be selected, and that he, Smith, had counted the coins in Jones' pocket ten minutes ago.
        - If (1) is true, then Smith is justified in believing (d).
        - So, in the above case, Smith is justified in believing (d). (from 1&2)
        - In the above case, (d) entails (e).
        - In the above case, Smith sees the entailment from (d) to (e), and accepts (e) on the grounds of (d).
        - If (3), (4), and (5) are true, then Smith is justified in believing (e).
        - So, in the above case, Smith is justified in believing (e). (from 3, 4, 5 &6)
    5. Here is the sub-argument for Premise 5
        - In the above case, (e) is true in virtue of the number of coins in Smith's pocket, while Smith does not know how many coins are in Smith's pocket, and bases his belief in (e) on a count of the coins in Jones' pocket, whom he falsely believes to be the man who will get the job.
        - For any person S and any true proposition p, if p is true in virtue of F1, but S does not know F1, and S falsely believes that p is true in virtue of F2, then S does not know that p. (implicit)
        - Therefore, in the above case, Smith does not know (e).
5. Fifth Step: put all things together.
    1. The following case is possible: Smith and Jones have applied for a certain job. Smith believes that (d) Jones is the man who will get the job, and Jones has ten coins in his pocket, because the president of the company assured him that Jones would

in the end be selected, and that he, Smith, had counted the coins in Jones' pocket ten minutes ago. Proposition (d) entails: (e) The man who will get the job has ten coins in his pocket. Smith sees the entailment from (d) to (e), and accepts (e) on the grounds of (d). But unknown to Smith, he himself, not Jones, will get the job. And, also, unknown to Smith, he himself has ten coins in his pocket.

2. In the above case, Smith believes (e).
3. In the above case, (e) is true.
4. In the above case, the president of the company assured him that Jones would in the end be selected, and that he, Smith, had counted the coins in Jones' pocket ten minutes ago.
5. In the above case, if (4) is true, then Smith is justified in believing (d).
6. So, in the above case, Smith is justified in believing (d). (from 4 & 5)
7. In the above case, (d) entails (e).
8. In the above case, Smith sees the entailment from (d) to (e), and accepts (e) on the grounds of (d).
9. If (6), (7), and (8) are true, then Smith is justified in believing (e).
10. So, in the above case, Smith is justified in believing (e). (from 6, 7, 8, & 9)
11. In the above case, (e) is true in virtue of the number of coins in Smith's pocket, while Smith does not know how many coins are in Smith's pocket, and bases his belief in (e) on a count of the coins in Jones' pocket, whom he falsely believes to be the man who will get the job.
12. For any person S and any true proposition p, if p is true in virtue of F1, but S does not know F1, and S falsely believes that p is true in virtue of F2, then S does not know that p. (implicit)
13. Therefore, in the above case, Smith does not know (e). (from 11 & 12)
14. Therefore, there might be such a case where one has justified true belief yet does not have knowledge. (from 1, 2, 3, 10 & 13)
15. If the traditional definition of knowledge is true, then there cannot be such a case where one has justified true belief yet does not have knowledge.
16. Therefore, the traditional definition of knowledge is false. (from 14 & 15)

8. Finally, I'd like to suggest that all inductive arguments can be reconstructed as deductive arguments. This idea is known as deductivism in logic.

- Here is a typical inductive argument:
    1. All previous U.S. presidents were older than 40.
    2. Therefore, probably the next U.S. president will be older than 40.
- This argument by itself is invalid. But it is likely that the person who makes this argument implicitly assumes that *if all previous U.S. presidents were older than 40, then probably the next U.S. president will be older than 40*. If this assumption is made explicit as a premise, the argument becomes valid:
    1. All previous U.S. presidents were older than 40.
    2. If all previous U.S. presidents were older than 40, then probably the next U.S. president will be older than 40.
    3. Therefore, probably the next U.S. president will be older than 40.
- It seems all inductive arguments can be transformed into deductive arguments without the loss of anything substantive. For another example,
    1. All the *observed* ravens are black.
    2. Therefore, it is very likely that all ravens are black.
- Recast it in a deductive form:
    1. All the observed ravens are black.
    2. If all the observed ravens are black, then it is very likely that all ravens are black.
    3. Therefore, it is very likely that all ravens are black.
- Note: People often confuse reasonableness with (objective) probability or likelihood.
    1. It is not the above argument, but the following argument that people find plausible:
        1. All the observed ravens are black.
        2. If all the observed ravens are black, then it is reasonable for the time being to believe that all ravens are black.
        3. Therefore, it is reasonable for the time being to believe that all ravens are black.
    2. But many fail to see the difference between "it is reasonable for the time being to believe p" and "it is (objectively) likely or probable that p."
        1. Suppose we have observed 1 million ravens and all of them are black. But in fact there are 10 million white ravens that have not been observed. Then it is (objectively) improbable/unlikely that the next raven to be observed is black. But given the evidence we have, it is still reasonable for the time being to believe that the next raven to be observed is black.
- If you want to know more about deductivism, see Jacquette, Dale (2009). Deductivism in Formal and Informal Logic. *Studies in Logic, Grammar and Rhetoric* 16 (29).

Appendix: A tip for reconstructing arguments

You are required to reconstruct an argument in a valid form. Sometimes you are not sure whether the argument you reconstruct is valid. How to deal with this problem? Here is a tip:

If you are not sure whether the argument you reconstruct is valid, re-do it so that the argument clearly follows one or more of the common valid forms.

Here are some common valid forms:

#	**Common Valid Forms**
1	1. If p, then q 2. p 3. therefore, q.
2	1. For any x, if x is F1, then x is F2 2. S is F1 3. therefore, S is F2.
3	1. If p, then q 2. not-q 3. therefore, not-p.
4	1. For any x, if x is F1, then x is F2 2. S is not F2 3. therefore, S is not F1.
5	1. If p, then q 2. If q, then r 3. therefore, if p, then r.
6	1. p or q 2. not-q 3. therefore, p.
7	1. p iff q 2. q 3. therefore, p.
8	1. p iff q 2. not-q 3. therefore, not-p.
9	1. If p & q, then r. 2. q 3. therefore, if p, then r.

A complex valid argument form often consists of several simple valid forms, such as

1. p→q
2. q→r
3. ∴ p→r
4. ¬r
5. ∴ ¬p.
6. s∨p.
7. ∴ s

Let me repeat the tip: If you are not sure whether your argument is valid, re-write it so that it follows one or more of the common valid forms.

Review Exercises

Chapter I

1. How are arguments different from interpretations and explanations? Use your own examples to illustrate your answer.
2. Write a non-argumentative passage about philosophy. The passage must contain *no* arguments.
3. What is the difference between atomic argument and complex argument? Use your own examples to illustrate your answer.
4. A mathematical proof is an argument which convinces other people that a certain mathematical proposition is true. But, as the mathematician Michael Hutchings puts it, "Math isn't a court of law, so a 'preponderance of the evidence' or 'beyond any reasonable doubt' isn't good enough. In principle we try to prove things beyond any doubt at all." Prove that in a Euclidean space, the sum of the three interior angles in a triangle is always 180°.
5. Determine which of the following passages can be considered arguments. State your reasons.
    1. Socrates: I am the kind of man who listens to nothing within me but the argument that on reflection seems best to me. (Plato, Crito)
    2. Socrates was arrested and charged with disrespecting the gods approved by the state, acknowledging new gods, and corrupting the youth of the city. He was tried before five hundred jurors, a majority of whom voted to convict him. His sentence was death or exile, and he chose death by poison rather than leave his beloved Athens. Socrates denied the charges against him and contended that he did not teach metaphysics and did not try to make bad arguments look good. He declared that he had done Athenians a service by arguing with them and turning their attention to the well-being of their souls. (Lewis Vaughn)
    3. Intellectual inbreeding or academic inbreeding refers to the practice in academia of a university's hiring its own graduates to be professors. To guard against and avoid academic inbreeding and draw qualified teachers from elsewhere in China and other countries and regions, Peking university will outsource to fill its faculty positions and will not recruit its own graduates in the year they finish school. Although similar measures have been used in other countries for years, it is the first time for a leading Chinese university to launch such a radical reform of its academic mechanism. (People's Daily, 11 July 2003)
    4. Scientists and mathematicians study perfect lines, squares, and triangles. The objects of their investigations do exist, otherwise all geometrical propositions would have been false (e.g., a triangle has three sides; a circle is a round plane figure whose boundary (the circumference) consists of points equidistant from a fixed point (the center); for any circle,

Circumference = π × Diameter). But no one can draw a perfect line, or square, or triangle; there are always imperfections, even if only at the molecular level. Thus, the objects scientists and mathematicians study cannot be the objects of sense experience. Plato concludes that they must exist as ideal, changeless things in an immaterial reality beyond sense experience. They are called "forms" or "ideas".

Chapter II

1. Write a non-circular and valid argument for the view that all Chinese scholars should write in Chinese. Is it a good argument? Why?
2. Can a circular argument be invalid? Why?
3. An argument is sound if and only if it is valid, and all of its premises are true. Is a sound argument necessarily good? Why?
4. Determine which of the following passages can be considered arguments. State your reasons.
    1. The broadening of my studies into philosophy was important for me not just because some of my main areas of interest in economics relate quite closely to philosophical disciplines (for example, social choice theory makes intense use of mathematical logic and also draws on moral philosophy, and so does the study of inequality and deprivation), but also because I found philosophical studies very rewarding on their own. (Amartya Kumar Sen, Nobel Laureate in economics)
    2. George Soros is a Hungarian-born American business magnate, investor, and philanthropist. He is heavily influenced by his mentor Karl Popper, one of the greatest philosophers of the 20th century. George Soros says of Karl Popper, "He influenced me with his writings and his thinking and I thought that I had some major new philosophical ideas, which I wanted to express. I now realize that I was mainly regurgitating Popper's ideas."
    3. Very few Chinese scholars read and understand both Kant and Hume. Yet many believe that Kant is a greater philosopher than Hume. Moreover, they think people who believe otherwise are either biased or ignorant. This is an instance of ideology in academia.
    4. According to a lower ideology, X is always right about every significant question. We are only supposed to study X's writings and appreciate X's wisdom. According to a higher ideology, while X might be wrong about certain issues, X is so great that any achievement without studying X's writings is impossible. Many scholars believe that while Kant might be wrong about certain issues, he is unquestionably great and any philosophical achievement without studying Kant's writings is impossible. Thus, their belief belongs to the higher ideology.

5. Do you agree that an undergraduate should major in philosophy if she is more interested in philosophy than in any other subjects? Write an argument to support your view. Make the argument as good as possible.

Chapter III

1. Determine whether the following argument forms are valid. State your reasons.
    1. Argument I
        - p∨q
        - p
        - ∴ ¬q
    2. Argument II
        - p↔q
        - ¬p
        - q∨r
        - t∧¬s
        - ∴ ¬(r→s)
2. First use symbols to re-write the following argument. Then determine whether it is valid. State your reasons.
    1. If God changes, then he changes for the worse or for the better.
    2. If he's perfect, then he doesn't change for the worse.
    3. If he changes for the better, then he isn't perfect.
    4. Therefore, if God is perfect, then he doesn't change. (Gensler 2010: 166)
        - Let P stand for "God changes", Q for "God changes for the worse", R for "God changes for the better", and S for "God is perfect".
3. What are the three types of "If p, then q"? Is the following proposition true or false? Why?
    1. If 2+3=6, then pigs can fly.

Chapter IV

1. How is a conditional different from an argument? "If you don't exercise and eat too much, then you'll gain weight." Is this an argument? Why?
2. What are the criteria of good reconstruction? What are the criteria of good argument? Suppose X is a good reconstruction of a certain argument. Is X a good argument? Why?
3. Determine which reconstruction is better and explain why it is better.
    1. Love is better than hate, because it brings harmony instead of conflict into the desires of the persons concerned. (Bertrand Russell)
        - Reconstruction 1

1. Love brings harmony instead of conflict into the desires of the persons concerned.
2. Hate brings conflict instead of harmony into the desires of the persons concerned. (implicit)
3. Great philosophers all praise love rather than hate.
4. Therefore, Love is better than hate.

- Reconstruction 2
    1. Love brings harmony instead of conflict into the desires of the persons concerned.
    2. Hate brings conflict instead of harmony into the desires of the persons concerned. (implicit)
    3. The fact that the desires of the persons are harmonious is better than the fact that the desires of the persons are in conflict. (implicit)
    4. If X brings C1, Y brings C2, and C1 is better than C2, then X is better than Y. (implicit)
    5. Therefore, love is better than hate.

2. When you meet with opposition, even if it should be from your husband or your children, endeavour to overcome it by argument and not by authority, for a victory dependent upon authority is unreal and illusory. (Bertrand Russell)
    - Reconstruction 1
        1. If a victory is dependent upon authority, it is unreal and illusory.
        2. You want to achieve a victory that is not unreal or illusory. (implicit)
        3. Therefore, your victory must not depend upon authority. (from 1,2)
        4. A real victory is dependent upon argument or authority. (implicit)
        5. Therefore, you should endeavor to overcome opposition by argument and not by authority. (from 3,4)
    - Reconstruction 2
        1. A victory dependent upon authority is unreal.
        2. A victory dependent upon argument is real. (implicit)
        3. A real victory is better than an unreal victory. (implicit)
        4. If X is better than Y , then you should always try to get X rather than Y. (implicit)
        5. Therefore, you should always try to get the victory dependent upon argument rather than the victory dependent upon authority. (from 1, 2, 3, and 4)
        6. If you should always try to get the victory dependent upon argument rather than the victory dependent upon authority,

then whenever you meet with opposition, you should endeavour to overcome it by argument and not by authority. (implicit)

7. Therefore, whenever you meet with opposition, you should endeavour to overcome it by argument and not by authority. (from 5 and 6)

4. Determine which of the following passages can be considered arguments. Reconstruct each argument in a deductively valid form. Briefly evaluate each argument. Enjoy.
    1. The law of non-contradiction is false because some logicians question it.
    2. Heidegger is a greater philosopher than Russell. John studies Heidegger while Mary studies Russell. So John's study is more important than Mary's.
    3. Chinese scholars understand German Philosophy better than American scholars because China has a much longer and greater cultural tradition than America.
    4. Many Chinese professors of philosophy including my teacher think Russell is too biased to understand some great philosophers such as Plato, Aristotle, Kant, and Hegel. Therefore, Russell's *A History of Western Philosophy* is not worth reading.
    5. Deductivism is the view that the only valid arguments are deductively valid arguments, and that deductive logic is the only logic that we have or need. The deductivist ploy regarding so-called non-deductive or inductive or ampliative arguments is to recast them as deductive enthymemes with unstated or missing premises of one kind or another. For example, the archetypical type of so-called "inductive reasoning" is inductive generalisation: All observed As are Bs. Therefore, all As are Bs. We can validate this argument by adding the unstated or missing premise "Unobserved cases resemble observed cases." (Alan Musgrave)

Harder Exercises 1

1. Determine which of the following passages can be considered arguments. State your reasons.

    i. Socrates: What about someone who works hard at physical training, eats very well, and never touches musical training or philosophy? .....a person like that, I take it, becomes an unmusical hater of argument who no longer uses argument to persuade people, but force and savagery, behaves like a wild beast, and lives in awkward ignorance without rhythm or grace. (Plato, *Republic*)

ii. We may distinguish two goods: instrumental goods and intrinsic goods. Many things can improve our well-being: chocolate, sturdy shoes, vaccinations, a reasonable amount of money. These things pave the way to a better life—they help to make it possible, and may, in some cases, even be indispensable to it. Philosophers call such things instrumental goods, things that are valuable because of the good things they bring about. If there are instrumental goods, then there must also be something worth pursuing for its own sake, whose goodness is self-contained, something valuable in its own right, even if it brings nothing else in its wake. Such things are intrinsically valuable. They must exist because if all valuable things were good merely as a means, there must be an infinite chain of instrumental goods extending into the future, without ever leading to any intrinsic good. Such a chain is impossible. (Russ Shafer-Landau)

iii. In *Letters Concerning the English Nation*, Voltaire contrasts English constitutional government with Continental absolute monarchy; English religious toleration with the attitude of the Roman Church; and the explanatory power of Newton's cosmology and of Locke's analytic empiricism with the dogmatism of Descartes. Voltaire's book was burnt; but its publication marks the beginning of a philosophical movement. (Karl Popper)

2. Does the following passage contain a complex argument? Why?

i. At first glance, the table in front of me is brown. But as soon as we try to be more precise our troubles begin. Although I believe that the table is 'really' of the same colour all over, the parts that reflect the light look much brighter than the other parts, and some parts look white because of reflected light. I know that, if I move, the parts that reflect the light will be different, so that the apparent distribution of colours on the table will change. It follows that if several people are looking at the table at the same moment, no two of them will see exactly the same distribution of colours, because no two can see it from exactly the same point of view, and any change in the point of view makes some change in the way the light is reflected. Since the table appears to be of different colours from different points of view, there is no reason for regarding some of these as more really its colour than others. And we know that even from a given point of view the colour will seem different by artificial light, or to a colour-blind man, or to a man wearing blue spectacles, while in the dark there will be no colour at all, though to touch and hearing the table will be unchanged. This colour is not something which is inherent in the table, but something depending upon the table and the spectator and the way the light falls on the table. When, in ordinary life, we speak of the colour of the table, we only mean the sort of colour which it will seem to have to a normal spectator from an ordinary point of view under usual conditions of light. But the other colours which appear under other conditions have just as good a right to be considered real; and therefore, to avoid favouritism, we are compelled to deny that, in itself, the table has any one particular colour. (Russell)

Harder Exercises 2

1. Determine which of the following passages can be considered arguments. State your reasons.
    1. A property is essential for an object if the object must have the property to exist and be the kind of thing that it is. A property is accidental if the object has the property, but doesn't have to have it to exist or be the kind of thing that it is. Suppose Fred has short hair. That is an accidental property of his. He would still be Fred, and still be a human being, if he let his hair grow long or shaved it off completely. An essential property is one that a thing has to have to be the thing that it is, or to be the kind of thing it fundamentally is. As a human being, Fred wouldn't exist unless he had a human body, so having a human body is an essential property of his. (John Perry: Glossary of Philosophical Terms)
    2. What is a higher man? A person, for Nietzsche, has a Dionysian attitude toward life insofar as he affirms his life unconditionally; in particular, insofar as he affirms it including the "suffering" or other hardships it has involved. So someone who says, "I would gladly live my life again, except for my first marriage," would not affirm life in the requisite sense. Thus, we may say that a person affirms his life in Nietzsche's sense only insofar as he would gladly will its eternal return: i.e., will the repetition of his entire life through eternity. In fact, Nietzsche calls "the idea of the eternal recurrence" the "highest formulation of affirmation that is at all attainable" (EH III:Z-1; cf. BGE 56). Higher men, then, are marked by a distinctive Dionysian attitude toward their life: they would gladly will the repetition of their life eternally. (SEP)
    3. In one form or another, the Socratic method has been part of Western education for centuries. As Socrates uses it, the method typically goes like this: (1) Someone poses a question uncover the truth about the meaning of a concept (for example, What is justice?); (2) Socrates' companion gives an answer; (3) Socrates raises questions about the answer, proving that the answer is inadequate; (4) to avoid the problems inherent in this answer, the companion offers a second answer; (5) steps (3) and (4) are repeated a number of times, ultimately revealing that the companion does not know what he thought he knew. This negative result may seem uninformative, but it is actually a kind of progress. False answers are eliminated, opinions are improved, and perhaps the truth is a little closer than before. (Lewis Vaughn)
    4. After a short exchange in the meta-dialogue in which Phaedo and Echecrates praise Socrates' pleasant attitude throughout this discussion, Socrates begins his response with a warning that they not become

misologues. Misology, he says, arises in much the same way that misanthropy does: when someone with little experience puts his trust in another person, but later finds him to be unreliable, his first reaction is to blame this on the depraved nature of people in general. If he had more knowledge and experience, however, he would not be so quick to make this leap, for he would realize that most people fall somewhere in between the extremes of good and bad, and he merely happened to encounter someone at one end of the spectrum. A similar caution applies to arguments. If someone thinks a particular argument is good, but later finds out that it is not, his first inclination will be to think that all arguments are bad; yet instead of blaming arguments in general and coming to hate reasonable discussion, we should blame our own lack of skill and experience. ("Plato: Phaedo" in IEP)

2. How many atomic arguments does the following passage have? Do they form a complex argument? Explain in detail.
    1. In the Sixth Meditation, Descartes considers three possibilities regarding the cause of his ideas of material objects: it is either (a) an unknown faculty of Descartes' mind, or (b) God, or (c) material things. Descartes believes that these are the only possibilities. Descartes first rules out the possibility that an unknown faculty of Descartes' mind is the cause, for ideas of material things occur independently of the will. He has no control over his ideas of material things, e.g., if he sees a big snake, he is forced to form the idea of a big snake: he does not want to form such an idea. Next, Descartes rules out the possibility that God is the cause of the ideas of material things. He reasons as follows: God has given me a strong natural tendency to believe that there are material objects which cause my ideas or perceptions of them. He has given me no faculty by which I could know that this belief is false. If God causes my ideas of material objects either directly or indirectly, i.e., by himself or through the agency of some creature other than material objects, then God would be a deceiver. But God is no deceiver. Hence, neither God nor some creature other than material objects is the cause of my ideas of material things. Since neither I (i.e., an unknown faculty of Descartes' mind) nor God nor one of his other creatures is the cause of my ideas of material things, it follows that they must be caused by material things. Therefore, material things must exist. (James D. Stuart)

Harder Exercises 3

1. Reconstruct the following argument in a deductively valid form. Reconstruct the big picture argument first. Then reconstruct the sub-argument (if any) for each premise. Each sub-argument must be an *atomic* argument. You might also need to

reconstruct the sub-sub-argument (if any) for each premise of each sub-argument. (Never forget to consult "A tip for reconstructing arguments" at the end of Chapter 4!)

- Socrates uses his question-and-answer approach to show that Thrasymachus' definition of justice is wrong. In particular, he applies a common form of argument called reductio ad absurdum. The basic idea behind it is if you assume a set of statements, and you can derive absurd or false statements from it, then you know that at least one of the original statements must be rejected. So in the preceding dialogue, Socrates says in effect, let's assume that Thrasymachus is right that justice is whatever is in the interest of the powerful, and that people are just if they obey the laws made by the powerful. It is clear, however, that the powerful sometimes make mistakes and demand obedience to laws that are not in their best interest. So if Thrasymachus' definition of justice is correct, then it is always just for people to do what is in the interest of the powerful, and it is also not always just to do what is in the interest of the powerful. His idea of justice then leads to a logical contradiction and is therefore false. (Lewis Vaughn)

2. First write a valid and non-circular argument *against* the claim that the death penalty should be abolished. Then write an objection to one of the premises of the argument. The objection must be a valid and non-circular argument. Finally, write a response to the objection. The response must be a valid and non-circular argument against one of the premises of the objection.

Harder Exercises 4

1. Is the following argument good? Why?
    1. If God does not exist, then it is false that if I pray, then my prayers will be answered.
    2. I do not pray.
    3. Therefore, God exists.
2. First identify the premises and the conclusion of the following argument. Then determine whether it is a good argument. State your reasons.
    1. Knowledge is not justified true belief. Suppose Job and Dimitri both applied for the same job. Near the water cooler at lunchtime, Job overhears someone ask The Boss, "Who will get the job?," and The Boss says, "Dimitri is going to get it." This justifies Job in believing that Dimitri will get the job. Distraught, Job heads over to the snack machine, where he sees Dimitri count ten dimes in change and put them in his pocket. This justifies Job in believing that Dimitri has at least ten dimes in his pocket. Job then goes through this argument to himself, "Dimitri will get the job. And Dimitri has at least ten dimes in his pocket. So the person who will get the job has at

least ten dimes in his pocket." As it turns out, Job is correct: the person who will get the job has at least ten dimes in his pocket. But that's because Job will get the job, and Job has at least ten dimes in his pocket. Job is perfectly justified in believing both premises of his argument, and the premises obviously entail the conclusion, so Job is justified in believing the conclusion too. Moreover, the conclusion is true. So if knowledge is justified true belief, then Job knows that the person who will get the job has at least ten dimes in his pocket. But it's obvious that Job does not know this. (John Turri on the Gettier problem)

Harder Exercises 5

1. Determine which of the following passages can be considered arguments. State your reasons. You do not have to reconstruct each argument.
    - Both Hume and Kant agree that we can know analytic statements without appealing to experience (that is, a priori). (Remember, Hume refers to such statements as "relations of ideas.") Through reason alone we can come to know such analytic a priori propositions as "all brothers are male" and "all bodies are extended." But Hume also holds that we can know synthetic propositions (those that are informative about the world) only a posteriori (only through experience). He thinks synthetic a priori knowledge is impossible. Kant, on the other hand, insists that synthetic a priori knowledge is possible. We can indeed know things about the world, and we can know them independently or prior to experience.
    - Kant's starting point is the premise (which he thought obvious) that science and mathematics do give us necessary, universal knowledge about the world. His original version of transcendental philosophy took both Euclidean geometry and the Newtonian laws of motion to be synthetic a priori principles. From there he argues that something must therefore be fundamentally wrong with both empiricism and rationalism because these theories fail to explain how this kind of knowledge is possible. Yet Kant's starting point is wrong. Neither Euclidean geometry nor the Newtonian laws of motion are a priori.
    - Kant was so self-confident that he called his theory the Copernican Revolution in philosophy. At a time when the prevailing (and Church-sanctioned) belief was that the sun orbited the earth, Nicolaus Copernicus thought the better theory was that the earth orbited the sun. Copernicus turned out to be right, and he arrived at his answer through a stunning reversal of the received view. In similar fashion, Kant thought he had instigated his own revolution by turning the traditional perspective on knowledge upside down. For centuries the conventional view was that

knowledge is acquired when the mind conforms to objects— that is, when the mind tracks the external world. But Kant proposed the opposite: objects conform to the mind. He argued that sense experience can match reality because the mind stamps a structure and organization on sense experience. There is synthetic a priori knowledge (e.g., Euclidean geometry and the Newtonian laws of motion), he said, because the mind's concepts force an (a priori) order onto (synthetic) experience. The idea is not that our minds literally create the world, but that our minds organize our experience so we perceive it as recognizable objects. The empiricists see the mind as a passive absorber of sense information, bur Kant says the mind is an active shaper of experience into objects that we can know a priori.

- Transcendental argument, in philosophy, a form of argument that is supposed to proceed from a fact to the necessary conditions of its possibility. A transcendental argument is simply a form of deduction, with the typical pattern: q is true only if p is true; q is true; therefore, p is true. As this form of argument appears in philosophy, the interest, and the difficulty, reside not in the movement from premises to conclusions, which is routine, but in the setting up of the major premises—that is, in the kinds of things that are taken as starting points. For example, Immanuel Kant tried to prove the principle of causality by showing that it is a necessary condition of the possibility of making empirically verifiable statements in natural science. (Britannica)
- Several scholars have criticized the histories of early modern philosophy based on the dichotomy of empiricism and rationalism. They view them as overestimating the importance of epistemological issues for early modern philosophers (epistemological bias), portraying Kant's Critical philosophy as a superior alternative to empiricism and rationalism (Kantian bias), and forcing most or all early modern thinkers prior to Kant into the empiricist or rationalist camps (classificatory bias). Kant is often said to be the source of the three biases. Against this criticism, my paper "Kant on Empiricism and Rationalism" argues that Kant did not have the three biases. However, he promoted a way of writing histories of philosophy from which those biases would naturally flow. (Alberto Vanzo)

2. Do you think all students of philosophy should study Kant? Make your argument as good as possible. Then write an objection to one of the premises of your argument. The objection must be a non-circular and valid argument that is worth discussing (imagine that your opponent is smart). Finally, write a response to the objection. Make your response as good as possible.

Harder Exercises 6

Determine which of the following passages can be considered arguments. State the premises and the conclusion of each argument. You do not have to reconstruct each argument.

1. If the French had not helped, the Americans probably would not have won the Revolutionary War.
2. In inference to the best explanation, we begin with premises about a phenomenon or state of affairs to be explained. Then we reason from those premises to an explanation for that state of affairs. We try to produce not just any explanation but the best explanation among several possibilities. The best explanation is the one most likely to be true.
3. Scientists have determined that life in the universe would not be possible if more than about two dozen properties of the universe were even slightly different from what they are; as the matter is commonly put, the universe appears "fine-tuned" for life. For example, life would not be possible if the force of the big bang explosion had differed by one part in 10^{60}; the universe would have either collapsed on itself or expanded too rapidly for stars to form. Similarly, life would not be possible if the force binding protons to neutrons differed by even five percent. The only two explanations for the highly improbable appearance of fine-tuning are (a) chance and (b) an intelligent agent who deliberately designed the universe to be hospitable to life. The latter simply has to be the better explanation, for the supposition that it is a matter of chance that so many things could be exactly what they need to be for life to exist in the universe just seems implausibly improbable. God is understood to be the intelligent agent who deliberately designed the universe to be hospitable to life. Therefore, God exists.

Reconstruct each argument in a deductively valid form.

1. "A stupid man's report of what a clever man says can never be accurate, because he unconsciously translates what he hears into something he can understand." (Russell)
2. In 1955, after learning the death of his lifelong friend Michele Besso, Albert Einstein wrote a letter to the family of Besso. In the letter, Einstein said, "Now he has departed from this strange world a little ahead of me. That means nothing. People like us, who believe in physics, know that the distinction between past, present, and future is only a stubbornly persistent illusion."

Harder Exercises 7

1. Determine which of the following passages can be considered arguments. State the premises and the conclusion of each argument. You do not have to reconstruct each argument.
    1. Philosophers distinguish two ways to acquire knowledge: through reason and through sense experience. The former is called a priori; it yields knowledge gained independently of or prior to sense experience. The latter is known as a posteriori; it gives us knowledge that depends entirely on sense experience. We can come to know many propositions a priori — for example, that all bachelors are unmarried, that all triangles have three sides, that 2 + 3 = 5, and that something is either a cat or not a cat. We need not do a survey of bachelors to see if they really are all unmarried; we can know this just by thinking about it. And we know that the statement "something is either a cat or not a cat" is true; it is a simple logical truth — and we know it without having to observe any cats. It seems that we can also come to know many propositions a posteriori — for instance, John the bachelor has red hair, that he just drew a triangle on paper, that he is holding five pencils, and that Tabby the cat is on the mat. To know these things, we must rely on our senses. (Lewis Vaughn)
    2. Hume asserts that neither reason nor experience can provide us with evidence that causal relationships exist. We can observe no power or force that enables causes to produce events. Our perceptions do not give us any reason to believe that one thing makes another thing happen. All we observe, says Hume, is one event associated with another, and when we repeatedly see such a pairing, we jump to the conclusion that the events are causally connected. We make these inferences out of habit, not logic or empirical evidence. (Lewis Vaughn)
    3. In making judgments about causes and effects, we reason inductively. That is, we assume that events that followed one another in the past will do the same in the future, that the future will be like the past. We presuppose, in other words, the principle of induction. Because of previous experience, we expect night to follow day, fire to burn, bread to nourish, and dogs to bark. Likewise the whole scientific enterprise runs on this principle, with scientists making inferences from empirical regularities to predictions about events to come. At first glance, it might seem that no one would seriously question the legitimacy of inductive reasoning. But Hume asks, Do we have any grounds whatsoever for believing the principle of induction? What justifies our assumption that the future will be like the past? He argues that the principle cannot be an a priori truth, and it cannot be an a posteriori fact. It cannot be the former because the denial of an a priori truth (such as "all bachelors are unmarried") is self-contradictory, and the denial of the principle of induction is not like that. It cannot be the latter because no amount of empirical evidence can show it to be true. Why? As Hume observes, to maintain that the principle of induction is an a posteriori

fact is to say that it can be established by experience (that is, inductively). That is equivalent to saying that the principle of induction can be proved by the principle of induction— which is to beg the question. Arguing in a circle like this offers no support to the principle at all. Hume concludes that we are not justified in believing the principle of induction. (Lewis Vaughn)

2. Name two common invalid argument forms. Explain why they are invalid.
3. What is a bad argument reconstruction?

Harder Exercises 8

Determine which of the following passages can be considered arguments. Reconstruct each argument in a deductively valid form. Reconstruct the big picture argument first. Then reconstruct the sub-argument (if any) for each premise. Each sub-argument must be an *atomic* argument. You might also need to reconstruct the sub-sub-argument (if any) for each premise of each sub-argument. (See "A tip for reconstructing arguments" at the end of Chapter 4). Finally, briefly evaluate each argument. Enjoy.

1. Here is the procedure we are going to use to take an argument from prose form and put it into our reconstructed form: A. Find the conclusion. B. Find the explicit premises. C. Add implicit premises or conclusions to make it strictly valid, consistent with the authors' intentions. D. Make charitable revisions in language to make the argument valid and as strong as possible. E. Put argument into standard form. Number each premise, separate the premises from the conclusion with "Therefore". F. Add justifications after every line, for example, [EP] Explicit Premise, [IP] Implicit Premise, 3 follows from 1 and 2, etc.
2. It is impossible for digital computers to understand language or think. Imagine a native English speaker who knows no Chinese locked in a room full of boxes of Chinese symbols (a data base) together with a book of instructions for manipulating the symbols (the program). Imagine that people outside the room send in other Chinese symbols which, unknown to the person in the room, are questions in Chinese (the input). And imagine that by following the instructions in the program the man in the room is able to pass out Chinese symbols which are correct answers to the questions (the output). The program enables the person in the room to pass the Turing Test for understanding Chinese but he does not understand a word of Chinese. The point is this: if the man in the room does not understand Chinese on the basis of implementing the appropriate program for understanding Chinese then neither does any other digital computer solely on that basis because no computer, qua computer, has anything the man does not have. (John Searle)

Harder Exercises 9

1. Determine which of the following passages can be considered arguments. State your reasons. You do not have to reconstruct each argument.
    1. During the reconstruction process, it is best to forego any critical evaluation of the argument and withhold our objections. The goal is to give the most charitable, and strongest version of the argument on the author's behalf that we can. The critical evaluation phase will come after we have the best reconstruction we can devise of the argument.
    2. In "Deductivism as an Interpretative Strategy: A Reply to Groarke's Defense of Reconstructive Deductivism," David Godden distinguished two notions of deductivism. On the one hand, as an interpretative thesis, deductivism is the view that all-natural language argumentation must be interpreted as being deductive. On the other hand, as an evaluative thesis, deductivism is the view that for a conclusion to follow, it has to follow of necessity from the premises — or, in other words, that being a good inference implies being deductive.
    3. Locke distinguishes between two kinds of properties that external objects can have. Primary qualities are objective properties such as size, solidity, and mobility. They are in material objects, independent of our senses, and would be possessed by the objects even if no one was around to sense anything. Secondary qualities are subjective properties such as the color red or the smell of roses. They are in the mind in that they depend on the operation of the senses. They exist only when someone experiences them. (Lewis Vaughn)
    4. An analytic statement is a logical truth whose denial results in a contradiction. For example, "All brothers are male" is analytic. To deny it — to say that "it is not the case that all brothers are male" — is to say that some males are not males, which is a contradiction. Or consider, "All bodies are extended [occupying space]." To deny this is to say that something extended is not extended — another contradiction. Analytic statements are necessarily true (cannot be false) but trivially so. They are true but tell us nothing about the world. The statement about brothers is obviously true but does not tell us whether any brothers exist. A synthetic statement is one that is not analytic. It does tell us something about the world, and denying it does not yield a contradiction. Science specializes in synthetic statements, and so do we in our everyday lives. Examples include: every event has a cause, the planets orbit around the sun, water boils at 100 degrees Celsius at sea level, and Abraham Lincoln was born in the United States.
2. First reconstruct each argument in a deductively valid form. Reconstruct the big picture argument first. Then reconstruct the sub-argument (if any) for each premise. Each sub-argument must be an *atomic* argument. You might also need to reconstruct the sub-sub-argument (if any) for each premise of each sub-argument.

(See "A tip for reconstructing arguments" at the end of Chapter 4). Finally, briefly evaluate each argument.

1. Values are not objective, because people would have agreed on values iff (= if and only if) values are objective.
2. How do we know that God exists? Some things in the world are clearly in motion. Things move when potential motion becomes actual motion. Only an actual motion can convert a potential motion into an actual motion. Nothing in the world can be at once in both actuality and potentiality in the same respect (i.e., if both actual and potential, it is actual in one respect and potential in another). Therefore nothing in the world can move itself. Therefore each thing in motion is moved by something else. The sequence of motion cannot extend *ad infinitum*. Therefore it is necessary to arrive at a first mover, put in motion by no other; and this everyone understands to be God. (St. Thomas Aquinas)

Harder Exercises 10

1. Some hold that we do not have to reconstruct an argument in a valid form. Here is their argument: "It is possible that the argument in an argumentative text is invalid. If an argument in an argumentative text is invalid, but your reconstruction makes it valid, then your reconstruction does not respect the text. A good reconstruction must respect the text. Therefore, we do not have to reconstruct an argument in a valid form." Do you agree? Why?
2. Reconstruct the following argument in a deductively valid form. Reconstruct the big picture argument first. Then reconstruct the sub-argument (if any) for each premise. Each sub-argument must be an *atomic* argument. You might also need to reconstruct the sub-sub-argument (if any) for each premise of each sub-argument. (See "A tip for reconstructing arguments" at the end of Chapter 4)
    - I begin with the assumption that suffering and death from lack of food, shelter, and medical care are bad. I think most people will agree about this, although one may reach the same view by different routes… . My next point is this: if it is in our power to prevent something bad from happening, without thereby sacrificing anything of comparable moral importance, we ought, morally, to do it. By "without sacrificing anything of comparable moral importance" I mean without causing anything else comparably bad to happen, or doing something that is wrong in itself, or failing to promote some moral good, comparable in significance to the bad thing that we can prevent. This principle seems almost as uncontroversial as the last one. … When we buy new clothes not to keep ourselves warm but to look "well-dressed" we are not providing for any important need. We would not be sacrificing anything significant if we were to continue to wear our old

clothes, and give the money to famine relief. By doing so, we would be preventing another person from starving. It follows from what I have said earlier that we ought to give money away, rather than spend it on clothes which we do not need to keep us warm. To do so is not charitable, or generous. Nor is it the kind of act which philosophers and theologians have called "supererogatory" – an act which it would be good to do, but not wrong not to do. On the contrary, we ought to give the money away, and it is wrong not to do so. (Peter Singer)

Harder Exercises 11

1. Write an objection to one of the premises of the argument by Peter Singer. Make the objection as good as possible (it must be a valid argument).
2. Reconstruct the following argument in a deductively valid form. (See "A tip for reconstructing arguments" at the end of Chapter 4)
    - One goal of philosophy is to take a position on an issue after having evaluated the best arguments for that position, and against that position. Ideally, you should be able to debunk the objections to your positions and have good objections to contrary positions. But objections are just another kind of argument. So, the key to having a good philosophical position is being a good consumer and producer of arguments.

Harder Exercises 12

1. Reconstruct the following argument in a deductively valid form. Reconstruct the big picture argument first. Then reconstruct the sub-argument (if any) for each premise. Each sub-argument must be an *atomic* argument. You might also need to reconstruct the sub-sub-argument (if any) for each premise of each sub-argument. (See "A tip for reconstructing arguments" at the end of Chapter 4)
    - We should oppose genetic enhancement in sport. There are two obvious reasons. One is safety: steroids, for example, have long-term medical risks. A second familiar reason is fairness: If there is a general ban in the Olympics on various forms of enhancement or blood doping or various forms of muscle enhancement, then if some use it surreptitiously or illicitly it puts the others at a disadvantage. But safety and fairness are not the only reasons to oppose genetic enhancement in sport. Besides safety and fairness, my main objection to the use of performance-enhancing genetic therapies has to do with the worry that it will corrupt sport and athletic competition as a place where we admire the cultivation and display of natural gifts. It will distance us from the human dimension of sport. Imagine a future where it's possible to engineer a bionic athlete (let's say in baseball, which is my favourite sport), who could hit every pitch for a home run of 600 feet. It would maybe be an amusing spectacle, but it wouldn't be a sport. We might

admire the pharmacist or the engineer, but would we admire the athlete? We would lose contact with the human dimension and the display of natural human gifts that I think is essential to what we admire and appreciate in sports. (Michael Sandel)

2. First write a possible objection to one of the premises of the argument by Michael Sandel. Make the objection as good as possible (it must be a valid and non-circular argument). Then write a response to the objection on Sandel's behalf. Make the response as good as possible (it must be a valid and non-circular argument). Each argument is supposed to deepen our understanding of the issue.

Harder Exercises 13

1. Reconstruct the following argument in a deductively valid form. Reconstruct the big picture argument first. Then reconstruct the sub-argument (if any) for each premise. Each sub-argument must be an *atomic* argument. You might also need to reconstruct the sub-sub-argument (if any) for each premise of each sub-argument. (See "A tip for reconstructing arguments" at the end of Chapter 4)
    - Epicurus argues that it is irrational to fear death. First of all, death is not bad for the living. For death is annihilation. The living have not yet been annihilated (otherwise they wouldn't be alive). So death does not affect the living. Neither is death bad for the dead. For the dead do not exist. Yet for something to be bad for somebody, that person has to exist, at least. If death is bad for neither the living nor the dead, then it is irrational to fear death.
2. First write a possible objection to one of the premises of the argument by Epicurus. Make the objection as good as possible (it must be a valid and non-circular argument). Then write a response to the objection on Epicurus' behalf. Make the response as good as possible (it must be a valid and non-circular argument). Each argument is supposed to deepen our understanding of the issue.