

CHAPTER 2 Claims, Issues, and Arguments

Every argument contains at least one intended conclusion plus one or more supporting reasons, called premises. However, in some passages it is not easy to tell whether an argument occurs at all, nor what the premises and conclusion of an argument are, nor how other arguments in the passage are related to that argument. This chapter explores that understatement. It begins with an introduction of special phrases that often indicate the presence of premises and conclusions. Then the chapter investigates the problems of identifying the unstated premises and conclusions of intended argumentation. For especially complex argumentation, the chapter introduces a diagramming technique that can display argument structure.

What is a Claim?

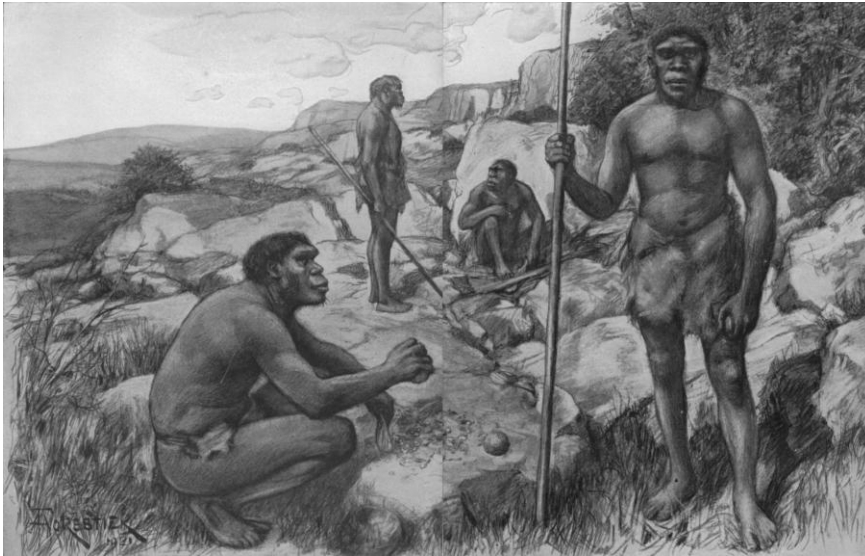
Claims are statements. Here is one: "Neptune has the fastest winds in the solar system." An important claim might be called a *proposition*, *assertion*, *judgment*, *hypothesis*, *principle*, *thesis*, or, in some situations, a *law*. Claims have to be capable of being true or false. So, if you say, "It's midnight," then you have made a claim, but you haven't if you ask, "Is it midnight?" or say, "Don't go out after midnight."

Although there's a difference between a declarative sentence and the claim made with that declarative sentence, this book will often not honor that distinction and will speak of declarative sentences themselves as being claims.

—CONCEPT CHECK—

Is the following sentence a claim?

The biggest question your pre-historic ancestors faced was, "Is that thing behind the bushes my next meal, or am I *its* next meal?"



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You can't spot the claims if you don't speak the language. In the passage below from a famous Valley girl, try to decide whether the phrase in italics is (used to make) a claim. You won't be able to figure this out if you don't speak a little Valley-girl-ese.

So, I loan Whitney my copy of *GQ*, right, and she drops strawberry yogurt right on the cover, and *like I could totally be so edged*, but I tried to be cool.

To tell whether it's expressing a claim, you don't have to be able to figure out whether it's true, but only whether it could be--whether it's the sort of thing that might be true or might be false. It does make the claim that the speaker could be upset by Whitney's dropping strawberry yogurt on her copy of *GQ Magazine*.

What is an Argument?

The word *argument* has more than one meaning. In this book we will not use the word in the sense of being unpleasantly argumentative. Instead, it will normally mean a conclusion supported by one or more reasons.

It takes only one person to have an argument, not two. Saying that two people are "in an argument" means that there are two arguments, not one, in the technical sense of "argument."

⁸ Answer: The question itself is not a claim, but the larger sentence containing the question is a claim. It is used to make a claim about the question.

Each person has his or her own argument. In short, our word *argument* is a technical term with a more precise meaning than it has in ordinary conversation.

Claims that serve as reasons in an argument are also called *premises*. Nothing to do with, “Keep off the premises.” That’s another use of the term. Any argument must have one or more premises.

—CONCEPT CHECK—

Match up the numbers with the letters. Describe the following numbered passages by placing the appropriate letter to the left of each number.

- a. Only a claim, with no reasons given to back it up.
 - b. An argument using bad reasons.
 - c. An argument using good reasons (assuming that the arguer is being truthful).
 - d. None of the above.
1. What time does the movie start?
 2. This card can save you a lot of money.
 3. Vote Republican in the next election because doing so will solve almost all the world's problems.
 4. John Adams was the second president of the United States. My history teacher said so, and I looked it up on Wikipedia with my phone.

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To find out whether an argument is present, you need to use your detective skills. Ask yourself whether the speaker gave any reason for saying what was said. If you get a satisfactory answer to your own question, then you probably have detected an argument, and you’ve uncovered its conclusion and premises. In detecting an argument, your main goal is to locate the conclusion, then the reasons given for that conclusion, while mentally deleting all the other sentences and phrases that are not part of the argument.

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 9 d 1, a 2, b 3, c 4. Passage (1) is a question, not a claim. A claim is an assertion that something is true, and it is usually made with a declarative sentence.

For any conclusion, the premises used directly to support it are called its **basic premises**. In a more complicated argument, there may be reasons for the reasons, and so on. But these reasons for the reasons are not part of the core. The core of the argument is the conclusion plus its basic premises.

—CONCEPT CHECK—

Pick the one best choice for the conclusion of Sanderson's argument in the following disagreement.

Sanderson: Do you realize just what sort of news you get on a half-hour American TV news program?

Harris: Yes, newsy news. What do you mean?

Sanderson: Brief news, that's what.

Harris: Brief news like boxer shorts?

Sanderson: Ha! Look at a time breakdown of the average half-hour news program broadcast on American TV. It is nine minutes of news!

Harris: What's the rest?

Sanderson: Eleven minutes of commercials, six of sports, and four of weather. You can't do much in nine minutes. I say nine is not enough if you are going to call it the "news." What do you think?

Harris: It is enough for me. News can be boring. Besides, if the American public didn't like it, they wouldn't watch it.

Sanderson: Now that's an interesting but ridiculous comment. But I've got to go now; let's talk again after lunch.

Sanderson's conclusion is

- a. If the American public didn't like brief TV news, they wouldn't watch it.
- b. Do you realize just what sort of news you get in a half-hour American TV news program?
- c. That's an interesting but ridiculous comment [about the American public's taste].
- d. There is not enough news on a thirty-minute TV news program in America.

e. An average half-hour American TV news program is eleven minutes of commercials, nine of news, six of sports, and four of weather.

After choosing Sanderson's conclusion from the above list, comment on the quality of his argument for that conclusion.

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What is the Issue?

We argue in order to settle **issues**. Issues arise when there is uncertainty about whether to accept or reject a claim. For example, someone argues for the claim that you ought to quit eating strawberry yogurt because it causes cancer, and you wonder whether it really does. You are wondering about the following issue:

whether eating strawberry yogurt will cause cancer.

It's common to express an issue by using the word "whether" to indicate the uncertainty involved. You don't want to express the issue by taking just one side of the issue.

When two people are "in an argument," they are divided on the issue. The metaphor is that they are on opposite sides of the fence.

10 Answer (d) is correct. Sanderson's conclusion is that more time should be spent on the news during a thirty-minute TV news program. Answer (e) is wrong because it is simply a fact that Sanderson uses in his argument. It is something he wants the reader to believe, but it is not something he is arguing for. Regarding the quality of Sanderson's argument, saying only "I don't like his argument" is insufficient; it doesn't go deep enough. This kind of answer is just opinion. To go deeper, the opinion should be backed up by reasons. The weakest part of Sanderson's argument is that he isn't giving us good enough reasons to believe his conclusion. He makes the relevant comment that news occupies only nine minutes out of thirty. He then suggests that you cannot "do much in nine minutes," and he evidently thinks this comment is a reason to believe his conclusion, but by itself it is weak. He probably believes it is obvious that nine is brief, but he ought to argue for this. It's not obvious to his opponent, Harris. Harris could respond by saying, "You can do nine minutes' worth of news in nine minutes. What do you want instead, ten minutes?" Sanderson should have mentioned that too much important news is left out in nine minutes and then tried to back up this remark.



A second, common way of expressing an issue is to present it as a question:

Will eating strawberry yogurt cause cancer?

The question also brings out the uncertainty and doesn't take a side. It would be a mistake to say the issue is that eating strawberry yogurt causes cancer. Using only the word "that" destroys the uncertainty and presents only one side of the issue.

The issue is not the same as the topic. The topic is food and health. Topics are more general than issues; issues are more specific than topics. Normally when you find an argument, the issue is whether the argument's conclusion is correct.

—CONCEPT CHECK—

The following sentence shows that the writer is confused about the difference between an issue and a claim:

The issue of whether an oppressive government is better than no government is a claim open to refutation.

What is the best way to rewrite the sentence in order to remove the confusion?

- a. The claim of whether an oppressive government is better than no government is an issue open to refutation.
- b. The issue of whether an oppressive government is better than no government is a refuted claim.
- c. The claim that an oppressive government is better than no government is controversial and open to refutation.
- d. The issue of whether an oppressive government is better than no government is a position open to refutation.

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Our example above used the slippery term “refutation.” If you claim what somebody just said is false, then you aren't refuting their claim; you are simply disagreeing with it. In order to refute it, you'd have to make a successful case that what they said is false. You can't refute someone's claim merely by contradicting it.

————CONCEPT CHECK————

What is the issue in this argument?

You politicians keep arguing that institutions can't be changed when, in fact, they change all the time. Haven't they ever heard of the institution of slavery? It's gone from this continent, isn't it?

- a. Can institutions be changed?
- b. Whether institution of slavery changed.
- c. That institutions can be changed.

11 The topic is oppressive governments. The issue is whether an oppressive government is better than no government. One position on that issue is the claim that an oppressive government actually is better than no government. This claim is controversial. Thus you should select c as the answer to the above question. That answer is the only one that isn't using one of the following terms incorrectly: issue, position, claim.

- d. That institutions can't be changed.

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The notion of an issue is explored more deeply in a later chapter.

What is a Proof?

People often argue in order to prove something. But that word “proof” is a tricky word. There are different standards of proof in different situations. What is required to prove a new theorem in mathematics to the university math professors is different from what is required to prove to your neighbor that you’re sorry to be so late in returning his shovel. Basically, though, a **proof** is a convincing argument, an argument that *should* convince people, not simply that *does* convince them. You prove a statement to other persons if you give them reasons that ought to convince them.

CONCEPT CHECK

Suppose you cannot locate that favorite blue shirt you want to wear. You’ve looked in the closet where you usually keep shirts. You remember washing it at the Laundromat in your apartment building last week. Maybe you hung it back in the closet after that, or maybe you didn’t. You can’t remember. You don’t remember any other time it has been out of the apartment recently. You do remember your worst case of bad memory; last year you were sure your apartment key was on the kitchen table, but then you found it an hour later on a shelf in your refrigerator. But after thinking about this you decide that is very unlikely the shirt loss is because of memory failure. You decide to do a more careful search. You look through each item of clothing in your closet, on the closet floor, and in the drawers in your dresser where you place other clothes. You look a few more places in your apartment. Then you remember that occasionally you hang clothes in the closet on top of other clothes hanging there because you don’t have enough coat hangers. So, you search your closet one more time looking under everything hanging there. Still no shirt. So you conclude, “This proves the shirt was stolen.” You start thinking about your three friends who have been in your apartment since the last time you saw that blue shirt. David was there when you went out for party supplies two days ago and came back an hour later. The shirt would fit him.

A logical reasoner hearing this story might say, “That’s not really a proof,” and this judgment would be correct. What else would it take for you to have a proof the shirt was stolen?

12 Answer (a). A *yes* answer and a *no* answer would be giving opposite answers to this issue.

Indicators

Spotting an argument and assessing whether the argument is any good are two distinct abilities. Usually you use them both at the same time. You don't go looking for arguments without also evaluating them. However, before you can evaluate an argument, you have to identify it, so let's begin with this skill. Detecting arguments can be difficult sometimes, but there are clues to look for. The start of a conclusion is often indicated by the word *therefore*, *so*, or *thus*. In addition to these **conclusion indicators**, the terms *because* and *suppose-that* signal that a reason is coming. Since the technical term for reasons is *premises*, the terms *because* and *suppose-that* are called **premise indicators**. Often, however, arguers are not so helpful, and we readers and listeners have to recognize an argument without any indicator terms. And even when we have indicator terms, we can't rely on them 100%. Those same terms might have other uses. For example, do you see why the conclusion indicator *so* is not working as a conclusion indicator in the following?

Air contains molecules. Dirt does, too. So does water.

There's no argument here, just a sequence of claims. The word *so* is indicating another term in the sequence.

CONCEPT CHECK

Do all strong arguments have two or more premises plus at least one conclusion?

- a. yes b. no

13 It's more likely you lost your shirt in the Laundromat than to a thief in your apartment. You can't have a proof without being sure that the shirt wasn't lost at the Laundromat or on your travels back from there. If you could rule this out, then you'd have a stronger case that it was stolen. Even so, that evidence about the Laundromat is not going to be available to you. Also, for a decent proof you'd need some more direct evidence of a thief, such as a friend telling you he saw David wearing it yesterday, or a neighbor telling you she noticed someone leaving your apartment yesterday carrying a blue shirt. Most probably you'll never get a proof your shirt was stolen even if it was, because having a proof requires having a totally convincing case.

Sometimes the conclusion is stated before the premises, sometimes after the premises, and sometimes embedded in the middle of the premises. Usually sentences are included that are neither premises nor conclusions; they are there for elaboration or for some other purpose, such as to entertain, to describe, to explain, to discount a possible complaint, and so forth.

Here is an example of an argument from authority that contains both kinds of indicator phrases:

Because the encyclopedia says that the whale shark is the biggest fish in the ocean, it follows that the whale shark really is the biggest fish on Earth.

The word *Because* indicates a premise, and the phrase *it follows that* indicates the conclusion. Indicators come before what they indicate. After identifying this argument, you might go on to evaluate it as being fairly strong, but as leaving out the crucial information about whether there are freshwater fish bigger than any fish in the ocean. There aren't.

This table provides more examples of indicator phrases:

14 Answer (b). Some good arguments have only one premise. Here is an example: "Viruses are the simplest life forms on Earth, so that virus you are looking at with your microscope is simpler than other life forms."

Premise Indicators

since

because

for the reason that

assuming

suppose

as indicated by

is implied by

given that

in view of the fact that

for

granted that

one cannot doubt that

Conclusion Indicators

therefore

consequently

thus

this means

so

it follows that

shows that

implies that

proves that

leads me to believe that

hence

in conclusion

for this reason

accordingly

the moral is

means that

we can infer that

as a result

The following phrases are not helpful clues in identifying arguments and analyzing their structure. They are not indicator phrases:

if

on the contrary

yet

and

nevertheless

also

Occasionally words that could be indicators do not function as indicators. Look at the word “since” in this example:

Since November when the inflationary spiral ended, state taxes have been high. State farm subsidies will therefore continue to rise.

This passage does contain an argument, and the conclusion indicator word *therefore* signals the conclusion, but the premise indicator word *since* isn't functioning to indicate a premise. It is working as a time indicator. Because *since* has multiple meanings, you need to determine whether it is functioning as a premise indicator in the particular situation you are looking at. The good news is that when it *is* a sign that some element of an argument is present, it always indicates a premise and never a conclusion.

Notice how different these two arguments are.

She's not here, so she's gone to the supermarket.
 She's not here, since she's gone to the supermarket.

The two arguments have different conclusions, don't they? One of the arguments is much stronger than the other.

—CONCEPT CHECK—

Identify the indicator phrases in the following passage:

I've been in love with you ever since you began going out with my friend Charles. So you shouldn't say no one loves you now that he doesn't love you anymore.

_____15

When you are suspicious that an argument is present in a passage, the best strategy for finding it, besides simply asking the arguer whether they are arguing, is to ask yourself which statements in the passage would be reasonably convincing premises for which other statements.

—CONCEPT CHECK—

Do these passages contain arguments? If so, locate the conclusion. Identify each indicator phrase as being either a conclusion indicator or a premise indicator.



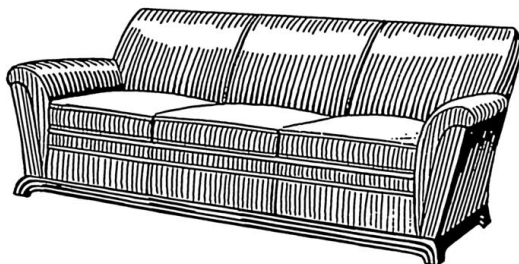
_____15 *So* is a conclusion indicator. *Since* is not operating as a premise indicator.

- a. Never pick up a recently killed rattlesnake, because its nerve reflexes enable it to bite for some time after death.
- b. Never pick up a recently killed rattlesnake. Its nerve reflexes enable it to bite for some time after death.
- c. In a country with a billion people, even if you're a one-in-a-million type guy, there are still a thousand just like you.
- d. Though rare on Earth, plasmas are the most common form of matter in the universe, even more common than gases.

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Discount Indicators

It is very common for passages containing arguments also to contain claims that are neither premises nor conclusions but instead signal the presence of an acknowledgment that some point that might seem to undermine the argument is weak. Here's an example:



16 (a) This is an argument. The conclusion is that (you should) never pick up a recently killed rattlesnake. *Because* is the premise indicator. (b) This is an argument with the same conclusion as in (a). Notice that the word *because* appeared in (a) but not in (b). Consequently, you have to work harder to locate the argument in (b). Good writers use indicator words to show their intentions to the reader. (c) This is not an argument. If there are a billion people, then being one in a million is not very special, is it? (d) This is not an argument. This kind of plasma has nothing to do with blood plasma. Besides solids, liquids, and gases, matter also takes the form of plasmas. A plasma is super-ionized in the sense that every electron has been stripped away from the nucleus. There are no ordinary atoms in a plasma. All stars are made of plasma. So are electric sparks.

Even though that sofa is very expensive, we should buy it anyway because we need one and this one is already here in the apartment we are going to rent.

The expense is a relevant factor. The claim “The sofa is very expensive” is there to discount or de-emphasize this factor which would normally be taken as a reason not to buy the sofa.

The discount claim is not a premise.

Discount indicators point to relevant factors that might be taken to count against the conclusion being drawn, and the discount claim is there to reject it or de-emphasize it. Discounting often increases the psychological persuasiveness of the argument because it shows that the arguer has paid attention to all the relevant factors.

The following terms are frequently used as discount indicators:

even though

I realize that..., but

in spite of the fact that

while it may be true that

Rewriting Arguments in Standard Form

Can you spot the conclusion and premises in this argument?

All machines have a finite working lifetime, and even though that big tree doesn't look like a typical machine it is really just a biological machine; therefore, I believe it will stop working someday, too.

The claim “That big tree doesn't look like a typical machine” is a discount claim. The argument's conclusion is "That big tree will stop working someday," but this sentence does not occur explicitly in the passage. The conclusion is slightly hidden in the words that follow the indicator word *therefore*. We readers have to figure out that the word *it* is referring to "that big tree," and we must also mentally strip away the word *too* and the phrase *I believe*. The reason to remove *I believe* is that it is clear the arguer isn't trying to convince that he or she believes the conclusion, but that the conclusion is true. After appreciating all this, we can give the following more explicit picture of the argument:

All machines have a finite working lifetime.
 That big tree is really just a biological machine.

That big tree will stop working someday.

Creating this clear list with the conclusion below the line is called **rewriting the argument in standard form**. In place of a line, if you add the symbol ‘∴’ before the conclusion, then that is also putting the argument into standard form or standard format.

The argument we’ve been analyzing was originally a single sentence, but this one sentence now has been shown to be composed of four statements, one being a discount claim and the other three being an argument.

The process of transforming an argument into its standard form is like the subconscious mental process that occurs when a logical reasoner "sees the argument" in a passage. Normally, you would take the trouble to display the argument in standard form only when confronted with an especially complicated argument that you must figure out very carefully. Nobody is suggesting that from now on you sit down with the morning newspaper and rewrite all its arguments into standard form. However, trying your hand at rewriting a few simpler arguments will help build up your skill so you can succeed with more complicated arguments when the stakes are higher.

Here is a list of what you should pay attention to when rewriting an argument in standard form:

- List the premises, followed by the conclusion
- Remove extraneous sentences
- Remove indicator phrases
- Replace pronouns with their antecedents if possible
- Draw a line between the premises and the conclusion (or else place a ‘∴’ before the conclusion)
- Add implicit premises
- Remove ambiguity wherever possible
- There is no need to number the premises because premise order should not make any difference

—CONCEPT CHECK—

Rewrite the following explicit argument in standard form. Don’t bother with implicit or unstated assumptions about not doing things that lead to your getting bit.

Even though you might be tempted, never pick up a recently killed rattlesnake, because its nerve reflexes enable it to bite for some time after death.

Conditionals and the Word *If*

The word *if* is not in the list of premise indicator words. You cannot rely on *if* to indicate a premise. In argument A below *if* is followed by a premise, but in argument B it is part of the conclusion.

- A. If, as we know, all men are mortal and Jeremiah is a man, not a god, then he is mortal, too.
- B. If a mercury thermometer is given prolonged heating, it will break. This is because prolonged heating will cause the mercury to expand a great deal. But the thermometer will break apart whenever the mercury expands this much.

Let's examine argument B more carefully. Does it assume that a mercury thermometer is actually given prolonged heating? No; doing so would break the thermometer. Notice also that the conclusion is not that the mercury thermometer will actually break, but only that it will break *if* heated. The conclusion is an if-then statement: *if* the thermometer is heated, then it will break. So, the *if* is not indicating a premise, nor is it indicating a conclusion; it is performing another function.

If-then statements are called **conditional statements** or **conditionals**. A statement can be a conditional even if the companion word *then* is not present. For example:

If the Campbell's Soup Company puts less salt in its soup, sales of Campbell's soup will increase.

Does it follow from this conditional claim that Campbell's Soup Company puts less salt in its soup? No. Is the speaker committed to the claim that sales of Campbell's soup will increase? No, the commitment is only to an increase on the *condition* that the company does something about the salt. That is why conditionals are called "conditionals."

17 It is important to remove the first pronoun from the premise. Here is the standard form of the explicit argument:

The nerve reflexes of a recently killed rattlesnake enable it to bite for some time after death.

You should never pick up a recently killed rattlesnake.

Can you conclude that from the original conditional statement that, if Campbell's sales do not increase, then the company failed to put less salt in its soup? Yes, this conditional statement, called the **contrapositive** of the original statement follows with certainty from the original conditional statement. We will explore contrapositives later.

Conditionals have a **standard form** which is "If A, then B." Often conditionals are expressed in other ways. For example, here is a conditional that contains neither an "if" nor a "then:"

The larger a star the quicker it burns up and dies.

Rewriting it in standard form produces:

If a star is larger, then it burns up and dies quicker.

CONCEPT CHECK



The Governor of Alaska (on left)

Suppose you were to learn for certain that if a person is the governor of Alaska, then he or she is a U.S. citizen. If so, can you be *absolutely sure* that if somebody is not a U.S. citizen, then he or she is *not* the governor of Alaska?

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18 Yes, this is the contrapositive of the original conditional.

Is the following conditional making a true statement about the real world?

If President John F. Kennedy was born in Bangladesh, then he was born in Asia.

Yes, it is true, and it is true even though both the if-part and the then-part are false. There's a big lesson with that example:

The truth of a conditional does not require the truth of its parts.

Later in this book we will explore in more depth the logic of conditionals, that is, reasoning correctly about conditionals.

—CONCEPT CHECK—

Answer "yes" or "no, not always" to these conditional claims:

- a. If it's an apple, then it's a fruit.
- b. If it's a fruit, then it's an apple.
- c. It's an apple if it's a fruit.
- d. It's a fruit if it's an apple.
- e. It's not a fruit if it's not an apple.
- f. It's not an apple if it's not a fruit.
- g. If the current president of the United States were also the leader of Pakistan, then the president would be the leader of an Asian country.
- h. If the tallest building in the U.S. is only 15 feet tall, then there is no building in the U.S. taller than 30 feet.
- i. If Joshua Dicker or his dad, Stuart, are invited, then Joshua Dicker's dad is invited.

19 (a) yes (b) no (c) no (d) yes (e) no (f) yes (g) yes (h) yes (i) no. In (i), if the *or* were *and*, then the answer would be yes.

Deductively Valid and Inductively Strong

The primary goal in argumentation is for the conclusion to follow from its basic premises either with certainty or with high probability. Technically, this means the arguer desires the argument to be deductively valid or to be inductively strong.

The concept of deductive validity can be given alternative definitions to help you grasp the concept. Below are five definitions. It is common to drop the word *deductive* from the term *deductively valid*:

An argument is **valid** if the truth of its basic premises force the conclusion to be true.

An argument is **valid** if it would be inconsistent for its basic premises to be true and its conclusion to be false.

An argument is **valid** if its conclusion follows with certainty from its basic premises.

An argument is **valid** if the conclusion would be true whenever the basic premises were true.

An argument is **valid** if it has no counterexample, that is, a possible situation that makes the premises true and the conclusion false.



This argument is valid:

All emeralds are green.

The stone placed in the safe deposit box is an emerald.

So, the stone placed in the safe deposit box is green.

Here is a similar argument that is not valid:

All emeralds are green.
 The stone placed in the safe deposit box is green.
 So, the stone placed in the safe deposit box is an emerald.

That last argument has a counterexample. You can imagine a situation where all emeralds are green and the stone placed in the safe deposit box is green jade. That's a situation where the premises are true but the conclusion isn't.

An argument that is not valid is called **invalid** or **deductively invalid**. In **deductive arguments**, the arguer intends for the argument to meet the standard of being deductively valid. In **inductive arguments**, the arguer intends the argument to satisfy another standard, that the conclusion follow with high probability but not certainty from the basic premises. If it does, the argument is said to be **inductively strong**. Inductive strength is a matter of degree, unlike with deductive validity. The distinction between deductive and inductive argumentation was first noticed by Aristotle (384-322 BCE) in ancient Greece.

When we study inductive arguments in later chapters we will see that an inductive argument can be affected by acquiring new premises (evidence), but a deductive argument cannot be. For example, this is a reasonably strong inductive argument:

Today John said he likes Romina.
 So John likes Romina today.

but its strength is changed radically when we add this premise:

John told Felipe today that he didn't really like Romina.

With inductively strong arguments there is a small probability that the conclusion is false if the premises are true, unlike with deductively valid arguments.

Several later chapters are devoted to exploring deductive validity and inductive strength, but it is important to note that even if your argument is deductively valid or is inductively strong, it won't succeed in convincing people of your conclusion unless they know that its premises are true. If you are a critical thinker who doesn't know whether one of the premises are true, then you will suspend judgment (about whether the argument is successful) until you find out whether the premises are true.

Uncovering Implicit Premises

Reasoners often leave parts of their reasoning unstated. Emilio left something unsaid when he argued that "if the stream were poisonous, everything in it would look dead. There are water spiders and plants in the stream. It's no death trap." Emilio meant for Juanita and you to assume that the water spiders and plants in the stream are not dead. He just didn't say so explicitly. It was too obvious.

Implicit premises are the unstated claims or unstated assumptions of the argument. For instance, suppose a biologist argues that there is nothing ethically wrong in the fact that about thirteen animals per day are killed in her laboratory, because the deaths further her scientific research. In this argument, she uses the unstated assumption that if something done to animals furthers someone's scientific research then it is not ethically wrong. In this case, by exposing the implicit premise we analysts can get a clearer idea of what sort of reasoning is going on. How did we figure out which assumption she was making? We mentally noted that with this assumption the argument would be deductively valid, and so we used the principle of charity and said this is what she must have been assuming. Of course we could be wrong. To know for sure what she is assuming, we would have had to ask her.

Let's talk about directions. Is New York to the right of Chicago? Or would you say it's to the left? If you think about what you know of U.S. geography, this isn't a difficult question. Chicago is in the interior of the U.S., and New York is on the Atlantic Coast, the East Coast.

New York is east of Chicago, but how about right of Chicago? That's not quite the same thing, is it?

Whether New York is to the right depends on what you can safely assume about your perspective. The answer is "Yes, it's to the right" if you can safely assume directions are to be judged by someone above the U.S. and looking north and down onto Earth because from that perspective the directions of east and right are the same direction.

But suppose you make a different assumption. If you were standing on the North Pole, you'd say New York is left of Chicago. If you were standing inside the Earth at its center, you'd say the same, but it would be very odd to assume that the judgment is to be made from either of these perspectives.

So, the bottom line here is that it's correct to say New York is to the right of Chicago if you make the normal assumptions about perspective.

Critical thinkers are charitable and not overly picky; they always pay attention to what assumptions are appropriate for the situation. But they aren't so charitable that they overlook

significant errors. Some arguments require making an assumption that really is not acceptable, and this is a sign that the argument is faulty or fallacious.²⁰

Common sense assumptions are almost always safe assumptions. These are the common beliefs shared by nearly every adult in your civilization. Here are some more examples:

- rain is wetter than dust
- you shouldn't stick a knife in your eye
- sons are younger than their fathers
- a week is longer than a minute
- mountains are too heavy to carry in your pocket
- the U.S. has a president, not a king.

When an argument relies on an assumption that is part of common sense or common background beliefs or what you can see right in front of you, the assumption is normally left implicit in the conversation. Why bother stating the obvious?

Here is a definition of implicit premise. Look for the word "intended."

Definition An **implicit premise** of an argument is a statement that does not appear explicitly but that is intended by the arguer to be a premise to help make the conclusion follow from the premises.

The phrase *intended. . .to help* in this definition is important. It plays a crucial role in identifying the implicit premise. Notice how you immediately think about the author's intentions when you hear this argument:

Tantalum can be melted, too, because all metals can be melted if you raise their temperature enough.

²⁰ These two words say about the same thing: *faulty, fallacious*.



melted tantalum

Choose the implicit premise from the following list:

- a. Some metals melt.
- b. Tantalum can be melted if all metals can.
- c. Tantalum is not a metal.
- d. Tantalum is a metal.
- e. All metals melt.

Not everything the arguer believes at the time counts as a premise in the argument, only the beliefs needed to make the conclusion follow--with certainty or with probability. For example, the arguer undoubtedly believes statement (a) – that some metals melt – but the arguer is not assuming this in order to get her conclusion to follow from her premises. Instead, she needs to assume that tantalum is a metal. With this premise, her argument is deductively valid. Without the implicit premise, her argument is deductively invalid. So, the answer is (d), not (a). Here is her deductively valid argument rewritten in a format that makes it easier to see all at once, with premises above the line and conclusion below the line:

All metals can be melted if you raise their temperature enough.

Tantalum is a metal. (implicit premise)

Tantalum can be melted.

The argument is now more clearly deductively valid, thanks to your detective work at uncovering the author's intentions about what is being assumed.

Arguments don't come to us with labels as being deductive or inductive. We who are trying to understand an argument will look to see if the argument meets either standard, being deductively valid or being inductively strong, and we will look for implicit premises that are needed for the argument to meet that standard. For example, do this with the inductive argument in this concept check.

—CONCEPT CHECK—

What is the missing premise in this passage?

Most soft minerals will make a compound with tantalum, so baxalite will, too.

—21

The most common implicit premises are definitions of words, principles of grammar, rules of semantics²², theorems of mathematics, and the commonly held beliefs of our civilization. We might argue that because Dwayne loves Jesus, Jesus is loved by Dwayne. This deductively valid argument depends on a grammatical principle about passive voice transformation that we rarely need to spell out. Everybody who speaks English can follow the inference, even though few of us could actually write down the grammatical and semantical rules of our own language.

There is another important, implicit assumption in the above argument. The word *Dwayne* names the same person throughout the argument. If we violate this assumption or tentative agreement among speakers, then we are said to be **equivocating**. A writer who bothered to explicitly remind us of this fact about the word *Dwayne* would be cluttering up the argument with too many details.

Many jokes turn on who holds what assumption. In the following joke, Suzanne says essentially that one of Jack's assumptions is mistaken:

Jack: Get those drugs out of this house; nobody is going to risk my daughter's sanity.

Suzanne: You can't risk what's not there, Jack.

21 Implicit premise: Baxalite is a soft mineral.

22 This book does not emphasize your knowing the difference between grammar and semantics. "He him ignored" contains a grammar error. The grammatically correct sentence, "He ignored yesterday who is knocking at the door tomorrow," contains a semantic error because it violates the meaning of words about time.

CONCEPT CHECK

If you understood that joke, then you saw that (pick one):

- a. Jack assumed that his daughter is sane.
- b. Jack assumed that Suzanne is insane.
- c. Suzanne assumed that Jack's daughter is sane.
- d. Jack assumed that Suzanne's daughter is insane.
- e. Suzanne assumed that Jack is insane.

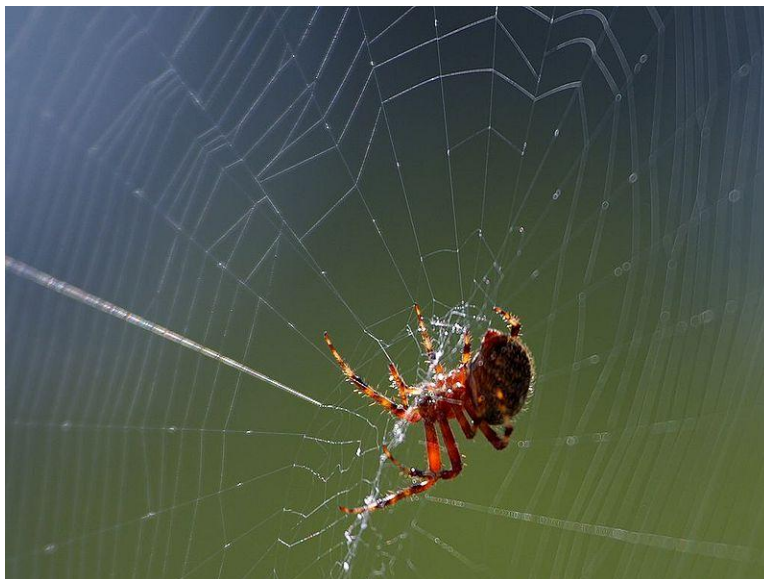
23

Locating Unstated Conclusions

Just as we detect missing premises by using our knowledge of indicator terms and of what is needed for deductive validity and inductive strength, so we can also use that knowledge to detect missing conclusions. What is the **implicit conclusion** in the following argument?

All insects have exactly six legs, but all spiders have exactly eight legs, so now what do we know about whether spiders are insects?

You, the reader have to figure out the conclusion for yourself: that spiders are not insects.



People who are unwilling to do this detective work and are insensitive to the implicit elements in reasoning will miss the point of many passages, as we will see in the following concept check.

—CONCEPT CHECK—

What is the implicit conclusion you are supposed to draw in the following joke?

My father had a lot of patience with me when I was growing up. Whenever he got mad at me he would slowly count to ten. Then he'd lift my head out of the water.

- a. All people have fathers.
- b. My father had a lot of patience with me when I was growing up.
- c. My father was impatient with me when I was growing up.
- d. My father would lift my head out of the water after a slow count to twenty.

—24

Unstated premises are very common. Unstated conclusions are less common and more difficult to uncover. If you were presented with the following conditional and knew nothing else, then it wouldn't be an argument. It would just be a claim. But let's suppose you can tell from the

24 The argument is an indirect way of saying my father was impatient, so the answer is (c).

background situation that an argument is intended. If so, what's the conclusion and the key missing premise?

If it looks like a duck, walks like a duck, and quacks like a duck, then it's a duck.



The unstated conclusion is that it's a duck. All you have explicitly is one premise. The other premise is that it does look like a duck, walk like a duck, and quack like a duck.

What is the unstated conclusion you are supposed to draw from the following piece of reasoning about the topic of white people and government funding of the space program?



I can't feed my kids, and whitey's on the moon. Rats bit my little sister. Her leg is swelling, and whitey's on the moon. The rent is going up. Drug addicts are moving in, and whitey's on the moon.

The unstated conclusion is that the government's spending priorities need revision; there should be less emphasis on funding the space program and more on doing something about poverty, health, and drug addicts. It can be very difficult to distinguish a jumble of statements from a group of statements intended to have a conclusion that you draw yourself. There is no mechanical way of telling which is which. However, it can be done, and in this group of statements about whitey on the moon, no one would have said them this way unless they expected you the reader to draw an obvious conclusion about the government's spending priorities.

Occasionally a clever (diabolical?) speaker, will present all sorts of reasons for drawing an obvious conclusion but will never quite draw that conclusion for you. The speaker is disguising an argument. On the other hand, the speaker could get defensive and say, "I didn't make that argument, you did." Speakers who are good with innuendo do this to you.

When you are in that situation and faced with some statements that could constitute an argument with an implicit conclusion, but maybe do not, then how do you tell whether you have an argument or merely a group of statements from which you are to draw your own conclusions and thus create your own argument? There is no simple answer to this question; it is a matter of the delicate application of the principle of fidelity. If it should be clear what conclusion the writer hopes you will draw, then there is an argument; if not, there is no argument.

Detecting Obscure Argumentation

It takes detective skills to detect the essence of an argument among all the irrelevant remarks that people make while they argue. Speaking of detective skills, I was 14 years old when my mother, a second-string member of the Folies Bergère dance group in Paris, was dancing for the French Foreign Legion in Morocco. She left me with Mathilde, an indifferent governess and a veteran of the French Resistance. It was a dark and stormy night in Paris when Mathilde came up behind me, reached into my shirt, and.... But I've gotten off the subject, haven't I?

——CONCEPT CHECK——



photo by Fernando de Sousa, Melbourne, Australia

Two people are sitting in a dark movie theater a row behind you. They are trying to get you to draw a conclusion without expressing it directly. What conclusion?

Man: Do you have the two snakes we brought in with us?

Woman: No, I thought you had them.

Man: Oh!

25

Another difficulty in spotting arguments is that they can differ greatly in their structure. Instead of backing up a conclusion by only one package of reasons, an arguer might give a variety of lines of argument for the conclusion. That is, the arguer could produce two or more sets of reasons in support of the conclusion, and might even add why the opposition's argument contains errors. Jones did this in our earlier courtroom story. He gave a set of reasons for acquittal by arguing that there is an alternative explanation of all the facts. In addition, he argued that the prosecution's strong reliance on the clerk's testimony is no good because the clerk stole from her sorority.

Arguments can have other complexities, too. Often arguers defend one or more of their reasons with reasons for those reasons, and even reasons for those reasons, and so forth. An arguer may

25 Snakes have gotten loose near you in the theater.

simultaneously argue for several conclusions, or draw a second conclusion from a first conclusion. So the structure of an argument can become quite complex. However, just as molecules are composed of atoms, so complex arguments are composed of "atomic" arguments, each with its own single conclusion and basic reasons to back it up. Breaking down complex arguments into their simpler elements in this way can make the complex arguments understandable.

Mathematics can contain obscure arguments. Math professors who create a proof rarely state every step in their proof. However, if the argument is correct, then the reasoning from any one step to another can be reconstructed as a deductively valid argument. For math experts, the reconstruction process is easier than for the rest of us.

In mathematical reasoning, it is customary to assume implicitly all the principles of mathematics you need to carry out the reasoning.

Here is an interesting dialogue that contains an obscure argument. Evidently this dialogue occurred several centuries ago.



King: I told you to bring me a head of a witch, and you've given me the head of a necromancer.

Executioner: The Inquisition has declared that all necromancers are witches.

King: Oh, all right then.

By saying, "Oh, all right then," the king infers that he has in fact been given the head of a witch. In his reasoning, he uses the following deductively valid, but implicit, sub-argument:

All necromancers are witches.

All heads of necromancers are heads of witches.

If you were asked whether the statement "she probably won't be here to chair the meeting" is a premise or a conclusion in the following argument, the right response would be to say "Both" because it is a basic premise, but it is also argued for.

She's got the flu again, so she probably won't be here to chair the meeting. Therefore, I'll have to do it. Damn!

The word *so* is a conclusion indicator of the sub-conclusion, and the word *therefore* is a conclusion indicator of the final conclusion, or last conclusion. Here are the two arguments:

She's got the flu again.
So, she probably won't be here to chair the meeting.

She probably won't be here to chair the meeting.
So, I'll have to chair the meeting.

—CONCEPT CHECK—

The word *so* is a conclusion indicator in the following passage. Is it an indicator of the final conclusion or only of a sub-conclusion on the way to the final conclusion?

It's safe to conclude that all the patients given the AIDS antidote now have red hair. Remember, Janelle had red hair before the experiment, and there has been no change in her hair color; Rudy has fairly red hair; and Sam's hair has now changed to red, hasn't it? So, all three have red hair. But these three are the only patients that were given the AIDS antidote.

_____26

Diagramming Multiple Arguments

26 Sub-conclusion. This sub-conclusion is a basic premise for the final conclusion that all the patients given the AIDS antidote now have red hair.

The multiple argumentation in the following passage has a more complex structure than the argumentation in the flu passage:

The children's book *The Wizard of Oz* is objectionable because it portrays witches as good. [The evidence is that] the Witch of the North was called the "Good Witch Glinda" in an early chapter, and Witch Glinda helped the heroine Dorothy find her way back to Kansas.

To see the big picture of the structure of the argumentation, it can be helpful to build a diagram that uses letters or numbers or a word to abbreviate its claims. Let's work on one part of the passage, the reasoning for the conclusion that the book portrays witches as good. Call this conclusion (C₁).

(C₁) The children's book *The Wizard of Oz* portrays witches as good.

This conclusion is supported by two basic reasons:

- (1) The witch is called "good"
- (2) The witch helps the heroine Dorothy.

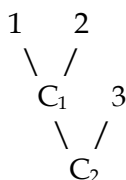
Then there is the bigger picture, the author's bigger conclusion

(C₂) The children's book *The Wizard of Oz* is objectionable.

That conclusion is supported by C₁ (which now becomes a basic premise for C₂) plus the following basic, implicit premise:

- (3) Anything that portrays witches as good is objectionable.

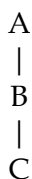
We might draw a picture of the relationship among all those statements this way, with lines going down from premises to their conclusion:



We readers quickly "get" this structure in our minds when we read the passage, but it would be the rare person who bothered to stop and write it down explicitly this way. You'd do that only if it were important to stop and analyze the passage, usually because the argument's structure is so complicated that you can't keep it in mind.

These diagrams are called **tree diagrams** because they look a bit like an upside down tree with the roots at the beginning tips. C₁ is a conclusion but not the final conclusion. We call it an **intermediate conclusion**.

Let's try to build a tree diagram for the argumentation about getting the flu and chairing the meeting. Here it is:



The letters represent statements used in the argumentation:

A = She's got the flu again.

B = She probably won't be here to chair the meeting.

C = I'll have to chair the meeting.

C is the final conclusion. B is an intermediate conclusion.

In that tree diagram²⁷, the downwardly-pointing line goes from a premise from its immediate conclusion. The premise is always higher than the conclusion it is supporting. In this particular diagram about the flu all the lines happen to point straight down, but that is not required. In other diagrams they might go off at an angle. The angle of the line is irrelevant as long as the line goes down from premise to conclusion. Horizontal lines are not allowed. You are welcome to use an arrow instead of a line.

The line's length is irrelevant. And no importance is given to which premise is on the left or right. So, the following two diagrams are equivalent diagrams:



But they are different from this diagram:



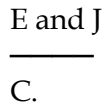
²⁷ The method of displaying the support relationship between premises and conclusions is called *tree diagramming* because the structure is like a tree in mathematical graph theory, and it's a little bit like a tree in real life. However, because a premise may directly support more than one conclusion, the diagram is mathematically a lattice rather than a tree. It's only because the term *tree* is more familiar than *lattice*, that this book has adopted the name *tree diagram*.



The reason why the third is do different is that B is an intermediate conclusion in the first two diagrams but not in the third.

————CONCEPT CHECK————

Draw the diagram of the following argument form:



Don't worry about which statements the capital letters represent.

————28

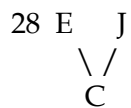
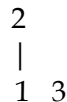
Let's diagram another example, an argument about whales:

All whales have backbones; my biology teacher said so. Therefore, Humphrey has a backbone, too.

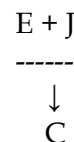
We first need to apply the principle of charity to spot the unstated assumption that Humphrey is a whale. Without that assumption, this would be a terrible argument, which it isn't. Now, let's pick arbitrary labels for the key statements:

- (1) All whales have backbones.
- (2) My biology teacher said that all whales have backbones.
- (3) Humphrey is a whale.
- (4) Humphrey has a backbone.

The correct tree diagram for this argument is



You might wish to diagram it this way if you know that E and J don't give separate reasons in support of C.



$$\begin{array}{c} \backslash / \\ 4 \end{array}$$

If you had two arguments that had nothing to do with each other, then you would not connect them and instead would use two separate diagrams.

If an argument contains a conditional, you can diagram the conditional in either of two ways. Let's use the schematic conditional "If A then B," and call this sentence 8. You can diagram this as simply 8, or you can diagram it this way:

$$\begin{array}{c} A \\ | \\ B \end{array}$$

————CONCEPT CHECK————

Can you fill in the nodes (labels) by replacing the question marks? Two nodes are completed.

If (1) Svetlana wants to get a higher GPA, then (2) she had better cut back on her work hours or her party time.

(3) Rolando told Kevin who told me that she does want to do what it takes to get a higher GPA, so I'd say (4) she really does.

(5) There's no way she can cut back on her work hours if (6) she's going to pay to stay in school, but (7) she's got to pay for this.

So, (8) she'll be cutting back on her party time.

$$\begin{array}{c} ? \\ | \\ ? \quad ? \\ | \quad | \\ 1 \quad 6 \\ | \quad | \\ ? \quad ? \\ \backslash \quad / \\ ? \end{array}$$

————29

29 Try to avoid looking at the answer until you've worked this concept check. Answer:

$$\begin{array}{c} 3 \\ | \end{array}$$

If a sentence is a negation, you might put the NOT in your diagram if this helps you picture the multiple argumentation. For example, suppose your argument contains the sentence, "Defense spending is not going to be significantly reduced." You might label this sentence as "D" and diagram the sentence as "D." Or you might diagram it with a more descriptive phrase as

NOT REDUCED

where your word "REDUCED" abbreviates "Defense spending is going to be significantly reduced." This way, "NOT REDUCED" abbreviates "Defense spending isn't going to be significantly reduced." You can use whatever definitions and symbols you believe will help to reveal the structure you want to reveal in your diagram. Some people like to use words; others prefer numbers or letters.

Let's work on one more complicated passage by drawing a tree diagram of the premise-conclusion relationships for the following argument. The sentences are already numbered.

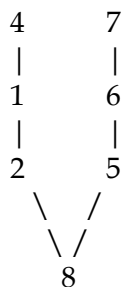
(1) If defense spending were going to be significantly reduced, then the value of the dollar against the German mark would increase. (2) The defense spending would have that effect because the U.S. balance of payments and national debt would be improved if defense spending were significantly reduced. (3) Also, if the balance of payments and national debt were improved, the value of the dollar against the German mark would increase. (4) However, we know that defense spending is not going to be significantly reduced, so the value of the dollar against the German mark won't increase.

This is complicated enough that it really helps to draw the diagram. We might use the following abbreviations:

REDUCED = Defense spending is significantly reduced.

INCREASE = The value of the dollar against the German mark increases.

IMPROVED = The U.S. balance of payments and national debt is improved.



Note the change to present tense in the abbreviated sentences; this is acceptable because tense is not important in this argument.

One important step in answering this question is to discover the logical forms of the component sentences of the argument. The statement

The conditional (1) is

If defense spending were going to be significantly reduced, then the value of the dollar against the German mark would increase.

It has the logical form.

If REDUCED, then INCREASE.

Therefore, the sentence (2) has this logical form:

If REDUCED, then INCREASE because

IMPROVED, if REDUCED.

Note that the premise of this sub-argument is equivalent to

If REDUCED, then IMPROVED.

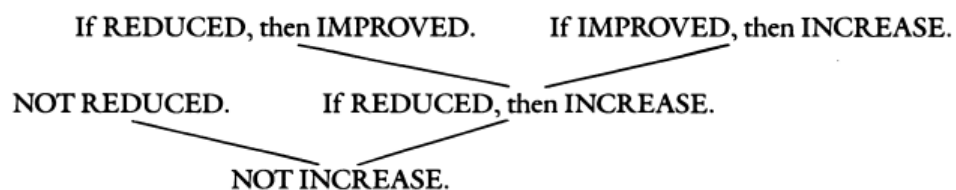
The third sentence, "Also, if the balance of payments and national debt were improved, the value of the dollar against the German mark would increase," has this form:

If IMPROVED, then INCREASE.

The fourth is

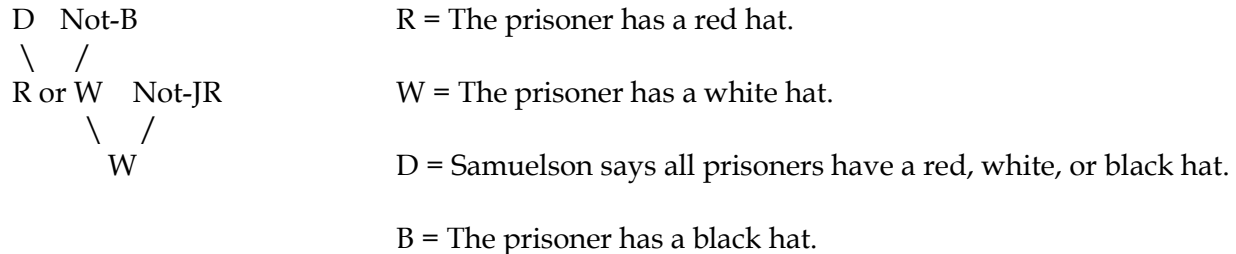
NOT REDUCED, so NOT INCREASE.

In the complete diagram of the argument, the lines go down from premises to conclusion as follows:



So far we have taken arguments and produced its tree diagram. Now let's reverse the order and go from the diagram to the English.

Given the following tree diagram, let's rewrite the argumentation in decent English, being careful to add helpful indicator words.



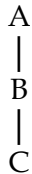
Here is the English. The prisoner must have a white hat for the following reasons. Samuelson says all prisoners have a red, white, or black hat. But we already know that the prisoner's hat isn't black. Therefore, the hat is red or white. However, we also know the prisoner's hat isn't red. So, it's got to be white.

Arguments have even stranger structures than any we've seen so far. A premise might be used to draw more than one immediate conclusion, in which case there would be more than one line descending from that premise in the tree diagram. A weather report might say, "It is raining there," and from this statement you might draw these two conclusions: "It's cloudy there. Also, most of the trees' leaves are wet there." A correct tree diagram for this piece of reasoning would look like this:

A = It is raining there.
 B = It is cloudy there.
 C = Most of the trees' leaves are wet there.



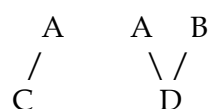
Here is an incorrect tree diagram for the same piece of reasoning.



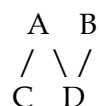
It is incorrect because it falsely suggests that B is stated as a reason to believe C.

Let's examine a slightly more complicated example of reasoning that introduces a new kind of tree diagram. Suppose a fire inspector for an insurance company learns that (A) your apartment building burned down yesterday and that (B) a well-known arsonist, Jerry Lee, was arrested for speeding in a direction away from your apartment building about five minutes after the fire started. On the basis of this information, the fire inspector might say, "I'll bet (C) the building's landlord will soon be filing a claim against our company, and (D) Jerry Lee is the best suspect to question first." Notice that although C and D are two conclusions, C isn't the reason she gives for D, and D isn't the reason she gives for C.

Instead, there are two arguments:



The two could be combined as



Descriptions and Explanations

Language is a tool we can use for many purposes. We use it to describe a situation, to explain why an event occurred, and to argue that our conclusion should be believed. But we also use it to intimidate, to promise, to perform marriages, to forgive, to apologize, and to insult. However, most of our reasoning occurs when we use language to describe, explain, or argue, which is why this book concentrates on these uses. Here is a quick summary of the differences:

- A description says that it's like that.
- An explanation says how it came to be like that.
- An argument tries to convince you that it is like that.

Arguments aim at convincing you that something is so or that something should be done. Explanations don't. They assume you are already convinced, and they try to show the cause, the motivation, or the sequence of events that led up to it.

Explanations of events often indicate the forces or causes that made the event occur. In the case of events that are human actions, such as Dwayne's unscrewing the lid on a jar of peanut butter, the explanation of Dwayne's action might appeal to his intentions, such as that he wanted to

satisfy his hunger. Intentions are mental causes, not physical causes. In one of the last chapters of this book, we will explore the details of causal explanations.

—CONCEPT CHECK—

Is this an argument or an explanation?

Let me explain myself more clearly. The car will explode if you drop the match into the gas tank. You don't want that, do you? So, don't drop the match in there.

—30

To appreciate the difference between a description and an explanation, consider one of the current limits of medical science. Scientists do not know what causes pimples, but they do have a clear understanding of what pimples are. That is, they can provide a detailed description of pimples, but they can offer no explanation of why some people get them and some do not. Scientists can describe but not explain.

When we explain, we normally explain events, not persons or objects. Historians don't explain Napoleon. They explain why he did what he did.

Arguments are different still. An argument is designed to convince someone to do something or to believe something, which it does by giving specific reasons. For example, we could argue that Napoleon became emperor of France because history professors say so. Notice that this argument doesn't describe the event (of Napoleon's becoming emperor of France) or explain it. The argument simply gives a reason to believe that it occurred.

The main goal in a good argument is for the conclusion to follow from the premises.

Although descriptions need not be explanations, and although arguments are different from both, in real life they get jumbled together. This is fine; we don't often need them to occur in their pure form. However, it's hard to appreciate all that is going on in a jumbled whole unless we appreciate the parts.

30 This is an argument for the conclusion that you should not drop the match in the gas tank. The speaker misused the word "explain." Instead of using the phrase, "explain myself," the speaker should have said, "spell out my argument."

CONCEPT CHECK

Below, say which is the argument, which is the description, and which is the explanation.

- a. It's raining cats and dogs. If we go on the picnic today, we will get really wet, and probably be unhappy.
- b. We shouldn't go on the picnic because we will get really wet and probably be unhappy.
- c. It's raining cats and dogs there at the picnic area because the thunderstorm finally blew in from the North.

³¹

If Betsy Ross says, "The new flag I designed has red and white stripes with thirteen stars," is she explaining the flag? No, she is just describing it. She is not explaining where the flag came from or what motivated her to make it. Nor is she arguing about it. However, if Betsy Ross says something a little more elaborate, such as "The new flag I designed has red and white stripes with thirteen stars for the thirteen new states," she is describing the flag and also explaining why it has thirteen stars instead of some other number.

³¹ (a) description, (b) argument, (c) explanation. The word "because" appears in both the argument and the explanation, which should tell you that the word "because" is not a reliable indicator of whether an argument or an explanation is present. However, if an argument is present, then the word "because" indicates a premise; but if an explanation is present, then the word "because" probably indicates a cause or motive.



If Betsy Ross says, "I designed the flag because I wanted to help our new nation," she is only explaining why she designed it; she is not arguing that she designed it, nor is she describing the flag.

Couldn't you say that when Betsy Ross says, "The new flag I designed has red and white stripes with thirteen stars" she is explaining what the flag is like? Well, people do say this, but they are being sloppy. She is just describing.

—CONCEPT CHECK—

Is the following passage most probably an argument, an explanation, or a description?

The most striking thing about Beijing, indeed about all of China, is that there are people everywhere. You need to imagine yourself in a never-ending Macy's sale. There are lines to everything. You have to get in a line to find out which line to be in.³²

³³

³² From Cheri Smith, *Suttertown News*, Sacramento, CA, March 19, 1987.

There are several good reasons to learn to distinguish arguments from explanations. You would be wasting your time explaining what caused some event if the person you were speaking to did not believe the event ever occurred. Instead, you should be directing your comments to arguing that the event did occur. Or, suppose you take an author to be arguing when in fact she is explaining. If you complain to yourself about the quality of her argument and dismiss her passage as unconvincing, you will have failed to get the explanation that is successfully communicated to other readers of the same passage.

An argument and an explanation are different because speakers present them with different intentions. Arguments are intended to establish their conclusion. Explanations aren't. They are intended to provide the motivation of the actor or the cause of whatever it is that is being explained.

—CONCEPT CHECK—

For each passage, indicate whether it is most probably an argument, an explanation, or a description.

- a. The apple fell because the drying stem was no longer strong enough to resist the weight of the apple.
- b. You should eat an apple a day because doing so will keep the doctor away.

_____34

Suppose you and your friend Edward are standing in an apple orchard looking at an apple that just fell to the ground in front of you. Edward, who is a scientist, explains that the apple fell because the force of gravity pulling down on the apple caused tension in the apple stem and eventually broke it once the stem had dried out and got brittle; gravity then was able to pull the

33 It is most probably only a description. It is at *least* a description because it describes Beijing as being a crowded city containing many lines. Nothing is explained. There is no explanation of why Beijing has so many people, or why it has so many lines. You might try to conceive of the passage as being an argument for the conclusion that Beijing is crowded and has lines, but no reasons are given in defense of this claim. It probably would be a mistake to say the passage uses the reason that Beijing has many lines to conclude that it is crowded. This would probably be a mistake, because the comments about lines seem to be there to illustrate or describe in more detail the crowded nature of the city, not to make a case for the claim that the city is crowded.

34 (a) This is an explanation of the apple's falling, (b) This is an argument concluding that you should eat an apple a day.

apple toward the center of the Earth until the resistance of the ground stopped the fall. His explanation is not an argument that the apple fell. It is taken for granted that the event occurred; what's in doubt is why it occurred. When Edward appeals to the existence of gravitational force and to the structural weakness of the apple's stem to explain why the apple fell, he is giving a possible explanation of why it happened, perhaps even the right explanation. Nevertheless, he doesn't defend his explanation. He doesn't argue that his is the right explanation. He doesn't give any reasons why the apple's falling should be explained this way instead of by saying that "It was the apple's time" or by appealing to magnetic attraction between the apple and the iron core at the center of the earth.



Let's now investigate how to distinguish explanations from arguments when they are jumbled together. You create both when you explain why event E occurred and then argue for why this explanation of E is better than alternative explanations. For example, articles in science journals are often devoted to arguing that one explanation of a phenomenon is better than a previously suggested explanation. Sometimes arguments are offered as to why someone's explanation of an event is the right one, and sometimes the argument is intermixed with the explanation. Nevertheless, the argument and the explanation are distinct, not identical. Even if an argument does not accompany the explanation, every scientist who claims to offer the explanation of some event has the burden of proving this claim by providing that argument if challenged.

CONCEPT CHECK

You remember the dinosaurs, don't you? They appeared on Earth back in the day when New Jersey was next to Morocco. Construct an argument for the fact that dinosaurs became extinct 65 million years ago without explaining that fact. According to the theory of evolution, this is approximately the time that the Rocky Mountains and European Alps were created. And it was at about this time that the world got its first plants with flowers. (Don't worry too much about the quality of the argument; just make sure that it is an argument and not an explanation.)

35



*A velociraptor*³⁶

CONCEPT CHECK

35 Argument: The experts in geology and biology confirm this, and they generally agree among themselves, except for a few lone wolves such as the creationists. That was not an explanation.

36 This photo from Wikipedia Commons Graphics is licensed under the Creative Commons Attribution 3.0 Unported license to Salvatore Rabito Alcón.

Construct an explanation, but not an argument, for the fact that dinosaurs became extinct 65 million years ago. (Don't worry too much about the quality of the explanation; just make sure that it is an explanation and not an argument.)

 37

Review of Major Points

We briefly explored the differences among descriptions, arguments, and explanations. Descriptions state the facts, report on states of mind, express values, and so forth. Arguments aim at convincing you that something is so or that something should be done. Explanations don't. They assume you are already convinced and instead try to show the cause, the motivation, or the sequence of events that led up to it. We noted that some arguments are strong enough to be called proofs.

Premise and conclusion indicator phrases serve as guideposts for detecting arguments. Almost all arguments have some implicit elements. The most common implicit premises are definitions of words, principles of grammar, and rules of mathematics. Rewriting arguments in standard form is a helpful way to display their essential content. Arguments can have quite complex structure; for example, there are often sub-arguments within longer arguments. Drawing tree diagrams can help display this structure.

Arguments can be evaluated as being deductively valid or inductively strong. With inductively strong arguments there is a small probability that the conclusion is false if the premises are true, unlike with deductively valid arguments.

Glossary

argument A conclusion plus one or more basic premises.

basic premises The basic premises for a conclusion are those premises that directly support the conclusion rather than indirectly support it. Indirect premises are premises in support of other premises, such as those in support of the basic premises.

conclusion indicators Words or phrases that signal the presence of conclusions but not premises. Examples: So, therefore, thus, it follows that.

37 A six-mile-wide rock crashed into our planet 65 million years ago, knocking up so much dust that the planet was dark for about a month. During this month the weather turned very cold, and the dinosaurs' main food died. The dinosaurs could not quickly adapt to the new conditions, and they died. (The air sure must have smelled bad that month!)

conditional statement An if-then statement. An assertion that the then-clause holds on the condition that the if-clause holds.

counterexample to an argument a possible situation that makes the premises true and the conclusion false. A possible situation is a logically possible one. A situation in which half of my ancestors died childless is not a possible situation.

deductive argument An argument intended to meet the standard of being deductively valid. [Later chapters are devoted to deductive and inductive argumentation.]

deductively valid An argument is deductively valid if its conclusion follows with certainty from its basic premises. [This chapter introduced four other, equivalent definitions.]

description A statement or sequence of statements that characterize what is described. Descriptions state the facts, report on states of mind, make value judgments or explain the situation. A pure description does not argue.

discount indicator A term in an argument that indicates the presence of a claim that discounts or de-emphasizes a relevant factor. That claim is neither a premise nor a conclusion.

equivocating Changing the reference of a term from one occurrence to another within an argument.

explanation A statement or sequence of statements designed to show the cause, the motivation, or the sequence of events leading up to the event that is being explained. Pure explanations do not describe. Nor are they designed to convince you that something is so or that something should be done.

final conclusion In a chain of arguments, the last conclusion, the conclusion that isn't used as a premise.

implicit premise A statement that does not appear explicitly in an argument but that is intended by the arguer to be a premise to help make the conclusion follow from the premises.

imply A statement P implies a statement Q if Q has to be true whenever P is. Informally, speakers might say "P means Q" instead of "P implies Q."

indicator term A conclusion indicator term is a word or phrase in an argument that is usually followed by the conclusion; a premise indicator term is usually followed by a premise.

inductive argument An argument intended to meet the standard of being inductively strong.

inductively strong An argument is inductively strong if the conclusion would be very probably true if the premises were to be true. Inductive strength is a matter of degree.

invalid Not deductively valid. Even strong inductive arguments are deductively invalid.

multiple argumentation A passage containing more than one argument.

premise A claim that is used as a reason in an argument.

premise indicators Words or phrases that signal the presence of premises but not conclusions. Examples: Because, since, for the reason that.

standard form A single argument rewritten with its basic premises above the line and its conclusion below the line. The premises and conclusion should be expressed as complete sentences. Pronouns should be replaced with their antecedents (the nouns themselves) wherever possible. The order of the premises is not important. Indicator words and other fluff words are stripped away. When an argument is in standard form, it is supposed to stand alone with everything significant stated explicitly so that the reader can view the whole argument and understand what it is without needing additional information from the context.

sub-conclusion The conclusion of an argument that occurs among other arguments.

tree diagram A picture of an argument in which lines descend from premises to their conclusion. A tree diagram is a tool intended to represent the details of complicated, multiple argumentation.

Exercises

General Exercises

1. If two people disagree with each other, then one of them is not a critical thinker.

- a. true b. false

■ 2. According to the U.S. Department of Agriculture's Food and Drug Administration, the four major food groups are corn, pork, beer, and Jell-O salad with marshmallows. Which food group is preferred by future Italian diplomats?

- a. corn
b. pork
c. beer
d. Jell-O salad with marshmallows.³⁸

³⁸ You can distinguish a serious question from a joke question, can't you?

3. Ok, you math geniuses, a farmer had 17 sheep, and all but 9 died. Then the farmer was given 2 from his brother but both died. How many of the farmer's sheep were left? [Hint: Not 8.]

4. You can not reduce your electric bill by tying knots in your electric wires to reduce the flow of electricity.

- a. true b. false

5.

Detecting Single, Explicit Arguments

- 1. What is the conclusion indicator term in this argument?

If it rains, then it's a bad time for a picnic. So, we shouldn't go there for a picnic since Svetlana knows it's raining there now. At least that's what she heard.

- a. If
b. Then
c. So
d. We shouldn't go there for a picnic
e. None of the above³⁹

- 2. What is the premise indicator term in this argument?

We already know the solution to Rafael's third math problem is a number which is divisible by 8. I think the answer is probably 32. At any rate, we can suppose that for any number, if it is divisible by 8, then it is divisible by 16. So, the solution to his third problem is divisible by 16. Isn't 32 divisible by 16?

- a. I think
b. at any rate
c. we can suppose that
d. if
e. so⁴⁰

39 Answer (c).

40 Answer (c).

■ 3. Which sentence below probably is *not* being used to make a claim (that is, a statement)?

- a. I wonder if we should turn back.
- b. Financial ruin from medical bills is almost exclusively an American disease.
- c. I learned a long time ago that *minor* surgery is when they do the operation on someone else, not you.
- d. My bumper sticker asks, “Do you believe in love at first sight, or should I drive by again?”⁴¹

4. Identify all the conclusion indicators and premise indicators, if any, in the following passage:

The Philadelphia company’s letter said they would place their call to us here in Los Angeles at 2pm their time. They are in a time zone that is three hours east of us, therefore we should expect their call at 11am our time, but if they don’t call then let’s go to plan B.

■ 5. The sentence below is quite likely

- a. an argument
- b. not an argument

Dynamic Random Access Memory (DRAM) chips were once the popular choice for memory storage on personal computers since, unlike the SRAM chip, they were less expensive per byte and the DRAM design essentially required using only one transistor per bit.⁴²

■ 6. The following passage contains

- a. an argument
- b. a report of an argument
- c. neither

Through a process of trial and error, early people slowly learned that some contaminated food made them sick, while other contaminations improved the flavor, made an exhilarating fruit drink, or helped preserve the food for longer periods of time. In modern times, scientists learned that the contaminations are due to bacteria, yeast, and molds.⁴³

41 Answer (a). Usually declarative sentences are used to make claims, but not always. The declarative sentence “I promised to meet you” is true or false, but the declarative sentence “I promise to meet to” is neither.

42 Answer (a). The conclusion is that dynamic random access memory (DRAM) chips were once the popular choice for memory storage on personal computers. One clue is the premise indicator term *since*.

43 Answer (c).

7. The sentence below is quite likely

- a. an argument b. not an argument

The life of a respected technical professional has few spare moments because there's all that work from running labs to teaching to speaking at colloquiums to writing grant proposals to selling research programs to administrating or managing to maybe even finding a few minutes to think about what to do.

■ 8. Which are the premise indicators in the following list?

if, then, yet, nevertheless, on the contrary, but, thus, suppose that⁴⁴

■ 9. Which are the conclusion indicators in the following list?

if, then, yet, nevertheless, on the contrary, but, thus, suppose that⁴⁵

■ 10. Does this argument contain any premise indicators that are working to indicate premises? If so, identify them.

President Kennedy was smart to have approved of the Bay of Pigs invasion of Cuba in 1961 since he could be reasonably certain the USSR wouldn't physically intervene to help Cuba, and since he wanted to do something that could overthrow the left-wing government that had replaced Cuba's right-wing dictatorship.⁴⁶

11. Is the word *since* working to indicate a premise or conclusion in the following?

Since 5 p.m. I've been hungry.

12. Add a premise indicator, remove the conclusion indicator (without replacement), and rewrite the following argument as a single sentence.

Ever since the inflationary spiral ended, state taxes have been high. State farm subsidies will therefore continue to rise.

13. Is the word *suppose* working as a premise indicator in the following?

44 Suppose that.

45 Thus.

46 Yes, the word *since* is used twice as a premise indicator.

I suppose you're right that the New York Giants have a better passing game than the L.A. Rams.

14. Add a premise indicator, remove the conclusion indicator (without replacement), and rewrite the following argument as a single sentence.

The average length of an ear of popcorn has been longer ever since the 2010 planting regulations were adopted. State sales of popcorn will therefore continue to prosper.

- 15. Is this really a statement?

Ah, America, the land of catastrophic wealth imbalance, may its flag ever wave.⁴⁷

- 16. Consider the following argument:

All those containers contain petroleum since each one has a blue top and all petroleum containers have blue tops.

Let A = All those containers contain petroleum.
 B = Each of those containers has a blue top.
 C = All petroleum containers have blue tops.
 D = Everything with a blue top is a petroleum container.

Which one of the following would be a symbolic representation of the argument in standard form?

| | | | | |
|------|------|------|------|-----------------|
| a. A | b. D | c. C | d. C | e. A |
| B | C | A | B | D |
| --- | --- | --- | --- | --- |
| C | A | B | A | C ⁴⁸ |

17. Is the argument in the previous question deductively valid?

- 18. Does the following contain an argument, and if so what are its conclusion and premises?

By the age of seven, Snow-White had grown more beautiful than her stepmother, the Queen. Then the Queen asked her mirror: Mirror, mirror on the wall, Who is the fairest of us all?" and it answered: "Queen, thou art the fairest in this hall, But Snow-White's fairer than

⁴⁷ Yes, it is a making two statements, that America is a land of catastrophic wealth imbalance and that America's flag should continue to wave. The second statement is probably not meant to be taken literally.

⁴⁸ Answer (d). To get this answer you had to remember that premise order is irrelevant.

us all." Horrified, the envious Queen called a royal hunter and said: "Take the child into the forest. Kill her, and bring me her lung and liver as a token."⁴⁹

19. Which of the following sentences contain explicit argumentation — that is, explicitly contain the two elements required to be any argument (a conclusion plus one or more premises)?

a. Among all creatures, humans are distinguished by the extent to which they wonder about things that do not immediately affect their subsistence.

b. Every man is a potential killer, even if he believes otherwise. What I mean to say is, every man is capable of taking a life. And man is not the only creature on Earth who is a potential killer.

c. If you were to pick an apple at random from that basket, then you'd probably get one without a worm in it.

d. Stop right there, Jack; it's not raining today, so you won't need to take that umbrella. Put it back.

20. The following passage is most likely

- a. an argument b. not an argument

Although rattlesnakes are the most common poisonous snake in North America, there are four types of poisonous snakes on the continent: rattlesnakes, copperheads, moccasins, and coral snakes. The first three belong to the pit viper group, and the most reliable physical trait by which to identify them is the pair of pits between the eye and the nostril. These pits are heat sensitive and allow a snake to sense its prey. Keep in mind that a snake's venom is designed for catching food, not attacking people.

■ 21. Is the following passage an argument? Why or why not?

49 Not an argument. Could it be interpreted as an argument for the conclusion that Snow White is the fairest of them all? Couldn't the reasons for this conclusion be that the mirror said so? No, what is happening in the passage is not an argument trying to convince the reader or the queen of this conclusion. Instead, the queen asked a question about who is the fairest, and the mirror answered that it is Snow White and proceeded to describe Snow White. The passage is a narrative, a story. The passage does give sufficient information to draw the conclusion that Snow White is the fairest for the reason that the mirror said so, yet the reader is not expected to do this kind of reasoning. The reader can tell from the rest of the passage that the writer's intent is merely to provide the information that Snow White is fairest and then to elaborate on the point by providing the information about the mirror.

If you get lost in the woods and no one responds to your calls, walk downhill until you come to a stream. Then walk downstream; you'll eventually come to a town.⁵⁰

- 22. Identify the discount claim and the discount indicator in the following passage.

Svetlana came over this afternoon in an even worse state than this morning. She is so mad at Na that I worry what she's going to do. She asked for the knife back that she loaned us. I realize that we did promise to give it back soon, but she's so agitated right now that, if we return it, I think she's going to use it on Na. So, let's lie to her and say we can't seem to find the knife.⁵¹

- 23. Indicate the conclusion of the following argument:

Our planet is 8,000 miles around, yet most all the air around the planet is in a thin blanket less than five miles thick, thinner as you go up. When any dust is blown up, it can't go far up. It circulates around, and somebody somewhere breathes it. Good dust or bad dust. Most people in Los Angeles believe that the great sunsets they saw three years ago were not out of the ordinary. In fact, Los Angeles had those great sunsets because it had great smog. The smog came from the explosion of the volcano in the Philippines three years ago. It sent 20 megatons of sulfuric acid into the air. This added color, not only to L.A. sunsets, but it made for great sunsets all over the world.

- a. When the dust goes up, it can't go far up.
- b. Most people in L.A. are mistaken about the cause of their beautiful sunsets three years ago.
- c. Los Angeles had those great sunsets (three years ago).
- d. The world had great sunsets three years ago because of the explosion of the volcano in the Philippines three years ago.
- e. The explosion of the volcano in the Philippines three years ago sent 20 megatons of sulfuric acid into the air.⁵²

50 The passage is giving you advice, not reasons for the advice. You could imagine someone creating an argument from this. It might be that the advice should be taken because it will lead you to safety in this situation, and you ought to accept advice that will do this.

51 The discount indicator is "I realize that ... but" and the discount claim is "We did promise to give the knife back soon."

52 Answer (b). The word "because" is not a premise indicator in an argument; it is a premise indicator in an explanation, and that is why (c) is an incorrect answer. This exercise has an

24. Identify the conclusion in this argument:

Robert Smalls was assigned to the slave crew of a Confederate ship at Charleston, South Carolina during the U.S. Civil War. When all the officers had gone ashore, he seized control of the ship, put on a Confederate officer's hat to hide his black face and sailed past the unsuspecting Confederate canons of Fort Sumter in Charleston harbor. Upon reaching the Union Navy off the coast of South Carolina, he turned over the ship to them. He later was made a captain in the Union navy and given command of the ship until the end of the war. So, are you so sure you were correct when you said, "There were no black heroes during that war"?

■ 25. (a) Identify the conclusion of this argument. (b) Assuming the premises are true, is the argument strong or weak?

No, table tennis could not have been invented before the American Revolution. This is because table tennis needs plastic balls, but plastic wasn't invented by 1775 when the Revolution began.⁵³

■ 26. Identify the conclusion indicator term, if there is any, in the following argument:

According to the *New Encyclopedia of the People of Russia*, King Ferdinand and Queen Isabella united Aragon and Castille into the modern country of Spain in 1469. They founded the Spanish Inquisition in 1478 as a branch of the government and appointed Torquemada to be the grand inquisitor. This government agency caused all sorts of official terror, and was generally bad for Europeans, although it brought certain short-term benefits to the Catholic Church. On the other hand, King Ferdinand and especially Queen Isabella paid for Christopher Columbus' trip west to find Asia, and this was very beneficial for the European world because it opened up new sources of wealth, adventure, and knowledge, although there may have been some negatives for the local tribes in the New World. So, Ferdinand and Isabella's marriage had both good and bad consequences for Europe. Nevertheless, when you weigh the pros and cons, you've got to admit that the good heavily outweighs the bad—for Europeans.

- a. according to
- b. nevertheless
- c. on the other hand

especially important form because so many real-life arguments have the same form. The form is: "Here is the data; most people draw such and such a conclusion from the data. They are wrong. Here is why." The conclusion is: They are wrong.

53 (a) Table tennis could not have been invented before the American Revolution. (b) Strong.

- d. so
- e. There is no conclusion indicator⁵⁴

27. The sentence “I now pronounce you man and wife,” when said by a judge (justice of the peace) to a couple who have applied for a license to be married, is

- a. a claim
- b. an argument
- c. none of the above

28. He’s so good at chess he doesn’t even refer to that piece as *the horse*.

Argument for the conclusion that he doesn’t even refer to that piece as the horse.

Argument for the conclusion that he’s good at chess.

A claim.

Neither an argument nor a claim.⁵⁵

29. Identify the conclusion indicator and the conclusion in this argument:

Slavery in Saudi Arabia was officially abolished in 1962. That means that if they still have slaves it’s under the legal “radar.”

- a. The indicator is “That means” and the conclusion is that slavery in Saudi Arabia is under the legal “radar.”
- b. The indicator is “That means” and the conclusion is that slavery in Saudi Arabia was officially abolished in 1962.
- c. There is no conclusion indicator, but the conclusion is that if Saudi Arabia still has slaves, then it is under the legal “radar.”
- d. The indicator is “That means that if” and the conclusion is that if Saudi Arabia still has slaves, then it is under the legal “radar.”
- e. None of the above.

54 Answer (e).

55 Answer (c).

30. Describe the following numbered passages by placing the appropriate letter to the left of each passage's number.

- a. Merely a claim or statement with no reasons given to back it up.
 - b. An argument using bad reasons.
 - c. An argument using good reasons (assuming that the arguer is being truthful).
 - d. None of the above.
1. You said that all deliveries from your firm would be made on Mondays or Tuesdays and that you would be making a delivery here one day this week. Since it is Tuesday morning and we've had no deliveries this week, your firm should make a delivery today.
 2. That night, over icy roads and through howling winds, Paul Revere rode the 60 miles, and even before the British got into their transports, word had come back to Boston that the King's fort at Portsmouth had been seized and His Majesty's military stores stolen by the rebellious Americans.
 3. Will you or won't you take me and Johnny Tremain across the Charles River?
 4. Not a word to the old gentleman, now; not a word.

31. Arguments in newspaper editorials, unlike ordinary arguments, are usually presented in standard form.

- a. true b. false

Conditionals

1. Does the following sentence express a conditional statement?

An ostrich is a bird; all birds can fly; and an ostrich cannot fly.

- a. yes b. no c. can't tell

■ 2. Is the following conditional true?

If kids who are abused become abusive parents when they have children, and John Drew is being abused by his mother, then when he grows up he is likely to abuse his own children.

- a. yes b. no c. need more information to tell⁵⁶

3. If the if-part of a conditional claim is true, and if the conditional claim itself is true, will the then part have to be true?

4. Is the following statement an argument?

If you had struck this match when it was dry, even though it's now wet, then it would have burst into flame.

Implicit Elements of Arguments

■ 1. If there is an argument present, then there will always be a premise present.

- a. true b. false⁵⁷

2. According to this textbook, if a premise or a conclusion is implicit, then it is:

- a. very probably true.
- b. always uncertain.
- c. unstated.
- d. none of the above.

■ 3. Identify the implicit conclusion of the following argument, then indicate whether the argument is inductive or deductive.

AIDS will kill everybody who gets it, and your mother has gotten AIDS so you can draw your own conclusion. ⁵⁸

4. What is the conclusion of this argument by analogy?

56 Yes. Any statement that expresses a deductively valid argument is true.

57 Answer (a). If all the premises were left unstated, there would be no arguing and instead merely the making of a claim.

58 Your mother, too, will be killed by AIDS. The argument is deductively valid.

To say that TEX, the scientific word processor language, takes a little effort to learn is like saying that with a little effort you could build your own full-scale, working Challenger spacecraft and run your own space shuttle program. Surely you don't believe you can do this, do you?

5. Rewrite this argument in standard form so that it is deductively valid: "Joshua, quit that! Justine isn't bothering you!"
6. When the senator says, "Murder is wrong," and the reporter says, "Well, then you must think capital punishment is wrong, too," the reporter is making an argument, but she is leaving a lot unsaid. Her significant implicit premise is that the senator thinks
- Murder is a kind of capital punishment.
 - Capital punishment is a kind of murder.
 - Capital punishment is neither right nor wrong.
 - If capital punishment is wrong, then murder is wrong.

7. Identify the principal implicit element (and say whether it is a premise or a conclusion) in the following argument regarding the correctness of the theory of biological evolution.

According to the fossil record as it is interpreted by evolutionists, spiders have been on earth for 300 million years but have not changed. Yet, if evolution were really working, surely they would have changed by now, wouldn't they?

8. Identify the most significant implicit premise used in the following argument:

All good Americans hate cancer and love the first lady. So, Roberto Salazar Rodriguez loves the first lady.

- 9. Give the standard form of this deductively valid argument, adding the significant implicit premises, if there are any:

If the moral thing to do is always whatever your society says, then Nazi brutality was ethically OK in Nazi Germany. Therefore, the moral thing to do is not always whatever your society says it is.⁵⁹

⁵⁹ Here is the standard form:

If the moral thing to do is always whatever your society says, then Nazi brutality was ethically OK in Nazi Germany.
Nazi brutality was not ethically OK in Nazi Germany.

The moral thing to do is not always whatever your society says it is.

10. What premise is probably being assumed to make the following argument be deductively valid?

Tom New is running for state treasurer of Indiana, so he knows a lot about public finances.

- a. If a person knows a lot about public finances, then the person is running for state treasurer of Indiana.
- b. If a person is running for some public office, then the person probably knows a lot about public finances.
- c. Tom New is a candidate with financial savvy.
- d. Anybody who runs for state treasurer of Indiana is financially ambitious.
- e. All candidates for federal office know a lot about public finances.
- f. If a person is running for state treasurer of any state, then the person knows a lot about public finances.
- g. People who know a lot about public finances often run for state treasurer in Indiana.

■ 11. The following statement is not an argument, but the reader most probably can assume that the speaker believes what?

Stick your hands up or I'll blow your head off.

- a. The hands of the person being spoken to are not up.
- b. If you stick your hands up, I will blow your head off.
- c. The two people have guns.
- d. If I blow your head off, then your hands were up.
- e. I will blow your head off.⁶⁰

12. Rewrite the conclusion of this argument as a declarative sentence.

⁶⁰ Answer (a).

What do you mean "We should let a pregnant woman decide whether she has an abortion"? If you let them decide, then you are letting people commit murder. You can't let them do that, can you?

Multiple Arguments

1. What is the most significant implicit premise used in the first sub-argument of this argument chain?

She's got the flu again, so she probably won't be here to chair the meeting. Therefore, I'll have to do it. Damn!

■ 2. Write out the standard form of the first sub-argument in the following argument.

Galileo said good science uses mathematics, yet Charles Darwin's work on evolution uses no mathematics. Therefore, Darwin's work on evolution is not good science.⁶¹

3. In the following passage, (a) does Alice argue? If so, what is her conclusion? (b) Does her employer? If so, what is his conclusion?

"Maybe. Maybe not," Alice said as her eyebrows bulged. "But that's beside the point. He should not be allowed anywhere near that project. Keep him out of there. Get somebody else," she said. Her employer had other ideas, evidently. He responded, "Listen Alice, you might be in charge of that project, but you're wrong, dead wrong. Think about it." "Look," said Alice, biting through her words, "there is no way in hell that I'm going to permit him to do that, and if you don't like it, you know what you can do with it." After several days, things quieted down between the two of them, but last week Alice received her termination notice. That was the day she bought the poison.

- a. Alice is arguing that he should not be allowed anywhere near that project.
- b. Her employer is arguing that she bought the poison.
- c. Her employer is arguing that he should be permitted to work on the project.
- d. Nobody is giving anybody reasons.

61 The sub-argument in standard form is:

Galileo said good science uses mathematics.

 Good science uses mathematics.

- 4. In this complex argument, one of the statements is an intermediate conclusion rather than the final conclusion. Identify it.

You should do well, since you have talent and you are a hard worker. I know you have talent, even though you don't believe it, because I've seen you perform and you're better than most people I've seen do this. Besides, Lady Gaga and Beyoncé both say you're talented.

- a. You should do well.
- b. You have talent.
- c. You are a hard worker.
- d. I've seen you perform and you're better than most people I've seen do this.
- e. Lady Gaga and Beyoncé both say you're talented.⁶²

Tree Diagrams

- 1. Draw the tree of all the argumentation.

Galileo said good science uses mathematics, yet Charles Darwin's work on evolution uses no mathematics. Therefore, Darwin's work on evolution is not good science.⁶³

⁶² Answer (b). Here is the main argument:

You have talent.
You are a hard worker.

You should do well.

Its first premise is not basic because it is argued for. Here is that argument:

I've seen you perform and you're better than most people I've seen do this.
Lady Gaga and Beyoncé both say you're talented.

You have talent.

⁶³ Here is the tree diagram for the entire argumentation:

A = Galileo said good science uses mathematics.

B = Good science uses mathematics.

C = Charles Darwin's work on evolution contains no mathematics.

2. Draw the tree diagram for the following deductively valid argument:

(A) All birds we've ever found on this planet could fly or hop. (B) That thing you see over there is definitely a bird. (C) You can draw your own conclusion.

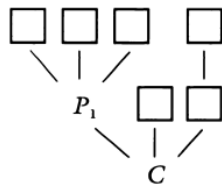
3. Draw the tree diagram for the following deductively valid argument:

Everybody who tests HIV positive eventually will contract AIDS. Your mother evidently just tested HIV positive. You can draw your own conclusion.

4. Complete the tree diagram for the following complex argumentation. Assume that statement C is the final conclusion.

P_1 P_4
 P_2 P_5
 $\frac{P_3}{C}$ $\frac{P_6}{P_1}$ $\frac{P_7}{P_3}$

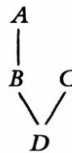
Answer:



Does the complex argumentation in the following passage have the same structure as the preceding tree diagram? Defend your answer.

photo by Gorkaazk

D = Charles Darwin's work on evolution is not good science.



Here is the sub-argument:





Let's hike out of here. We'll get sick if we stay and drink the water from the stream. Also, we've been here so long that more camping will be boring, and aren't the mosquito bites worse than we expected? The water will make us sick because there was a sign back at the ranger station warning us about giardia, and the dog we saw last night drinking from the stream is still vomiting. Besides, the water is murky.

5. Consider the following complex argument for the final conclusion C:

| | | |
|-----------------|-------------------|-------------------|
| P_1 | P_4 | |
| P_2 | P_5 | |
| $\frac{P_3}{C}$ | $\frac{P_6}{P_1}$ | $\frac{P_7}{P_3}$ |

In this complex argumentation, P2 serves as both a premise and a conclusion.

- a. true b. false

6. In the complex argumentation in the previous question, P₃ is the conclusion of a sub-argument.

- a. true b. false

7. In the complex argumentation in the previous question, P₄ is the conclusion of a sub-argument.

- a. true b. false

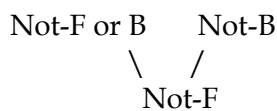
8. Consider this argument:

Either you are no friend of Sarah's or you will let me in to borrow your stereo for her.
But since you obviously won't let me in to borrow your stereo for her, you are no friend of hers, and I intend to tell her so.

Is the following a correct diagram of the premise-conclusion-support relationships? If not, why not?

B = You will let me in to borrow your stereo for Sarah.

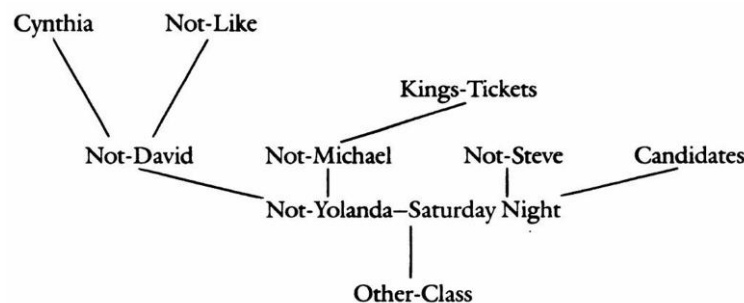
F = You are a friend of Sarah's.



■ 9. Draw the tree diagram of the multiple argumentation contained within the following passage:

There is no way you are going to be able to convince David to go out with Yolanda on Saturday night. He is living with Cynthia. Besides, he doesn't really like Yolanda, does he? And don't try to talk to Michael, either. He and Yolanda haven't said much to each other ever since she got stuck holding the extra Kings tickets that she couldn't resell. And forget Steve, too. But those three guys are the only possible candidates for Yolanda, so there's no way that Yolanda is going out Saturday night with anyone from our class. If Yolanda goes out Saturday night, it will be with someone not in our class.⁶⁴

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- Cynthia = David is living with Cynthia.
- Not-Like = David doesn't really like Yolanda.
- Not-David = David can't be convinced to go out with Yolanda Saturday night.
- Kings-Tickets = Michael and Yolanda haven't said much to each other ever since she got stuck holding the extra Kings tickets that she couldn't resell.
- Not-Michael = Michael can't be convinced to go out with Yolanda Saturday night.

10. A juror is arguing that the defendant Mayfield is guilty of robbing the Ail-Night Grocery. Draw the tree diagram, and evaluate the quality of the argumentation.

No, he's as guilty as sin. Take a look at his face. He won't even look the district attorney in the eye. Besides, he refused to take the lie detector test. You failed to mention that the police report shows when he was first arrested he denied even being in the grocery store, but we've proved he was there, so he's a known liar.

11. Draw the tree diagram of the following multiple argumentation. You may ignore implicit premises and any explanations that are given in the passage. If you use any of the numbered statements below in your tree, use those numbers in your tree.

(1) George recently filed a police complaint against his neighbor for making too much noise. So, (2) he will be contacted by the city after the investigation. It also follows that (3) he doesn't see much hope in solving his problem by talking to his neighbor any more. George filed not only because (4) there had been many incidents of loud noise, as far as he was concerned, but also because (5) his wife urged him to. (6) She was mad about his doing so badly in his job interview on the morning after he was up several times complaining to her about the neighbor's noise.

12. Consider the following complex expressions which are composed of simple claims that are abbreviated as A and B and C. For each of the complex expressions, say whether it is an argument or merely a claim:

- a. A, but not B.
- b. A, but not B, and consequently C.
- c. A, which is why B, but not C.
- d. A and B follow from C.
- e. A and maybe B, or perhaps C.⁶⁵

-
- Not-Steve = Steve can't be convinced to go out with Yolanda Saturday night.
 - Candidates = David, Michael, and Steve are the only possible candidates for finding someone to go out with Yolanda on Saturday night.
 - Not-Yolanda-Saturday Night = There's no way that Yolanda is going out Saturday night with anyone from our class.
 - Other-Class = If Yolanda goes out Saturday night, it will be with someone not in our class.

65 (a) claim, (b) argument. Try to work (c) and (d) and (e) on your own.

Creating and Improving Arguments

1. Research the issue of whether the United States can afford to expand its space program. Take a side and create a 200- to 300-word argument in defense of your position. Give credit to your sources (that is, use footnotes to say where your information came from).

■ 2. Lesley and Rico say they've found a deductively valid, simple argument that, when rewritten in standard form, is a mixture of true and false sentences in which the premises are all true. Why is this unusual?⁶⁶

3. The following is an argument. Construct a new argument that defends the opposite conclusion but that devotes about half its attention to countering the points made in the first argument.

America should have more alcoholics. Here is why. Drinking alcohol makes you feel good, and Americans deserve to feel good, if anybody does. Legislators who are alcoholics will be off playing golf or hanging out in bars; they will be preoccupied and therefore won't pass so much harmful legislation that rips off us taxpayers. Besides, if I want to be an alcoholic and don't do anything to harm you, then you shouldn't be telling me what I can do with my body; it's my body, not your body, right?

You will be graded on the clarity of your argument, your ability to foresee counters from your opponents, and the absence of silly, naive, or irrelevant comments. The upper limit on your new argument should be two pages, typed double-spaced.

4. Construct an argument defending your position on the issue of whether there ought to be a law permitting the county public health department to start a needle exchange program. Under this program, drug addicts would be given new or clean hypodermic needles in exchange for their old or used needles, no questions asked. The purpose of the program would be to slow the spread of AIDS.

Background: Assume that it is a misdemeanor to possess a hypodermic needle that has not been prescribed by a doctor and that it is a misdemeanor for a doctor to prescribe or give away hypodermic needles and other drug addiction paraphernalia except for certain listed problems, such as diabetes and allergies.

You will be graded not on what position you take but on the clarity of your argument, your ability to foresee counters from your opponents, and the absence of silly, naive, or irrelevant comments. Keep your argument to two pages, typed, double-spaced.

⁶⁶ There couldn't be any false statements, so there's a contradiction here.

5. This is a voluntary exercise to be done by four students working as a group. The group chooses an issue to debate in front of the rest of the class, but the issue must be approved by the instructor. The group meets outside of class to research the issue. A typical issue might be whether the college should spend more money on athletic scholarships and less money on other projects. Another issue might be whether U.S. defense spending should be cut. Two students agree to argue for a yes position on the issue; the other two students agree to argue for the no position. During the class debate, all four students speak alternatively, each for five minutes or less. Speakers may use their time either to present arguments for their own position or to attack arguments presented by the opposition. When the four are done, the rest of the students in the class get to ask them questions or otherwise enter into the debate. The goal of the exercise is to show a significant understanding of the issue and to carry out good logical reasoning on the issue.

6. Create an argument for why the following question was answered incorrectly.

Question: Evaluate this explanation (without appealing to outside experts on mudslides): "The North Carolina coastal hills are especially prone to mudslides because of the loosely binding sandy soil, which has little clay, and because the coast's vegetation doesn't provide a stable root system."

Answer: This explanation is circular because it states that there are mudslides in the first half, and then in the second half it states there is not stability, which is basically repeating the fact that the land is subject to mudslides.

Descriptions, Explanations, and Arguments

1. Are the following three passages most probably expressing arguments, explanations, descriptions, or what?

- a. A quartz crystal oscillator is very small and contains a crystal of the mineral silicon dioxide that can be made to vibrate when stimulated electrically.
- b. A clock's quartz crystal oscillator is a fascinating device that is not as complicated as it may seem to be. Here is how it works. Power from a small battery makes the crystal vibrate, and when this happens the crystal gives out pulses of current at a very precise rate, a fixed electrical frequency. A microchip reduces this rate to one pulse per second, and this signal activates the time display mechanism for the second hand.
- c. Many clocks and watches contain a quartz crystal oscillator that controls the hands or the time display. Power from a small battery makes the crystal vibrate, and it gives out pulses of current at a very precise rate — that is, a definite frequency. A microchip

reduces this rate to one pulse per second, and this signal activates the time display mechanism.⁶⁷

2. Suppose you asked someone to explain why tigers eat meat but not plants, and you got the answer, "Because a zookeeper once told me that's what they eat." You should consider this to be an incorrect answer. Why?

- a. You asked for some sort of explanation of why tigers eat meat but not plants, yet the answer mentioned nothing about plants.
- b. You requested an explanation but got an argument instead.
- c. The argument that a zookeeper said so commits a fallacious appeal to authority.

3. Suppose you have asked your English instructor why Ernest Hemingway won the 1954 Nobel prize for literature, and suppose she answers, "He won because the Swedish Nobel Committee liked his short stories and novels about his own experiences in World War I and in the Spanish Civil War of the late 1930s." She is

- a. explaining but not arguing.
- b. explaining and arguing.
- c. only describing.
- d. describing and arguing.
- e. only arguing.⁶⁸

⁶⁷ a. Description of a quartz crystal oscillator. Not an explanation.

b. This is an explanation of how a quartz crystal oscillator works in a clock. The passage also provides some additional description of the inside of a clock that uses the oscillator.

c. Like passage (b), this one describes the inner workings of a certain kind of clock. Compared to (b), it is harder to tell whether any explanation is present, but probably one is present. To tell whether an explanation is present, the reader must look at what is said, then try to reconstruct the intentions in the mind of the speaker. If the intentions were to say (1) what causes what, (2) what motivates an action, (3) what purpose something has, or (4) what origin something has, then an explanation is present. Otherwise, there is only description.

⁶⁸ Betsy Ross is describing but might or might not be explaining, depending on the context. If she just makes this statement out of the blue, she is not offering a cause for some event, nor offering a motivation for what happened. She is simply describing the state of her body or

4. When Betsy says "I'm angry," she is reporting information about her state of mind, not arguing for a conclusion. But is she explaining or not explaining here state of mind?

5. The following passage is primarily

- a. a description
- b. an argument
- c. a request

About two-thirds of the salt in sea water is sodium chloride. Other substances present are magnesium chloride, sodium sulfate, potassium chloride, and calcium chloride. In the remaining 1 percent of salts are tiny traces of about forty different elements, including iron, uranium, silver, and gold. The percentage of gold is so small that you would have to process tons of seawater to get even a tiny amount. If the salt were taken out of all the seawater in the world, it could cover all the land areas on Earth with a layer 500 feet thick.⁶⁹

6. The following passage is primarily

- a. a description
- b. an argument
- c. a request

The sun's rays do not fall vertically outside the tropics, even at noontime. June 21 in the northern hemisphere is the day of the year with the longest daytime. On this day, the perfectly vertical fall of the sun's rays is farther north than on any other day of the year. This special, farthest north place is actually a line of places around the earth at 23.5° north latitude. It is called the Tropic of Cancer. The day when the sun reaches the Tropic of Cancer is called the solstice, and it begins the summer. Hawaii is the only part of the U.S. that is south of the Tropic of Cancer.

7. Is this passage primarily an argument or an explanation?

mind. However, if the context were that she has just been asked to explain why she ripped her new flag to pieces, her response would count as an explanation of this action.

⁶⁹ Answer (a). The passage is describing the constituents of sea water; it is not giving reasons for some conclusion or asking anything of the reader.



Mayfield is guilty because the FBI report says that his fingerprints match those on the countertop beside the cash register.

8. Is this passage primarily an argument or an explanation?

The passenger died because the driver was drunk and speeding on the freeway.

9. Take at least two of the following sentences and work them into an argument on the issue of which computer your office should purchase.

- a. The Apple clone is cheaper than the Cray-Sinclair, although both are within our budget.
- b. The Cray-Sinclair computer is faster than the Apple clone.
- c. The Cray-Sinclair won't run Word, and the Apple clone runs all the software we want right now.
- d. The Cray-Sinclair has a better service contract than the Apple clone.

10. Discuss the following argument. At the very least, describe it and evaluate it. Are some reasons better than others?

Drinking alcohol causes kidney disease, traffic accidents, and other serious problems. In addition, the singer Michael Jackson says drinking is an undesirable habit. Your older brother says no one will kiss a person whose breath smells like alcohol. Therefore, no sensible, intelligent person should ever drink.

Evaluating Arguments

Although much of the rest of this book is devoted to the topic of evaluating arguments, here are some initial exercises.

1. How good is this argument? Is it inductively strong? Is it valid?

Anytime you murder someone you are killing that person.
So, if a pilot kills someone during the battle, the pilot is murdering that person during the battle.

■ 2. How good is this argument? Is it inductively strong? Is it valid?

Anytime you murder someone you are killing that person.
So, if a pilot murders a person during the battle, then the pilot kills someone during the battle.⁷⁰

3. Evaluate the quality of this argument:

Nathan was arrested for breaking and entering. At the trial two witness who didn't know each other or Nathan testified that Nathan committed the crime. The defense attorney said Nathan was 100 miles away at the time, but the only evidence for this was Nathan's own claim that he was 100 miles away at the time.

4. Evaluate the quality of this argument:

All ice eventually melts when heated to over 47 degrees Fahrenheit. The ice in the refrigerator of the President of France was heated to over 47 degrees Fahrenheit that day. So, the ice in the President's refrigerator eventually melted.⁷¹

■ 5. Does this argument have any counterexamples? If so, find one.

All cats are interesting animals.
All cats have fur.
So, all interesting animals have fur.⁷²

70 This is a very strong argument. It is deductively valid and all its premises (there's just one) are true.

71 The argument meets the standard of being deductively valid. But you'll have to suspend judgment about the argument as a whole because you don't know whether one of its premises is true. You don't know whether it is true that the ice in the refrigerator of the President of France was heated to over 47 degrees Fahrenheit that day.

72 The following situation is a counterexample. A situation where all cats and crocodiles are interesting animals and all cats have fur but crocodiles don't. In this situation the premises are

6. Does this argument have any counterexamples? If so, find one.

All cats are interesting animals.
All interesting animals have fur.
So, all cats have fur.

■ 7. Does this argument have any counterexamples?

Either Juan is coming to the party and bringing the beer or Tom is staying home and watching his favorite program. Juan is coming to the party. Therefore Juan is bringing the beer.⁷³

both true but the conclusion is false, so we have a counterexample that shows the argument was deductively invalid.

⁷³ You can imagine a situation where Juan comes to the party without the beer, while Tom stays home and watches his favorite program. In that situation the premises are true while the conclusion is false. So this is a counterexample, and the argument is deductively invalid.