

Critical Thinking Lecture 3:

More Deduction

3.1 Invalid Conditional Arguments

As we have seen, a valid deductive argument is one in which that the truth of the premises guarantees the truth of the conclusion. If a deductive argument is valid, then it is impossible for the premises to be true and the conclusion false. Necessarily, if the premises are true, the conclusion is true also.

Conditional claims have the form "If p then q", where p is the sufficient condition and q is the necessary condition. We have seen that there are two valid and two invalid forms of conditional deductive argument. The valid forms are **affirming the sufficient condition** and **denying the necessary condition**. Many conditional arguments at first glance might look valid, but in fact are not. The invalid conditional arguments are those which **affirm the necessary** and those which **deny the sufficient**.

Affirming the necessary condition. The invalid conditional argument form where the non-conditional premise affirms the necessary condition of the conditional statement. (This is also called "affirming the consequent".)

e.g.

If p then q.

q _____

Therefore p

If I am a father, then I am a parent.

I am a parent.

Therefore, I am a father.

The above argument is invalid, i.e. it is possible for its premises to be true but its conclusion false, as in the case of a person who is a mother. Arguments that affirm the necessary can be much harder to spot than this, though, especially if the conclusion is true. We get lulled into thinking that the argument must be a good one.

e.g.

If you are in Berlin then you are in Germany.

You are in Germany.

Therefore you are in Berlin.

This argument is not valid. Why not? Well, if you can see that it affirms the necessary, you'll know by our basic rules that it is invalid. Also, remember, if it is invalid, that means the premises could be true and yet the conclusion false. Is this the case here? Yes. Note that the conditional claim is not that ONLY people who are in Berlin are in Germany, but rather that ALL people who are in Berlin are in Germany. According to the conditional claim in the argument, it could be true that all Berliners are in Germany, and that you are one of the people who are Munich, not Berlin, but still in Germany.

e.g.

If it is a human then it is a primate.

Koko is a primate.

Therefore, Koko is a human.

This too is invalid. It affirms the necessary condition. It is possible that the premises are true, but the conclusion false, e.g. Suppose that Koko is a gorilla.

Denying the sufficient condition. The invalid conditional argument form where the non-conditional premise denies the sufficient condition of the conditional statement. (This is also called "denying the antecedent".)

e.g.

If p then q.

Not p

Therefore not q

If it is a square then it has four sides and four right angles.

This shape is not a square.

Therefore this shape does not have four sides and four right angles.

This is invalid. Even if the premises are true, it could be the case that the conclusion is false, e.g. if the shape in question is a non-square rectangle.

Another example:

If there is a tiger at the zoo, then I'll go.

There is no tiger at the zoo.

Therefore I won't go.

Again, this is invalid because it denies the sufficient. If the conditional premise had been "I'll go to the zoo only if there is a tiger there", then the argument would be denying the necessary and valid. But according to the actual conditional premise in the above argument, there being a tiger at the zoo is enough to make me go, but I might go even if there is no tiger. Maybe I want to see the pandas. This is compatible with the truth of the premises of the above argument.

An example from an advertisement encouraging people to wear helmets when they ride bikes: **If you don't need a head, then you don't need a helmet.**

Obviously, this claim was meant to fit into an argument with the conclusion that you need a helmet. But is it a valid argument?

If you don't need a head, then you don't need a helmet.

You do need a head.

Therefore, you do need a helmet.

This argument is invalid. It denies the sufficient condition. What they should have said is "If you need a head, then you need a helmet", or "If you don't need a helmet, then you don't need a head".

NB In contrast to the valid forms of conditional argument, aff suff and den nec, the invalid forms do not have matching f's and n's in their names: "aff nec" and "den suff".

3.2 Conditional Arguments of Many Forms

Since a conditional claim can be restated in many forms, conditional arguments can come in many forms as well, e.g.

Only citizens of Spain know how to speak Spanish.

Isabella is a citizen of Spain.

Therefore, Isabella knows how to speak Spanish.

Add WeChat powcoder

Is this argument valid? To answer this question we can try to imagine scenarios in which the premises are true and the conclusion false, or we can ask if it is affirming the sufficient or denying the necessary. (Ideally we should employ both of these methods, to be sure.) Which is the sufficient condition and which is the necessary condition? Perhaps the easiest way to tell is to translate the conditional premise into its standard "If p then q" form. **Has the arguer said "If you are a citizen of Spain then you know how to speak Spanish"? Or has the arguer said "If you know how to speak Spanish then you are a citizen of Spain?"**

Remember, "If you are a father, then you are a parent" can be translated into "All fathers are parents". "If you are a father, then you are a parent" can be also be translated into "Only parents are fathers". So, "Only citizens of Spain can

“speak Spanish” is translated as “If you speak Spanish then you are a citizen of Spain”.

If you can speak Spanish then you are a citizen of Spain.

Isabella is a citizen of Spain.

Therefore, Isabella can speak Spanish.

What is the form of this argument?

Affirming the necessary. Invalid.

Note that there is a similar deductive argument which is valid:

All citizens of Spain can speak Spanish.

Isabella is a citizen of Spain.

Therefore, Isabella can speak Spanish.

Affirming the sufficient. Valid.

Assignment Project Exam Help
<https://powcoder.com>

Add WeChat powcoder

For each of the following conditional arguments, state the form of the argument (e.g. affirming the sufficient), and state whether the argument is valid or invalid.

Only idiots think that Morocco is in Europe.

Dave thinks that Morocco is in Europe.

Therefore, Dave is an idiot.

The first premise is equivalent to "If you think Morocco is in Europe, you are an idiot". The above argument affirms the sufficient, and hence is valid.

You will be punished if you stole from the shops.

You did not steal from the shops.

Therefore, you will not be punished.

The first premise is equivalent to "If you stole from the shops then you will be punished." The above argument denies the sufficient, and hence is invalid. The conditional premise is compatible with it being the case that if you stole from the shops or insulted the bus driver you will be punished. In such a case, the fact that you did not steal from the shops would not imply that you will not be punished.

All hamburgers are made in the town of Hamburg, Germany.

This item of food was made in the Wentworth Building, Sydney Uni.

Therefore, this item of food is not a hamburger.

The first premise is equivalent to "If it is a hamburger then it is made in the town of Hamburg, Germany". The above argument denies the necessary, and hence is valid.

Assignment Project Exam Help
NB To say an argument is valid is not to say that it is flawless. It is only to say that it has the right kind of FORM for a deductive argument, not that its premises or conclusion are true.
<https://powcoder.com>

Another example
Add WeChat powcoder
Every example in this lecture is easy to understand.

This is not easy to understand.

Therefore, this is not an example in this lecture.

The above argument denies the necessary, and hence is valid. If an argument is valid and has only true premises, then its conclusion is true. The conclusion of the above valid argument is false. This means we must reject at least one of the premises. I hope that for you it is the second premise.

3.3 Soundness = Validity + Only True Premises

As we noted in the last lecture, the best kind of deductive argument, which really does guarantee the truth of its conclusion, is an argument that is **sound**. It must possess two features in order to be sound:

- 1) It must have only true premises.
- 2) It must be valid.

A sound argument has a true conclusion. (But note that many unsound arguments also have true conclusions.) If you know that an argument has only true premises and that it is valid, you can be assured that the conclusion is true.

In this course you should acquire the ability to tell whether an argument is sound, or, at least, the ability to say what would be required for an argument to be sound.

Assignment Project Exam Help

Every member of Luke's family grew up in Sydney.

Kanye West is not a member of Luke's family.

Therefore, Kanye West did not grow up in Sydney.

Add WeChat powcoder

The above argument has only true premises and a true conclusion, but is not sound, because it is not valid. It denies the sufficient.

If Sydney is in Queensland, then Sydney is in Australia.

Sydney is in Queensland.

Therefore, Sydney is in Australia.

The above argument affirms the sufficient, so it is valid. But premise 2 is false, so this argument is not sound.

If you are a farmer, you own at least one horse.

Bob does not own a horse.

Therefore, Bob is not a farmer.

The above argument is unsound because, although the argument is valid (denying the necessary condition), its first premise is false. We can know that the argument is unsound regardless of what we know about Bob. Maybe Bob does not own a horse and is not a farmer. Even in this case, since the first premise is false the argument is not sound.

You are a member of parliament only if you are a human being.

Scott Morrison is a member of parliament.

Therefore, Scott Morrison is a human being.

The above argument is sound because it has only true premises and is valid (affirming the sufficient).

Sometimes we are not in a position to tell whether an argument is sound because we do not know whether the premises are true. Even in such cases, if the argument has one of the standard forms for conditional arguments, we can tell whether or not it is valid.

If going to war ultimately will bring peace and prosperity, we should go to war.

Going to war ultimately will bring peace and prosperity.

Therefore, we should go to war.

This argument, in more specific instances, is one of the most significant we face. It is obviously valid. Is it sound, though? That depends on the truth of its premises. It is usually very difficult to see whether the second premise is true. The first premise is also contentious. (Some moral philosophers think that the first premise is true, others think it is false.)

Disagreements over the truth of claims can lead to disputes over which deductive argument is relevant in a given situation. This gives rise to the phrase "**One person's modus ponens is another person's modus tollens**".

Remember, modus ponens is another name for the valid form of argument that affirms the sufficient, i.e.

If p then q

p _____

Therefore, q

Modus tollens is another name for the valid form of argument that denies the necessary, i.e.

If p then q

Not q _____

Therefore, not p

Suppose that one person firmly believes both <If p then q> and p, and is unsure whether q is true. He or she will conclude that q, using modus ponens. But suppose that another person firmly believes both <If p then q> and not q. He or

she will conclude that not p, using modus tollens. Hence, **one person's modus ponens is another person's modus tollens.**

e.g. Jesus said that he is Lord, according to E. S. Lewis. Lewis then offers roughly the following argument:

If what Jesus said was wrong, then he was a lunatic or a liar (or was mistaken).

But Jesus was not a lunatic or a liar (or mistaken).

Therefore, Jesus is Lord. (**Modus Tollens**)

But many people who accept the first premise think that Lewis has chosen the wrong argument here. Instead, they think he should have used modus ponens:

If what Jesus said was wrong, then he was a lunatic or a liar (or was mistaken).

What Jesus said was wrong.

Therefore, Jesus was a lunatic or a liar (or was mistaken). (**Modus Ponens**)

e.g. Suppose that Molly and Polly agree that, if a foetus is a person, then abortion is impermissible. Suppose that Molly is more convinced that abortion is

permissible, and Polly is more convinced that a foetus is a person. Molly will think that the relevant argument is an instance of modus tollens:

If a foetus is a person, then abortion is impermissible.

Abortion is permissible.

Therefore, a foetus is not a person.

In contrast, Polly will think that the relevant argument is an instance of modus ponens:

If a foetus is a person, then abortion is impermissible.

A foetus is a person.

Therefore, abortion is impermissible.

Another, more complex example from philosophical arguments about freedom. It seems plausible to many people that many of our actions are free. It also seems plausible that if an action was free, then the agent could have done otherwise. But it also seems plausible that, given what we know about causation from physics, every physical event has a necessitating cause, and hence all physical events, including our actions, could not have been otherwise. This view is known as determinism. These three claims are in tension. Using modus ponens and modus tollens does not allow us simply to resolve this tension and figure out what we should say about free will, but it does allow us to get a clear grasp of the various theoretical options.

Modus ponens (affirming the sufficient):

If my action is free, then I could have done otherwise.

I freely came to this lecture.

Therefore, I could have done otherwise (determinism is false).

Modus tollens (denying the necessary):

If my action is free, then I could have done otherwise.

Determinism is true (so I could not have done otherwise).

Therefore, it is not the case my action was free (hard determinism)

But there is another option here. Some philosophers think we should reject the conditional claim:

My actions are free.

Determinism is true (so I could not have done otherwise).

Therefore, it is not the case that if my action is free, then I could have done otherwise (compatibilism is true).

An important moral of this story is that being able to detect the validity of deductive arguments will not on its own let us discern what to believe. Rather, this ability will help us to figure out what to believe when we combine it with our justified beliefs about the truth or falsity of particular claims.

3.4 Disjunctive Deductive Arguments

Another common form of deductive argument is a **disjunctive argument**. A disjunction is a claim of the form "p or q". Each part of a disjunction is called a "disjunct". In this case, one disjunct is p and the other disjunct is q.

The word "or" is ambiguous, i.e. it has more than one meaning. Some disjunctions are **inclusive disjunctions**, which mean "p or q and possibly both p and q". e.g. Suppose we are going on holidays to Canberra. You ask, "What can we do in Canberra?". I say to you "We could go to the National Gallery, or we could visit Parliament House." This means "either p or q and possibly both p and q".

Inclusive disjunction.

Other disjunctions are **exclusive disjunctions**, which mean "p or q but not both p and q". e.g. Either you've heard James Brown before or you've never heard him. e.g. Either you are coming to the beach or you are staying home.

In everyday language sometimes we can distinguish between inclusive and exclusive disjunction in virtue of the fact that the speaker adds "and not both" or "and possibly both" to the end of the claim "p or q". Sometimes the

speaker does not do this and we are not in a position to ask what she means. In cases like this we might have to decide whether it is better to read it as an inclusive or an exclusive disjunction based on the context in which the claim is made, and drawing on our background knowledge about the compatibility or incompatibility of the two disjuncts.

If the situation is unclear, the arguer often spells out which kind of disjunction is in play.

e.g. **You can have the Cadbury's showbag or the Darrell Lea showbag
BUT NOT BOTH!**

**You can have pork dumplings, or seafood dumplings, or sticky rice,
or pork buns, or rice noodles. In fact, you can have all of them.**

Disjunctions can be used in deductive arguments. Once we have determined which kind of disjunction is in play, we can tell whether the argument is valid simply by considering its form.

<https://powcoder.com>

With **inclusive disjunctions**, there is a standard form of argument that is deductively valid.

Add WeChat powcoder

p or q

Not p

Therefore q

Equally, this could be:

p or q

Not q

Therefore p

When you visited New Zealand you went to the North Island or the South Island.

When you visited NZ you did not go to the South Island.

Therefore, you went to the North Island.

Is the above argument valid? (i.e. Is it the case that, necessarily, if the premises are true then the conclusion is true?) First, we should figure out which kind of disjunction is in the premise. Since it can be true that you can visit both the North Island and the South Island, the disjunction in this case is inclusive. Since this argument fits the standard form for inclusive disjunctive arguments, it is valid. i.e. If its premises are true, then its conclusion is also true.

Note that arguments featuring inclusive disjunctions are invalid if they have the following form:

p or q
p _____ **Assignment Project Exam Help**

Therefore not q
<https://powcoder.com>

e.g. **You like pizza or you like burritos.**

You like pizza. **Add WeChat powcoder**

Therefore, you do not like burritos.

This is clearly a bad argument. On one reading, it is invalid, because the first premise is an inclusive disjunction that leaves open the possibility that both p and q are true. (On another plausible reading, though, this argument is valid but unsound. The principle of charity might suggest that the first premise is intended by the arguer to be an exclusive disjunction. If it is such, then the argument is valid but unsound, because the first premise, when read as an exclusive disjunction, is clearly false.)

With **exclusive disjunctions**, which mean "p or q but not both p and q", there are two forms of argument that are valid.

The first valid form is:

p or q

Not p

Therefore q

and an equivalent argument:

p or q

Not q

Therefore p

The second valid form is:

p or q

p

Therefore not q

Assignment Project Exam Help
and an equivalent argument:

p or q

q <https://powcoder.com>

Therefore not p

Add WeChat powcoder

(The reason that there are two versions of each form of valid argument is that disjunction is symmetrical. i.e. "p or q" implies "q or p". As we have seen, conditionals are not symmetrical. i.e. "If p then q" does not imply "If q then p".)

Either you've heard James Brown before or you have never heard him.

You've heard James Brown before.

Therefore, it's not the case that you have never heard James Brown.

Either you are leaving the party or you are staying.

You are leaving the party.

Therefore, you are not staying.

An argument featuring an exclusive disjunction would have to be pretty weird to be invalid. e.g.

p or q

Not p

Therefore, not q

or

p or q

p

Therefore q

Bob Marley was born in Jamaica or England.

Bob Marley was born in Jamaica.

Therefore, Bob Marley was born in England.

Assignment Project Exam Help

This argument is so obviously confused that it virtually never occurs in real life.

<https://powcoder.com>
If you encounter a disjunctive argument, you have to decide whether it

includes an inclusive or an exclusive disjunction (which requires that you consider the actual content of the claim and its context), and then decide whether it is valid (could the premises be true but the conclusion false?), and then decide whether it is sound (is it valid with only true premises?). As we shall see later in the course, often a disjunctive argument is not sound because the disjunctive premise is false - it is a "false dilemma".

For each of the following disjunctive arguments:

Is the disjunction inclusive or exclusive? Is the argument valid or invalid? Is the argument sound or unsound?

The next corner you take will be a right or a left.

The next corner you will take is a right.

Therefore, the next corner you will take is not a left.

Exclusive disjunction. Valid. We are in no position to tell whether it is sound, because we do not know whether the second premise is true.

Adam has a library card or Susie has a library card.

Adam has a library card.

Therefore, Susie does not have a library card.

It is likely that the first premise is an inclusive disjunction, because one person having a library card doesn't stop another person from having one. If this disjunction is inclusive, though, the argument would be invalid. If the disjunction were exclusive, the argument would be valid, but then it would most likely be unsound, because the disjunctive premise most likely would be false.

Assignment Project Exam Help

If you go on to study formal logic you will see that disjunctions can be

rephrased as conditionals.

Inclusive disjunctions like so:

$p \text{ or } q = \text{If not } p \text{ then } q \text{ \& if not } q \text{ then } p.$

Exclusive disjunctions like so:

$p \text{ or } q = \text{If not } p \text{ then } q \text{ \& if not } q \text{ then } p, \text{ and not } (p \text{ \& } q).$

<https://powcoder.com>

Add WeChat powcoder

3.4 Material Inference in Deduction

One of the surprising features of conditional arguments and disjunctive arguments is that we can tell whether they are valid simply by thinking about their form. As far as the validity of these arguments is concerned, it does not matter what p is or what q is. (Obviously, we cannot tell whether an argument is sound unless we know whether its premises are true, so the actual content of p and q matter a great deal to soundness.) Some other kinds of deductive arguments can be valid or invalid not purely in virtue of their form, but in virtue of both their form and their content. An argument whose validity relies purely on its form is sometimes referred to as a **formal inference**. Conditional deductive

arguments and disjunctive deductive arguments are formal inferences. An argument whose validity also depends on its content is sometimes referred to as a **material inference**. (Formal logic students: Don't confuse this with the material conditional, i.e. The truth-functional If ... then....)

When we are assessing the validity of material inferences, we cannot simply check whether the argument fits a standard valid form. Instead, we have to ask whether the truth of the premises guarantees the truth of the conclusion, i.e. whether necessarily, if the premises are true, then the conclusion is also true. If it is possible that the premises could be true and the conclusion false, then the argument is invalid. (This is the case even if the conclusion is actually true.)

P1: Russia is bigger than India.

P2: India is bigger than France.

C: Russia is bigger than France.

The above argument is deductively valid because necessarily, if the premises are true, the conclusion must also be true. This depends on the relation "being bigger than". The relation of being bigger than is transitive i.e. If a is bigger than b and b is bigger than c then a is bigger than c.

P1: Bobby-John loves Mary-Lou.

P2: Mary-Lou loves Bill-Joe.

C: Bobby-John loves Billy-Joe.

The above argument is invalid because it could be that the premises were true but the conclusion false. This depends on the relation of loving. Loving is NOT a transitive relation.

P1: One Australian dollar equals 100 Australian cents.

C: 100 Australian cents equals 1 Australian dollar.

The above argument is valid, and this depends on the relation of being equal to. The relation of being equal to is a **symmetrical**, i.e. If a is equal to b then b is equal to a.

P1: Bobby-John loves Mary-Lou.

C: Mary-Lou loves Bobby-John.

The above argument is invalid. It is perfectly possible for the premise to be true but the conclusion false. The argument is invalid even if Mary-Lou does love Bobby-John. The relation of loving is asymmetrical. Loving is intransitive and asymmetrical.

P1: The ticket costs one Australian dollar.

P2: One Australian dollar equals 200 Australian cents.

C: The ticket costs 200 Australian cents.

The above argument is valid because the truth of the premises would guarantee the truth of the conclusion. This depends on the relation of "being equal to". Of course, though, the argument is not sound, because the second premise is false. When we say that it is valid, we mean that if the premises were true the conclusion would also have to be true.

P1: Adelaide is West of Sydney.

P2: Perth is West of Adelaide.

C: Perth is West of Sydney.

Ordinarily, we might say that the above argument is valid, because "being west of" appears to be a transitive relation, and this means the truth of the premises would guarantee the truth of the conclusion. But is "being west of" really a transitive relation? What if we add a few more premises:

P1: Adelaide is West of Sydney.

P2: Perth is West of Adelaide.

P3: Cape Town is West of Perth.

P4: Buenos Aires is West of Cape Town.

P5: Easter Island is West of Buenos Aires.

P6: Auckland is West of Easter Island.

C: Auckland is West of Sydney.

The above argument is plainly invalid, because all of its premises are true and its conclusion is false. (It is true that Auckland can be reached by heading West from Sydney, but Auckland is to the East of Sydney.) Thus, "being west of" is not actually a transitive relation. This means that the original argument concerning Perth and Sydney is invalid as well. Even though every claim in the argument is true, the truth of the premises does not guarantee the truth of the conclusion.

Surprisingly, it seems that the relation of "being North of" is a transitive relation, as it "being South of". It turns out that North and South are very different from East and West.

Assignment Project Exam Help

<https://powcoder.com>

3.5 More Complex Deductive Arguments

Add WeChat powcoder

We have now acquired lots of conceptual tools that are useful for constructing and analysing deductive arguments.

The only way to get into the storeroom is to open the lock or break the lock. The thief got into the storeroom and the lock was not broken. All members of the club can open the lock on the store room. Since Dave is not a member of the club, he could not have opened the lock. Therefore, Dave is not the thief.

How can we analyse this argument? First, find the ultimate conclusion:

C: Dave is not the thief.

What are the main premises that support this conclusion?

P1: The thief opened the lock (If someone is the thief then s/he opened the lock).

P2: Dave could not have opened the lock. (Dave did not open the lock.)

C: Dave is not the thief.

This part of the argument is valid. It denies the necessary. (Technically, for the argument to be valid, the second premise should be "Dave did not open the lock". There is a materially valid inference from "Dave could not have opened the lock" to "Dave did not open the lock".)

What sub premises are offered in support of the main premises? Let's think first about P1. The relevant part of the argument is:

The only way to get into the storeroom is to open the lock or break the lock.

The thief got into the store and the lock was not broken.

We can rephrase the first of these claims as **"If the thief got into the storeroom then the thief opened the lock or broke the lock"**. Another premise is that **the thief got into the storeroom.**

P1.1.1: If the thief got into the storeroom then the thief opened the lock or broke the lock.

P1.1.2: The thief did get into the storeroom.

Therefore

P1.1: The thief opened the lock or broke the lock.

The above sub argument is valid. It affirms the sufficient.

There is another sub premise that combines with P1.1

P1.1: The thief opened the lock or broke the lock.

P1.2: The lock was not broken (or, The thief did not break the lock)

Therefore

P1: The thief opened the lock.

The above sub argument is a disjunctive argument. It denies one of the disjuncts and affirms the other, so it is valid. (NB It does not matter whether it is an inclusive or exclusive disjunction in this case, as this form is valid for both kinds of disjunctive argument.)

How about the sub argument in support of P2? Here the relevant part of the original argument is: **All members of the club can open the lock on the store room. Since Dave is not a member of the club, he could not have opened the lock.** This contains a conditional deductive argument.

P2.1: All members of the club can open the lock on the store room.

Assignment Project Exam Help
We could translate this into the standard "If p then q" form:

P2.1: If you are a member of the club then you can open the lock on the store room. <https://powcoder.com>

P2.2: Dave is not a member of the club

Therefore **Add WeChat powcoder**

P2: Dave could not have opened the lock

The above sub argument denies the sufficient, and hence is invalid. We can see that the premises of this sub argument could be true and yet the conclusion false, because the conditional premise allows that some non-members of the club also can open the lock. It denies that any member of the club cannot open the lock, but it does not say that only members of the club can open the lock.

We can slot all of these pieces together:

P1.1.1: If the thief got into the storeroom then the thief opened the lock or broke the lock.

P1.1.2: The thief did get into the storeroom.

P1.1: The thief opened the lock or broke the lock.

P1.2: The lock was not broken (or, The thief did not break the lock)

P1: The thief opened the lock (or, If someone is the thief then s/he opened the lock).

P2.1: If you are a member of the club then you can open the lock on the store room.

P2.2: Dave is not a member of the club.

P2: Dave could not have opened the lock.

C: Dave is not the thief.

Overall, this argument is invalid, because one of the sub arguments that make it up is invalid. Since this is an imaginary example, we can't really ask whether the premises and sub premises are true or false, but we can tell that the argument is not sound regardless, because it is not valid.

Putting a rough argument into its deductive form is useful to two reasons: It allows us to test the validity of the argument.

It helps us to isolate premises which might be implicit and which might be contentious.

Deductive arguments can get very complicated, as you will see if you go on to further studies in philosophical logic. No matter how complicated they get, though, they are judged according to whether they are valid, and further, whether they are sound.