Basic Concepts of Logic

2014.05.06

PHIL 180: Introductory Logic

Arguments

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- The thing that the argument is arguing *for* is called the *conclusion* of the argument.
- The reasons which are presented in the conclusion's favor are called the *premises* of the argument.

A Sample Argument?

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premises —

1. Gay marriage is morally tantamount to polygamy
2. Polygamy is wrong.

conclusion —

3. So, gay marriage is wrong.

A Sample Argument?

- Some interpreted Perkins as making this argument:

1. Legalizing gay marriage will lead to the legalization of polygamy.
2. We ought not legalize polygamy.

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3. So, we ought not legalize gay marriage.

- So understood, Perkins is making a claim about the likely *causal consequences* of legalizing gay marriage.
- This would be (what we will later call) a *slippery slope* argument.

A Sample Argument?

- But perhaps we should understanding him as making a claim, not about the likely causal consequences, but rather about what we implicitly commit ourselves to by thinking that we ought to legalize gay marriage:

1. If we ought to legalize gay marriage, then we ought to legalize polygamy.
2. We ought not legalize polygamy.

---

3. So, we ought not legalize gay marriage.

A Sample Argument?

- Maybe Perkins is merely providing an objection to a premise in somebody *else's* argument, *i.e.*,

1. If all loving relationships deserve the rights of marriage, then loving polygamous relationships deserve the rights of marriage.
2. Loving polygamous relationships don't deserve the rights of marriage.

---

3. So, not all loving relationships deserve the rights of marriage.

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- So, what we ought to say about Perkins' statements will depend upon how we ought understand them.
- Lesson: before we get to evaluating arguments, it is important to figure out *whether the person is making an argument*, and, if so, *what the argument is*.

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- So, this will count as an argument:

1. Bacon isn't meat.
2. Samuel Huntington is spry.
3. Summer will never come.

---

4. So, Elmer Fudd isn't fictional.

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therefore,	hence,	so,	thus,
this entails that	as a result,	for this reason,	we may conclude
consequently,	accordingly,	this implies that	this entails that

Finding Argumentative Structure

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since	for	as	because
given that	owing to	in that	for the reason that
seeing that	seeing as	as is shown by	may be inferred from

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Since the moon's gravity is less than that of the earth, Astronauts on the moon's surface were able to jump higher than they could on earth.

Sabeen is visiting New York because her company was hired to do a workshop there.

Finding Argumentative Structure

The Principle of Charity

When searching for argumentative structure within a passage, attempt to find the argument which is most persuasive.

Finding Argumentative Structure

We must give up some privacy in the name of security. If the homeland is not secure, terrorist attacks orders of magnitudes larger than 9/11 will find their way to our shores. No amount of privacy is worth enduring an attack like this.

Finding Argumentative Structure

1. We must give up some privacy in the name of security.
2. If the homeland is not secure, terrorist attacks orders of magnitude larger than 9/11 will find their way to our shores.

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3. So, no amount of privacy is worth enduring an attack like this.

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3. So, if the homeland is not secure, terrorist attacks like this will find their way to our shores.

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1. If the homeland is not secure, terrorist attacks orders of magnitude larger than 9/11 will find their way to our shores.
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3. So, we must give up some privacy in the name of security.

Conditionals

- Each card below has a letter printed on one side and a number printed on the other side.

9	*J*	*U*	2

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Rule

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- Which cards do you have to flip over in order to figure out whether the claim is true or false?

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Rule

If there is a vowel printed on one side of the card, then there is an even number printed on the other.

- Which cards do we have to turn over in order to discover whether the rule is being obeyed?

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Rule

If there is a vowel printed on one side of the card, then there is an even number printed on the other.

- Which cards do we have to turn over in order to discover whether the rule is being obeyed?
  - All of them?

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Rule

If there is a vowel printed on one side of the card, then there is an even number printed on the other.

- Which cards do we have to turn over in order to discover whether the rule is being obeyed?
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Conditionals, again

Each card has an age printed on one side and a beverage printed on the other.

Beer	22	16	*Coke*

Rule

If the age on one side is less than 21, then the drink on the other side must not be alcoholic.

- Which cards do we have to turn over in order to find out whether the rule is being obeyed?

Conditionals

- Claims of the form

  If *blah*, then *bleh*.

  are called *conditionals*.

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- Alternatively: they say that the truth of *Q* is *necessary* for the truth of *P*.

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- *X* is necessary for *Y* if and only if everything which is *Y* is also *X*.
  - Being European is necessary for being French.

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  - Being a triangle is necessary for being an equilateral triangle.

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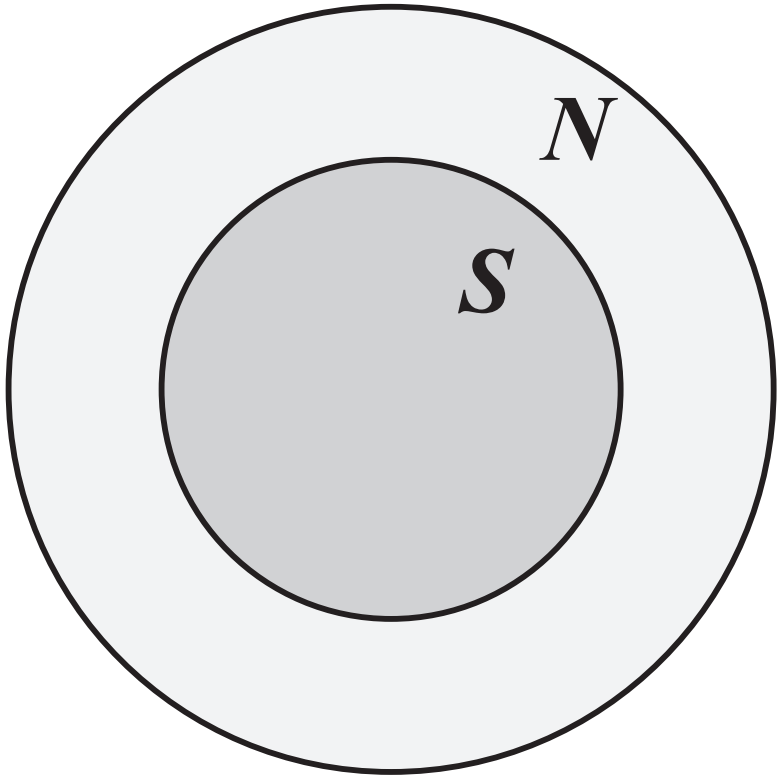

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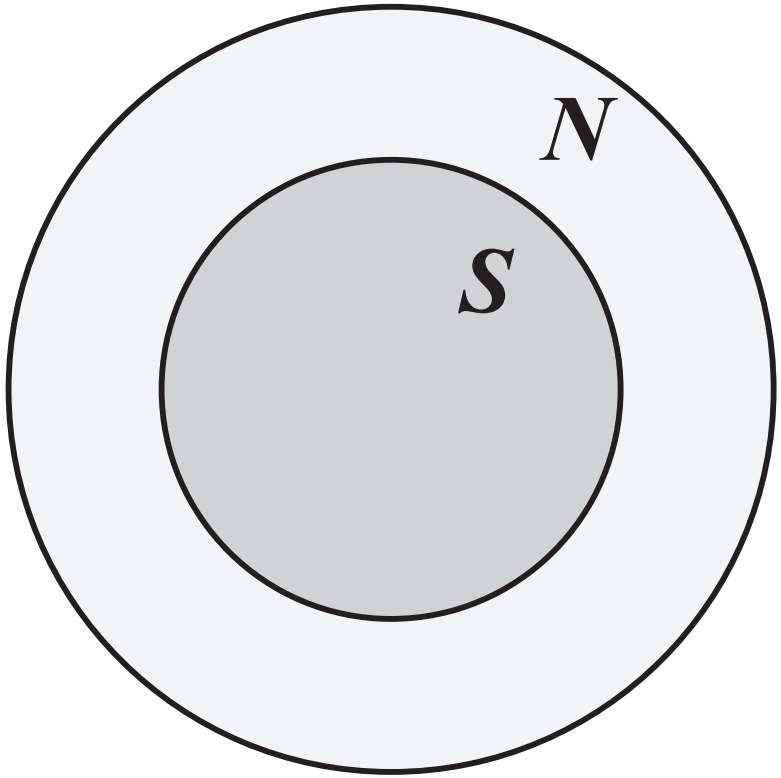

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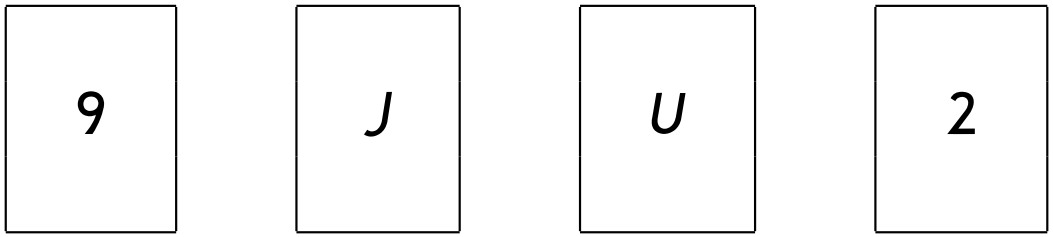

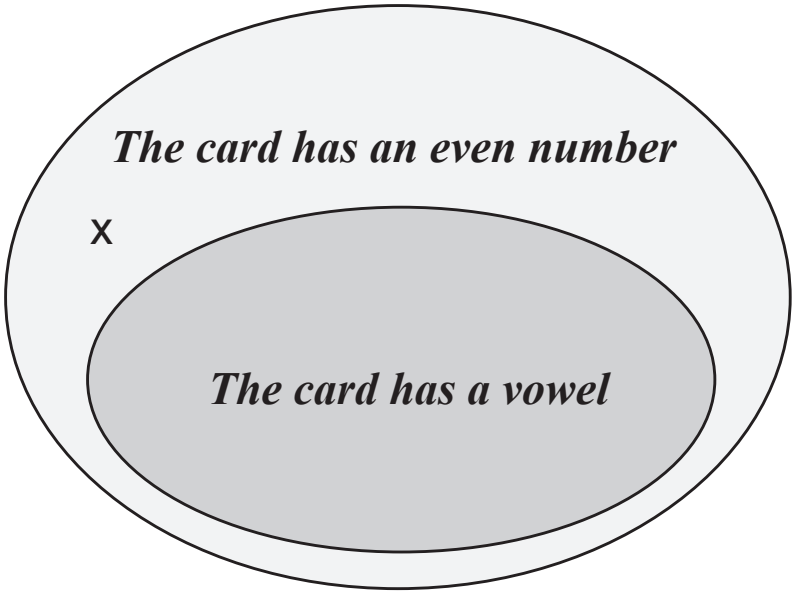

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An argument is <u>deductively valid</u> if and only if it is impossible for all of its premises to be true while its conclusion is simultaneously false.

Deductive Validity

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1. If Obama is president, then he is the commander in chief.
2. Obama is president.

---

3. So, Obama is the commander in chief.

1. Gerald is either in Barcelona or in New York.
2. Gerald is not in New York.

---

3. So, Gerald is in Barcelona.

1. Sabeen is younger than 30.

---

2. So, Sabeen is younger than 40.

Deductive Validity

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- If the truth of the premises is enough to guarantee the truth of the conclusion, then the argument is valid, *whether or not the premises actually are true*.
- If all of the premises of a deductively valid argument are all true, then we say that the argument is *sound*.

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Deductive Soundness

An argument is <u>deductively sound</u> if and only if it is deductively valid and it has all true premises.

In Class Exercise!!!

Special Cases of Validity

Deductive Validity

An argument is deductively valid if and only if it is impossible for all of its premises to be true while its conclusion is simultaneously false.

- If it is impossible for an argument's premises to all be true, then it is impossible for all of an arguments premises to be true while its conclusion is false.

Special Cases of Validity

Deductive Validity

An argument is deductively valid if and only if it is impossible for all of its premises to be true while its conclusion is simultaneously false.

- If it is impossible for an argument's premises to all be true, then it is impossible for all of an arguments premises to be true while its conclusion is false.
- So this is a deductively valid argument:

1. It is raining.
2. It is not raining.

---

3. So, chocolate falls from the sky every Thursday.

Special Cases of Validity

Deductive Validity

An argument is deductively valid if and only if it is impossible for all of its premises to be true while its conclusion is simultaneously false.

- If it is impossible for an argument's conclusion to be false, then it is impossible for all of the argument's premises to be true while its conclusion is false.

Special Cases of Validity

Deductive Validity

An argument is deductively valid if and only if it is impossible for all of its premises to be true while its conclusion is simultaneously false.

- If it is impossible for an argument's conclusion to be false, then it is impossible for all of the argument's premises to be true while its conclusion is false.
- So this is a deductively valid argument:

1. Barack Obama is a space alien.
2. Sunday follows Friday.

---

3. So, if it's raining, then it's raining.

Inductive Strength

- Not every persuasive argument is *deductively valid*.

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- Consider, for instance,

1. Every morning, the sun has risen in the east.

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- Is this argument deductively valid?

Inductive Strength

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- Consider, for instance,

  1. Every morning, the sun has risen in the east.

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  3. So, tomorrow, the sun will rise in the east.

- Is this argument deductively valid?
- No, but it is still *very* persuasive. It's still a *very* good argument.

Inductive Strength

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If $\Pr(\text{conclusion} \mid \text{premises}) = x$*, then the strength of the argument from* premises *to* conclusion *is* x*.*

- Say that an argument is *strong*, as opposed to *not strong*, iff $x > 0.5$.

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Inductive Cogency

An argument is inductively cogent if and only if it is inductively strong and it has all true premises.