Introduction

Philosophy 109

Caley Howland

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Preliminaries about me

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Preliminaries about you

- Name you go by and your pronouns!
- Year at Rutgers
- Taken any philosophy before? Major?
- Taken any logic before?

Announcements

- Check you have access to the website and google classroom
- Website: caleychowland.github.io
- Google classroom code: ubex57v

Announcements

- Make sure the syllabus has no contradictions and/or falsehoods
- Course materials will be posted to the website
  - Readings
  - Schedule
  - Homework
- Homework for next time:Read Forallx Section 1, exercises 1-4. Turn it in on the Google classroom.
- Logic is a PENCIL activity!

Announcements Cont'd

- There are TWO Forallx books!
  - Forallx is abbreviated "FaX" on the schedule.
  - Readings for FaX are by *section* numbers.
  - So read all of "Key Notions in Logic" for next time
- Exercises are assigned for each section in terms of question numbers or part letters.
- Hardegree Chs 1 and 2 are also helpful.
  - But in the weeds - read the FaX section first.

Purpose of the Course

- Arm you with some basic tools for evaluating and modelling reasoning and decision-making
- The course has three parts:
  1. Deductive Reasoning: Sentential Logic (Truth-Functional Logic)
  2. Inductive Reasoning and Decision: Probability and Decision Theory
  3. Upshots in Psychology

Structure of the Course

- First, we'll study sentential logic
- Then, we build on this sentential logic using probabilities to model inductive reasoning.
- Then build on this to model rational decision-making
- Finally, we will explore ways in which humans systematically deviate from the rational standards that we have analyzed using these tools (ahem the domain of psychology).

Structure of our Days

- Some lecture
- Powerpoints, some handouts, some board writing
- Problem sets, problem sets!
  - Both as a class and in small groups

Some Bummers

- This course is **inescapably cumulative**
- You MUST:
  - attend class
  - do the reading
  - practice problems
- So before you fall behind, come ask for help!

The Good News

- We are studying formal methods in a piecemeal way; make sure you know each step well and the larger picture is much easier.
- You have access to many of the answers to the daily exercises - use them to your advantage!
  - Don't just copy the answers, study the answers!
- We'll start with the most straightforward kind of symbolic logic, called **sentential logic**.

What is Philosophy?

- As we'll understand it, it's a technical term.
- It isn't what people mean by everyday phrases like "That's just my philosophy man.", or "Philosophy is a way of life."
- Philosophy is the systematic and critical study of "fundamental" questions, which requires:
  - thinking and reading critically
  - analyzing and assess arguments
  - **constructing logically tight arguments**

Uh Oh

- So in a way - we aren't *doing* philosophy in this class.
- We are learning the mathematical and logical tools required to do philosophy.
  - How do we construct logically tight arguments if we dont' know any logic!
- it's hard to do philosophy if we aren't clear on what makes for a good and a bad philosophical argument
  - but philosophy isn't the only discipline in which logic is used.
  - many disciplines use logic to give precise theories and models, and to evaluate their own arguments.

So, what is Logic?

- "Logic", as we will use the word, is a technical term.
- It isn't what people mean by everyday phrases like "That person is logical", or "That's illogical, Captain."
- Logic doesn't tell you how people do think, it doesn't tell you how they should think.
  - How people actually think is a question of *psychology*.
  - How people should think is a question for epistemology.

What is Logic?

- Logic is the study of arguments.
- It is concerned with what makes an argument *good* or *bad*.
- "Argument" is again a technical term.
  - It does not mean pleasant disagreements, or fights.

Argument

An argument is a group of statements (or propositions) where one statement is supposed to be supported by the others.

Arguments

Argument

An argument is a group of statements (or propositions) where one statement is supposed to be supported by the others.

- There are two kinds of statements in an argument
  - The conclusion (only one)
  - Premises: statements supposed to provide support for the conclusion.

Argument Examples

Argument

An argument is a group of statements (or propositions) where one statement is supposed to be supported by the others.

- Today is mercury is in retrograde. I am hungry. So the moon is made of cheese.
- If today is Wednesday, then I have class in Scott Hall. Today is Wednesday. So, I have class in Scott Hall.
  - BOTH count as arguments. Because one set of statements is meant to support another.

Statements

Statements

- Statements are declarative sentences.
  - The moon is made of fine cheese.
  - Does Caley understand what planets are?
  - Ouch!
- Statements are either true or false (but not both).
- Sometimes logicians will talk about ‘propositions’: the meaning of sentences.
- Statements are the basic building blocks of logic, they are what make up arguments.

Not Statements

- The following sentences are not statements:

1	What is the atomic weight of Carbon?	Question
2	Let's go to the park today.	Request
3	We suggest that you travel by bus.	Suggestion
4	Turn to the left at the next corner.	Imperative
5	Holy mackeral!	Exclamative

Statements

- The following sentences are statements:
  (1) Boris Johnson lost the Brexit vote.
  (2) Broccoli is a source of vitamin A.
- Statements have truth values.
- They either have the value of true or false (and not both).
- Quick test of whether a sentence is a statement:
  - Does it make sense to respond to it "Is that true?"?

Example Argument

Here are two simple example arguments (inspired by Meatloaf).

A
- Premise 1: If it ain't broke, you should break it.
- Premise 2: It ain't broke.
- Conclusion: Therefore, you should break it.

B
- Premise 1: If it ain't broke, you should break it.
- Premise 2: You should break it.
- Conclusion: Therefore, it ain't broke.

Deduction and Validity

- These are examples of *deductive* arguments.
- Argument A has a very important good-making feature (that B does not): it is valid.

Validity

An argument is *valid* iff If the premises are true, the conclusion must be true. Or, equivalently, it is impossible for the premises to be true and the conclusion false.

Validity and Entailment

Validity

An argument is *valid* iff If the premises are true, the conclusion must be true. Or, equivalently, it is impossible for the premises to be true and the conclusion false.

- When an argument is valid, it's conclusion is said to *follow* from its premises.
- This relationship is called *entailment* or *consequence*.
- A deductive argument is one which purports to be valid. Good deductive arguments are valid.
- When an argument is valid, and all of its premises are true, then we call the argument *sound*.

Examples?

1. If I'm teaching, then I'm not writing a paper.
2. I'm teaching.

   Therefore I'm not writing a paper.

Any more?

Deductive Logic

- Deductive logic is the study of validity.
- Validity is a matter of form, not content.
- A valid argument is one which has a valid form.
- This is what makes it useful to do formal, sentential logic.

- We are going to learn to translate arguments into symbolic forms, to make it easier to determine whether they are valid.
- For instance, the example argument A above can be rendered as:
  1 $P \to Q$
  2 P
  3 $\therefore Q$
- Any argument that has this form will be a valid one.
- This form is so common and important it has a fancy latin name: *Modus Ponens*.
- Argument B has the form of a famous mistake, or formal fallacy, called Affirming the Consequent.

Reading for Next Time

- Forallx Section 1.
  - Note that Forallx is abbreviated "FaX" on the schedule.
  - All readings are given in terms of *section* numbers, rather than chapter numbers.
  - Exercises are assigned for each section in terms of question numbers or part letters, depending on the week.
- Hardegree Chs 1 and 2 are also helpful.