Philosophy 154: Symbolic Logic

Spring 2008

crn#24094 9:35 am-11:00 am DAVSN 0104

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Office Hours: TR 11:30-12:30, 4:00-4:45

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Overview

When we act on falsity, we waste our efforts, get hurt, or die. We need truth to live. We get truth by reasoning: deriving new truths from ones we already have. Logic studies the difference between good reasoning and bad reasoning. The central idea is preserving truth: the patterns of reasoning that give you truth if you start with truth. The best kind of truth preservation is proof. Proof works by exploiting systematic formal patterns in the use of words. Symbolic logic studies these patterns by inventing a system of symbols which have just these formal features, but little or none of the complexities of natural languages: a simple formal language.

In this course we learn this language and how to use it. Along the way we examine the basic concepts of logic: proof, truth, validity, consistency, and others. We then show how these ideas apply to sentences constructed by joining other sentences with words or phrases like 'and', 'or', 'if ... then' and 'not'. We develop techniques for deciding the truth of sentences and the validity of arguments, including a method of deriving true sentences from other true sentences. We then extend the language to deal with words like 'all' and 'some'.

The method of formal languages is tremendously useful in philosophy, mathematics, computer science, linguistics and other areas of intellectual inquiry. Developments in our understanding of symbolic logic in the late 19th century led to an explosion of creative investigation in these fields in the 20th century. Current work in philosophy and many other fields depends on the tools, techniques and results of this creative explosion.

Text

Barwise, J. and Etchemendy, J. (1999). *Language, Proof and Logic*. CSLI Publications, Stanford, CA

Requirements

(a) As with any mathematical system or foreign language, there really is no substitute for constant practice. There are a lot of exercises at the end of each section of the text. Some of them will involve using your computer and the accompanying software. Do as much of these as you can; I may specifically instruct you to do particular exercises from time to time. Generally I won't give you a schedule of when to complete assignments; instead, you should plan to do some every day, and aim to get all the exercises from each chapter done by the time we move on to the next chapter.

We will spend time in class working through particularly hard exercises, and ones you have questions about.

(b) There will be quizzes every other week during the semester and a final. The quizzes will each count for 10% of your grade and the final will count for 40%. For the most part questions on the quizzes will be drawn from exercises in the text.

Schedule

We will work through Parts I and II of our text. We may get ahead or behind. Read the text before class. We will skip the "optional" sections of the text (with perhaps one or two exceptions; also, there's no reason not to work through them if you wish). Do the computer exercises. Other exercises from the text will be assigned several days before the meetings.

Date	Readings	Quizzes
Jan 29, 31	Basic concepts of logic; Chapter 1, Atomic Sentences	
Feb 5, 7	Chapter 2: The Logic of Atomic Sentences	q1
Feb 11, 13	Chapter 3: The Boolean Connectives	
Feb 19	**No class:** Presidents Day	
Feb 21	Chapter 4: The Logic of Boolean Connectives	q2
Feb 26, 28	Chapter 5: Methods of Proof for Boolean Logic	
Mar 4, 6	Chapter 6: Formal Proofs and Boolean Logic	q3
Mar 11, 13		
Mar 18, 20	Spring Recess - **NO CLASS**	
Mar 25, 27	Chapter 7: Conditionals	q4
Apr 1, 3	Chapter 8: The Logic Of Conditionals	
Apr 8, 10	Chapter 9: Introduction to Quantifiers	q5
Apr 15, 17	Chapter 10: The Logic of Quantifiers	
Apr 22, 24	Chapter 11: Multiple Quantifiers	q6
Apr 29, May 1	Chapter 12: Methods of Proof for Quantifiers	
May 6	Chapter 13: Formal Proofs and Quantifiers	
May 13	Final 10:30am to 12:30pm.	**FINAL**