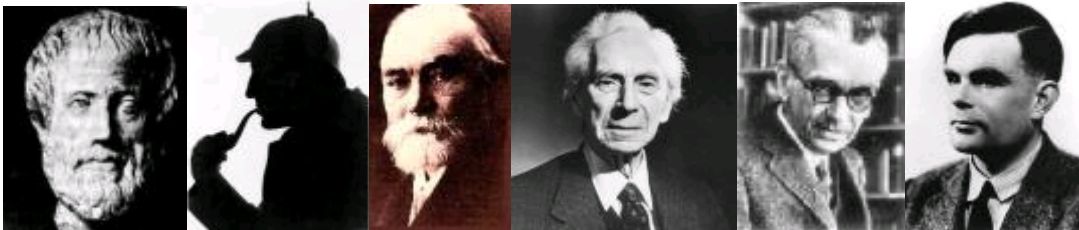


SYLLABUS
Philosophy 6a: Introduction to Symbolic Logic
Brandeis University
Summer 2008: Session II
Miriam Schoenfield



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Lord Snopes has been brutally murdered! Either the maid or the cook did it, or else it was either the butler or the gardener. The maid did it only if it was done silently; but it was done quickly if the cook did it. However, it was done neither silently nor quickly. The gardener did it if but only if it was done with a rope. It was done with a rope only if it was not done quickly. On the other hand, if the cook or butler did it, then it had to be done with a pistol. But if it was done with a pistol, then it wasn't done silently. Furthermore: it wasn't done with a rope.

Sherlock Holmes can take this disorganized collection of facts and deduce the identity of the murderer. But you don't need to be Sherlock Holmes to solve this problem. Symbolic logic provides the concepts and the formal techniques that can elucidate just this sort of deductive reasoning. Anyone can solve the problem by applying the right rules.

WHAT THE COURSE IS ABOUT

This course introduces you to the aims and techniques of modern symbolic logic. The topics to be covered (note: don't worry if you don't understand this yet) include: the logic of truth-functions and quantifiers, the concepts of validity and proof and their relation to formal deduction, and the application of formal techniques (truth tables, truth trees, natural deduction proofs) to everyday reasoning. Time permitting, parts of each class on Friday will be used to discuss interesting applications of logic to various puzzles and problems in philosophy.

There are no prerequisites for the course; no philosophy, engineering, math, or computer background is presupposed. One of my goals is to help students who have felt intimidated by formal or symbolic systems feel more comfortable with this sort of material, and experience the satisfaction that comes from working out a difficult problem. We will start slowly, but we will pick up steam as we go. Since the summer session is only five weeks, it's important to keep up with the material. If there is something you're having trouble with, let me know as soon as possible, so I can help. The material is cumulative, so it's important to address difficulties as they come up, rather than waiting for the day before the final exam.

REQUIRED TEXT

Joseph Bessie and Stuart Glennan, Elements of Deductive Inference: An Introduction to Symbolic Logic, Wadsworth Publishing, 2000

WHAT WILL BE EXPECTED OF YOU

Readings & Exercises. It is very important that you do the reading and at least *try* some of the exercises in the book before class. I will be making specific reading assignments, but I will not be grading the exercises. A good rule of thumb for the exercises: try the first few; if they're easy, jump to the hardest ones at the end; if you have trouble, use these to figure out what you don't know; go back and re-read relevant section.

Problem Sets. Submit problem sets as assigned. There will be **5 problem sets** (about one per week), and they will account for 50% of your grade. Problem Sets up to one day late will be accepted for half-credit. No late work is accepted after the answer sheet is posted or handed out (even if you're not in class that day). Try solving the problems yourself, first. But if you're having trouble, set up an appointment with me, and we can work through them together.

Tests. There will be **2 tests**, a midterm, worth 20% of your grade, and a final, worth 30% of your grade.

Practice tests (with answers) will be available in advance, but answering a real test question often will require you to apply your knowledge to new problems not specifically discussed in class nor in the book. This ability to use your knowledge in new situations requires study activities different from memorizing. The most effective way to study for such an exam is to practice with lots of problems. We will have a review session before exams, and in general, you should feel free to set up an appointment with me to discuss any questions you might have.

Attendance and class participation. Classes will be held M,T,Th and F from 11:00am-1:00pm, between July 7 and August 8.

Although I will not take attendance on a regular basis, it is highly recommended that you attend all classes. You are responsible for material discussed in class, even if it is not in the book. Questions and participation are highly encouraged.

DISABILITIES

If you are a student with a documented disability on record at Brandeis University and wish to have a reasonable accommodation made for you in this class, please see me as soon as possible.

**ASSIGNMENT SCHEDULE: Phil 6a
Brandeis University Summer 2008**

- July 7 (Mon) INTRODUCTION: WHAT LOGIC IS ABOUT, CH 1.
- July 8 (Tues) A LOGICAL LANGUAGE: SL
TRUTH FUNCTIONALITY AND THE SL CONNECTIVES
Sections 2.1, 2.2, 2.3
- July 10 (Thu) REPRESENTING ORDINARY LANGUAGE IN SL
SL AS A FORMAL LANGUAGE

Sections 2.4, 2.5
- July 11 (Fri) TRUTH TABLES: TRUTH FUNCTIONALITY ON DISPLAY
Sections 3.1, 3.2
PROBLEM SET #1 DUE
- July 14 (Mon) FORMAL SEMANTICS
USING TRUTH TABLES TO DIAGNOSE LOGICAL PROPERTIES I:
VALID ARGUMENTS AND TAUTOLOGIES
Sections 3.3, 3.4
- July 15 (Tues) USING TRUTH TABLES TO DIAGNOSE LOGICAL PROPERTIES II:
CONTRADICTIONS, EQUIVALENCES, CONTINGENT SENTENCES, AND
CONSISTENCY
Sections 3.5, 3.6
- July 17 (Thu) TRUTH TREES I: HOW TO CONSTRUCT THEM
Sections 3.9, 3.10
- July 18 (Fri) TRUTH TREES II: HOW TO USE THEM TO TEST FOR LOGICAL
PROPERTIES
APPLICATIONS: KNIGHTS AND KNAVES
Section 3.11
PROBLEM SET #2 DUE
- July 21 (Mon) NATURAL DEDUCTION PROOFS AS TESTS FOR LOGICAL PROPERTIES
I: THE WHOLE LINE RULES
Sections 4.1, 4.2
- July 22 (Tues) NATURAL DEDUCTION PROOFS AS TESTS FOR LOGICAL PROPERTIES
II: EXTENDING THE RULE SET
CONDITIONAL PROOF AND REDUCTIO AD ABSURDUM
Sections 4.3, 4.4
- July 24 (Thu) **MIDTERM**
- July 25 (Fri) NATURAL DEDUCTION PROOF STRATEGIES
APPLICATIONS: THE TORTOISE AND THE HARE, MP
Section 4.5

- July 28 (Mon)** **USING PROOFS TO TEST OTHER LOGICAL PROPERTIES
METATHEORY
Sections 4.6, 4.7**
- July 29 (Tues)** **PREDICATE LOGIC – GETTING A FEEL FOR THE LANGUAGE
Sections 5.1, 5.2, 5.3
PROBLEM SET #3 DUE**
- July 31 (Thu)** **SEMANTICS: UNDER WHAT CONDITIONS ARE PL SENTENCES TRUE?
Sections 5.4, 5.5**
- August 1 (Fri)** **SEMANTICS CONTINUED: TRANSCRIBING ENGLISH INTO PL
APPLICATIONS: THE SORITES PARADOX
Sections 5.6**
- August 4
(Mon)** **A BIT MORE SEMANTICS
TRUTH TREES FOR L
Sections 5.7, 6.1, 6.2**
- August 5
(Tues)** **TRUTH TREES CONTINUED
INFINITE TREES AND E*
Ch 3: pp. 86-98
PROBLEM SET #4 DUE**
- August 7 (Thu)** **REVIEW**
- August 8 (Fri)** **FINAL EXAM**