Introduction to Logical Reasoning

Review #2

Modern Symbolic Logic

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The Skills You Have Practiced...

1. Translating English into the language of logic,

2. Assessing arguments with truth tables, and

3. Assessing arguments with natural deduction.

Translating English to Logic

Translating English to the language of logic requires determining the logical form of a statement, or a series of statements.

Common Problems

Remember the compound statement indicator words. But do not get complacent—you are not a robot!

Common Conjunctive Indicators

and	but	while
both . . . and . . .	yet	however
also	though	furthermore

Common Disjunctive Indicators

or	either . . . or . . .	unless

Common Hypothetical Indicators

if . . . then . . .	if [vs.] only if	necessary [vs.] sufficient

Common Problems

There are still some tricky patterns to remember:

– "not both" vs. "both not",

– "sufficient" vs. "necessary",

– "if" vs. "only if", and

– commas distinguishing sub-statements with parentheses.

Examples

Statement 1

Getting straight A's is sufficient for making the Dean's list.

Statement 2

Getting an A in logic is necessary for getting straight A's.

Truth Table Argument Assessment

When assessing the validity of an argument with a truth table, you are doing the following:

1. Translating the argument (if it is in English) into the language of symbolic logic,

2. Putting the argument into argumentative form,

3. Constructing a complete truth table that includes columns for each premise and the conclusion, and

4. Seeing if the conclusion is true whenever all premises are true.

Common Problems

People often get confused about setting up the rows of the truth table. Remember that there will be 2^n lines, where n is the number of simple positive statements involved. Then, do not forget how to fill in the initial T's and F's for these simple positive statements.

People also get confused about which lines to look at for checking validity once the table is filled in.

Example

If I study hard then I will pass logic. Furthermore, if I pass logic then I will make the Dean's list. Therefore, if I study hard then I will make the Dean's list.

Natural Deduction

When assessing the validity of an argument with natural deduction, you are doing the following:

1. Translating the argument (if it is in English) into the language of symbolic logic,

2. Putting the argument into argumentative form, and

3. Using the nine rules of inference to derive the conclusion from the premises.

Common Mistakes

There are a variety of distinct problems when doing natural deduction:

1. Forgetting or mixing up the nine rules of inference,
2. Not recognizing the simpler patterns when they appear,
3. Not keeping track of "what I need" and "what I can get",
4. Mixing up the numbers when stating a justification,
5. Forgetting the last line will be the argument's conclusion, and
6. Panicking and giving up when things get tough.

Example

1. $(E \vee F) \rightarrow (G \,\&\, H)$.
2. $(G \vee H) \rightarrow I$.
3. E.

$\therefore$ I.

Next Class...

Exam #1 will begin promptly at 3:30PM in **lecture hall 1202**. Please show up and be seated by that time.

Be aware that you will be asked to put anything you bring (including cell phone) in the aisle or the back of the room. You will *not* be able to leave the room until you finish the exam. Plan accordingly. You will be provided with two pencils, one pen, and scratch paper.

Otherwise, please do not forget to turn in your response to the Review Session #2 Questionnaire on your way out.