Clarion-Venango Hurley Logic Chapter 1 Notes

1.1 Arguments, Premises and Conclusions

Concepts:

These are terms you should be able to define and recognize after covering Section 1.1.
1. definition of logic
2. definition of an argument
   You will be responsible for memorizing this definition (word for word) on the first quiz and midterm. It is the only instance when I will ask you to memorize material in this fashion.
3. statement
4. truth values: statements are either true or false
5. premise & conclusions indicators
6. Know the difference between "For this reason" and "for the reason that."
7. Not all arguments have premise and conclusion indicators. When you are faced with such an argument attempt to find the "topic sentence" or main point of the argument. Good bets for its location are the first or last sentence of the argument.
8. inference
9. proposition

Premise Indicators	**Conclusion Indicators**
• since	• therefore
• as indicated by	• wherefore
• because	• accordingly
• for	• we may conclude
• in that	• entails that
• may be inferred from	• hence
• as	• thus
• given that	• consequently
• seeing that	• we may infer that
• for the reason that	• whence
• inasmuch as	• so
• owing to	• it follows that
	• implies that
	• as a result

1.2 Recognizing Arguments

Concepts:

These are terms you should be able to define and recognize after covering Section 1.1.
- factual claim
- inferential claim: explicit & implicit
- two uses of the word "since" temporal versus logical sense
- the role of interpretation in evaluating information/arguments
- Non-arguments lacking inferential claims
- Be careful to note that reports, explanations, expository passages and illustrations as well as arguments may look quite similar and the author is often inconsistent when he applies these labels in the exercises that follow.

Breakdown:

Passages lacking an inferential claim:

1. **Warnings:** often end in an exclamation point.
2. **Pieces of Advice**
3. **Statements of Opinion:** these must always be supported by evidence to be considered arguments in the strict logical sense.
4. **Loosely Associated Statements:** these are statements in which the premise will not bear any common-sense or logical relation to the conclusion.
5. **Report:** absent here is the claim that the statements support or imply anything; report passages should read like a chronicle of events without the interjection of opinion.
6. **Expository passage:** just as it sounds, this is merely an explanation.
- **NOTE:** some passages can be interpreted both as expository passages and as arguments.
6. **Illustration:** statement and examples that further clarify the category being discussed. For our class, think of an illustration as a set of instructions, a how-to procedure.
7. **Explanations:**

   Two Parts:

   1. Explanans: "statement or group of statements that purports to do the explaining" reasons.
   2. Explanandum: "statement that describes the event of phenomenon to be explained"

   > **NOTE:** the method for distinguishing arguments from explanations; there must be an element of persuasion present to classify a passage in the argument category. If a passage presents generally known facts, then it is an explanation.

8. **Conditional Statements:**
   - These are "if … then" statements.

- ◦ Review the definition of antecedent & consequent.
- ◦ One conditional statement does not an argument make.
- ◦ Note the rules for recognizing conditional statements as arguments.
- ◦ Necessary & Sufficient conditions: based on the conditional statement: If A, then B.
  1. **Necessary**: A cannot occur without the occurrence of B.
  2. **Sufficient**: the occurrence of A is all that is needed for the occurrence of B.
- ◦ This is an idea that you will encounter again and again in academic writing and argumentative literature. For those planning a trip to law school, this is a critical concept.
- Context is everything and the intended audience plays a large role in determining what the context actually is.
- There is a wealth of ambiguity here. Note the paragraph on mid-21 about explanations that resemble arguments.

Summary:
1. Look for indicator words (Section 1.1)
2. an inferential relationship between statements, and
3. typical kinds of non-arguments discussed in this section.

1.3 Deduction and Induction

Numbers in parenthesis refer to page numbers in the text.

Deductive Argument: conclusion follows necessarily from the premises (100%) certainty

Indicator words: certainly, absolutely, definitely
See examples
Types of Deductive Arguments:

1. arguments based on mathematics
2. arguments from definition
3. categorical syllogisms
4. hypothetical syllogisms
5. disjunctive syllogisms

Language Patterns for syllogisms & examples:

Categorical Syllogisms:
- A set of three statements placing objects/persons into categories/groups.
- The statements always begin with the words: All, No or Some.
- The pattern:

All cats are mammals.
All mammals are animals.
Therefore, all cats are animals.

Some fish are not trees.
No trees are plants.
Therefore, some fish are not plants.

Hypothetical Syllogisms:

- A conditional statement (If [antecedent]_____, then _[consequent]_____.) paired with two other statements that repeat the antecedent and consequent.
- The pattern:

If I receive a paycheck this week, then I should be able to pay the bills.
I received a paycheck this week.
Therefore, I should be able to pay the bills.

If the snow total runs over 35" this season, then we will need more money to salt the roads.
We will not need more money to salt the roads.
Therefore, the snow total is not over 35".

Disjunctive Syllogisms:

- An Either _____ or _____. statement paired with two other statements in which one alternative is eliminated and we are left with the remaining alternative.
- The pattern:

Either we pay the rent or we will be evicted.
We did not pay the rent.
Therefore, we will be evicted.

Either taxes will be raised or we will run up large deficits.
Taxes will not be raised.
Therefore, we will run up large deficits.

Inductive Argument: conclusion follows probably from the premises (51% or better)

Indicator words: improbable, plausible, implausible, likely, unlikely, reasonable
Types of Inductive Arguments:

1. predictions
2. arguments from analogy
3. inductive generalizations
4. arguments from authority
5. arguments based on signs
6. causal inferences

Factors that help us decide between deductive and inductive arguments:

1. The presence of indicator words.
2. The "actual strength of the inferential ink between premises and conclusions."
3. Instances in which the conclusion does not follow from the premises either necessarily or probably.
4. **The easiest way to learn to distinguish deductive from inductive arguments is to learn to recognize the deductive argument forms on**

sight. If your argument does not follow the form [i.e., language pattern] of a deductive argument, then it is necessarily inductive by the process of elimination.

Some cautions/notes from reading:
- Geometric arguments are always deductive
- Scientific arguments can be either inductive or deductive.
- The common definition for distinguishing between deductive and inductive arguments (general/particular) does not hold.

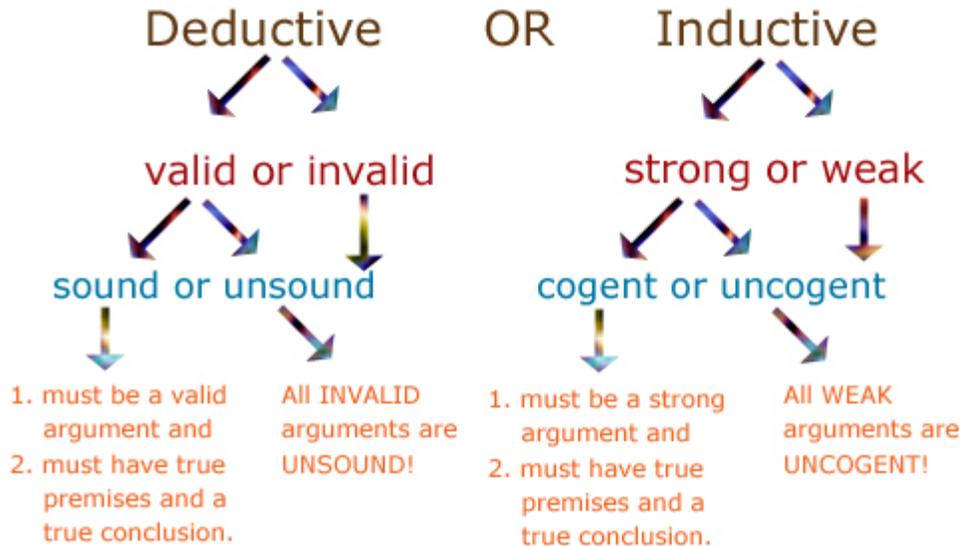# 1.4 Validity, Truth, Soundness & Cogency

Valid Deductive Arguments

- There is no middle ground;an argument is either valid or invalid.
- Validity is not determined by the truth or falsity of the premises.
- Validity is determined by the relationship between premises and conclusion (i.e., Ask yourself: do the premises support the conclusion?).
- View chart. Note that all invalid arguments are unsound.
- **Sound argument** = true premises, true conclusion Both conditions must be met for an argument to be sound. *There is only one kind of sound argument.*

Inductive Arguments

- **Strong Inductive Argument** = "improbable that premises are true and conclusion is false"
  - Strong arguments have a probability of 51% or greater. See examples. The conclusion, however, is not guaranteed, it is only likely.
  - "A cogent argument is strong and has all true premises; if either condition is missing, the argument is uncogent. "In a cogent argument the premises must not ignore relevant information that would make them untrue.
- **Weak Inductive Argument** = "conclusion does not follow probably from the premises"
  - See examples.
  - *Read section on probabilistic support*; support is at issue here, not the truth or falsity of the premises.
  - Review chart p.49. *Notice that there is only one type of sound, cogent argument: true premises, true conclusion.*

Deductive & Inductive decision tree

Deductive OR **Inductive**

Deductive → valid or invalid
- sound or unsound
  - 1. must be a valid argument and
  - 2. must have true premises and a true conclusion.
  - All INVALID arguments are UNSOUND!

Inductive → strong or weak
- cogent or uncogent
  - 1. must be a strong argument and
  - 2. must have true premises and a true conclusion.
  - All WEAK arguments are UNCOGENT!

1.5 Argument Forms: Proving Invalidity

Numbers in parenthesis refer to page numbers in the text.
This week we are looking at the validity/invalidity of deductive arguments. "The validity of an argument has nothing to do with its specific subject matter. ...Its validity rests purely upon the arrangement of the letters within the statements and it has nothing to do with what the letters might stand for."
The process of "uniformly substituting terms or statements in place of the letters in an argument form is called a **substitution instance** of that form."

Valid Form: Categorical Syllogism	Invalid Form: Categorical Syllogism
All A are B. <u>All B are C.</u> All A are C.	All A are B. <u>All C are B.</u> All A are C.

Counterexample Method:

- **WHY IS IT USEFUL?**: We use the counterexample method to prove invalidity; it cannot be used to prove validity.
  - **APPLICATION:** This technique is commonly used in the *legal field* to show that the opponents argument does not hold together. Another situation in which we routinely hear counterexamples is *during political debates* when one opponent attempts to discredit the other's arguments by providing parallel examples that expose the absurdity of the underlying logical structure. View any *op-ed page* in a major newspaper and you are sure to find at least one counterexample.
- **HOW DOES IT WORK?** This method proves an argument invalid by generating an example of a given argument form with true premises and a false conclusion.
- Please note that the technique of using a counterexample to prove arguments invalid only works for deductive arguments.
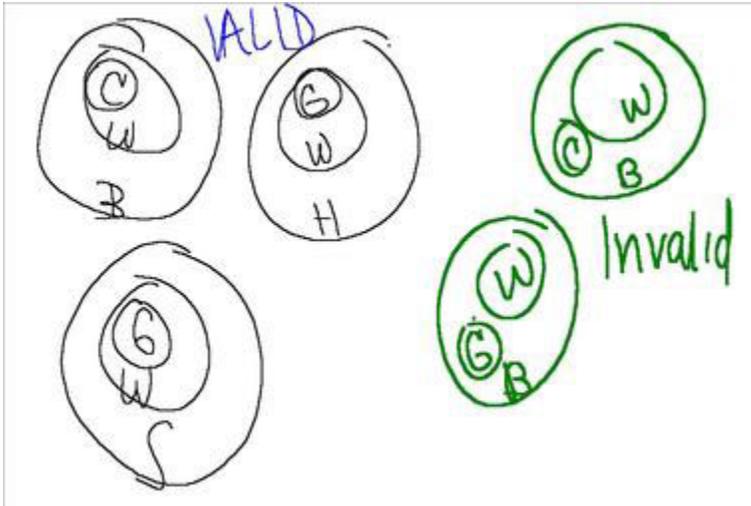
STEP-BY-STEP METHOD FOR PROVING AN ARGUMENT INVALID BY THE METHOD OF COUNTEREXAMPLE:

1. **Locate the conclusion** of the argument.
2. **Symbolize the given argument using statement letters in place of phrases.** This reveals the argument's form.
3. **Consistently substitute the generic terms:** cats, dogs, mammals, fish and animals to generate an argument with true premises and a false conclusion.
4. It is helpful to **begin your term substitutions with the conclusion** by choosing two terms that make it false.
5. Next, work through the premises **selecting a third term that makes the premises true**.
6. If you are presented with a hypothetical syllogism, try using the suggested substitutions: e.g., Abraham Lincoln, suicide and dead. The goal is to use terms that have a necessary connection (e.g., rain-wet, snow-cold, suicide-dead).
7. If the conclusion is a conditional statement, join a true antecedent with a false consequent.

Things to remember when working on substitution:
- Be sure to separate form words from content words. Form words for categorical and hypothetical syllogisms are: "all", "no", "some", "are", "not", "if", and "then." In addition, other types of deductive arguments include the form words: "either", "or", "both", and "and."
- **Remember the word "some" means "at least one" in logic.**
- This technique is difficult at first, but like other challenging endeavors, will **get easier with practice**. Thus, you should try to do as many problems as you can to gain skill and confidence.
- **If you are struggling** with a particular problem and cannot generate a counterexample, **move on to other problems** and return to the difficult one later.

Smartboard Notes from Chapter 1 Lectures: