4.1 The Components of Categorical Propositions

- Categorical Propositions:
  - Relate subject terms and predicate terms.
  - Either all or part of the class denoted by the subject term is included or excluded from the class denoted by the predicate term.
4.1 Continued

- Standard Form:
  - Requires the quantifiers “all,” “no,” or “some.”
  - The subject term is a noun or noun phrase.
  - The copula, or links between subject and predicate terms are “are” or “are not.”
  - The predicate term is a noun or noun phrase.
4.2 Quality, Quantity and Distribution

- **Quality:**
  - **Affirmative:**
    - All $S$ are $P$.
    - Some $S$ are $P$.
  - **Negative:**
    - No $S$ are $P$.
    - Some $S$ are not $P$. 
4.2 Continued

- Quantity
  - Universal:
    - All $S$ are $P$.
    - No $S$ are $P$.
  - Particular:
    - Some $S$ are $P$.
    - Some $S$ are not $P$. 
4.2 Continued

Letter Names of Propositions:

- A: universal affirmative
- E: universal negative
- I: particular affirmative
- O: particular negative
4.2 Continued

Distribution:

- Applies to terms not propositions.
- Is something being asserted about every member of the $s$ or $p$ class?

Two mnemonic devices for distribution:

"Unprepared Students Never Pass"
- Universals distribute Subjects.
- Negatives distribute Predicates.

"Any Student Earning B's Is Not On Probation"
- A distributes Subject.
- E distributes Both.
- I distributes Neither.
- O distributes Predicate.
Aristotle held that universal propositions about existing things have existential import.

George Boole held that no universal propositions have existential import.

John Venn (who perfected Boole’s theory) developed a system of diagrams to represent the information they express.
4.3 Continued

Shading = emptiness
X = existence

A: All S are P.
E: No S are P.
I: Some S are P.
O: Some S are not P.
Immediate Inferences have only one premise, which proceeds immediately to the conclusion.

Some trade spies are not masters of bribery.

Therefore it is false that all trade spies are masters of bribery.
4.3 Continued

- Unconditionally Valid arguments are valid from the Boolean standpoint, regardless of whether they refer to existing things.

- Testing immediate inferences for validity:
  It is false that all $A$ are $B$.
  It is false that some $A$ are $B$.
  We diagram the following way:
Some $T$ are not $M$. Therefore, it is false that some $T$ are $M$. We diagram the following way:

It is false that all $M$ are $C$. Therefore, no $M$ are $C$. We diagram the following way:

And finally, All $S$ are $W$. Some $S$ are $W$. 
The Existential Fallacy is a formal fallacy that occurs whenever an argument is invalid merely because the premise lacks existential import.

All $A$ are $B$.
Therefore some $A$ are $B$.

It is false that some $A$ are not $B$.
Therefore it is false that no $A$ are $B$. 
4.4 Conversion, Obversion and Contraposition

- **Conversion**
  - Subject and predicate switch places.
    - No cats are dogs; no dogs are cats.
4.4 Continued

Obversion:

- Change quality, not quality.
- Replace predicate with its term complement.

All horses are animals, no horses are non-animals.
Contraposition:

- Subject and predicate switch places.
- Replace each with its term complement.

All horses are animals; all non-animals are non-horses.
Adopts the Aristotelian standpoint that universal propositions about existing things have existential import.

- **Contradictory** = opposite truth value.
  - Contradictories: A–O and E–I (same as modern square).

- **Contrary** = at least one is false.
  - Contraries: A–E.
4.5 Continued

- Subcontrary = at least one is true.
  - Subcontraries: I–O.

- Subalternation:
  - Truth “Flows Down” from A–I and E–O.
  - Falsity “Flows Up” from I–A and O–E.
4.5 Continued

- Testing Immediate Inferences:
  - All Swiss watches are true works of art. Therefore it is false that no Swiss watches are works of art.
  - The Existential Fallacy: from the Aristotelian standpoint, committed only when contrary, sub-contrary and subalternation are correctly used to draw inferences about things that do not exist.
4.5 Continued

- Conditionally Valid applies to an argument from the Aristotelian standpoint, when we are not certain whether the subject term of the premise actually denotes an existing thing.

<table>
<thead>
<tr>
<th>Existential fallacy examples: Two standpoints</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>All cats are animals.</strong></td>
</tr>
<tr>
<td><strong>Some cats are animals.</strong></td>
</tr>
<tr>
<td><strong>Boolean:</strong> Invalid, existential fallacy</td>
</tr>
<tr>
<td><strong>Aristotelian:</strong> Valid</td>
</tr>
<tr>
<td><strong>All unicorns are animals.</strong></td>
</tr>
<tr>
<td><strong>Some unicorns are animals.</strong></td>
</tr>
<tr>
<td><strong>Boolean:</strong> Invalid, existential fallacy</td>
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<tr>
<td><strong>Aristotelian:</strong> Invalid, existential fallacy</td>
</tr>
</tbody>
</table>
Symbolize Universal categorical propositions from the Aristotelian standpoint.

- The Aristotelian standpoint is that universal propositions have existential import when they refer to existing things.
4.6 Continued

- Proving the Traditional Square of Opposition Through the Use of Venn Diagrams
4.6 Continued

- Testing Immediate Inferences from the Aristotelian Standpoint
  - If inferences are valid, they are valid from both Aristotelian and Boolean standpoints.
  - Invalid Boolean references may be valid from the Aristotelian standpoint.

1. Test an inference form for validity from the Boolean Standpoint.

2. Then adopt the Aristotelian standpoint (above).
1. Test a complete inference form for validity from the Boolean Standpoint.

2. Then, since it is invalid from the Boolean standpoint, adopt the Aristotelian standpoint.
Terms Without Nouns

- If a term consists only of an adjective, a plural noun or pronoun should be introduced to make the term genuinely denotative.

Some roses are red.
Some roses are red flowers.
Nonstandard Verbs

Statements in ordinary usage often incorporate forms of the verb “to be” rather than “are” and “are not.”

Some college students will become educated.
Some college students are people who will become educated.
Singular Propositions and the Use of Parameters

This proposition makes an assertion about a specific noun, while the parameter affects the form, not the meaning.

George went home.
All people identical to George are people who went home.
Adverbs and Pronouns

Spatial and temporal adverbs may be respectively translated in terms of places and times.

He is always clean shaven.
All times are times he is clean shaven.
Unexpressed Quantifiers

- Be guided by the most probable quantifier.

  Emeralds are green gems.
  All emeralds are green gems.

  Or

  There are lions in the zoo.
  Some lions are animals in the zoo.
Nonstandard quantifiers

Other than “All”, “Some” or “No.”

Standard quantifier: Some soldiers are heroic.
Nonstandard quantifier: A few soldiers are heroes.
Conditional Statements

If it is a mouse then it is a mammal.
All mice are mammals.

If it is a turkey, then it is not a mammal.
No turkeys are mammals.
Exclusive Propositions

“Only,” “None but,” “None except,”

None but the brave deserve the fair.
All people who deserve the fair are brave people.
The Only”: Statements beginning with “the only” are translated differently than those that begin with “only.”

The only animals that live in this canyon are skunks. All animals that live in this canyon are skunks.
4.7 Continued

- **Exceptive Propositions**
  - Take the forms, “All except $S$ are $P$” and “All but $S$ are $P$.”

<table>
<thead>
<tr>
<th>Key word (to be eliminated)</th>
<th>Translation hint</th>
</tr>
</thead>
<tbody>
<tr>
<td>whoever, wherever, always, anyone, never, etc.</td>
<td>use “all” together with people, places, times</td>
</tr>
<tr>
<td>a few, several, many</td>
<td>use “some”</td>
</tr>
<tr>
<td>if ... then</td>
<td>use “all” or “no”</td>
</tr>
<tr>
<td>unless</td>
<td>use “if not”</td>
</tr>
<tr>
<td>only, none but, none except, no ... except</td>
<td>use “all”</td>
</tr>
<tr>
<td>the only</td>
<td>use “all”</td>
</tr>
<tr>
<td>all but, all except, few</td>
<td>two statements required</td>
</tr>
<tr>
<td>not every, not all</td>
<td>use “some ... are not”</td>
</tr>
<tr>
<td>there is, there are</td>
<td>use “some”</td>
</tr>
</tbody>
</table>

- **All except students are invited.**
- **No students are invited people and all non-students are invited people.**