Aristotelian/Traditional Categorical Logic

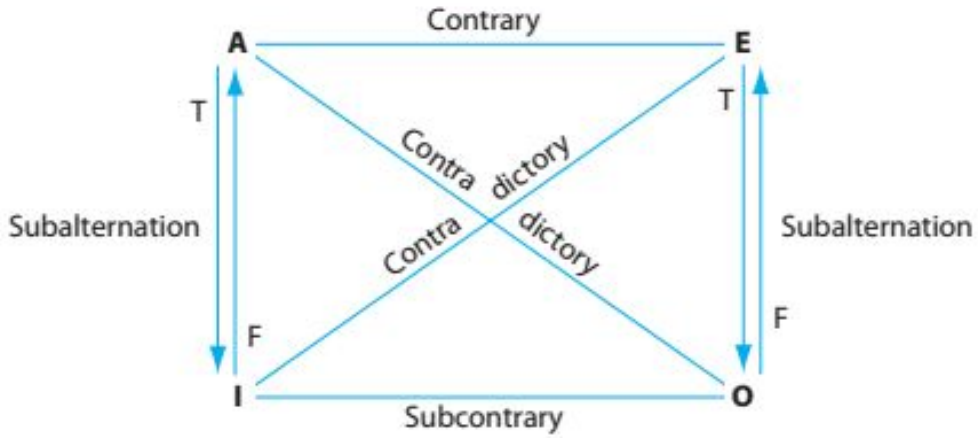
A quick note on *term complements* from last class:

> In the abstract were able to simple prefix a variable with 'non-' in order to represent its term complement. This, however, is not so straightforward when we use full English sentences. How, for example, do you add 'non-' to 'persons who like asparagus'? In order to discover the true term complement for a given term, you will need to use / learn a bit of English grammar. Essentially, you need to narrow down the range of objects picked out by the word/phrase that you are working with. This is easy for one-word terms like 'dog' as the complement is simply 'non-dogs'. For 'persons who like asparagus', however, the scope of this phrase is not all people, but the class of people who like asparagus. Thus, I would **not** have as the term complement: non-persons who like asparagus. This would pick out the class of non-persons who **also** like asparagus (computers, tables, etc). Instead, I want to isolate the group of people who do not like asparagus. So the term complement would be: persons who do not like asparagus. More examples are as follows:

Term	Complement
dogs	non-dogs
qualified persons	unqualified persons
persons who like asparagus	persons who do not like asparagus
non-cats	cats
sensible actions	senseless actions

Section 4.5

We have been working, the last two classes, with the Boolean/Modern understanding of what inferences are valid within our categorical system. Today, we expand upon what has been said by making our logic *stronger*. A stronger logic can prove more stuff (theorems) than a weaker logic. Everything that was valid in the Boolean system is still valid in the Aristotelian system, but there will be things we can prove in the Aristotelian system that would be invalid on the Boolean system. This is because in the Aristotelian system, universal propositions about existing things **have** existential import. We begin by removing the logically undetermined portions of our previous square of opposition.



As before, A and O / E and I are contradictories. Now, however, the borders of the square are connected.

Contrary: at least one is false (not both true)

Subalternation: truth flows downward, falsity flows upward

Subcontrary: at least one is true (not both false)

Just because there are no dashed lines on this square, however, does **not** mean that there are **no** logically undetermined relations. Having a true O proposition, for example, will allow us to infer that the corresponding A proposition is false. That, however, is all we are allowed to infer. The corresponding E proposition could be true or false; and the corresponding I proposition could be true. If we have a true A proposition, however, we can infer quite a few things. We can infer that the corresponding E and O propositions are false, and that the corresponding I proposition is true. Given these complexities, it should be easy to see why we can infer more things than we could on the Boolean square.

Testing Immediate Inferences:
In the last section we began testing single premise arguments (immediate inferences) for validity/invalidity using our Boolean square and the transformation rules known as conversion, obversion, and contraposition. We will do the exact same thing with the Aristotelian square and those three transformation rules. These three transformation rules work exactly the same and their equivalences hold in the Aristotelian system too. The only difference is when an argument commits the existential fallacy.

Note: You do not need to know when an invalid argument is committing an illicit contrary/subcontrary/subalternation (page 234). Simply stating that it is invalid is sufficient.

As a refresher, the existential fallacy can occur in the Aristotelian system when non-existing things are talked about in a universal proposition which serves as the premise of the argument. Thus, the argument:

> All unicorns are kind.
> Therefore, it is false that some unicorns are not kind.

This argument commits the existential fallacy because it invokes non-existing things in the universal premise. Something we have not run across yet is an argument that has a particular premise with a non-existing thing. Take the following example:

> Some unicorns are kind.
> Therefore, it is false that no unicorns are kind.

This argument does **not** have a universal as a premise and so, even though it has a non-existing thing in the premise proposition, does not commit the existential fallacy. The argument is valid but not sound. The only arguments that commit the fallacy are modeled below.

Existential fallacy examples: Two standpoints

All cats are animals. Some cats are animals.	Boolean: Invalid, existential fallacy Aristotelian: Valid
All unicorns are animals. Some unicorns are animals.	Boolean: Invalid, existential fallacy Aristotelian: Invalid, existential fallacy