

SYLLOGISTIC LOGIC

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INTRO TO LOGIC

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CATEGORICAL LOGIC

Arguments based on relations between classes (categories).

- **One class can be wholly contained within another.**

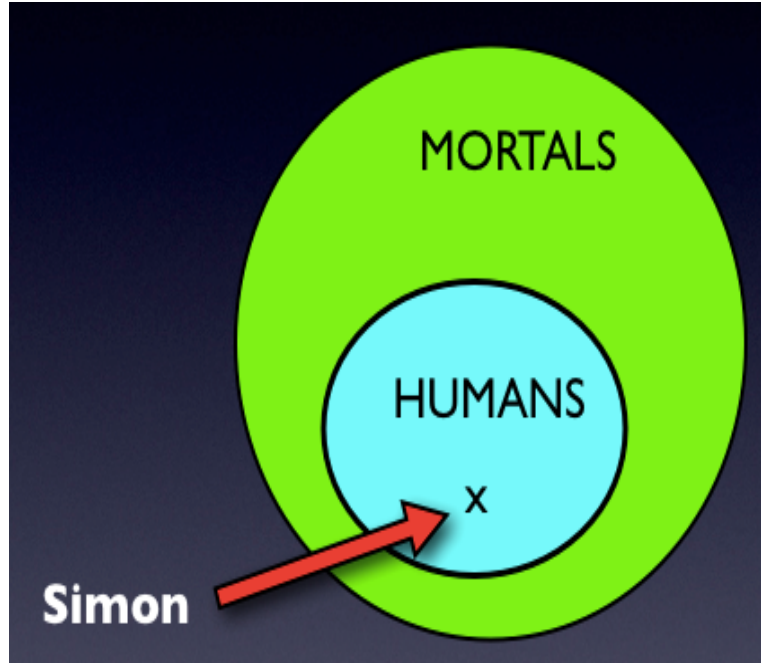
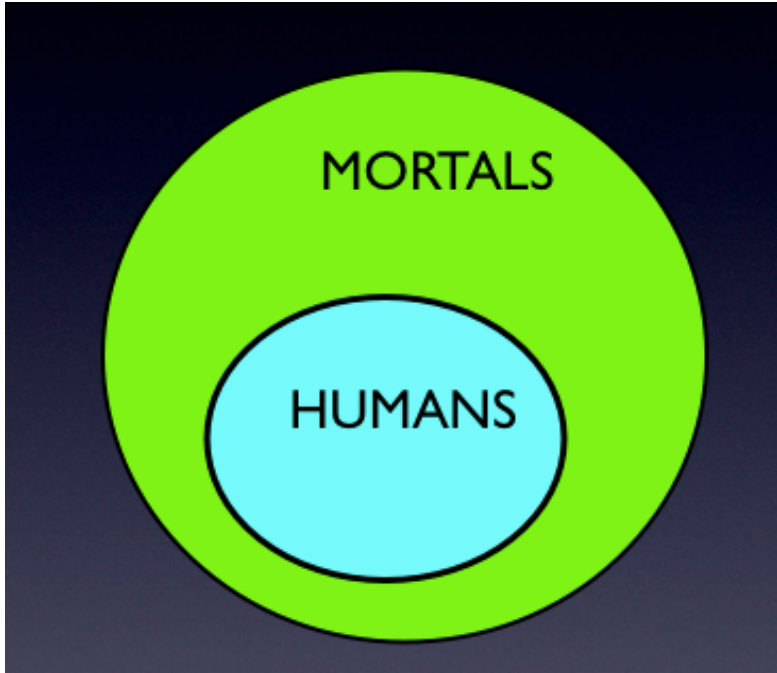
Class of newts is included within class of animals.

- **Some but not all members of a class are included in another class.**

Class of students has some members contained within class of females.

- **Classes may have no members in common.**

No members of the class of newts are included in the class of students.



CATEGORICAL PROPOSITIONS

Each proposition affirms, or denies, that some class S is included in some other class P, in whole or in part.

Wffs (well formed formulas) are sequences having these forms:

all A is B	some A is B	x is A	x is y
no A is B	some A is not B	x is not A	x is not y

1. Universal Affirmative

All S is P

Example: All teachers are mean.

2. Universal Negative

No S is P

Example: No teachers are mean.

3. Particular Affirmative

some S is P

Example: Some teachers are mean.

4. Particular Negative

some S is not P

Example: Some teachers are not mean.

Note: “Some” in logic means “at least one”

5. Indefinite – Affirmative and Negative

x is A

x is not A

x is y

x is not y

Examples: This teacher Jordan is mean/not mean.

STANDARD FORM

A Universal affirmative

All *S* is *P*.

E Universal negative

No *S* is *P*.

I Particular affirmative

Some *S* is *P*.

O Particular negative

Some *S* is not *P*.

Examples:

Some insects are not pests.

No criminals are good citizens.

All politicians are not truthful.

Some chemicals are poisons.

All lawyers are wealthy people.

CATEGORICAL SYLLOGISMS

Deductive argument consisting of three categorical propositions that together contain exactly three terms, each of which occurs in exactly two of the propositions.

Example:

No heroes are cowards.

Some soldiers are cowards.

Therefore, some soldiers are not heroes.

***Predicate* of the conclusion “heroes” = major term**

***Subject* of the conclusion “soldiers” = minor term**

Third term “cowards” which never occurs in the conclusion but always appears in both premises = middle term

Each premise is named after the term that appears both in it and in the conclusion.

The major term and the minor term must each occur in a different premise.

Premise containing the major term = major premise

It is the major premise not because it appears first, but only because it is the premise that contains the major term; it would be the major premise no matter what order the premises were written.

Premise containing the minor term = minor premise.

The middle term may be the subject term of the major premise and the predicate term of the minor premise

The middle term may be the predicate term of both premises

The middle term may be the subject term of both premises

The middle term may be the predicate term of the major premise and the subject term of the minor premise.

DISTRIBUTION

Propositions can refer to *all* members of a class or to only *some* members of that class.

A proposition ***distributes*** a term if it refers to all members of the class designated by that term.

A (universal affirmative) distributes only its subject term

“All senators are citizens”: it is about *all* senators, but not all citizens

E (universal negative) distributes both its subject and predicate terms

“No newts are witches”: it says something about all newts and all witches

I (particular affirmative) distributes neither its subject nor its predicate term

“Some soldiers are cowards”: doesn’t refer to all soldiers or cowards

O (particular negative) distributes only its predicate term.

“Some horses are not thoroughbreds”: this part of the class of horses is excluded from the class of *all* thoroughbreds. Given the particular horses referred to, each and every member of the class of thoroughbreds is *not* one of those particular horses. When something is excluded from a class, the whole of the class is referred to.

WHY DOES DISTRIBUTION MATTER?

In order for a syllogistic argument to be valid...

The middle term needs to be distributed in at least one premise. (Fallacy of the undistributed middle.)

Any term distributed in the conclusion must be distributed in the premises. (Fallacy of illicit process)

STAR TEST

A letter is distributed in a wff it occurs *just after* “all” or *anywhere after* “no” or “not.”

All <u>A</u> is B	x is A
No <u>A</u> is <u>B</u>	x is not <u>A</u>
Some A is B	x is y
Some A is not <u>B</u>	x is not <u>y</u>

Star premise letters that are distributed and conclusion letters that aren't distributed.

The syllogism is **VALID** if every capital letter is starred once, and there is exactly one star on the right hand side.

No P* is B*

Some C is B

Some C* is not P

No P* is B*

Some C is not B*

Some C* is P*