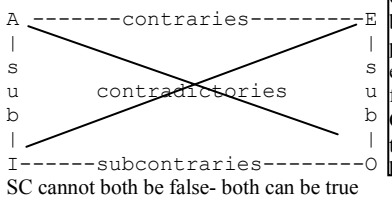
A – All ( ) are ( ) Universal Affirmative 1
E – No ( ) are ( ) Universal Negative 1,2
I – Some ( ) are ( ) Particular Affirmative 0
O – Some ( ) are not ( ) Particular Negative 2

M P	P M	M P	P M	Figures↑
S M	S M	M S	M S	<-Moods
S P	S P	S P	S P	

1. Middle Term Rule (Fallacy – Undistributed Middle) – The middle term must be distributed at least once.
2. Minor Term Rule (Fallacy – Illicit Minor) – If the minor term is distributed in the conclusion, it must be distributed in the minor premise.
3. Major Term Rule (Fallacy – Illicit Major) – If the major term is distributed in the conclusion, it must be distributed in the major premise.
4. Affirmation Rule (Fallacy – Exclusive Premise) – At least one premise must be affirmative
5. Negation Rule (Fallacy – Negation) – If the conclusion is negative, at least one premise must be negative. Likewise, if a premise is negative, the conclusion must be negative.
6. Quantity Rule (Fallacy - Subalternation) – If the conclusion is particular, a premise must be particular

A syllogism may commit more than one fallacy!



Contradictory propositions cannot both be true and cannot both be false. Of a pair of contradictory propositions, exactly one is true and exactly one if false.
Contrary propositions are propositions that cannot both be true, but both can both be false.

SC cannot both be false- both can be true
Conversion –E and I only- No S are P = No P are S | Some S are P = Some P are S
Conversion is not valid for A and O propositions.
Socrates is not Greek – No thing identical with Socrates is a thing which is Greek
No spitting is allowed – No act of spitting is an act which is allowed.
She always cooks ham on new year's day – All times that are new years day are times when she cooks ham.
Sheldon never eats beans – No times are times when Sheldon eats beans.
Some men are wicked – Men are sometimes wicked.
Some times are times when Men are wicked.
A chicken is a domesticated animal. – All chickens are domesticated animals.

Categorical Syllogism – an argument consisting of two premises and one conclusion, such that the solution is not entailed by either premise alone (by an immediate inference, for example). Each premise must be a categorical proposition (or paraphrasable into a categorical proposition). Must have two premises and a conclusion to have a shot of being valid. If there are three or more propositions, it commits the fallacy of four terms.

Only men are rational (= All rational beings are human)
No female is a man (= No female is a male being
No female is rational

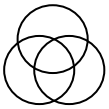
Obvious equivocation of the term "man" - commits the fallacy of four terms.

DIAGRAM UNIVERSALS BEFORE PARTICULARS!!!

Minor term – subject of the conclusion. Major term – Predicate of the conclusion. Middle term – term that appears only in the premises. MP first in Standard form.

There are 256 forms – 15 are valid.

1 – AAA	EAE	AII	EIO	**Example – EIO-3**
2 – EAE	AEE	EIO	AOO	No M are P
3 – IAI	AII	OAO	EIO	Some M are S
4 – AEE	IAI	EIO		Some S are not P



Barbara, Celerant, Darii, Ferio | Cesare, Camestro, Festino, Baraco | Disamis, Datisi, Bocardo, Ferison | Camenes, Dimaris, Fresison

All trespassers will be prosecuted - x import / sub alternation (univer. implies particular)

Distributed?	S	P
A	Yes	No
E	Yes	Yes
I	No	No
O	No	Yes

Plurative Propositions – Most S are P
Plurative Syllogisms - All M are P, Most S are M, Most S are P – A+B > C

Contradiction – negation of the conclusion.
Quantifier – implicit / explicit
Cows moo – implicit quantifier – All. A Scout is reverent – implicit All quantifier.
A lady is present – some ladies are persons who are present.
ONLY – only registered students receive a grade. All those who receive a grade are registered students. /// The word 'nut' occurs in 'donut'. It is impolite to say 'damn it'.
All times when you can't beat them are times when you should join them. All times when you are late are better than times when you don't show up. // I want to be kind – All things identical with me are people who want to be kind.

MP IF P THEN Q
P
Q

MT IF P THEN Q
NOT Q
NOT P

Truth functional compound – a sentence that contains another sentence. I know. :simple sentence. I don't know. : compound – negation of "I know." // The truth value of the compound is a function of the simple part.
1)Not p – ~p Unary function
2) p or q – p ▼ q Binary function
3) If p then q - p → q Binary
4) p and q p • q Binary
5) p if and only if q p ↔ q Binary

P	Q	▼	→	•	↔
T	T	T	T	T	T
T	F	T	F	F	F
F	T	T	T	F	F
F	F	F	T	F	T

Disjunction - **Disjuncts** | Conditional – **antecedent**, **concequent** | Conjunction – **conjuncts** | Biconditional is true when both parts agree truth value.
Truth functional tables – see if there is a counter example row (premises true, but conclusion false). Invalid!

P → Q
Q
P

P	Q	P	→	Q	Q	P
T	T	T	T	T	T	T
T	F	T	F	F	F	T
F	T	F	T	T	T	F
F	F	F	T	F	T	F

Indirect table – Reducto ad absurdum
Assume the conclusion and look for a contradiction – if contrad. exists – VALID
Circle the contradiction and write "valid!"
TRANSLATION – some humans are not mortal - negation: All humans are mortal.
Exclusive "OR" – p or q, but not both
P ▼ Q does not satisfy this.
(p ▼ q) • ~(p • q) p or q and not p and q
DeMorgan's laws
~(p • q) = (~p ▼ ~q) - negation of a conjunction gives a disjunction of the negation of the conjuncts.
~(p ▼ q) = ~p • ~q
COMMUTATION
p • q = q • p p ▼ q = q ▼ p
ASSOCIATIVE
p • (q • r) = (p • q) • r - wedgies too
IDEMPODENCE
p = p • p p = p▼ p
BICONDITIONAL REWRITE
p ↔ q = (p→q) • (q→p)
p if and only of q – agree in truth value!

If you neglect the tooth, you loose it.
You don't neglect it
You don't lose it
Denying the Antecedant

P ONLY IF Q p → q
P UNLESS Q p ▼ q or ~q → p
P BUT Q p • q
P IF Q q → p
Neither P NOR Q ~p • ~q or ~(p • q)
Either P OR Q p ▼ q
Exclusive OR (p ▼ q) • ~(p • q)

Well Formed Formulas (WOOF)
If p then q = q is the case if p
TAUTOLOGY – true under every truth value assignment (Logical equivalencies)
X is logically equivalent to Y if and only if X ↔ Y is a tautology.
'Snow is white' implies 'snow is black or snow is white'.
LAWS
Duns Scotis – suttle doctor
~p → (p→ q)
Export-import law
[p-->(q-->r)] <--> [(p.q)-->r]
Distributive laws
[pv{q.r)] <--> [(pvq).(pvr)]
[p.(qvr)] <--> [(p.q)v(p.r)]
Law of excluded middle pv~p
Law of contradiction
(law of non-contradiction!)
~(p.~p)
Peirce's law
[(p-->q)-->p] <--> p
Laws of simplification
(p.q) --> p
(p.q) --> q
Principle of transposition
(p-->q)-->(~q-->~p)
Law of Clavius
(~p-->p)-->p
Principle of the syllogism
(p-->q) --> [(q-->r)-->(p-->r))

Informal Fallacy – flawed because of content or manner of presentation – element of deception.
FALLACY – plausible, potentially persuasive, but faulty argument. FORMAL – flawed because of it's defective logical form. Admits counter examples.
Weak inductive conclusion is not adequately supported by the premises.
Begging the question – form is valid, but a deception is going on. Circular reasoning. Assuming in the premises what ought to be concluded
Ad Homonym –(REL) an argument against another argument, but the attack is against the person, not the argument. **Abusive** – Say something negative about the person in hopes …
Circumstantial – Questions a person's objectivity. May have stake
You too – Accuses person of being hypocritical.
Red Herring – (relevance) fishy! Gives the appearance of arguing for one claim, but is really changing the topic.

Equivocation – Use of the same word twice in different ways.
Amphiboly – Structural ambiguity. Being in a dilapidated condition, I was able to buy the house very cheap.
Hasty Generalization – Attempts to generalize from **insufficient** evidence. Meant to deceive.
Non- Sequitor – Any kind of irrelevance.
Affirming the Concequent
p → q
q
p

Denying the Antecedant
p → q
~p
~q

Paridox of implication – I'll ski tomorrow, therefore if I break my leg, I'll ski…
Equivocation – more than one meaning. dif intension
Ampliatives – content of conclusion goes beyond the premises.non- analytic
An argument that has as it's conclusion a logical truth is VALID.

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