The Three Laws of Thought . . . Are Equally Laws of Things
   Identity: A is A.
   Contradiction: A is not non-A.
   Excluded middle: A is either B or non-B.

(God’s Truth Denotes God’s Reality)
   (A thing is what it is.)
   (No thing simultaneously has a character and has it not.)
   (No thing is both what it is and not what it is.)

Definition
   “The definition of anything is the statement of its essence: what makes it that, and not something else.” (Joseph, 72)

Six Rules of Definition: A definition
   must (1) “give the essence of that which is to be defined”; (2) “be per genus et differentiam” (of kind and varieties); (3) “be commensurate with that which is to be defined, i.e. be applicable to everything included in the species defined, and to nothing else”; (4) “not, directly or indirectly, define the subject by itself”; (5) “not be in negative where it can be in positive terms”; (6) “not be expressed in obscure or figurative language.” (Joseph, 111-115)

Parts of a Categorical Proposition
Terms: subject and predicate
Quantifier(s): all, some, most, few, etc.; modify terms
Copula–linking verb
Qualifier: silent affirmative, no or not negative; modifies copula

Types of Categorical Proposition
- All propositions affirm or deny the predicate of some or all of the subject.
  - A (universal affirmative): All x are y.
  - E (universal negative): No x are y.
  - I (particular affirmative): Some x are y.
  - O (particular negative): Some x are not y.

Note: Quantity (universal or particular) affects terms. Quality (affirmative or negative) affects copula.
To negate a term, use no or not; to negate the copula, use no or not.

Rules of Distribution
Universal subjects (A & E propositions) and negative predicates (E & O propositions) are distributed.
Particular subjects (I and O propositions) and affirmative predicates (A and I propositions) are undistributed.

Parts of a Syllogism
Major term: predicate of conclusion; Minor term: subject of conclusion; Middle term: in both premises but not in conclusion
Major premise: minor term (P) and middle term (M)
Minor premise: minor term (S) and middle term (M)
Conclusion: minor term (S–because subject of conclusion) and major term (P–because predicate)

Two Categorical Premises and a Categorical Conclusion
(Note: Middle term links major & minor terms to yield the conclusion.)

Five Rules of the Syllogism (following Gordon H. Clark)
1. Two negative premises do not imply a conclusion. (G&B 5; Joseph 3)
2. Two affirmative premises do not imply a negative conclusion. (G&B 7; J 5)
3. An affirmative and a negative premise do not imply an affirmative conclusion. (G&B 4; J 4)
4. Two premises in both of which the middle term is undistributed do not imply a conclusion. (G&B 2; J 2)
5. Two premises in which a given term is undistributed do not imply a conclusion in which it is distributed. (G&B 3; J 6)

Breaking the rule at left commits the fallacy at right:
Exclusive premises
Negation from affirmation
Affirmation from negation
Undistributed middle
Illicit process

Figures and Their Valid Moods
(Moods in parentheses yield weaker conclusions than the premises warrant.)
(64 possible moods in each of 4 figures = 256 possible argument forms)
(19 strong valid ≠ 5 weak valid = 24 (9.4%) valid forms; 232 [90.6%] invalid)

<table>
<thead>
<tr>
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<td>Major Premise</td>
<td>M P</td>
<td>P M</td>
<td>M P</td>
<td>P M</td>
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<td>Minor Premise</td>
<td>S M</td>
<td>S M</td>
<td>M S</td>
<td>M S</td>
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<td>Valid Moods</td>
<td>Barbara Celarent Darii Ferio (AAI) (EAO)</td>
<td>Cesare Camestres Festino Baroco (EAO)</td>
<td>Darapti Disamis Datisi Felapton Bocardo Ferison</td>
<td>Bramantip Camenes Dimaris Fresapio Fresision (AEIO)</td>
</tr>
</tbody>
</table>

Vowels denote proposition types (AEIO). Consonants in Figs. 2-4: Initial consonant matches Fig. 1 target; “m” (≡ muta): transpose premises; “s” (≡ simpliciter): convert simply the original premise or new conclusion designated by the preceding vowel; “p” (≡ per accidens) convert by limitation the original premise or new conclusion designated by the preceding vowel; “c” (≡ conversio syllogismi): employ indirect reduction (using contradiction of conclusion of original argument as premise in new argument whose conclusion contradicts a premise in the original argument). Moods in parentheses () are “weak” valid, concluding less (the subaltern) than the universal conclusion possible.

Formal Fallacies of the Categorical Syllogism
(Fallacies in the Form, Not Substance, of the Argument)
1. Illicit Major–major term distributed in conclusion but not in premise.
2. Illicit Minor–minor term distributed in conclusion but not in premise.
3. Undistributed Middle–middle term not distributed at least once.
4. Four-term Fallacy–at least one term is ambiguous or equivocal (results in a non-syllogism).

Immediate Deduction
(Inferences From a Single Categorical Proposition)
Obversion: Maintain order, change quality, contradict the predicate. A to E (All x are Y, := No x are non-Y) E to A (No x are Y, := All x are non-Y) E to O (Some x are Y, := Some x are not non-Y) O to I (Some x are not Y, := Some x are non-Y)
Conversion: Reverse subject and predicate, maintain quality, ensure that no term distributed in the converse (result) was undistributed in the convertend (original). A to I (All x are Y, := Some x are X) E to E (No x are Y, := No x are X) I to I (Some x are not Y, := Some x are non-Y) I to O (Some x are not Y, := Some x are non-Y) O to I (Some x are not Y, := Some x are non-Y)
Contraposition: obvert, convert, obvert. A to A (All X are Y obverts to No X are non-Y, which converts to No non-Y are X, which obverts to All non-Y are non-X.)
E to O (No X are Y obverts to All X are non-Y, which converts to Some non-Y are X, which obverts to Some non-Y are not non-X.) O to O (Some X are not Y obverts to Some X are non-Y, which converts to Some non-Y are X, which obverts to Some non-Y are not non-X.) I does not contraposit because I would obvert to O but O would not convert.

**Seven Relations Between Different Propositions (or Types of Propositions) with the Same Terms**

1. **Independence**: Truth or falsehood of one is unrelated to truth or falsehood of other: impossible.
2. **Equivalence**: Both statements must be true or both must be false, not one true and the other false: impossible.
3. **Contradiction**: Truth of either statement (A or E; I or O) entails falsehood of other (O or I; E or A), and falsehood of either (A or E; I or O) entails truth of other (O or I; E or A).
4. **Contrariety**: If either (A or E) is true, other (E or A) must be false, but both (A and E) might be false.
5. **Subcontrariety**: Truth of either (I or O) does not entail falsity of other (O or I), but falsity of either (I or O) entails truth of other (O or I).
6. **Subalternation**: Truth of one (A or E) entails truth of other (I or O), but falsity of one (A or E) does not entail falsity of other (I or O).
7. **Superalternation**: Truth of one (I or O) does not entail truth of other (A or E), but falsity of one (I or O) entails falsity of other (A or E).

**Square of Opposition**

(ILLUSTRATES RELATIONS 3-7 ABOVE.)

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**Other Types of Arguments**

*Hypothetical arguments*: Conditional “major” premise and categorical (unconditional) “minor” premise yield a constructive (affirmative) or destructive (negative) conclusion:

- **Modus Ponens** (constructive; way of addition; affirms antecedent): \( p \land q; p; \therefore q \) (= If \( p \) then \( q \); \( p \); therefore \( q \).)
- **Modus Tollens** (destructive; way of subtraction; denies consequent): \( p \land q; \neg q; \therefore \neg p \) (= If \( p \) then \( q \); not \( q \); therefore not \( p \).)

Fallacies: denying antecedent \( (p \land q; \neg p; \therefore \neg q) \) and affirming consequent \( (p \land q; q; \therefore p) \).

*Disjunctive arguments*: Disjunctive “major” premise and categorical “minor” premise yield categorical conclusion:

- **Exclusive disjunctives**: either X or Y but not both and not neither; valid: *modus ponendo tollens* (way of denying by affirming); (1) \( X \); \( \neg Y \); (2) \( Y \); \( \neg X \); *modus tollendo ponens* (way of affirming by denying); (1) \( \neg X \); \( \neg Y \); (2) \( \neg Y \); \( \neg X \).

Fallacy in *inclusive* disjunctives: inferring, from the affirmation of either alternant, the denial of the other. The only conclusion validly proved in inclusive disjunctives is affirmative.

- **Conjunctive argument**: Conjunctive “major” premise and simple “minor” premise yield simple conclusion.

(1) \( \neg (P \lor Q) \); \( P \); \( \therefore \neg Q \). (2) \( \neg (P \lor Q) \); \( Q \); \( \therefore \neg P \).

Fallacy: inferring, from denial of either, affirmation of other: (1) \( \neg (P \lor Q) \); \( \neg P \); \( \therefore Q \). (2) \( \neg (P \lor Q) \); \( Q \); \( \therefore \neg P \).

**Dilemma**: forcing the opponent to choose among his beliefs.

(1) Constructive: (a) Simple: \( p \lor q \); \( r \lor t \); \( \therefore p \lor r \lor t \) \( v = \lor \) (v = “or”)
(2) Destructive: (a) Simple: \( p \lor q \); \( \neg r \lor t \); \( \therefore \neg p \lor r \lor t \)
Fallacies: same as in hypothetical arguments: denying the antecedent or affirming the consequent.

Answering dilemmas: (1) Going between the horns: denying the disjunctive premise. (2) Taking the dilemma by the horns: denying the hypothetical premise.

(3) Countering the dilemma: Proposing another dilemma that proves the opposite (contradictory) conclusion from that reached by the first dilemma.

**Sorites**: “a syllogism in the first figure with many middle terms,” i.e., “a polysyllogism in the first figure with the intermediate conclusions suppressed” (H. W. B. Joseph). (Note: sequence does not affect validity.) (Fallacies: same as for categorical syllogism— but with more opportunities to fail.)

Beginning with the minor premise: A is B. B is C. C is D. D is E. E is F. Therefore A is F. Equally valid is any other sequence of the same propositions, e.g.: A is B. C is D. E is F. B is C. D is E. Therefore A is F.

Beginning with the major premise: E is F. D is E. C is D. B is C. A is B. Therefore A is F. Equally valid is any other sequence of the same propositions, e.g.: E is F. A is B. D is E. B is C. C is D. Therefore A is F.

**Enthymeme**: Any argument, of any type, in which one or more premises or the conclusion is unexpressed, the arguer depending on the hearer to supply the missing statements.
Informal Fallacies

[Note: An argument may embody two or more informal fallacies, and the informality leads to some overlapping, so that what might be called, e.g., ignoratio elenchi (irrelevant conclusion) might also be called red herring (diverting the issue).]

A. Fallacies of Relevance

1. Argumentum ad Baculum: appeal to force (“Agree with me or I’ll punch you in the nose!”)
2. Argumentum ad Hominem (abusive): attacking the person instead of the argument; some subvarieties:
   a. poisoning the well: direct attack on the trustworthiness of one making an argument
   b. Tu quoque! (“You too!”): “accusing your critic of the same thing your critic accuses you of, rather than defending yourself against the criticism” (Kreeft, 80).
   c. genetic fallacy: rejecting a person because of his origin or his claim or because of who said it
3. Argumentum ad Hominem (circumstantial):
   a. urging an opponent to accept one’s argument not on its logical validity or evidential credibility but because its conclusion is consistent with other(s) of the opponent’s beliefs, or
   b. urging an audience to reject an opponent’s argument because its conclusion seems to serve his self-interest
4. Argumentum ad Ignorantiam (from ignorance or silence): X must be true because it has not been proved false. Exceptions:
   a. In court of law, accused is presumed innocent until proven guilty.
   b. Where it is reasonable to believe that if X were true Y would also be true, the falsehood of Y will (by modus tollens) entail reasonable grounds for concluding the falsehood of X.
5. Argumentum ad misericordiam: appeal to pity (“Buy my books so I can feed my starving children!”)
6. Argumentum ad populum: “the attempt to win popular assent to a conclusion by arousing the feelings and enthusiasms of the multitude” (Copi, Intro., 4th ed., 79)
   a. alternate definition: “deciding truth by opinion polls” (G&B 97)
   b. related fallacy: consensus gentium: appealing to majority opinion (G&B 97)
7. Argumentum ad verecundiam: appeal to authority, particularly the famous, without regard to their expertise.
8. Argumentum ad ignominiam: appeal to shame instead of reason as the ground for belief
9. Dicto simpliciter or Accident: “applying a general rule to a particular case whose ‘accidental’ circumstances render the rule inapplicable” (Copi, 81)
10. Converse accident: hasty generalization, drawing a general rule from unrepresentative example(s); sometimes called (or committed by) cliche or special case or stereotyping: “makes no room for the exception” (Kreeft, 91)
11. Black and White: not allowing for gradations between extremes
12. False cause:
   a. Non causa pro causa, mistaking for the cause of an event anything that is not the true cause
   b. Post hoc ergo propter hoc, assuming that because X occurs before Y it must be the cause of Y
13. Petito Principii: begging the question—assumes as a premise the conclusion one intends to prove; related to this, arguing in a circle uses the conclusion as a premise for an argument to prove one of the premises for the conclusion
14. Contradictory Premises: an argument in which one premise contradicts the other, though normally the contradiction is carefully hidden by obscure language
15. Complex question: asking a question that assumes a particular answer to a prior, unspoken question (e.g.: “Have you stopped beating your wife?” and “Where did you hide the murder weapon?”)
16. Ignoratio Elenchi (“ignorance of confutation”): irrelevant conclusion; proof of a conclusion not contradictory to the proposition to be confuted. (“Free trade maximizes living standards.” “But foreign tariffs hurt us!”)
17. Argumentum ab annis: appeal to age (for or against a conclusion); also called argumentum ab gerontiam.
18. Argumentum ad futurum: appeal to the future; related: Argumentum ad novum: appeal to newness or novelty
19. Straw man: setting up a caricature of an opponent’s position and attacking that (cf. B.9, quoting out of context)
20. Special pleading: considering only evidence that agrees with one’s conclusion
21. Red herring: diverting the issue, drawing attention away from the actual argument

B. Fallacies of Ambiguity

1. Equivocation: using the same word(s) in different senses within one argument “Strict definitions and strict adherence to them are essential to intelligible discussion.”—Gordon H. Clark, Religion, Reason, and Revelation, 303.
2. Amphiboly: ambiguity not in the meaning of words but in the grammar or syntax of the proposition
3. Accent: ambiguity arising from shift in focus or emphasis
4. Composition (distinguish from hasty generalization: The latter “argues that since many or most atypical members of a class have a specified property therefore all members of the class (distributively) do so.” The former “that since all of the members of a class have a specified property therefore the class itself has that property.” Copi, 99)
   a. from parts to whole: assuming that what is true of the part(s) is true of the whole
   b. from individual part(s) to all parts
5. Division (distinguish carefully from accident. The latter “argues that since most members of a class have a specified property therefore any particular member or subclass of members . . . must have that property also,” the former “that since a class itself (collectively) has a specified property therefore any member or subclass of members of the class must have that property also.” Copi,