

Arguments

An *argument* is a sequence of declarative sentences. The last sentence in the sequence is the *conclusion* of the argument. The sentences preceding the conclusion are the *premises* of the argument.

Some Sample Arguments

- A. 1. If Rover is a dog, then Rover is a mammal.
 2. Rover is a dog.
 3. Therefore, Rover is a mammal.
- B. 1. Rover is a dog.
 2. If Rover is a dog, then Rover is a mammal.
 3. Therefore, Rover is a mammal.
- C. 1. If it is raining, then the streets are wet.
 2. The streets are not wet.
 3. Therefore, it is not raining.
- D. 1. Snow is green.
 2. Grass is red.
 3. Therefore, snow is green and grass is red.
- E. 1. If it is raining, then the streets are wet.
 2. It is not raining.
 3. Therefore, the streets are not wet.
- F. 1. If Hillary Clinton is President of the USA, then she is a federal employee.
 2. Hillary Clinton is a federal employee.
 3. Therefore, Hillary Clinton is President of the USA.

Some Definitions of Technical Terms

- D1. Argument A is *valid* if and only if (iff) it is impossible for all of A's premises to be true while A's conclusion is false. (Equivalently: if A's premises were true, then A's conclusion would also be true.) Argument A is *invalid* iff it is not valid.
- D2. Argument A is *sound* iff: (1) A is valid and (2) all of A's premises are true. Argument A is *unsound* iff it is not sound.

Some Common Valid Argument Forms

Modus Ponens (MP)

1. If P, then Q
2. P
3. Therefore, Q

Multiple Modus Ponens (MMP)

1. P
2. If P, then Q
3. If Q, then R
4. Therefore, R

Modus Tollens (MT)

1. If P, then Q
2. not-Q
3. Therefore, not-P

Conjunction (Conj)

- | | |
|-----------------------|-----------------------|
| 1. P | 1. P |
| 2. Q | 2. Q |
| 3. Therefore, P and Q | 3. Therefore, Q and P |

Hypothetical Syllogism (HS)

1. If P, then Q
2. If Q, then R
3. Therefore, if P, then R

Disjunctive Syllogism (DS)

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|-----------------|-----------------|
| 1. P or Q | 1. P or Q |
| 2. not-P | 2. not-Q |
| 3. Therefore, Q | 3. Therefore, P |

Sentence Forms

A *negation* is a sentence of the form “not-P”.

A *conditional* is a sentence of the form “If P, then Q”. The *antecedent* of a conditional is the sentence that appears immediately after “if”. The consequent is the sentence that appears immediately after “then”.

A *conjunction* is a sentence of the form “P and Q”. Its two constituent sentences are its *conjuncts*.

A *disjunction* is a sentence of the form “P or Q”. Its two constituent sentences are its *disjuncts*.

Two Common Invalid Argument Forms

Affirming the Consequent

1. If P, then Q
2. Q
3. Therefore, P

Denying the Antecedent

1. If P, then Q.
2. not-P
3. Therefore, not-Q

A Complicated Instance of Modus Ponens

1. If snow is white and grass is green, then roses are red and violets are blue.
2. Snow is white and grass is green.
3. Therefore, roses are red and violets are blue.

Complex Arguments

A *complex argument* is a sequence of arguments. The conclusion of the last argument in the sequence is the *main conclusion* of the complex argument. The conclusions of the other arguments in the sequence are the *subconclusions* of the complex argument. The other sentences appearing in a complex argument are its *premises*.

- G.
1. If Rover is a dog, then Rover is a mammal.
 2. Rover is a dog.
 3. Therefore, Rover is a mammal.
 4. If Rover is a mammal, then Rover is an animal.
 5. Therefore, Rover is an animal.
- D3. A complex argument A is *valid* iff every (simple) argument in A is valid.
D4. A complex argument A is *sound* iff: every (simple) argument in A is sound.