

Logic Handout

1. Definitions

An *argument* is a series of statements intended to establish another statement.

The *conclusion* of an argument is the statement it is intended to establish.

The *premises* of an argument are the statements that are intended to establish its conclusion.

2. Two Example Arguments

- (1) If Bob Dylan's new album is good, then everyone will buy it.
- (2) Bob Dylan's new album is good.
- (3) Therefore, everyone will buy it.

- (1) Everyone in Northampton has snow tires on his car.
- (2) Therefore, everyone in Mexico has snow tires on his car.

3. Valid and Sound Arguments

An argument is *valid* =df. it is logically impossible for its premises to be true and its conclusion false.

An argument is *sound* =df. (a) it is valid, and (b) all of its premises are true.

4. Common Valid Argument Forms

- Modus Ponens (MP):
 - (1) P.
 - (2) If P then Q.
 - (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.

5. Examples of Valid Arguments

- (1) If roses are red, then violets are blue.
- (2) Roses are red.
- (3) Therefore, violets are blue. (MP)

- (1) If Ian Thorpe is the greatest swimmer in the world, he will win the 200m free at the commonwealth games.
- (2) Ian Thorpe will not win the 200m free at the commonwealth games.
- (3) Therefore, Ian Thrope is not the greatest swimmer in the world. (MT)

6. Examples of Invalid Arguments

- (1) J. S. Bach wrote *The Goldberg Variations*.
- (2) Mozart wrote *The Magic Flute*.
- (3) Therefore, Joey Ramone wrote "I Wanna be Sedated."

- (1) If Sue is a bachelor, then Sue is not married.
- (2) Sue is not a bachelor.
- (3) Therefore, Sue is married. (denying the antecedent)

- (1) If Sue is a bachelor, then Sue is not married.
- (2) Sue is not married.
- (3) Therefore, Sue is a bachelor. (affirming the consequent)

- (1) Bartlett Hall is in Amherst.
- (2) Therefore, Bartlett Hall is not in Northampton.

7. (Good arguments that are not Sound)