# Argument Forms and Fallaces

An **argument form** is “an arrangement of statement variables and operators such that uniform replacement of the variables by statements results in an argument.” A **valid argument form** is an argument that satisfies the truth table tests discussed previously.

It is worth taking some time to learn some of the most common valid (and invalid) argument forms. Why? First, because it allows us to more easily assess he validity of arguments in everyday life in the following way: *If an argument is a substitution instance of a valid argument form, it is valid.* By contrast, an argument is *invalid* only (1) it is a substitution instance of an invalid form AND (2) it is NOT a substitution instance of any valid form. Second, these forms can (in a variety of ways) be used to *prove* the validity of more complex argument forms.

## Common Valid Argument Forms

Here are some of the more common argument forms. ∴ is a logical symbol meaning “therefore”—it indicates that what follows is the conclusion.

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| Name | Form | Example |
| Disjunctive Syllogism (DS) |  | Either Mario defeated Bowser or Luigi did.  But Mario did not do it.  So, Luigi did. |
| Pure Hypothetical Syllogism (HS) |  | If you practice logic every day, you will become better at arguing.  If you become better at arguing, you will become president.  So, if you practice logic every day, you will become president. |
| Modus Ponens (MP) |  | If Alex is a mother, she is female.  Alex is a mother.  So, Alex is female. |
| Modus Tollens (MT) |  | If Lassie is a mother, then she is female.  Lassie is not female.  So, Lassie is not a mother. |
| Constructive Dilemma (CD) |  | If you go to McDonald’s, you will eat unhealthy food, and if you eat at Subway, the food will not taste good.  You will either eat at McDonalds’s or Subway.  So the food will either be unhealthy or it will not taste good. |
| Destructive Dilemma (DD) |  | If you will enjoy retirement, then you must save adequate money; and if you will enjoy your working life, you must not work too much overtime.  You will either not save adequate money or work too much overtime.  So, you will either not enjoy retirement or you will not enjoy your working life. |

## Showing Valid Arguments are Unsound

All of the argument forms listed above are *valid*—that is, if the premises are true, the conclusion is guaranteed to be true as well. This does not mean, however, that every valid argument has a true conclusion. In particular, some valid arguments with *false* premises will have false conclusions (though some valid arguments with false premises might also have true conclusions!).

Here are two common valid (but unsound!) deductive arguments:

* **False dilemma—**Occurs when a premise of the form is FALSE, because it leaves out some third option that is neither p nor q. This can occur in disjunctive syllogisms and constructive or destructive dilemmas.
  + Example: “It will either snow 3 ft. tomorrow, or it will be 120 degrees outside. So, there is no point in doing my homework, because either way school will be cancelled.” (Leaves out possibility of moderate weather).
  + Showing that a dilemma is unsound in this way (by finding a third option to show the disjunctive premise false) is called **“escaping between the horns”** of the dilemma.
* **Begging the question—**This is a very general fallacy that occurs whenever one of the argument’s premises is in as much need of defense as the original conclusion. It begs the question “Why should I believe that?”
  + Example (hypothetical syllogism): “If the death penalty is made illegal, murders will go up 300%. If my opponent is elected, the death penalty will be made illegal. So, if my opponent is elected, murders will go up 300%.” (Why should anyone believe the first premise?)

**Dilemmas: Grasping the horns.** On some occasions, a constructive or destructive dilemma will have a false conjunctive premise (i.e., the premise with the two conditional statements). This often occurs when the arguer has begged the question. In this case, you can defeat the dilemma by saying “there’s no reason to accept that premise—it begs the question!” This is known as “**grasping the horns”** of the dilemma.

## Common Invalid Argument Forms

Here are two common *invalid* argument forms:

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| Name | Form | Example |
| Affirming the Consequent |  | If Babe is a cow, Babe is a mammal.  Babe is mammal.  So, Babe is a cow. |
| Denying the Antecedent |  | If Babe is a cow, Babe is a mammal.  Babe is not a cow.  So, Babe is not a mammal. |

If an argument fits one of these forms (and doesn’t fit the form of any valid argument), it is invalid!

## Translation Tips: Rules of Replacement

The valid argument forms written above are very “strict,” in that each and every premise by arranged in exactly the “right” way. Sometimes you will have to “tweak” arguments in ordinary language to get them to fit. Here are two rules to help you do this (“::” means “logically equivalent to”).

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| Name | Form | Example |
| Double Negation (DN) |  | “The cat is on the mat” means the EXACT SAME THING as “It is false that that the cat is not on the mat.”  In other words—you can also add or subtract a double negation without changing a proposition’s meaning. |
| Commutativity (Com) |  | In “and” and “or” statements, you switch around the order of the statements. “The Packers won or the Vikings won” means the same exact thing as “The Vikings won or the Packers won.”  This rule DOES NOT work for conditional statements. |

## Review Questions

Determine which (if any) valid form each of the arguments below represents (if the form is not one of the valid forms, the argument is not valid). Remember that the premises may be out of order, and that commutativity or double negation may have been used:

1. A ⊃ ~B / ~~B // ~~A
2. B / ~B ∨ C // C
3. B / ~B ⊃ A // ~A
4. C ∨ A / C // ~A
5. C ⊃ B / ~~B ⊃ A // ~~C ⊃ ~~A
6. D ∨ E / (E ⊃ F) ∙ (D ⊃ ~~G) // G∨F