

Introduction to Logical Reasoning

Validity and Truth

Professor David Emmanuel Gray

Northwestern University in Qatar
Carnegie Mellon University in Qatar

Truth and Falsity

Recall that an individual statement is either true or false. A statement is **true** if and only if what it asserts is actually the case. A statement is **false** if and only if what it asserts is *not* the case.

This means that truth and falsity are attributes of individual *statements*. However, it makes no (logical) sense to say that an argument is true or false. This is because an argument is a collection of statements, not an individual one.

Validity and Invalidity

Instead, now know that a deductive argument is either valid or invalid. An argument is **valid** if and only if the truth of its premises logically entails the truth of its conclusion. An argument is **invalid** if and only if it is logically possible for the premises to be true while the conclusion is false.

This means that validity and invalidity are attributes of *arguments*. However, it makes no (logical) sense to say that an individual statement is valid or invalid.

Some Facts

The following information is true:

| City | Latitude |
|-----------------|--------------------------------|
| Evanston, USA | $42^{\circ} 2' 28'' \text{N}$ |
| Pittsburgh, USA | $40^{\circ} 26' 26'' \text{N}$ |
| Doha, Qatar | $25^{\circ} 17' 12'' \text{N}$ |
| Key West, USA | $24^{\circ} 33' 19'' \text{N}$ |

Problem 1

Use these facts to create a valid argument with two false premises and a false conclusion.

Problem 2

Use these facts to create an invalid argument with two false premises and a true conclusion.

Problem 3

Use these facts to create an invalid argument with two true premises and a true conclusion.

Next Class...

We will do a workshop on constructing valid/invalid arguments with true/false statements.