Introduction to Logical Reasoning
Inductive Arguments

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Inductive Argument: An argument claiming that its premises *plausibly* (that is, with *some degree of probability*) support its conclusion.

So the claim is not that the conclusion must be true, but that the conclusion is *probably* true.

Induction

Inductively *Strong* Argument: An argument where *if* all the premises are true, then the conclusion is *very likely* to be true as well.

Inductively *Weak* Argument: An argument where the conclusion is still likely to be false even while the premises are all true.

Inductively *Cogent* Argument: A (1) strong argument, whose (2) premises are all true.
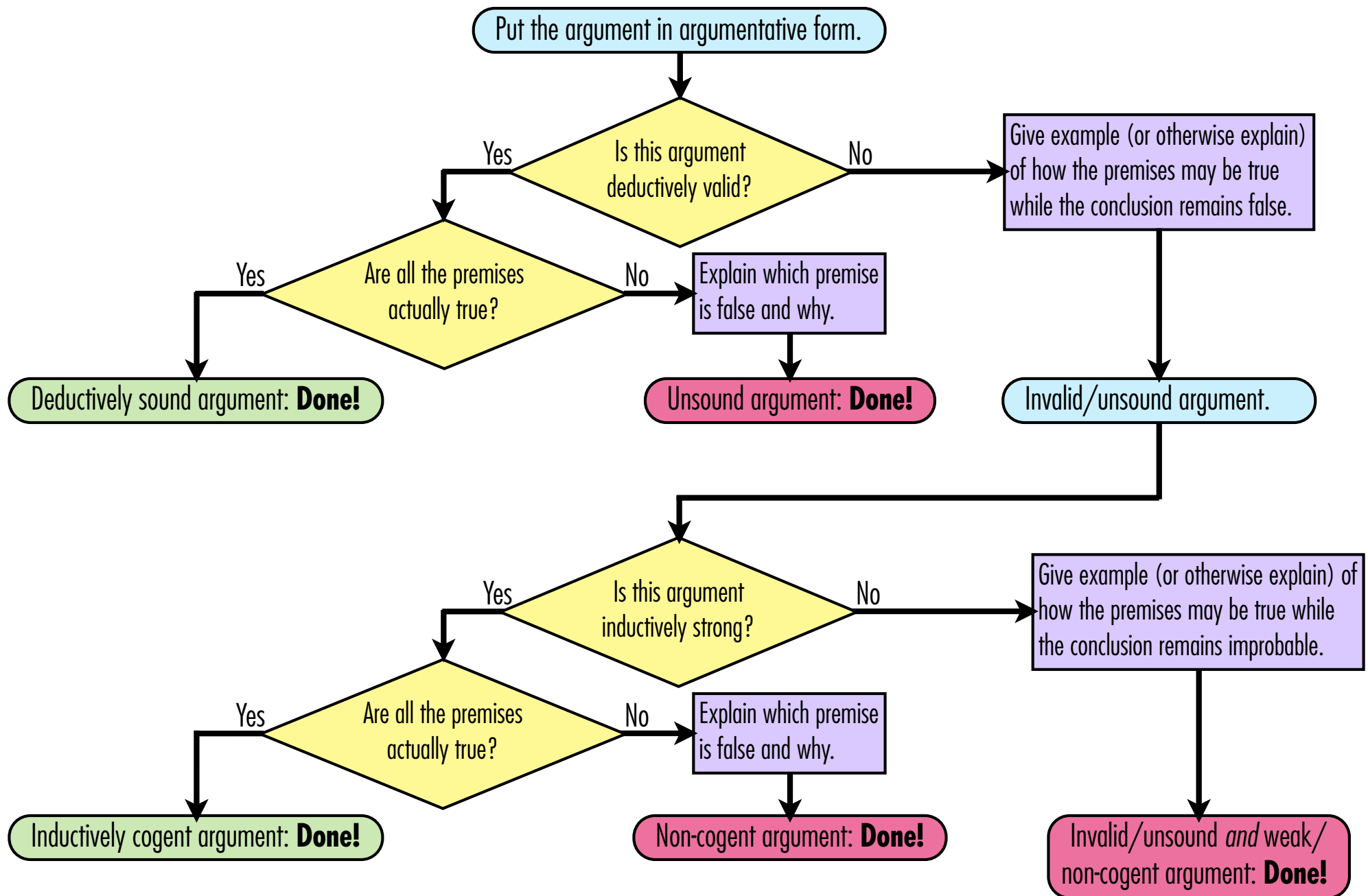
Argument 1

Assess the following argument:

> The defendant is guilty because he confessed to stealing the jewels and he was present at the crime scene.

The same argument in its argumentative form:

1. The defendant confessed to stealing the jewels.
2. The defendant was present at the crime scene.

∴ The defendant is guilty.

The Process of Assessment

Put the argument in argumentative form.

Is this argument deductively valid?

Yes → Are all the premises actually true?

No → Give example (or otherwise explain) of how the premises may be true while the conclusion remains false.

Are all the premises actually true?
- **Yes** → Deductively sound argument: **Done!**
- **No** → Explain which premise is false and why. → Unsound argument: **Done!**

Invalid/unsound argument.

Is this argument inductively strong?

Yes → Are all the premises actually true?

No → Give example (or otherwise explain) of how the premises may be true while the conclusion remains improbable.

Are all the premises actually true?
- **Yes** → Inductively cogent argument: **Done!**
- **No** → Explain which premise is false and why. → Non-cogent argument: **Done!**

Invalid/unsound *and* weak/non-cogent argument: **Done!**

Argument 2

Assess the following argument:

I was abducted by aliens last night because I woke up disoriented this morning and my neighbors saw a bright light above my villa.

The same argument in its argumentative form:

1. I woke up disoriented this morning.
2. My neighbors saw a bright light above my villa.

∴ I was abducted by aliens last night.

Induction

The strength of a non-deductive argument will often depend crucially on the particular form of the argument being made.

Statistical Induction

Statistical Induction: An inductive argument in which the description of some sample (i.e., a collection of things *S* drawn from a larger population *P* of these things) is extended to apply to items outside of the sample.

Sample *S*
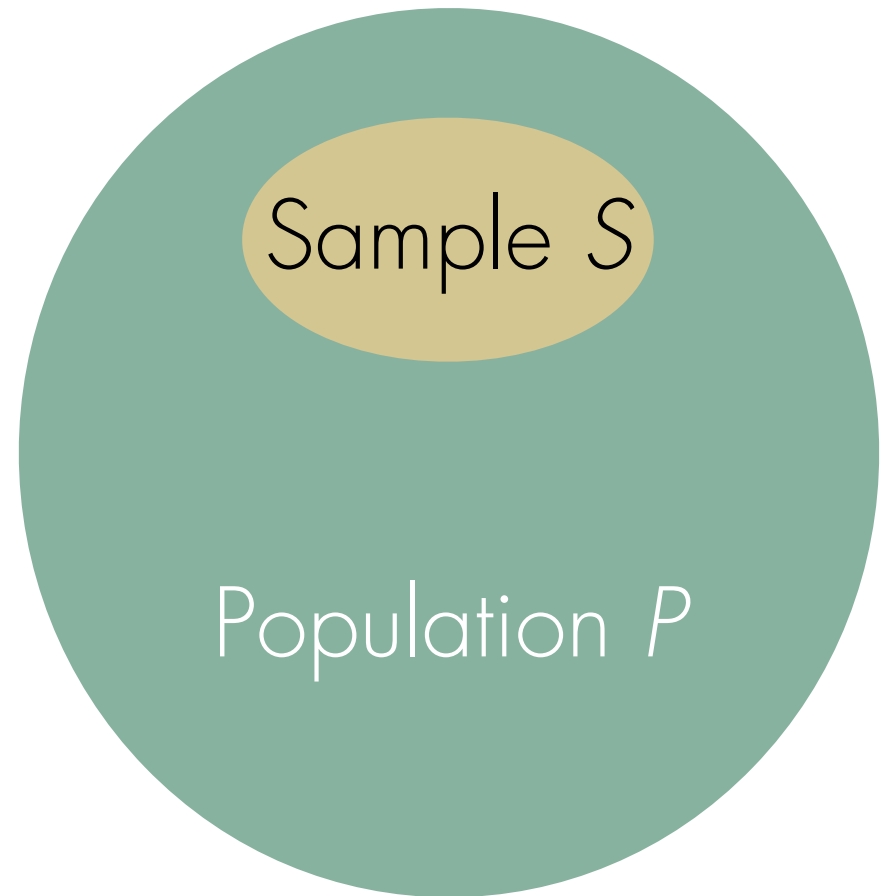
Population *P*

Statistical Induction

Statistical Induction: An inductive argument in which the description of some sample (i.e., a collection of things *S* drawn from a larger population *P* of these things) is extended to apply to items outside of the sample.

Claim about a sample: *S* has property *p*.

Claim about the entire population: *P* also has property *p*.

Statistical Induction

The tools of statistics (not covered in this course) provide the best methods for assessing the strength of this type of argument. Even so, two important factors influence the strength of such an argument:

1. Sample size, and

2. Representativeness (or unbiasedness) of the sample.

Argument 3

Assess the following argument:

65 out of these 100 people living in Qatar say they prefer shopping at the Villagio Mall. So 65% of people living in Qatar prefer shopping at the Villagio Mall.

Sample of 100 People Living In Qatar

All People Living in Qatar

1. **Claim about a sample:** 65 out of these 100 people living in Qatar say they prefer shopping at the Villagio Mall.

∴ **Claim about the entire population:** 65% of people living in Qatar prefer shopping at the Villagio Mall.

Argument by Analogy

Argument by Analogy: An inductive argument that

   1. Asserts that two things, the analog *A* and the target *T*, are similar in some way,

   2. Takes a description of the analog *A*, and

   3. Extends that description to the target *T*.

The analogy: *A* and *T* are similar to each other in some relevant way.

Description of the analog: A has property p.

Description of the target: *T* also has property *p*.

Argument by Analogy

The strength of an argument by analogy depends crucially on the analogy. In particular, there are two things that make an argument by analogy stronger:

1. Many relevant similarities between the target and the analog, and

2. Few relevant dissimilarities between them.

Argument 4

Assess the following argument:

> Humans and robots both can move about, solve mathematical equations, and win chess games, and humans have intelligence. So robots have intelligence.

The same argument in its argumentative form:

1. **The analogy:** Humans and robots both can move about, solve mathematical equations, and win chess games.
2. **Description of the analog:** Humans have intelligence.

∴ **Description of the target:** Robots have intelligence.

Next Class…

We will do a workshop on informally assessing the soundness and cogency of arguments.