Logically Complete

Set of logical operators that can express all possible truth table values by combining into a Boolean expression

For example: {AND, NOT}

May not be the simplest equations, but still a useful property to know and understand.

Equivalenty, set of *gates* that can be used to build any circuit

Logically Complete

Why do we care?

This is a guarantee that, as long as we start out with some minimal set of gates, there is no (combinational) circuit that we won't be able to build

Logically Complete

- How do we know that {AND, OR, NOT} is logically complete?
  - We can express any truth table in SOP form!

Logically Complete

- What if we want to show another set is logically complete?
  - For example, given that {AND, OR, NOT} is logically complete, how can we show that {AND, NOT} is logically complete?

Logically Complete

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  - For example, given that {AND, OR, NOT} is logically complete, how can we show that {AND, NOT} is logically complete?

- Build an OR gate using only {AND, NOT}

Logically Complete

- In general, if set S is logically complete, we can show that set T is logically complete by using T to build every element of S.