My Reflection on week 2 Class on Discrete mathematics

Atomic and compound propositions

The main difference between compound propositions and atomic propositions are that, atomic propositions are fundamental statements that cannot be further broken down. Compound propositions are created by combining atomic propositions with logical operators. Simple assertions can be transformed into complicated one’s logical operators like ¬ (not), ∧ (and), and ∨ (or). We can articulate dependencies and linkages between several propositions thanks to this.

Another level of complexity is added with the introduction of conditionals, which are represented by -> (implies). Conditional statements convey logical inferences, whereby the conclusion (q) is implied by the premise (p).

The domains where these concepts are useful: mathematics, computer science, philosophy, artificial intelligence, Linguistics, Cognitive Science and many more.

Truth tables

The example that shows how to find a statement’s truth value is illustrative. A methodical approach is made decomposing a complex statement into atomic propositions and then stating it using propositional logic. To assist ground the concept in real-world circumferences, a specific example involving getting pizza, sauce or cheese, and pasta is used.

The process of creating truth tables is illustrated by an example employing the proposition p∧¬p. This example reinforces the understanding of how to methodically assess the truth values of compound propositions by providing a practical application of the principle covered.

A truth table offers a thorough summary of the truth values for every possible pairing of atomic propositions that make up a compound proposition. This approach is a potent tool for logical analysis because it guarantees a methodical investigation of every scenario.

It is used in mathematics and science that rely on Boolean logic.

Boolean algebra

The notion of logical equivalency is presented, emphasizing that two propositions are equivalent logically if their truth values are the same. Similar to how regular algebra has its own set of laws, this forms the foundation for a set of laws governing logical equivalency. Boolean algebra is performed using a set of laws that include identity laws, domination laws, idempotent laws, commutative laws, associative laws, distributive laws, De Morgan’s laws, negation laws, and absorption laws.

Emphasis is placed on the analogy between regular algebra and Boolean algebra, which facilitates the intuitive transition between the two. A set of guidelines known as the laws of logical equivalency can be methodically used to simplify and establish the equivalency of complex propositions.

It is mostly used in digital electronics and computer programming languages.

References

Atomic and compound propositions

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Truth tables

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Boolean algebra

1. Wikipedia contributors. (2023b, November 28). *Boolean algebra*. Wikipedia. <https://en.wikipedia.org/wiki/Boolean_algebra#:~:text=Boolean%20algebra%20has%20been%20fundamental,in%20set%20theory%20and%20statistics>.